EXAMINATION OF THE SPANISH TRANSLATION OF A DEVELOPMENTAL SCREENING INSTRUMENT

by

MARIA PILAR POMÉS

A DISSERTATION

Presented to the Department of Special Education and
Clinical Sciences
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

March 2012

DISSERTATION APPROVAL PAGE

Student: Maria Pilar Pomés

Title: Examination of the Spanish Translation of a Developmental Screening Instrument

This dissertation has been accepted and approved in partial fulfillment of the requirements for the Doctor of Philosophy degree in the Department of Special Education and Clinical Sciences by:

Jane Squires	Chairperson
Debra Eisert	Member
Paul Yovanoff	Member
Edward Olivos	Outside Member

and

Kimberly Andrews Epsy	Vice President for Research & Innovation/Dean of the Graduate School

Original approval signatures are on file with the University of Oregon Graduate School.

Degree awarded March 2012

DISSERTATION ABSTRACT

Maria Pilar Pomés

Doctor of Philosophy

Department of Special Education and Clinical Sciences

March 2012

Title: Examination of the Spanish Translation of a Developmental Screening Instrument

Immigrant populations are growing and permanently changing the demographic profile of the United States. Diverse cultural and linguistic backgrounds are manifested in the families in each community, imposing demands and challenges to agencies that provide services to them. A large population of immigrant families, especially first and second generations, experiences a process of acculturation while they are adapting to a new country. Recognizing this reality is crucial when culturally sensitive screening services are offered. Culturally sensitive assessments are not always available to families with young children, and psychometric properties of these instruments are not always thoughtfully studied. As a consequence, families might not receive reliable information about their children's skills. Psychometric examination of properties of screening tools is required to be responsive to the needs of diverse families. This study is aimed at examining the item equivalence of the Ages and Stages Questionnaires 3rd Edition (ASQ-3) for the 9, 18 and 30 month intervals and the cultural appropriateness, readability and utility of the Spanish ASQ-3 translation.

Quantitative and qualitative techniques were used to determine item characteristic invariance across the English and Spanish versions and cultural appropriateness. Findings show that most of the ASQ-3 items function invariantly across language versions, indicating that these items are productive for gathering information, present an adequate hierarchy difficulty for order of items, and are properly using the response categories included on the tool. In addition, most of the values and qualities selected by parents are congruent with the content of activities included on the ASQ-3 items. Parents identified questions as useful for helping them to think more about their children's development. Accessible and sensitive instruments may facilitate parent participation in assessment, increasing the number of children correctly identified as having developmental risk regardless of ethnicity or linguistic background. Implications for practice and research are discussed, supporting cross-cultural studies on parent-completed questionnaires as an effective strategy for conducting screening and monitoring of young children's development in a context of cultural and linguistic diversity.

CURRICULUM VITAE

NAME OF THE AUTHOR: Maria Pilar Pomés

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene
Universidad Católica del Maule, Talca-Chile
Pontificia Universidad Católica, Talca-Chile

DEGREES AWARDED:

Doctor of Philosophy, Special Education, 2012, University of Oregon
Master of Science, Education, 2005, Universidad Católica del Maule
Bachelor of Special Education, 1995, Pontificia Universidad Católica de Chile

AREAS OF SPECIAL INTEREST:

Early Intervention and Early Childhood Education
Learning Disabilities

PROFESSIONAL EXPERIENCE:

Assistant Professor, Universidad Católica del Maule, 1995 to present

Practicum and Student Teaching Coordinator and Supervisor, Universidad Católica del Maule, 1998 to 2007

Practicum and Student Teaching Supervisor, Early Intervention Program, University of Oregon, 2010 to 2011

GRANTS, AWARDS, AND HONORS:

Graduate Teaching Fellowship, Early Intervention Supervisor, University of Oregon, 2010-2011

Davis-Bricker Award for Student Research, College of Education, University of Oregon, 2011

Education Quality Improvement Scholarship, Chilean Ministry of Education and Universidad Católica del Maule, 2007

PUBLICATIONS:

Squires, J., Pribble, L., Chen, C-I., & Pomés, M. P. (in press). Early childhood education. In G. Miller & W. Reynolds (Eds.), *The handbook of psychology* (2nd ed.). Somerset, NJ: Wiley.

ACKNOWLEDGMENTS

I would like to express my sincere thanks to Professor Jane Squires for all her support and encouragement throughout my time in the Early Intervention (EI) program and during the dissertation process. Thanks also to my other dissertation committee members, Doctor Debra Eisert, Professor Paul Yovanoff, and Professor Edward Olivos, who respectively provided their expertise in the areas of child development, statistical analysis and bicultural parent involvement. I would also like to convey my appreciation for the help of Kimberly Murphy, Rob Hoselton, Liz Twombly, and Paul H. Brookes Publishing, who assisted me in the process of collecting and organizing the research data.

I especially want to thank the parents who completed questionnaires and participated in interviews. Their comments and feedback were essential to helping me identify ways to make the screening process more appropriate and productive for families. I also want to acknowledge Ching-I Chen, Young-Ah Park, Kathy Moxley, and Lois Pribble, my fellow doctoral students, who provided ideas, support, and encouragement through the entire dissertation process.

This research was supported by the Davis-Bricker Award for Student Research. This award allowed me to conduct my study and contribute to the analysis of screening tools in the context of cross-cultural research. For that I am thankful.

This dissertation is dedicated to Ramón, Joaquín, Pablo, and Francisco. This has been a family endeavor and I could not have completed my dissertation without your support. We have built this project together. Now it is time to start a new adventure!

TABLE OF CONTENTS

Chapter Page

Chapter Page

LIST OF FIGURES

Figure Page

LIST OF TABLES

Table Page

CHAPTER I

INTRODUCTION

Immigration has dramatically increased in the last two decades and is transforming the demographic landscape. The U.S. population increased about 9% between 2000 and 2009, rising from 281 million to 307 million. At the same time, the Latino population grew by 43%, four times more rapidly than the overall population, accounting for more than half of the additional 27.3 million people added to the U.S. population during this past decade (U.S. Census Bureau, 2011). Latinos account for almost one-sixth of the U.S. population and it is estimated they will represent three of every ten people in the U.S. by 2050 (Saenz, 2010).

The Latino population in the U.S is not a homogenous group; the largest groups of Latino populations include Mexican, Puerto Rican, Salvadoran, Cuban, Dominican, Guatemalan, Colombian, Honduran, Spaniard, and Ecuadorian, representing 94% of all Latino immigrants. Mexicans are the largest segment, accounting for about three-quarters of the 15.2 million increase in the Latino population from 2000 to 2010 (U.S. Census Bureau, 2010). The states with the most Latino immigrants are located in the south and southwest, with California and Texas having the largest concentrations (47%). Georgia, Nevada, and North Carolina have also emerged as primary destinations over the last two decades (Rumbaut & Komaie, 2010; Saenz, 2010).

Mexicans, Puerto Ricans, Dominicans, and Central Americans have the highest poverty rates in the U.S., whether they were born in the U.S or elsewhere. Almost 14% of Latino young adults are unemployed, 31% have no health insurance, and 23% are living in poverty (Saenz, 2010; U.S Census Bureau, 2009).Young children from immigrant

families are more likely to be exposed to risk factors, and the number of risk factors is closely related to child poverty. Nine percent of children with no risk factors are living in poverty; 48% of children with four risk factors are living in poverty. In the U.S, 18% of children in immigrant families have at least three risk factors, and 2% are experiencing four risk factors (Shields & Behrman, 2004).

The trend of demographic diversification among young children is following the same patterns as those for the adult population. Over the last two decades, the number of culturally and linguistically diverse children under five years of age has increased from 26% to 45% (U.S Census Bureau, 2005). Currently, one out of seven children in the U.S speaks a language other than English at home. These large differences make it difficult to bridge the academic achievement gap for many immigrant children, when disadvantages are present even before they begin kindergarten, and become more solid from the third through the eighth grades (Saracho & Spodek, 2010). In this context, schools need to offer young children opportunities that support their cultural practices, using their native language as a mediator to promote their development and learning.

The process of acculturation experienced by foreign families and their children is another challenge. Psychological and cultural adaptations for families sometimes generate stress and internal conflicts, especially for parents who raise their children in a new cultural environment (Birman, 2006). These challenges also might affect parental practices and the quality of parent-child interactions. Parental practices are closely associated with beliefs, attitudes, and knowledge that parents and caregivers express. At the same time, parenting styles impact children's growth and development (Bornstein & Cote, 2006). From an ecocultural perspective, development is influenced by the ways in

which a child participates in activities situated in his/her proximal environment, including practices that make up the daily routine in the family's life, and within the context of a broader social community (Worthman, 2010). Families experiencing the acculturation process need to be supported; raising children in a different cultural environment can be extremely challenging.

Children and their families exposed to risk conditions can benefit from individualized and high quality early intervention services. As an effective strategy to promote inclusive practices, early intervention provides intensive and adjusted services for diverse children at risk for developmental delays and disabilities. Thus, considering the current diversity of the U.S population, there is an imperative need for providing sensitive and responsive services for children from culturally and linguistically diverse backgrounds.

Early identification of children who might be experiencing developmental delays or disabilities is a primary goal for improving the quality of life for young children and their families. Timely and effective identification of children who may need individualized services is the first step in a complex system aimed at optimizing developmental outcomes (Squires, Twombly, Bricker, & Potter, 2009). Promoting children's development and positive family outcomes (Bagnato, 2007), in the context of their proximal experiences, routines and customs is of prime importance.

The need for accurate screening tools that respect family's culture and native language is evident. With an increasing number of immigrant young children residing in the U.S, valid and reliable tests that can be used with diverse children are needed. Several challenges are present. Programs rarely have qualified bilingual personnel to assess

children in their native language. In addition, there is a lack of financial resources to support development of culturally appropriate assessments, lack of articulated program guidelines about how to assess young children whose language is other than English, lack of community awareness about the importance of cultural and linguistic appropriateness when serving young children and their families, and lack of professional development opportunities (National Association for the Education of Young Children [NAEYC], 2005).

The Ages and Stages Questionnaires, Third Edition (ASQ-3) (Squires & Bricker, 2009), is a cost-effective parent-completed screening tool widely used in the U.S and other countries. The ASQ has been translated into several languages (e.g., Spanish, French, Danish, Chinese, Norwegian and Turkish) and the number of international studies of its psychometric properties with diverse cultural environments is increasing. Although a large population of Latino infants and toddlers across the U.S are being screened using the Spanish translation of the ASQ, only preliminary psychometric studies have been conducted. Preliminary field testing with Spanish-speaking families in a variety of settings in the U.S has been completed, but specific cutoff points have not been empirically tested. More evidence is needed on the psychometric properties of the ASQ Spanish translation for identifying Latino young children who are at risk for developmental delays.

When translating, the presence of possible bias needs to be examined; it may exist when the content of a test is inappropriate for a subpopulation of children. Avoiding bias when using a translated version of an instrument is essential for promoting test equity and fairness (Snow & Van Hemel, 2008). Items on the Spanish translation of the ASQ-3 need

to be examined to provide evidence of their accuracy in discriminating children who are typically developing from those who are following unexpected developmental trajectories.

Preliminary studies conducting differential item functioning (DIF) analyses on the second edition of the ASQ indicated most of the items on the English and Spanish translation functioned in a similar way. Additional studies need to be conducted on the ASQ-3 to examine how items function comparing these two test versions. More statistical evidence needs to be provided to show that the ASQ-3 as a culturally sensitive and valid screening tool that maximizes the accurate identification of Latino infants and toddler at risk for developmental delays and disabilities. Evidence of its utility for the Latino population also needs to be investigated.

The purpose of this study is to examine the equivalence and cultural appropriateness of the Spanish translation of the Ages and Stages Questionnaires 3rd Edition (ASQ-3) (Squires & Bricker, 2009) for the 9, 18 and 30 month intervals. The study will analyze the function of items in both the English and Spanish translations and how parents evaluate cultural appropriateness and utility of the Spanish version. Based on the results, this investigation will examine how language translation impacts parents/caregivers responses to the ASQ-3 items.

CHAPTER II

REVIEW OF LITERATURE

The Necessity of Timely Identification and Early Intervention

Early intervention enhances the opportunities for optimal development for infants, toddlers, and preschoolers with disabilities (Ramey & Ramey, 2004). Interventions that provide individualized, adjusted, and systematically planned services are able to expand children's growth and to offer meaningful support to families. The first years of life should be rich with experiences for the expansion of developmental opportunities for all children, especially for those living in adverse environments. Early education and care programs can provide children with an enriched environment with enhanced experiences to support the expression of their potential, and to prevent negative outcomes such as school failure, grade retention, and the need for special education (e.g., Ramey & Ramey, 2004; Heo, Squires, & Yovanoff, 2008; Guralnik, 2011). Several factors can impact a child's trajectory, including the presence of biological and environmental risk factors.

Theoretical models of human development have explained how environmental and biological factors may affect our knowledge and understanding of children's developmental and learning processes. Human development is often configured and modeled as the interaction of biological and socio-cultural factors (Richter & Janson, 2007). Specifically, children's development is influenced by the relationship between the positive effects of protective factors and the barriers imposed by risk factors. All of these elements interact within different contexts, such as the individual, family, community, socioeconomic and cultural environments (Shonkoff, 2010; Sameroff, 2010). The continuous interaction of biological and socio-cultural factors and their impact on

development have been explained by different developmental theories that highlight the impact of child–adult interactions and the importance of healthy and nurturing relationships across the developmental process. The transactional model, formulated by Sameroff and Chandler (1975), and later redefined in the context of early childhood intervention (Shonkoff, 2010), is the foundation of a family-centered early intervention approach.

The transactional approach focuses on interactions between biological and environmental variables and how this relationship clearly impacts the child's developmental repertoire. Early experiences with enriched environmental conditions have the power to mold and strengthen the brain connections that have been provided by the genetic structures of the organism (Shonkoff, 2009). In this respect, the transactional model explains an individual's developmental outcomes as a result of the series of interactions between the individual and his or her context (Sameroff & Mackenzie, 2003). It is established that interactions between psychological and biological factors and different environmental conditions can build and reinforce the way in which individuals grow and behave (Campbell, Shaw, & Gilliom, 2000). These developmental principles are part of the core foundation of early childhood education and support the premise that young children whose learning and development are being affected by organic or environmental conditions can benefit from timely and systematic interventions.

Benefits and the effectiveness of early intervention have been well documented in the last two decades (e.g., Barnett & Belfield, 2006; Bruder, 2010; Downs & Strand, 2006; Guralnick, 1998; Guralnick, 2008; Magnuson, Ruhm, & Waldfogel, 2007; Ramey & Ramey, 1998; Ramey & Ramey, 2004; Shonkoff , 2010; United Nations Educational,

Scientific and Cultural Organization [UNESCO], 2007). The effectiveness of established early care services for young children has become a critical issue, considering the potential impacts of these interventions on child behaviors. Cognitive skills, socioemotional abilities, language development, school readiness, and numeracy are the principal domains targeted by early childhood education. In this respect, there is consistent evidence that early intervention services, especially for children at risk, improve cognitive skills, school achievement, and emotional development as well as long term outcomes such as employment and social behavior (Burger, 2010; Reynolds &Temple, 2008). Thus, high quality services provided in a timely manner enhance intellectual and social competencies, which are the basis for subsequent development.

Not only in the U.S, but also internationally, demonstrating the effectiveness of early intervention programs is a priority. A recent literature review describes evidence supporting the benefits of early childhood interventions in 38 countries. Researchers found that children from differing contexts and countries receive substantial cognitive, behavioral, health and academic gains from early childhood interventions (Nores, & Barnett, 2009). The authors also reported that benefits are maintained over time. An important finding of this study suggested that interventions that have an educational or stimulation component demonstrated the greatest cognitive effects.

In addition to the short and long term effects that early intervention services have demonstrated, opportune service provision can minimize the need for further special education for children who are at risk for developmental delays. Educational costs can also be reduced. In 2008 – 2009, expenditures for public and private education, from prekindergarten through graduate school, were estimated at $1.1 trillion (Snyder &

Dillow, 2010). Annually, for programs that serve children from birth to 5 years of age, total government spending exceeded $22 billion. In 2009 in the U.S, $439 million was spent for children birth to 3 years of age with disabilities or at risk for disabilities who were served through the Individuals with Disabilities Education Improvement Act of 2004 (IDEA, 2004), Part C (U.S. Department of Education, 2009).

In terms of economic benefits, interventions that begin early are cost-effective. Economic returns range from $4 to over $10 per dollar invested when children at risk are able to receive high-quality intervention programs (Heckman, Grunewald & Reynolds, 2006; Reynolds & Temple, 2008), which indicates that providing high quality education during the preschool years is a cost effective investment. In a recent review of studies focused on the effectiveness of early intervention services, Reynolds and Temple (2008) summarized in statistical terms the gains obtained from high quality and systematic early instruction. The results indicated that programs using high quality interventions are the most cost-effective. According to the authors, the magnitude of effect sizes in these programs reaffirms positive economic returns. The average effect size on cognitive skills at school entry was 0.42 standard deviations, which is associated with preschool participation for more than one year. Average effects were also statistically significant for social and emotional development, school achievement, and special education. Therefore, early intervention programs may maximize developmental achievements, promoting lifelong positive outcomes and economic returns (Rydz et al, 2006).

Among the factors that support a positive impact on child development through the provision of early intervention services, appropriate length and comprehensiveness of programs and their intensity are important elements to consider. Interventions that

provide intensive, systematic and adjusted instruction, integrating diverse dimensions of child's development, may promote children's learning. High quality professional instruction as well as low teacher-child ratios have demonstrated their effectiveness by facilitating positive children's development outcomes. Another crucial factor that supports early intervention effectiveness is parent involvement and family participation into the decision making process (Reynolds, Magnuson, & Ou, 2010). Greater parent participation in early education and greater support for parents may optimize children's opportunities for growth and development. Additionally, promotion of parent involvement in the intervention process enhances parental ability to make educational decisions for their child and empowers families to meet their children's goals (Soodak & Erwin, 1995; Bruckman & Blanton, 2003).

High quality early intervention is characterized by the use of reliable and relevant data that guides the decision making process, offering the possibility to adjust the level of supports provided to children. Systems such as monitoring and accountability provide a meaningful way to evaluate program effectiveness, to sustain its positive impact, and to introduce modifications and improvements when they are needed. These elements need to be complemented by capable leadership efforts, and consistent administrative support that encourage permanent professional development and strategic alliances between state and local agencies (Lucas, Hurth, & Kasprzak, 2010).

Although early intervention programs have been shown to be effective and provide significant opportunities for improving children's developmental outcomes and family support, participation rates decrease for children whose families experience economic vulnerability and have a low level of parental educational attainment, as well as

for minority groups such as Latino families (Barnett & Belfield, 2006). Approximately, 47% of children receiving early intervention are more likely to be part of a minority group, compared to 39% for the general population. In addition, 43% of children who participate in early care services are more likely to be part of a low income family (Wagner & Hebbeler, 2010). It is important to mention that children from socioeconomically disadvantaged families made as much or even more progress in early childhood programs compared to their peers from advantaged contexts (Burger, 2010). This finding suggests the importance of early and high quality intervention services, especially for children who are at risk for disabilities or developmental delays, when these are triggered and exacerbated due to socioeconomic factors.

Early Identification and Access to Early Intervention Services

According to Part C of the IDEA (2004), three categories of children are eligible for federally supported services: children who manifest developmental delays; children with diagnosed conditions with a high probability of resulting in developmental delay; and finally, children who present risk conditions (Shackelford, 2006; Hebbeler et al. 2007). In this scenario, early intervention programs are serving a wide variety of children, making the organization and implementation of services a difficult endeavor. Approximately 41% of children who are receiving services from early intervention programs present speech or communication delays; 18% of children have been diagnosed with motor delays; global developmental delays are present in 12% of the children; and 9% have congenital disorders such as cleft lip and palate, muscular dystrophy, metabolic disorders, and hemoglobin disorders (Wagner & Hebbeler, 2010).

Children and families who are receiving early intervention have obtained access to services from different entry gates. For some families, the first contact with early intervention services comes before the birth of a child who has been diagnosed with special needs. For other families, the entry to specialized services occurs as developmental delays become apparent in the child. In addition, there are several ways to recognize when special services are needed. Concerns about a child's development may be initially proposed by family members or significant caregivers, professionals from a childcare center, or a pediatrician. According to the National Early Intervention Longitudinal Study (NEILS), the average age at which parents/caregivers raise concerns about their child's development is 7.4 months for children who start receiving services before 31 months of age. The authors also found that only16% of the children left early intervention programs before they turned 36 months of age. A large population of children who enter early intervention programs before they turn 1 year old continue needing specialized services until they transition to kindergarten. Ensuring that families with children with disabilities can obtain services that respond effectively to their concerns early is an essential aspect to be considered to promote high quality early intervention programs (Hebbeler et al., 2007).

Children who enter early intervention have received different types of assessments to determine their eligibility for services. The first step within a comprehensive determination process usually is accomplished through developmental screening. The screening process is an effective way to discriminate between children who might need further evaluation for specialized services, and children who might not. From a preventative perspective, screening of children with special needs is a crucial

aspect of a comprehensive system of service delivery, ensuring appropriate and early identification for children who are following an unexpected developmental trajectory (Brothers, Glascoe, Robertshaw, 2008; Dionne, Squires, Leclerc, Peloquin, & McKinnon, 2006; Heo, Squires, & Yovanoff, 2008; Kapci, Kucuker, & Uslu, 2010). Thus, an effective screening process that enables families to understand their children's developmental status and make careful and appropriate decisions is the first step to optimizing outcomes for families with young children with potential delays.

Early Identification: The Legal Framework and Assessment Practices

Use of comprehensive and accurate developmental screening is the first step to facilitate the early identification of children with potential delays, especially for those who come from diverse cultural and linguistic backgrounds. The diversity that characterizes the current U.S population imposes additional requirements for assessment procedures, including screening tools that need to be culturally and linguistically sensitive. An increasing number of children in the U.S. come from families where English is not the primary language, with a large population of Latino children under the age of five (Buysse, Castro, & Peisner-Feinberg, 2010). An effective and culturally appropriate early identification system therefore needs to respond to diverse language and cultural variables in families (Pizur-Barnekow et al., 2010).

The assessment process, including screening, is an essential component of an early intervention system. Recommendations by early childhood professional organizations for developmentally appropriate practices focus on four major topics related to assessment: (a) use of culturally and linguistically responsive assessment procedures, (b) high level of family involvement and participation into the assessment

and decision making processes, (c) consideration of the child's natural and daily routines as a context for developing the assessment, and (d) evidence-based and developmentally appropriate practices that link assessment results with planning instruction and subsequent program evaluation.

IDEA (2004), Part C requires states to develop a timely, comprehensive, and collaborative evaluation process. Evaluation and assessment have different purposes under Part C. Evaluation is defined as the procedures utilized to determine a child's eligibility status conducted by qualified professionals, establishing the developmental level of a child in different developmental domains (e.g., physical, cognitive, communication, social-emotional and adaptive). Assessment is defined as a continuous process applied throughout the period of a child's eligibility conducted to identify children's needs and strengths and to determine families' concerns and desired outcomes. This process takes place in order to enhance the resources that families have to support the development and growth of their infant or toddler with a disability. From the assessment process, a continuum of services that meet the child's needs and family goals is also identified (Shackelford, 2006).

In 2005, 293,816 children less than 3 years of age, and their families received services through the IDEA, Part C (Danaher, Goode, & Lazara, 2010). In 2008, this number grew to 342,544 (U.S. Department of Education, 2009). At least 5% to 8% of children under the age of 5 years are estimated to have a disability (Pinto-Martin, Dunkle, Earls, Fiedner, & Landes, 2005); therefore, systems need to be well prepared to receive and serve this young diverse population. Ineffective or late identification of infants and young children with special needs obligates states and agencies to invest larger amounts

of money for interventions that could have been provided at an earlier time with less cost (Pinto-Martin et al., 2005).

A joint position statement of the National Association for the Education of Young Children (NAEYC) and the National Association of Early Childhood Specialists in State Departments of Education (NAECS/SDE) affirms that assessment needs to be a developmentally appropriate, culturally and linguistically responsive process that is contextualized in children's natural routines and environment. Additionally, the family is seen as a member of the community and an active participant into the assessment process, maintaining constant communication with other members of the professional team. Evidence gathered needs to come from real circumstances and family contexts that are part of the children's culture, language, and daily experiences. Valid and reliable assessment instruments should be used in combination with professional judgment and recommended standards for selecting and using appropriate tools. Assessment instruments should be used in a consistent manner according to the purposes for which they were designed. In addition to screening, criterion- based assessment can be used, allowing connections between results and instructional goals and promoting accommodations for children with disabilities from diverse cultural backgrounds (NAEYC & National Association of Early Childhood Specialists in State Departments of Education [NAECS/SDE], 2003).

The Division of Early Childhood (DEC) of the Council for Exceptional Children also recognizes that assessment for young children is a family-based procedure that should take place in a natural setting with family members who are active participants. Families as partners provide relevant and unique information about their children,

informing how daily circumstances are impacting the children's development and learning. DEC recommendations also include that assessment results should be used to plan intervention services, connecting results with instructional content and developmental goals; as a guide for monitoring progress; and for evaluating quality programs. Professionals must share information in a respectful manner to help families to make better decisions. Additionally, assessment methods, content, styles, and materials must be adjusted to respond to young children's behavior and interests (Sandall, Hammeter, Smith, & McLean, 2006).

NAEYC, in the context of developmentally appropriate practices, recommends that the assessment of young children's development and progress is a continuous and well planned process, with results used to guide the design and implementation of meaningful and developmentally appropriate intervention practices. A constant exchange of relevant information should flow between family members and professionals who are involved in the assessment process. Assessing young children is a complex task that needs to take into consideration the uniqueness of the child and the developmental trajectory that a child might experience; all of this embedded into a particular cultural and linguistic circumstance that is affecting the child's growth and development. The use of screening tools to identify children who may have special needs should be complemented with additional assessments, and if needed, referrals suggested. Diagnosis is not the result of an isolated screening test. In the same way, NAEYC also recommends that placement decisions should never be made based on one screening or assessment tool (Copple & Bredekamp, 2009).

In 2010, DEC updated a series of recommendations with the purpose of addressing the needs of children and their families who come from diverse cultural and linguistic backgrounds as a way to guide the development and improvement of policy and practices. With these recommendations, DEC strongly suggested that practitioners who work with families from culturally and linguistically diverse backgrounds should utilize evidence-based practices that validate, respect and respond to families' needs and expectations. There is a need of supporting families' values, beliefs and their language, and encouraging active family involvement and participation. DEC suggests that the provision of services should be responsive to differences in ethnicity, culture, language, religion, education level, income, family configuration, and geographic location among others, giving all families equal opportunities for accessing services and enriched learning environments. In the area of assessment of children from minority group, DEC recommends paying close attention to assessment and the selection of tools. Assessment instruments should be reliable and valid for a specific population, appropriate and responsive to the characteristics of that sample. It is essential to consider that when instruments are translated into the family's language, professionals should be aware of possible misinterpretation of the test items. Complementary information should be gathered in order to obtain a more complete knowledge of children's level of development and their families' needs. Observations across the family's natural context during daily routines in addition to interviews with family members are an effective strategy to complement standardized assessment results of children from diverse cultural backgrounds (DEC, 2010).

IDEA guidelines (2004) and recommendations by professional organizations have underscored the importance of assessment practices that empower families, and facilitate their involvement and participation in the decision making process. Responsive and sensitive assessment practices are essential for accurate measuring of skills, especially for culturally and linguistically diverse children. A naturalistic approach that uses child's daily routines and familiar circumstances as a context for assessment strategies is highly recommended to gather comprehensive information about a child's needs and strengths. Developmentally appropriate assessment practices will allow professionals and families to offer children rich and meaningful experiences, with assessments responsive to families' values, beliefs, and priorities.

Assessment and the Linked System in Early Intervention

Timely identification of children who may be experiencing developmental delays is essential for successful early intervention. Discriminating between typically developing children and children who may need specialized services must be as accurate as possible, and also must be feasible in terms of cost, including the amount of professional resources needed. Use of screening tools is the first step in a process to find children who might require early intervention (Meisels, Atkins-Burnett, 2005), and information from screening should also assist with assessment procedures.

Fragmented intervention practices where practitioners perform different actions without any coordination among providers is a common occurrence. As a consequence, some services to young children and families are not optimally effective. Overlap of assessments and evaluation procedures performed by different agencies and service providers puts additional demands on professionals and family members participating in

the provision of services (Bruder, 2010). A comprehensive intervention approach that effectively assesses and supports children with disabilities requires connecting or linking its components in a cyclical relationship (Pretti-Frontczak & Bricker, 2004), avoiding overlap of tasks, personnel and other program costs.

Critical components of an effective linked system include: assessment, goal identification, learning process, and ongoing evaluation (Bagnato, Neisworth, & Munson, 1998; Pretti-Frontczak & Bricker, 2004). All of these components or phases play an essential role in the design, delivery and sustenance of early intervention services for children with special needs and their families. As shown in Figure 1, screening procedures are an entry gate to the provision of early intervention services, identifying children who might need additional in depth assessment to determine their eligibility for specialized services.

Assessment procedures, especially those whose contents link to learning and developmental goals are the foundation of a linked system (Bagnato, Neisworth, & Pretti-Frontczak, 2010). Evaluation of intervention efforts provides continuous feedback for the entire system on its effectiveness. Evaluation data assist in monitoring a child's progress, facilitating the adjustment of the intervention as needed, assuring a positive impact.

According to Pretti-Frontczak and Bricker (2004), the linked system promotes three important goals: (a) efficient use of professionals and other resources, (b) the accountability process, and (c) individualized intervention, responsive to children's needs and family priorities. In this context, the purpose of assessment is to gather information to identify children's interest, their needs and emerging skills, providing information to guide the formulation of goals and orienting the learning process. The purpose of

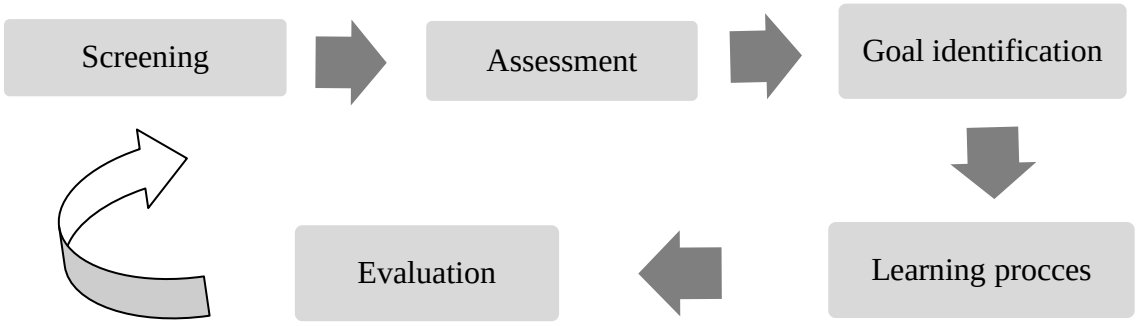

Figure 1. Components of the linked system. Adapted from "An Activity-Based Approach to Early Intervention" by K. Pretti-Frontczak & D. Bricker, 2004. p. 45.

goal identification is to prioritize developmentally appropriate short and long term objectives. Based on the assessment results, functional and significant goals will be formulated to promote children's growth and development.

The learning process is the next element in the linked system, and its purpose is to help children to move from one stage of development to another more advanced stage, integrating family members and promoting the use of daily routines as strategies to embed child goals. Evaluation, the last component of this system, allows practitioners and caregivers collect data and observe developmental progress across intervention settings. In this way, based on evidence, progress monitoring and program improvements will be possible. Continuous evaluation will guide the decision making process and sustain the integrity of the linked system.

Assessment in the Context of Early Intervention

Assessment is a critical component of the linked system and has the potential of mobilizing and activating each element within the early intervention process. Assessment

processes allow professionals and families to better understand the trajectory of a child's development and to modify the scope of intervention practices. In early intervention, assessment ideally is a collaborative process that integrates different professionals' view and family's opinions. Assessment should be considered as a reciprocal procedure to guide the decision making process and to evaluate the effectiveness of instructional strategies (Brassard & Bohem, 2007). Furthermore, it is possible to describe assessment as a flexible process of gathering and summarizing information about child's development and his/her sociocultural context with the purpose of planning individualized intervention and promoting progress within child's daily environments (Bagnato, Neisworth, & Pretti-Frontczak, 2010; Brassard & Bohem, 2007). This ecocultural perspective of assessment also highlights its dynamic and complex nature that enhances the decision making process in the context of early intervention practices.

The consideration of a young child in relationship to his/her environment is a vital principle. Among professionals, there is an increasing recognition of the benefits of using a naturalistic approach to assess children's developmental status in the context of their familiar experiences. This model is known as authentic assessment, and is a developmentally appropriate alternative to conventional ways of testing (Bagnato et al., 2010).

A definition of authentic assessment was presented by Bagnato and Yeh Ho (2006). "Authentic assessment refers to the systematic recording of developmental observations over time about the naturally occurring behaviors and functional competencies of young children in daily routines by familiar and knowledgeable caregivers in the child's life" (p. 16). This definition stresses the importance of capturing

the natural behaviors of young children in the context of their typical settings. Another fundamental element considered in the conceptualization of authentic assessment is the importance of family participation. Observations rely on parents and caregivers who are part of the children's daily life.

The conventional testing model is not recommended as a best practice in early intervention. Conventional testing is characterized as a highly structured collection of specific questions and activities conducted by an examiner in an unnatural circumstance where a child is expected to perform predetermined behaviors in order to determine a score as compared to a normative sample (Bagnato et al., 2010). Unfamiliar professionals are responsible for eliciting specific answers in a context that does not belong to the child's daily routines and natural environment. Materials used in conventional testing are also unfamiliar and usually not functional. The role of the family is passive; they are expected to follow the professional's directions and after the assessment process is finished, they receive the results and conclusions of the testing procedure (Grisham-Brown, Pretti-Frontczak, & Hubbell, 2011).

Information gathered through authentic assessment is an effective strategy to identify and describe what a particular child can do and what emerging skills are being developed in a context of familiar circumstances for that child. Authentic assessment focuses on documenting a child's learning processes rather than determining correct and incorrect responses to specific questions and artificial activities. The applicability of authentic assessment is also evident for practitioners; they are able to recognize the child's developmental level and to make the appropriate learning arrangements to meet the developmental goals for the child. Thus, the naturalistic approach emphasizes that the

content of what is being assessed needs to be the same as the content of what is taught (Bagnato et al., 2010; Grisham-Brown et al., 2011). This link between the information gathered through the assessment process and the teaching content provides children with significant and coherent opportunities for learning and development.

Family members and caregivers are active participants of the authentic assessment approach. Teachers, families, and other professionals work together to gather information about the child, promoting collaboration among team members and, especially, empowering families. With family participation, daily routines and real circumstances become the setting of the assessment; in this way, it is possible to collect information that would not be available using a conventional testing approach (Bagnato, 2007). Information provided by parents complements professional data gathering, enriching results from the assessment, and contributing to the entire cycle of the linked system. Solid partnerships between early intervention practitioners and families are promoted during the naturalistic data gathering process, and channels of communication are expedited, regardless of family's ethnicity or linguistic background (Grisham-Brown et al., 2011). When families are integrated into the assessment process, accurate and relevant information of the child's skills will more often be obtained, and the determination of developmental goals will respond better to real child's needs and family priorities.

Purposes of Assessment

The specific objective of a particular assessment activity will determine the type of assessment that is used. Assessment may be used to determine children's developmental or functional level; to orient their learning process, identifying appropriate

goals; to monitor their progress; and to evaluate the integrity and results of the intervention program. Thus, the purpose of assessment activities and its results will guide the oncoming decisions that support the child's development and growth (Snow & Van Hemel, 2008). There are essentially four purposes for assessment: (a) screening, (b) eligibility and individualized program planning (c) child progress monitoring, and (d) program evaluation (Bagnato, 2007; Bagnato et al., 2010; Grisham-Brown et al., 2011). Each of these is briefly summarized.

As defined earlier, screening is a brief and general method for selecting those children who might need a more extensive assessment. The result of a screening test usually indicates whether a child's developmental characteristics meet the criterion level, or falls above or below criteria separating typical developing children from those who may need further assessment. Screening focuses on a general array of developmental domains such as communication, gross and fine motor, cognition, perception, and socioemotional areas (Meisels & Atkins-Burnett, 2005) and indicates if there are any suspected delays. The group of children identified as having probable delays is usually referred for a diagnostic or eligibility assessment. Due to its general nature, screening decisions are likely to include errors (Glascoe, 2005). Regardless of its brevity, screening accuracy is intended to be maximized and error diminished in order to correctly identify children for further assessment and for receiving specialized early intervention services.

Once a need for additional assessment is identified, a diagnostic assessment is given to the child. Eligibility can be defined as a comprehensive and interdisciplinary process to gather information about developmental and functional abilities from which scores will be obtained and comparisons made to eligibility criteria (Bagnato et al.,

2010). While the eligibility criteria for infants and toddlers are defined by each state, assessments need to provide psychometric evidence, including their appropriateness for different ethnic, language, and age group populations (Snow & Van Hemel, 2008).

In the context of authentic assessment, curriculum-based assessment can be used in some states for eligibility purposes. This type of comprehensive assessment links the determination of the child's developmental status and identification of goals with programming and intervention guidelines. Curriculum-based assessment can be scored using Item Response Theory (IRT) derived cutoff scores and traditional standards scores and be used for eligibility purposes in many states (Bagnato, Neisworth, & Munson, 1998; Bagnato et al., 2010).

Individualized program planning is facilitated through the use of curriculum-based assessment (CBA). Using CBA, determining the child's developmental level, emerging skills and needs at the same time as determining if he/she qualifies for services allows professionals to identify goals and strategies to be included into the intervention process. Connections between the results of the assessment process and instructional content are crucial to promote children's development and positive family outcomes (Bagnato, 2007). Assessment for program planning can be described as a process of determining a comprehensive curriculum framework, including a sequence of developmentally appropriate activities, instructional suggestions and monitoring options. Items must reflect the content that professionals and families want their children to learn. It is recommended that team members and families complete the process by summarizing assessment information, analyzing patterns, interpreting results and making decisions on

frequency and intensity of instructional practices (Hawkins, Pretty-Frontczak, Grisham-Brown, Brown, & Moore, 2011).

Progress monitoring includes the continuous data collection process associated with adjusting decisions to estimate whether the intervention is effective in promoting child's development and family goals. Acquisition of new skills, the strengthening of emerging skills and generalization to unique contexts are among the variables for data collection, to contrast with child's initial developmental level across different domains (Pfeiffer-Fiala, Pretti-Frontczak, Moore, & Lyons, 2011). Information that is collected for this purpose has the potential of improving the quality of intervention. Data can be used at the individual level or combined across children at the classroom level to assess the appropriateness and effectiveness of the intervention program. Also, data can be used at a center or school to identify strengths and weaknesses at a program level (Snow & Van Hemel, 2008).

The last purpose of assessment is program evaluation. Programs are required to provide information on their quality and effectiveness serving children and their families. The ongoing information collected must reflect the principles and mission that guide the program, and also provide information about the relationships among the program, child, and family (Bagnato et al., 2010). Program evaluation is commonly associated with the concept of accountability, especially since the enactment of the No Child Left Behind Act in 2001.

The assessment required by state and federal governments is intended to evaluate program improvements and effectiveness. Evaluation data are used to make decisions about funding, extending, or terminating programs. For this reason, interpreting data for

accountability is a complex and challenging task. The consequence of low or insufficient children performance can imply the termination of a program; however, decisions made about program's continuity should consider additional and reliable data in order to understand the interaction among different variables affecting the program quality (Snow & Van Hemel, 2008).

Assessment serves a multipurpose use in the early childhood field, especially from a naturalistic perspective in which a child's development needs to be examined within his/her particular sociocultural context. Assessment functions as a nexus among different aspects of the intervention process, providing information about each component of the linked system. Information gathered at each level of the system facilitates the decision making process and provides the opportunity to modify, adjust and to enhance intervention efforts, and finally to improve the quality of the entire system (Pretti-Frontczak & Bricker, 2004). Even though each element has significant importance within the linked system, early identification of developmental delays and disabilities is a core step for the success of early intervention programs.

From a proactive perspective, screening constitutes the initial step of assessment and provides an effective alternative for preventing disabilities and altering a delayed developmental trajectory. Thus, the benefits of effective screening and the dynamic nature of the linked system will allow professionals and families to work collaboratively in reaching children's goals and achieving positive outcomes.

Developmental Screening

Early identification of children who might be experiencing developmental delays or disabilities is a primary goal for improving the quality of life of children and their

families. Identification of children with special needs is believed to be possible based on the assumption that it is feasible to distinguish between children who have significant developmental problems, from those whose development is following an unexpected trajectory, or whose problems are temporary (Squires et al., 2009). As described before, timely and effective identification of children who may need individualized services is the first step in a complex system aimed at optimizing developmental outcomes.

Important legislative efforts at the federal and state level have promoted early identification of children with special needs. One clear initiative is the child find program, a component of IDEA that requires states to identify, assess, and refer all children, ages birth to 21years, who need early intervention or special education services. Each state is responsible for planning and implementing a comprehensive child find system (Pizur-Barnekow et al., 2010). Children must meet eligibility criteria to receive specialized services, according to the guidelines established by each state. It is required that each responsible agency distributes information about available services within the community and ways to access those services, including procedures for screening of health and development. The use of standardized, validated, and accurate measures is recommended rather than use of informal procedures. In addition, screening is mandated under the Early Periodic Screening, Diagnosis and Treatment (EPSDT) Act and is required of pediatric healthcare providers who provide health supervision services. States also need to provide follow-up services once children are referred for early intervention programs (U.S Office of Special Education Programs, 2011). Coordination between agencies and programs is essential to guarantee timely and effective delivery of services for children with special needs and their families.

Accurate screening tools with evidence of their psychometric properties are a recommended alternative to identify children who might require specialized intervention. Easy to administer and low cost instruments are also required in order to screen a large number of children and increase access to services. Frequency of screening is another aspect to be considered for improving the effectiveness of identification of children with developmental delays or disabilities. Effective screening programs usually monitor children at frequent intervals to observe developmental trajectories, assuming a dynamic nature of development and variability among individual children (Squires et al., 2009). Knowledge of developmental milestones and the general principles that guide early development are essential to recognize and evaluate the potential utility and effectiveness of screening instruments. Different approaches, types, and formats of screening tools are also important aspects to consider when selecting the appropriate screening instruments to be used. Finally, psychometric properties should be taken into account when constructing, designing, and evaluating screening instruments for diverse population. These topics are addressed below.

Child's Development

Screening tools need to be constructed considering children's developmental principles in order to be responsive to expected child behaviors. Knowledge of typical and atypical developmental trajectories is essential for responsive screening tools, especially for diverse populations (Copple & Bredekamp, 2009). Thus, practitioners who use instruments that have been constructed around developmental patterns are able to make general predictions about what children at particular ages are capable of doing, and they can identify children who are following different developmental patterns.

Skills in developmental domains such as physical, cognitive, and socio-emotional are combined in an integrated and comprehensive manner in a developing child. Each area or domain is influenced by, and in turn influences other domains, impacting the general course of development (Berk, 2008). Children experiencing enriched learning environments are all positively supported and stimulated to master emerging skills and to acquire new abilities, promoting all aspects of development. Children's developmental skills such as expressive and receptive language and social emotional abilities are positively mediated by healthy environmental experiences (Glascoe, 2005). For this reason, development and learning are most likely to occur and to be expanded when new experiences are built on what is familiar and known by a child, and when he/she has the opportunity to extend or build on abilities to acquire new skills and knowledge.

Screening of infants and young children focuses primarily on two main periods. Infancy and toddlerhood is the first period, and includes the development of children from birth to 2 years. This period is characterized by changes in the body and brain that support the emergence of motor, perceptual, and intellectual skills. In addition, language and social relationships begin to be part of the child's repertory of communication skills. Early childhood is the next period, from 2 to 6 years. During this time span children learn how to be more self-controlled and independent. Play activities such as pretense play support complement aspects of psychological development. Cognitive and language skills expand at a rapid pace; children can manifest a sense of morality and establish close relationships with peers during this time (Berk, 2008).

Developmental principles. Following the principles summarized by Copple and Bredekamp (2009), children's learning and developmental processes share common patterns that can be distinguished through different circumstances and context. The recognition of these patterns allows professionals to appraise children's level of development and make decisions to effectively support them. These principles will be briefly described in order to better understand the meaning of the elements and behaviors measured by developmental screening tools. Three groups of principles will be described.

The first group of principles refers to the basic features of human development and how it is constructed. As stated early, a basic principle is to understand development and learning processes as a result of a dynamic and continuous interaction of biological, maturational, physical, and social experiences. Family, proximal educational experiences, and community networks constitute different levels of the social system that impact children's development. As a consequence of cultural influences and early social relationships, children develop specific learning styles and motivations for acquiring new skills and knowledge. Children differ in their ways to approach new experiences and learn from them; for instance, initiative, patience, attention span, and flexibility are basic learning functions that vary from child to child, and without doubt, affect development and growth. Nurturing, stable, and secure relationships with significant adults are also necessary to support healthy development.

The second group of principles highlights the interconnections among developmental domains and contextual circumstances. Developmental areas are interrelated, which means that modifications in one domain impact other areas, and changes in one domain can facilitate or become a barrier for development in other

domains. In addition, it is important to consider that development follows relatively stable and predictable sequences, where new abilities and knowledge are built on previous and more elementary acquired skills. Yet, the ways that those changes are expressed and interpreted in different environments and cultures may vary. For cultural differences associated with learning and development, it is necessary to consider the individual differences that affect the trajectory of maturation. Individual differences include expected variations of the typical course of development, and also variations that respond to the distinctive characteristics of each child, such as specific aptitudes, temperament, and personality.

The final group of developmental principles is related to the ways in which children access new and advanced competencies. Children acquire knowledge and new skills in a variety of ways, moving from simple to complex cognitive and physical constructions. During the early years of life, children learn through sensory experiences and behavioral responses, and advance to symbolic or representational ways of knowledge. Children's functioning will progress when children are supported to reach the next level in their current developmental stage, moving from what is already known to something that can be learned with help (Garhart, 2000). Being aware of child's developmental characteristics implies the need for using screening instruments that consider those basic developmental principles. Further, all of these guidelines will be a helpful in understanding and evaluating the quality and appropriateness of screening instruments.

The Screening Process

Demographic changes in the U.S population, including greater economic and racial/ethnic diversity increase the need for accurate and effective screening. Early identification and intervention are essential for improving the quality of life of vulnerable populations (Robbins, Pretti-Frontczak, & Grisham-Brown, 2011). Thus, accurate screening facilitates the early access to specialized intervention for young children who may be experiencing disadvantaged living conditions.

Screening can be defined as a brief and general method for discriminating children who are likely to have disabilities, from those who are developing according to the expected patterns (Bagnato, 2007; Glascoe, 2005). Screening has the potential to identify children in need of more intense and systematic intervention. Screening instruments include selected milestones that are arranged in a meaningful way in order to allow practitioners and families to detect deficiencies or unexpected developmental trends. Screening results should be confirmed following a more comprehensive and in depth assessment procedure in the context of a linked system as described above. To better understand the process of screening infants and young children, characteristics and formats of screening approaches will be addressed.

Considerations of screening procedures. Traditionally, the need for screening of infants and young children was primarily a medical practice focused on neuromotor functioning. More recently, developmental behaviors have constituted the focus of pediatric and educational evaluations (Snow & Van Hemel, 2008). Complementing this integrated perspective of screening, recommended practices and federal laws mandate that screening procedures need to include parents and caregivers as primary source for

collecting relevant and meaningful information (Bagnato et al., 2010; Sandall et al., 2006; Squires et al., 2009), making child identification a shared and interdisciplinary responsibility. Therefore, a family-based screening approach helps to build partnerships with caregivers, including family's priorities and desired outcomes for their children.

Another feature of screening is utility, or how easily screening tools can be implemented and used. The general and brief nature of screening should facilitate their use in an efficient child identification system. Screening approaches that rely only on professional's expertise are very expensive and time consuming as well, often making this procedure a sporadic event occurring at infrequent intervals. Using professionally administered tools may make the monitoring process impossible because of its cost (Squires et al., 2009). Approaches that allow families to be directly involved to monitor their progress often result in more accessible systems, reducing the economic cost and time requirements (Bagnato, 2007; Squires et al., 2009). Utility in terms of economic cost and time required will be an important aspect to consider when selecting and implementing a screening system.

Approaches to screening. Different approaches can be used to screen infants and young children. The first approach can be identified as a traditional model of screening. Following the medical prevention model, this approach focuses on the discrimination of children who might need additional assessment from those who appear to be typically developing. Children who appear at risk are referred for a more complete and in depth assessment to determine whether or not they require specialized intervention (Grisham-Brown et al., 2011). In this model, screening appears as an isolated process for identifying and referring at risk population to other intervention instances.

A different approach places screening as a component of a linked and comprehensive system of intervention (Pretti-Frontczak & Bricker, 2004). As stated early, under this approach, screening becomes the first step of the intervention process. Access to further assessment or monitoring procedures are connected and assessment results bring dynamism and continuity to the intervention process, as illustrated in Figure 2. This representation emphasizes the role of screening as the beginning of the intervention process that facilitates gathering of information to make decisions about children's progress, their current needs, and the possible next steps in the provision of services.

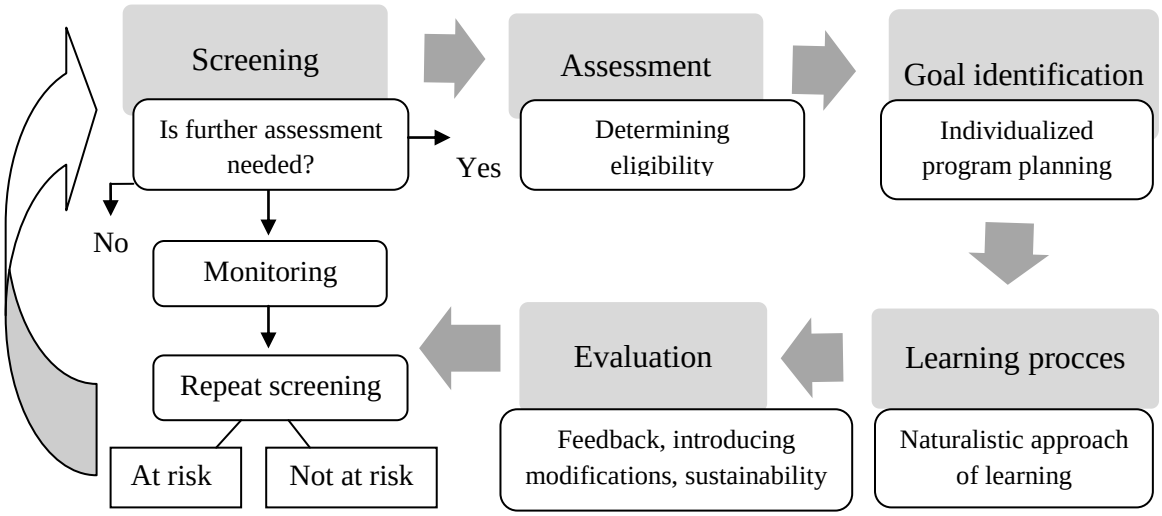

Figure 2. Screening in the context of the linked system. Adapted from "An Activity-Based Approach to Early Intervention" by K. Pretti-Frontczak & D. Bricker, 2004. p. 45.

Finally, a contemporary way of approaching the screening process is through a tiered model where adjusted and intensive interventions are provided before labeling

students as “children with disabilities” and before referring those children for additional assessment and enrolling them in special education (Grisham-Brown et al., 2011). An essential feature of this model is the utilization of differentiated levels of support, usually referred to as tiers. The model includes continuous monitoring of students’ progress and constant evaluation of intervention quality (e.g., Berkely, Bender, Peaster, & Saunders, 2009). This layered approach has been primarily used in the health prevention system since the early 1950s (Gordon, 1983) and it was adapted and used in early intervention four decades later (Simeonsson, 1991). The basic idea highlighted in this model is to offer appropriately tiered responses to children’s needs and adjusted instructions that matched their developmental level. In the context of the tiered model, the idea of universal screening has been acquiring relevance as a strategy to include a larger population of young children who might be at risk for developmental delays or disabilities (Bagnato et al., 2010).

Types of screening and formats. Screening can be used for different purposes and for different populations, in a variety of settings and by different professionals or teams. Types of screening can differ according to the age group assessed, and the objectives of the screening program. Screening can be used for newborns; in this case, screening provides useful information about overall physiological status and risk factors, including their neuromotor development. Universal newborn screenings are used to ensure that health and socioemotional processes are typical, thus preventing future problems and delays. Identification of possible vision and hearing problems is often an important part of screening the development and growth of a young population (Grisham-Brown et al., 2011).

A third type of screening is developmental screening. Developmental screening intends to identify delays in different developmental areas and covers general domains and functional skills appropriate to the age of the children being screened (Snow & Van Hemel, 2008). Developmental screening allows professionals make comparisons between children being assessed and those who were part of the normative sample when the test was developed. Results usually are given using standard scores that compare children's performances across developmental domains (Grisham-Brown et al., 2011). Screening as a general procedure is able to indicate only that a child might have a delay or difficulty that should be explored using a more complete assessment procedure, but it should not be used to confirm the presence of a disability (Meisels & Atkins-Burnett, 2005).

There are different screening formats and ways in which families can access screening services. Using community or public space, a particular agency can organize massive screenings or "round ups" (Grisham-Brown et al., 2011). On round up days, parents bring their children to a central location, and professionals and volunteers conduct the screening in different developmental areas. The instruments utilized during this process usually are simple and easy to administer to a large group of children (Squires et al., 2009). Although opportunities for community-based screening are a positive alternative for finding children who might need special education, it is not a systematic continuous process that allows practitioners and families to monitor children's developmental status and growth. A more comprehensive and linked model is recommended to provide an effective screening and monitoring system.

Another commonly used format is developmental surveillance or the well-child checkup system that usually takes place at pediatrician clinic. The American Academy of

Pediatrics (AAP) (2006) provided strategies to support professionals in the medical field to address developmental monitoring in children from birth through 3 years of age. The Academy recommends that developmental surveillance should be incorporated at every well-child preventive care visit and formal screening should be conducted at the 9, 18, and 30 months (or 24 months). Surveillance is a flexible, continuous and cumulative process that intends to identify children who might have developmental delays or disabilities, including the observation of children's development, evaluations of the general health condition, and appropriate referrals (AAP, 2006). If surveillance results indicate a concern, developmental screening should be conducted (Drotar, Stancin, Dworkin, Sices, & Wood, 2008). In addition, when screening is paired with surveillance procedures, it is possible to observe improvements in the number of referrals for further assessment and intervention (Hix-Small, Marks, Squires, & Nickel, 2007). If well implemented, the surveillance system conducted at well-child preventive care visit can be an effective strategy for expanding coverage and preventing disabilities in young population. Opportune identification and referrals have the potential to minimize developmental problems in children with disabilities or at risk for disabilities.

Another format is a family-based screening system where parents and caregivers are the primary resource of information. Appropriate and recommended practices in the field of early intervention, in addition to legal requirements, support parent participation at the time of gathering relevant information (Janson & Squires, 2004). Research studies on parent accuracy have found that regardless of socioeconomic status, parent's education, and geographic location, parents and caregivers can provide accurate and reliable information about their children's development (Coplan, 1982; Glascoe &

MacLean, 1990; Glascoe, 1999; Glascoe, 2003), obtaining better results when reporting on observable and current children's behavior (Diamond & Squires, 1993; Harris, 1994; Squires, Nickel, & Bricker, 1990). Under this format, families have the opportunity to be involved in the screening procedure, and if necessary, in the subsequent intervention. Developmental screening instruments may be presented as questionnaires for parents or caregivers asking about their child's typical routines and activities, achievements of specific developmental milestones, and parental concerns (Snow & Van Hemel, 2008). The screening process can be enhanced because parents possess extensive knowledge and experience about their own children. Further, parents are able to monitor their child's development on a regular basis (Kapci et al., 2010), perhaps enhancing their ability to recognize and describe their child's development (Janson & Squires, 2004). Family-based screening is also cost-effective (e.g., Janson & Squires, 2004; Kapci et al., 2010; Pinto-Martin et al., 2005; Squires et al., 2009), maximizing available resources and encouraging family participation.

Conditions Required for Effective Screening

Screening tests need to be accurate (high sensitivity and high specificity) in order to maximize the number of young children who are correctly identified as needing early intervention. In the early childhood context, screening should be designed and implemented in the child's natural environment allowing high levels of parental involvement. Basic psychometric qualities of screening tests that need to be considered are reliability and validity. These two important psychometric qualities will be described in the context of developmental screening.

Reliability. It is an important indicator that allows practitioners and researchers to generalize the results of a measurement instrument applied under specific conditions to other settings, instances and observers (Salvia, Ysseldyke, & Bolt, 2009). An instrument is reliable when it demonstrates stability over repeated applications (Abell, Springer, & Kamata, 2009). Consistency between different users can be demonstrated examining interobserver or inter-rater reliability. In this case, usually two observers conduct a test independently and their observations yield an estimation of the level of agreement between the results.

The estimation of test reliability can also be obtained based on the consistency of repeated applications. This form of reliability is known as test-retest reliability and implies administering the same test to the same group of people in two opportunities, with an interval between the two applications (Gall, Gall, & Borg, 2007).

Finally, the estimation of internal consistency is the most common approach used to establish the internal reliability of a measurement instrument. The coefficient obtained from this procedure estimates how consistent items are within a test. Alternate forms reliability is conducted by dividing a test into two different set of items, each one measuring the same construct or skills, obtaining two alternate forms. Correlations of results are computed to estimate test reliability (Salvia, et al., 2009).

Validity. It is a fundamental indicator in constructing and evaluating testing instruments. Interpretations of test results can be valid or invalid in the context of its proposed use, meaning that a designed instrument should accurately measure what it was intended to measure (Gall et al., 2007). The process of validation implies the accumulation of evidence to provide a scientific basis for score interpretation. Thus, the

quality of a test usually is associated with the validity of the inferences that can be derived from that instrument (Salvia et al., 2009). Even though it is not possible to validate all inferences of a test, there are different ways to gather validity evidence. First, evidence can be gathered on test content, including the format of the items and guidelines for administration. Content validity should be an accurate representation of a domain or area of sampled test items.

Secondly, criterion-related validity considers the evidence gathered on a test related to a criterion measure, expressed as a correlation between the assessment procedure and the criterion (Meisels & Atkins-Burnett, 2005; Salvia et al., 2009). Correlations between current performance and a criterion measure might be established, and also it is possible to predict a child's performance on a criterion measure based on his/her current performance (Gall et al., 2007). Positive predictive value for a screening instrument is the percentage of children who do not meet the criteria for that test, and who are found to have a disability in a future assessment (Glascoe, 2005).

Finally, an additional way to gather validity evidence is on the theoretical characteristics that are being measured. Construct validity indicates how well an instrument is able to measure a theoretical trait or concept being studied (Salvia et al., 2009). The theory from which a construct was formulated provides a meaningful foundation that can guide the process of making predictions.

Validity of an instrument can also be explained by its sensitivity and specificity. Sensitivity is the percentage of children at risk for developmental delays or with disabilities who have been correctly identify by the instrument. Specificity is defined as the percentage of children without disabilities who also have been correctly identified as

typically developing children by the screening measure (Glascoe, 2005; Meisels & Atkins-Burnett, 2005; Pretti-Frontczak & Shannon, 2011). Standards for sensitivity indicate that at least 70 – 80% of children with disabilities should be identified after one screening administration and 80% or more of children should be correctly identified as typical developing, minimizing the likelihood of overreferrals (Glascoe, 2005). A low degree of sensitivity in a screening tool can lessen its validity and lead to missing the identification of children and families who are in need of early intervention (Snow & Van Hemel, 2008). It is important to ensure that the screening approach implemented meets the basic requirements of accuracy in testing and provides evidence of its validity and reliability.

Developmental screening tests should be standardized on a large, representative national sample, whose characteristics reflect those of the screened population in terms of cultural background, parents' level of education, linguistic and economic characteristics (AAP, 2006; Salvia et al., 2009; Pretti-Frontczak & Shannon, 2011). Characteristics of the diversity of a population, without doubt, need to be considered for test development and for the implementation of measurement tools. When minority groups are assessed, adaptations often are required. Failure to consider the cultural and linguistic diversity in testing is closely related to error and misinterpretation of results (Robbins et al., 2011). On the other hand, the simple translation of a test into another language does not provide enough evidence that the psychometric properties of the original instrument will be maintained (Heo et al., 2008). Cross-cultural appropriateness must be studied along with the accuracy of the translation and the preservation of psychometric properties. Effective, reliable and valid screening measures will allow practitioners and families to make the

appropriate decisions in the context of a linked system that relies on accurate, culturally appropriate instruments.

ASQ: Features and Feasibility of a Developmental Screening System

Although no screening tool can fit the needs, values and beliefs of all families across all settings (Squires et al., 2009), some instruments are more appropriate than others to capture a more complete and accurate representation of children's performance levels. Accurate and culturally sensitive developmental screening tools are able to provide evidence on their psychometric properties to avoid misinterpretation and bias. A screening system for a particular population of children and families should respond to children's characteristics and be accurate enough to discriminate between children who are following expected developmental trajectories and those at risk for delays or disabilities. This section describes how features and psychometric properties of a screening instrument might allow practitioners and families to identify in timely manner children who are in need of further specialized services.

As described in the previous section, developmental screening includes different approaches and formats, including direct observation, questionnaires, interviews, check lists, and parent-completed tools (Kapci et al., 2010; Squires, Potter, Bricker, & Lamorey, 1998). When parents have the opportunity to practice and request the elicitation of expected behaviors from their children, they can precisely identify patterns of development. Closely attending parents' concerns about their child's development is another effective way to monitor that child's development (Glascoe, 1999). The Ages and Stages Questionnaires Third Edition (ASQ-3) (Squires & Bricker, 2009) is a parent-completed developmental screening and monitoring system that promotes active family

participation during the assessment process, gathering information from families and supporting service providers to follow legal guidelines and those published by professional organizations as NAYEC and DEC (Bricker, Squires, & Clifford, 2010).

General Description of the ASQ-3

A rich and continuous revision process has been conducted by researchers on the ASQ, improving and transforming this tool in to a valuable resource for practitioners and families. Responding to needs for early identification of developmental delays during the early 1980s, the ASQ was created and field tested. At that time, there was a great need for instruments with the capacity of identifying and monitoring the development of children who were suspected of having a disability as a consequence of medical, biological, and environmental risk conditions. Further, the lack of economic support to assess children who might be at risk for disabilities and consequently the need for cost-effective ways to identify early, children who might be experiencing developmental delays were the motivation to create a cost-effective tool (Squires et al., 2009). In this context, on-going feedback from families, caregivers, and practitioners was received and considered for continuous improvement of the quality of this screening and monitoring system.

The ASQ is consistent with a linked system approach in which screening is the first step for identifying possible needs, connecting results with ongoing intervention and regular monitoring. Its main purpose is to identify accurately infants and young children who are in need for additional assessment to determine whether they are eligible for early intervention. The ASQ is supported by fundamental principles, including a screening and monitoring process that includes: (a) a tool that can be used for an interdisciplinary team applying a naturalistic approach; (b) a system to be used continuously to monitor children

progress, responding to the dynamic nature of young children's development; (c) a system with effective predicted properties, and is accurate, cost effective, easy to implement and sustain; and (d) a system that allows high parental involvement, considering family input.

The ASQ-3 system can be used as a child find tool or as a way to monitor the developmental status of children who are at risk for disabilities or delays as a consequence of medical factors such as low birth weight, prematurity, or from environmental factors such as poverty, parents with intellectual disability, history of abuse or neglect. Questionnaires can be used one or two times (e.g., 4 and 12 month intervals) or continuously throughout the preschool years.

To facilitate family and providers participation, users can have access to a web site to complete the questionnaires. Alternatively, a paper version can be sent by mail to parents who return the questionnaire after observing whether the child can perform the described behaviors. Another useful way to apply the ASQ-3 system is through home visits, facilitating parents' understanding of the screening process and strengthening the relationship between professionals and family members. The ASQ-3 also can be used in clinics, schools and child care programs (Squires et al., 2009).

In 2009, the 3rd edition of the ASQ was published incorporating suggestions from families and professionals. The new edition included a standardization sample of more than 18,000 questionnaires. The ASQ-3 system is composed of 21 questionnaires designed to be answered by parents or other caregivers of a child between 1 month and 5 ½ years of age. Intervals (i.e., 2, 4, 6, 8, 9, 10, 12, 14, 16, 18, 20, 22, 24, 27, 30, 33, 36, 42, 48, 54, and 60 months) cover the 2 month to 5.5 age span. Questions are organized

into five areas or domains: communication, gross motor, fine motor, problem solving, and personal social. Each questionnaire includes 30 developmental items, carefully developed following four crucial criteria: (a) address developmental milestones, (b) focus on behaviors appropriate for a developmental quotient range of 75 – 100 for each interval, (c) include behaviors that are observable and easy for parents to apply, (d) use simple parent friendly language; requiring a reading level from fourth to sixth grade. Parents respond "yes", "sometimes", or "not yet" to behaviors described on the questionnaires. In addition, each questionnaire includes an overall section to address general parental concerns.

A questionnaire can be completed by parents in 10 – 15 minutes, and scored in less than 5 minutes. Professionals score and convert responses into point values, comparing the final score for each domain to an established screening cutoff point. Based on the final score, practitioners and parents determine next steps (Squires et al., 2009).

Five major modifications were made in the ASQ-3. First, the administration age ranges were expanded to include children of any age between 2 month and 5 ½ years. Second, 2 and 9 month intervals were added to complete the series. Third, revised cutoff scores were derived for the 19 questionnaires from the previous edition, adjusting standards to the characteristics of the current population. Fourth, a monitoring zone was defined for each age interval, indicating a need to follow a child more closely between questionnaires. Finally, some items were slightly modified, changing words, clarifying illustrations and adding examples. Modifications suggested by users, especially related to enhancement of the cultural appropriateness for diverse families were included.

Additional questions related to expressive language and parental concerns about behaviors were added to the overall section (Squires et al., 2009).

Psychometric Properties of the ASQ-3

Intensive and systematic revisions of the psychometric properties of the ASQ-3 were examined. The sample of 18,000 questionnaires was used to determine new cutoff scores for each interval. Reliability and validity were also studied using representative subsamples. Test-retest reliability was conducted comparing two questionnaires completed by the same parent at a 2 week time interval. The percentage of agreement for the 145 parents was 92%. Interclass correlations ranged from .75 to .82, indicating strong test-retest reliability. Interobserver reliability was established comparing questionnaires completed by trained examiners and questionnaires answered by parents. The percentage of agreement between ASQ classifications for a group of 107 children was 93% with interclass correlations ranging from .43 to .69, indicating a robust agreement. Internal consistency was also examined, establishing the relationship between areas and the total score. Correlations appeared to be consistent, ranging from .60 to .85, (with gross motor .60). Results indicated a moderate to strong internal consistency measured by coefficient alpha. Concurrent validity was computed by comparing children's performance on a standardized test and the results obtained on the ASQ-3. The standardized measured used was the Battelle Developmental Inventory (BDI), first and second editions (Newborg, Stock, Wnek, Guidubaldi, & Svinicki, 1988, 2005). Agreement for a group of 579 children suggested that the ASQ-3 and BDI had moderate to high agreement between classifications (i.e., both test classified the child as typical, or as identified with delays).

Cutoff scores for the ASQ-3 were based on a sample of 18,572 questionnaires, including both nonrisk and risk children in order to have a more representative sample of the general population. Sensitivity ranged from 85% to 92%, specificity ranged from 78% to 92%, and positive predictive value ranged from 32% to 64%. Overidentification across intervals ranged from 6% to 13%, and underidentification ranged from 1% to 13%. Cutoff scores of 2 standard deviations below the mean appeared to be most effective, maximizing accuracy and minimizing error (true positive and false positive proportions). A monitoring zone was provided to identify children with scores between 1 – 2 standard deviations below the mean who might benefit from more intensive follow-up. The purpose of this monitoring zone is to identify children's abilities that are not below the referral cutoff score but that might benefit from targeted activities.

Cross-Cultural Adaptation and Feasibility of the ASQ

The ASQ has been translated into several languages including Spanish, French, Danish, Chinese, Norwegian and Turkish. There is an increasing interest in examining the validity and reliability of the translated ASQ in other cultures (Dionne et al., 2006; Heo et al., 2008; Janson & Squires 2004; Tsai, McClelland, Pratt, & Squires, 2006). Research findings suggest that translating an assessment measure into another language is not sufficient evidence to ensure that psychometric properties will be transferred to the new language version. Careful examination of validity and reliability characteristics of the translated version must be accomplished to prove its effectiveness and accuracy in assessing children from different cultural backgrounds (Dionne et al., 2006; Janson & Squires, 2004; Tsai et al., 2006). Recent research on the ASQ has been conducted mainly on the second edition (Squires & Bricker, 1999), indicating that the ASQ-2 is an effective

screening instrument that can be cross-culturally adapted to determine the level of need, according to child's developmental status.

A study conducted on the normative data of a Norwegian translation of the ASQ compared results with the original U.S normative data. Results showed that parents' reports of their children's development were similar in the two samples, suggesting that behaviors selected by the ASQ were culturally independent in this particular case. Observing children's developmental trajectories between the two countries, results appeared to be less affected by cultural and socioeconomic differences, especially for this preschool population. This finding suggested that due to similarities among many Western countries and the general nature of the developmental patterns addressed on the ASQ, results might be generalized to comparable cultures. The comparison of Norwegian and U.S results supported the feasibility of cross-cultural validity of the ASQ (Janson & Squires, 2004).

A pilot study was conducted with a Taiwanese sample, with the purpose of exploring the reliability and validity of scores using a Chinese translation of the 36-month ASQ interval. Results indicated initial cultural appropriateness, validity, and reliability of scores when used with 3-year-old Taiwanese children. In addition, opinions gathered from Taiwanese child development experts, parents, and preschool teachers supported the translated Chinese 36-month ASQ as culturally appropriate with an adequate level of reliability and validity for this population (Tsai et al., 2006).

In a more recent study also conducted in Norway, the construct validation of the ASQ was studied, considering demographic and socioeconomic factors, including premature births, based on the Norwegian normative data. Results confirmed the

construct validity of the ASQ, and highlighted the impact and close relationship between socio-demographic variables and child's development. An important practical implication derived from this study is the recommendation to develop gender dependent norms in order to minimize false positive boys or false negative girls (Richter & Janson, 2007).

A study conducted in Canada investigated the psychometric properties of the French translation of the ASQ and cutoff scores were compared between the two versions (Dionne et al., 2006). The French translation cutoffs were lower in the communication, fine motor and problem solving domains and higher only in the personal social domain. The authors suggested that differences in the communication and personal social domains may be explained by cultural differences, such as varying expectations about independent behaviors. Additionally, the authors mentioned that translation issues may have impacted the interpretation of particular questions yielding differences between the two studied samples (Dionne et al., 2006). Another study conducted in Canada explored the applicability of using the English version of the ASQ with at risk young children and their parents. The study concluded that parental completion of the ASQ was a feasible and cost-effective screening strategy for identifying developmental delay among children at risk in Canada (Elbers, Macnab, McLeod, & Gagnon, 2008).

The ASQ was also translated into Korean and cross-cultural adaptations were made to the U.S version. Results from a sample of 3,220 parents of young children between the ages of 4 months and 5 years were analyzed. Reliability, including domain correlations, internal consistency, and evaluation of cutoff scores for the Korean population were examined. In this study, comparisons between Korean and U.S samples were conducted using Rasch analyses and the differential item functioning (DIF) model.

Results indicated that internal consistency of the Korean ASQ was high. Validity results also were strong. For the DIF analyses, items in communication and personal-social domains demonstrated the greatest number of items functioning differently for Korean and U.S populations. The authors mentioned that these differences were expected because questionnaire items reflect expected cultural and linguistic differences between Korean and English. Overall, the ASQ was translated considering its cultural appropriateness and functioned as a valid and reliable parent-completed screening instrument to early identify young children with developmental delays (Heo et al., 2008).

A study conducted in Netherlands also had the purpose of investigating the psychometric properties of the Dutch translation of the ASQ of the 48 month interval. The ASQ was translated into Dutch and back-translated into English. Participants were 1510 preterm and 562 term children. Parents of children born in 2002 and 2003 completed the questionnaire at the well child visit. Results indicated that mean population scores for the Dutch translation were mostly similar to those obtained in the USA, Norway and Korea. Differences were present for problem solving and fine motor. The reliability was acceptable for all domains. Sensitivity to predict special education at five years of age was 89% and specificity 80%. The study concluded that the observed psychometric properties of the Dutch ASQ for the 48 month interval supported its usefulness in the early detection of developmental problems among children (Kerstjens et al., 2009).

Similarly, research conducted in Turkey examined the Turkish translation of the second edition of the ASQ. Validity and reliability results supported the applicability of the ASQ as a screening tool for young Turkish children. The authors mentioned that there

were some items that had to be modified for the Turkish culture; especially in the communication domain, to adapt them to the structure of the Turkish language. The study suggested the cultural stability of ASQ items, and highlighted the importance of considering variations in language when translating developmental screening tools. The authors recommended that words and expressions should be conceptually equivalent (Kapci et al., 2010).

A recent study completed in Spain evaluated universal preschool screening procedures developed in Galicia, including the application of a Spanish translation of the ASQ. The study compared results on the ASQ with data gained through research studies previously conducted in the U.S and Norway. Results indicated that ASQ performance in Galician children did not differ significantly from data collected in the U.S and Norwegian studies. The authors stated that minor differences could be attributed to differences in the pre-school curricula as well as diverse cultural practices among countries. In the context of this study, the use of parent-completed measures was an effective and efficient screening strategy for the Galician universal screening system (Sarmiento, Squires, & Ponte, 2010).

A recent preliminary study was conducted in South Africa with the purpose of examining the utility of adapting assessments for young children from diverse cultural backgrounds. Two assessments were adapted, including the ASQ. The study examined children's performance on measures of development completed for 47 preschool children between 3 and 6 years of age. The ASQ was completed by parents and results were compared to original norms. The distribution of the ASQ scores was normal and no statistically significant differences were found for the different age groups on the

assessments. Results suggested that their translation and application of the ASQ were reliable for the urban, middle-class Afrikaans-speaking group of children. The authors recommended that additional modifications to this translated version of the ASQ need to be made when applying this tool in rural areas (Borman, Sevcik, Romski, & Kyeong Pae, 2010).

The ASQ-3 as a parent-completed developmental screening system appears to be an effective tool within pediatric and educational settings for screening infants and toddlers. The features that characterize this instrument make it easy to adapt for use in different cultures and a valuable tool for identifying children at risk for developmental delays. Cultural and linguistic differences between U.S samples and other countries have been empirically addressed in several studies. Although the Spanish translation of the ASQ-3 has been field tested with Spanish-speaking families in a variety of settings in the U.S, and is used widely across the country, special cutoff points have not been empirically developed as yet.

Preliminary studies conducting DIF analyses indicated that English and Spanish items functioned in a similar way in most cases (Squires et al., 2009). Normative ASQ second edition data were collected through preschool programs, agencies, voluntary caregivers, and via Internet. Data from pencil and paper questionnaires for the 4-60 month intervals were included in the analyses. Items identified by DIF analyses were reviewed by a native Spanish-speaking expert to determine whether the translations were appropriate for the DIF items. Out of 570 ASQ items across the 4-60 month intervals, 132 items indicated that the ASQ functioned differently between the two versions. Excluding the repeated items, 95 unique ASQ items indicated DIF across all age intervals

and domains. The communication domain (34 items) and the 24 month interval (15 items) had the most items showing DIF. In the Spanish translated items, 12 out of the 95 unique items were discovered to either provide fewer examples than in the English version or to contain minor grammatical errors. One item had different meanings in the English and the Spanish versions.

Overall, research supports the feasibility and appropriateness of applying the ASQ in different cultures when careful linguistic and cultural considerations are taken into account, along with the examination of its psychometric properties. However, more research is needed to explore cultural and linguistic effectiveness and psychometric accuracy of the ASQ-3, especially for Spanish-speaking families in the U.S.

Developmental Screening and Cultural Minority Groups in the U.S.

The level of access children have to educational services, health care, and social networks varies by economic and social variables. When resources are not equally distributed, children's lives are impacted, affecting their development (Derman-Sparks & Olsen, 2010). A fundamental principle is that all children have the right to participate in the education they need to become successful, developing their potential (NAEYC, 2005). Educational services must utilize evidence-based practices that respond to families' beliefs, their rearing practices and parenting styles. Reliable and valid assessment instruments that are responsive to the child's linguistic and cultural background should be used (DEC, 2010). The early identification of children's developmental needs is an effective strategy to provide inclusive opportunities for all children and families in the context of their own culture.

Actions and decisions that people make in the context of daily routines represent their cultural group and relationships. Parents and caregivers share culture's values, beliefs, rules, expectations and priorities with their children, transferring patterns of behavior and cognition to their children (Bornstein & Cote, 2006; Derman-Sparks & Olsen, 2010). Even though each culture is unique and has differing beliefs about what it means to raise a young child (Suizzo et al., 2008), all cultural groups consider the customs and manner in which children are raised and customs are transferred as an essential value. In a diverse society, multiple cultures are interacting and affecting each other in a dynamic way, with varied parental practices, interactions and expectation.

The United States is a country with a diverse population. In the 1990s, approximately 40% of the total population growth in the United States was due to immigration. In the 2000 Census, a total of 31.1 million foreigners were counted, the largest immigrant population in modern history (Harwood & Feng, 2006). In 2007, the nation's immigrant population reached 37.9 million. In 2009, there were 307 million people living in the United States, including 38.5 million foreign born, representing 1 in 8 residents. In 1990, there were 1 in 13 immigrants. (Center for Immigration Studies, 2007). In 2009, 20.5 million foreign born people came from Latin America, and Mexico was the predominant country of origin. Eleven and a half million immigrants from Mexico represented 30% of the total foreign born population (U.S Census Bureau, 2011). California had received the largest number of foreign residents, reaching 9.9 million people. In Texas there were 4 million foreign residents, and in Florida 3.5 million.

Immigrant families experience a series of transformations in their lives, impacting family dynamics, patenting styles and their children's development, a process known as

acculturation. Acculturation includes psychological and cultural changes that occur as a result of contact between cultural groups and their individual members, including changes in social structures at a community level and also in the repertoire of people's behaviors at an individual level (Bornstein & Cote, 2006). In this process, cultural conflict and stress may be present during intercultural social interactions (Berry, 2006), in addition to the stress associated with the process of adaptation to a new system, codes, neighborhoods, and in many times, a different language (White, Roosa, Weaver, & Nair, 2009). Individuals who have more interactions with the dominant culture, participating in the community through work, schooling, and other social activities, are able to effectively acculturate in more domains than individuals with less contact (Bornstein & Cote, 2006).

When Latino families do not perceive their own values represented in the dominant culture, it may be more difficult to seek and obtain support. This also may be a source of parenting stress for immigrant Latino families and their young children (Fischer, Harvey, & Driscoll, 2009). Working with families who are experiencing the process of acculturation requires considering the political, economic, and demographic characteristics of their original societies to better understand their needs and motivations.

Foreign families face several barriers to integration in a new society. The poverty rate for immigrants and their children born in the U.S is 17%. Even immigrant people who have lived in the U.S for 20 years are more likely to live in poverty. In the U.S, approximately 30% of adult immigrants have not completed high school and nearly 34% percent do not have health insurance. According to the Center for Immigration Studies (2007), the high rate of immigrant poverty may be associated with a low education level.

Foreign languages may be another barrier to cultural integration. Among foreign groups in the U.S in 2009, 76% of Latino people were much more likely to speak a language other than English at home compared with non-Latino people (U.S Census Bureau, 2011). In this context, families find it difficult to access timely and appropriate social and educational services. As institutions and services for young children and their families become sensitive to the similarities and differences among cultures within a diverse society, children can prosper and families can achieve their expected outcomes.

Culture is one of the most important tools that children acquire from their principal caregivers for their social life. Child development and parenting practices are affected by child's cultural background and also by the environmental and socioeconomic conditions in which a family lives (Bornstein & Cote, 2006; White et al., 2009). Parenting practices are closely related to beliefs, attitudes, expected outcomes, and the cultural knowledge of parents and caregivers. Thus, the dynamic and varied content of parent-child interactions is usually embedded in daily family routines and interactions (Weisner, 2002).

Parenting practices for immigrant families may differ with respect to the dominant culture, creating barriers for integration in the host community. Some families are able to accommodate parenting practices of their culture of origin with those of the culture of destination, whereas other families find difficulties in that process. A model of parenting and child development that integrates cultural traditions with current conditions and cultural demands is necessary to promote a positive acculturation experience (Bornstein & Cote, 2006; Ceballo, & Hurd, 2008).

Latino parents have been described as expressing an interdependence or collectivism interactional framework. Parents in collectivist cultures interact and make decisions supporting interdependence goals, while European American families in the U.S have been often described as following an individualistic social interaction framework, emphasizing strategies that promote independence goals (Fischer et al., 2009; Suizzo et al., 2008). These different social interactional styles affect the beliefs and values that parents hope to transfer and preserve in their children. Research on parenting practices across cultures, particularly for Latino people, has demonstrated that it is also important to consider the diverse subcultures that are represented in a certain culture (Mexican, Puerto Rican, Cubans, Central and South American, and Dominicans), the socioeconomic and educational levels of the parents, as well as the level of acculturation in the U.S (Pérez, & Fox, 2008).

Children are more likely to develop their potential when their learning environments at home and in the community reflect positive and nurturing values and inclusive educational practices (Suizzo et al., 2008). The consideration of cultural features is crucial when designing interventions and selecting instruments to assess young children's developmental status. The validity and adequacy of these assessments is essential for gathering reliable information for guiding an appropriate and culturally responsive intervention system (DEC, 2010; NAEYC, 2005). A screening system such as the ASQ-3 is an effective and appropriate approach for screening young children from diverse culturally and linguistically diverse backgrounds, and for assisting their families that may be experiencing the complex process of acculturation.

Immigrant children who were born out of the United States and those who were born inside of the country often share similar realities, challenges, and concerns. In other aspects, their experiences are distinctive, making it necessary to describe these two groups separately. During the last four decades, a new second generation of children of immigrants born in the U.S or brought at an early age from out of the country has appeared (Portes, Rumbaut, Fernández-Kelly, & Haller, 2006). The second-generation is growing rapidly and it is expected that this cohort will increase from 9.8 million in 2000 to 21.7 million in 2020. At that time, the second generation will surpass the size of the first generation, which will increase to 20.6 million (Fry & Passel, 2009; Suárez-Orozco, Suárez-Orozco, & Todorova, 2008; Johnson & Lichte, 2010). In this dynamic context, children may experience different influences and practice unique early parenting experiences, depending on their families' cultural and linguistic backgrounds as well as their immigration history.

First and second generation immigrants have in common foreign-born parents. For that reason, they are likely to retain cultural and linguistic traditions in their homes while living in a new country. Both the first and second generations also share experiences associated with high levels of poverty, less educational opportunities, segregation, ethnic and racial discrimination, and community violence (Suárez-Orozco et al., 2008), in comparison to the American population. Thus, children of immigrant parents usually face barriers during their adaptation process, making their participation into society difficult and economic mobility problematic.

In a context of necessary adaptation to and assimilation of a new culture, it is likely that second-generation immigrants show some advantages over the first generation.

The U.S-born generation did not experience the disorientation and stress of arriving in a new country without knowing how society functions, as the majority of the first generation had to suffer. Benefits can also be found for immigrant children who are born out of the U.S. and come to this country. One important advantage is that in areas such as well-being and health, immigrants are stronger than the second generation. Even though immigrants appeared to have lower income levels and less education, first-generation young children tend to be healthier than children born to second-generation mothers, and less likely to engage in risky behaviors and experiment with drugs and alcohol (Suárez-Orozco et al., 2008).

Mexican immigrants and their U.S-born children are becoming the largest minority ethnic group in the U.S. This reality, experienced by the existing immigrant community, affects how the new generation is able to adapt or not to the new cultural environment. The preceding generation's social and economical accomplishments will serve as a guide for the next generation. Already assigned status and expectations to the first generation may also be transferred to the second generation, preserving those negative stereotypes associated to being Mexican immigrant in U.S (López & Stanton-Salazar, 2001).

Enriched parenting practices as well as appropriate community support can nurture and protect first and second generation immigrant children while confronting barriers to adaptation. Young children will manifest different strengths and needs when they are facing the adaptation process, depending on their previous experiences and the social capital that their families are able to accumulate and transfer to them (Portes et al., 2006). That capital will constitute the main resource that specialized agencies and

practitioners may use to help children to cope with adaptation challenges from a more sensitive and culturally responsive approach. Intervening early with families while their children are very young may assist families in supporting a positive trajectory as children begin the adaptation process.

Cross-Cultural Adaptation of Developmental Screening Instruments

Young children from non-English speaking homes need to be assessed using linguistically and culturally appropriate tools with adequate technical standards (NAEYC, 2005). Young children from diverse cultural backgrounds should receive regular developmental screening with the purpose of identifying a possible problem or delay in specific developmental domains, including first-and second- language acquisition (DEC, 2010). Culturally responsive assessments are those that take place in settings that embrace diversity, demonstrating respect for cultural practices in the child's environment. Culturally appropriate assessments do not include terms, concepts or materials that are inadequate or unfamiliar to the child's home culture and results should be interpreted in the context of the family's values, traditions and beliefs. The language proficiency level of the child in his/her native and second language, and the family's preferences should be considered, allowing for flexibility in the child's responses.

Maximizing the validity of adapted instruments is one of the main interests of cross-cultural research studies (Van de Vijver & Leung, 2011). The establishment of equivalence between different cultural and linguistic backgrounds is an important component of the methodological rigor necessary to avoid bias across cultures when adapting assessment instruments. One of the challenges of cross-cultural studies is the identification of sources of differences among cultures. The documentation of those

cultural differences needs to be addressed by research designs that involve evaluating cultural facts. It is important to consider the distance between cultures when translating and adapting measurement instruments. More similar cultural groups tend to present fewer differences in the variables and behaviors included in the test; in consequence, it is more likely to find fewer cross-cultural differences when the distance between cultures is smaller (Van de Vijver & Matsumoto, 2011).

When conducting assessments with young children from minority cultural groups, challenges and concerns related to the likelihood of test bias may be present. Standardization samples usually misrepresent minority groups relative to the overall population (Snow & Van Hemel, 2008). Fairness and equality of testing is an important concern when assessing diverse subpopulations. Test equity and fairness is achieved when a test measures only differences between subpopulations related to a relevant construct (Messick, 1989). Bias may be present when the content of the test is unfamiliar to, or inadequate for, a subpopulation of children; in that case, the test or item content is inappropriate for that subpopulation (Qi & Marley, 2009; Snow & Van Hemel, 2008; Wyse & Mapuranga, 2009). Statistically, a test or test item qualifies as biased if the expected scores are not the same for examinees from different subpopulations, assuming that they have the same level of ability (Kamata & Vaughn, 2004).

The existence of bias should be investigated at the test and item level. If bias is only examined at the test level, the existence of bias at the item level may be ignored. Interest in bias at the item level may be useful in the process of test development; in this case, test items that are indentified as biased can be revised and if necessary removed (Kamata & Vaughn, 2004). Even though authors of most standardized tests have

examined test items and removed any biased items, there is a possibility that some items are biased for a particular subpopulation. In the test construction process, minority groups or subpopulations that are likely to be exposed to bias are usually based on ethnicity or gender (Qi & Marley, 2009; Kamata & Vaughn, 2004; Snow & Van Hemel, 2008). Item bias can be originated from different sources, such as poor item translation, ambiguities in the original item, low content appropriateness of an item to a different culture, and the specific connotations associated with the way in which an item has been written (Van de Vijver & Matsumoto, 2011). Thus, examination of bias at the item level allows for investigating the impact of specific items for the group that is being examined and maximizing the comparability of the results obtained (Kamata & Vaughn, 2004; Van de Vijver & Matsumoto, 2011). Bias is a serious threat against the equivalence of measurement outcomes across cultures that can mislead inferences and conclusions of research studies across different cultural backgrounds. Decisions about bias and equivalence should be based on a combination of statistical procedures and substantive considerations (Van de Vijver & Matsumoto, 2011).

The American Educational Research Association (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME) provide guidelines for the educational measurement specialist to orient the process of development, selection, and administration of educational and psychological instruments (Hambleton, 2005). Three major standards have gained relevance in the context of test translation and adaptation. First, users should revalidate a test when substantial changes in test format, administration style, instructions, language or content have been made. Second, when a test is translated into another language,

reliability and validity evidences should be demonstrated for the translated version of the test. Third, when two language versions of a test need to be compared, evidence of test comparability should be followed. The primary goal of these standards is to address and consider sources of error and invalidity that might appear when tests are translated or adapted to another cultural or linguistic context (Hambleton, 2005). If test results yield one thing for one group, but something different for another group, it is not possible to raise conclusions about levels of proficiency between the two groups (Myers, Wolfe, Feltz, & Penfield, 2006).

Three categories can be identified as sources of error or invalidity in the context of test adaptation: (a) cultural and language differences, where interpretation of results should be considered for all stages of the assessment process, including construct equivalence, item formats used, test administration, and the pace that examinees show; (b) designs and administration methods, with important aspects to be considered including the process of translation, design for adapting the test, data collection strategies, and the design of analysis for establishing equivalence; and (c) interpretation of results, when the purpose of the test is to provide basis for comparing culturally and linguistically diverse groups. Factors such as similarity of curricula and student motivation between the groups should be considered before interpreting test results (Hambleton, 2005).

The International Test Commission (ITC) proposed guidelines for adapting tests and establishing score equivalence, including a set of practical guidelines for test development, validity and reliability for assessment practices (Hambleton, 2005; ITC, 2010). The ITC guidelines include four areas or categories. The first area is the context of

the test, including issues related to the construct equivalence in the language of the groups of interest. The second category is test development and adaptation, which addresses the process of adapting a test, considering translators, and appropriate statistical methods for analyzing data to examine score equivalence. The third category is administration of the tests, including guidelines about how tests can be administered in multiple language groups, and for selecting adequate administrators, choosing items formats, and establishing the appropriate time limits. The final category refers to documentation and score interpretations. Guidelines are provided for researchers to orient the process of communicating decisions that they make when adapting tests, to provide adequate evidence of validation of an adapted test, and to avoid misinterpretations of results from tests in multiple languages (Hambleton, 2005).

Optimizing Assessment Adaptations

Fairness in assessment assumes that children who are being measured have the same level of ability on the variable being observed; it means that the items in the instrument behave in a similar manner across subgroups. The items should be unbiased, as measured by differential item functioning (DIF) (The American Educational Research Association [AERA], American Psychological Association [APA], and the National Council on Measurement in Education [NCME], 1999). To investigate whether irrelevant variance is associated with item performance, researchers often use DIF analyses to establish statistical evidence for item bias (Qi & Marley, 2009). DIF is present when two or more subpopulations perform differently on a test item, assuming that those groups have been matched on the construct measured by a test, or when children are located on the same score distribution (Snow & Van Hemel, 2008; Wyse & Mapuranga, 2009).

Equity and fairness of assessments may be ensured by conducting a DIF analysis that investigates whether items function differently for subgroups by comparing the performance of the advantaged group, usually called the reference group, to the performance of the disadvantaged group, also called the focal group (Wyse & Mapuranga, 2009). When DIF is detected and performance is not equivalent, properties of the item must be studied carefully prior to the use of the item in the test. A consistent reason must be available for using a flagged item, or that item should be deleted from the test (Orlando & Marshall, 2002; Snow & Van Hemel, 2008).

Considerations for Test Translation and Adaptation

Translating an assessment tool brings several concerns that need to be addressed. Linguistic and cultural considerations as well as psychometric properties should be estimated. Hambleton and Zenisky (2011), addressed this issue, proposing a check form composed of 25 questions that summarize translation and adaptation problems that have been described in the cross-cultural research. The first group of questions refers to the meaning of each test items across the source and target languages of interest, and determines the extent to which the versions of the test questions are equivalent. The second group of questions is related to the evaluation of comparability that addresses the types of formats used and the physical presentation of items in a test. If items are formatted differently across languages, the results may appear dissimilar, preventing the establishment of cross-cultural comparisons. The next topic to be addressed in evaluating translations of measures by the questions is grammar and syntax. These questions focus on differences in expressions that may simplify or make the text more difficult, producing differences in the level of difficulty between the two language translations. The fourth

group of questions takes into account the stimulus materials that are included in the test (e.g., tables, charts, and graphs) that can impact the level of motivation for respondents, being inconsistent across culturally and linguistically diverse groups. This lack of consistency may introduce bias into the results. Finally, the last group of questions refers to the cultural relevance and specificity of the instruments. It involves culture and the environments in which a test or assessment will be used. The social context and appropriateness of the content are essential elements to be considered.

There is an increasing belief that translating an instrument does not only include a linguistic process. The direct translation of an instrument is not sufficient evidence to guarantee test equivalence (Peña, 2007). A high quality translation needs to maintain cultural characteristics of the original material, but also should modify the content of items if a direct or literal translation is producing a cultural inappropriate elicitation (Van de Vijver & Leung, 2011). Ensuring equivalence at the level of context and opportunity when cross-cultural research studies on child's development are designed is an important methodological goal. Instruments used across cultures need to provide equal opportunities for the examinees to demonstrate the same abilities and behaviors under study.

Peña (2007) proposed four categories of test equivalence to facilitate the process of designing and evaluating the appropriateness of translation and adaptation of measurement tools. The identification of these categories needs to consider the study's goals as well as stimulus and measurement outcomes. In this context, each category will complement the features of the others. The first category is linguistic equivalence, referring to the direct translation of an instrument and its instructions. This is usually

accomplished using translation from the source to the target language; then, a back translation is done by a different translator who translates the target version to the original language. Both versions are compared and differences discussed and resolved.

The second category is functional equivalence, meaning that the two versions of an instrument measure the same construct. Cultural equivalence is the third category and considers the way in which examinees interpret and respond to the items in a test. In addition, cultural equivalence implies that both versions of a test address the same cultural meaning for each group. Finally, the last category proposed by Peña is metric equivalence, referring to the difficulty level available in items or questions in the two language versions of a test.

The ASQ-3 User's Guide (Squires et al., 2009) recommends 6 steps to facilitate equivalence in translations, as guidelines for programs that are interested in translating and adapting the ASQ-3. The steps include: forward translation to the target language, back translation to the source language, comparison between back translation and the original ASQ-3, modifications of the forward translation, piloting the translated version, and finally, modifications of the pilot version (Squires et al., 2009).

In conclusion, the screening of young children from diverse backgrounds needs to be conducted using culturally and linguistically adequate instruments that meet the required standards for adapting tests. Careful attention should be paid when constructing or adapting tests, including a close examination of test items to ensure that they are free from bias, avoiding culturally inappropriate use of measurements and the establishment of conclusions from misinterpreted results. Through valid, reliable and culturally

appropriate screening tools, young children who might have disabilities or developmental delays will be identified.

The following research questions will be investigated:

1. Do 9, 18 and 30 months items function invariantly across the Spanish and English language version of the ASQ-3?
2. What is the cultural appropriateness of the Spanish translation of the ASQ-3 as evaluated by Spanish-speaking parents?
3. What is the readability and utility of the Spanish translation of the ASQ-3 as evaluated by Spanish-speaking parents?

CHAPTER III

METHOD OF STUDY

Examining the equivalence and cultural appropriateness of the Spanish translation of the Ages and Stages Questionnaires 3rd edition (ASQ-3) (Squires & Bricker, 2009) for the 9, 18 and 30 months intervals was the purpose of the study. How items or questions function in the English and Spanish translation of the ASQ-3 and how parents evaluate cultural appropriateness and utility of the Spanish version were analyzed. The following research questions were investigated.

1. Do 9, 18 and 30 months items function invariantly across the Spanish and English language version of the ASQ-3?
2. What is the cultural appropriateness of the Spanish translation of the ASQ-3 as evaluated by Spanish-speaking parents?
3. What is the readability and utility of the Spanish translation of the ASQ-3 as evaluated by parents?

Research Design

A non-experimental psychometric study was conducted to examine the equivalence and appropriateness of the ASQ-3 for the 9, 18 and 30 month intervals. Item Response Theory (IRT) modeling was used to examine if items for the English ASQ-3 and the Spanish translation functioned similarly at 9, 18, and 30 months intervals. Also, interviews with a sample of the Spanish-speaking population were conducted to obtain

parents' [1] responses and opinions about the cultural appropriateness of the Spanish ASQ-3 and their level of satisfaction with using the ASQ-3.

Participants

A total of 798 English and Spanish-speaking parents and their children ages 9, 18 and 30 months participated in this study. A sample of 424 Spanish-speaking parents and a sample of 374 English-speaking parents were recruited, as shown in Table 1. Participants resided in the United States at the time of data collection. On-line, de-identified data retrieved from the ASQ publisher (Paul H. Brookes Publishing) and from the ASQ Oregon website were analyzed along with data gathered directly by the researcher from families. Children who are typically developing and those who are experiencing risk factors (e.g., living below the federal poverty level, mother's age of 19 or younger at child's birth, mothers with educational level of 12th grade or less) were included in the samples. Children with documented developmental delays were excluded. The number and ages of children that were recruited are reported in Table1.

Recruitment of Participants

A convenience sample of English and Spanish-speaking children approximately 9, 18 and 30 months of age and their parents who consented to participate were recruited in different locations of the U.S. Data were collected in preschool public programs, child care centers, nonprofit agencies, health centers, Woman, Infant and Children's program (WIC), and through the internet (ASQ Oregon website and Paul Brookes publisher on-line data base).

[1] The term "parent" will be used to include primary caregivers such as relatives, foster parents and others who spend significant time with young children

Table 1. Number of participants by age interval and language version

Age interval	Questionnaire	Spanish	English	Total
9 months 0 days – 10 months 30 days	9 months	108	112	220
17 months 0 days – 18 months 30 days	18months	139	135	274
28 months 16 days – 31 months 15 days	30 months	177	127	304
Total		424	374	798

Thirty-six families in different regions of the U.S were contacted by phone and in person by the researcher through letters sent to programs and agencies. Flyers and posters describing the project were posted in different centers, programs, and on an internet site (craigslist). A packet with materials was sent to interested families and service providers containing: a) consent forms, including a brief description of the study and features of the ASQ-3; b) demographic form; and c) ASQ-3 appropriate for the child's age and language spoken; d) a pre-paid addressed envelope. Parents completed the ASQ-3 corresponding to their child's age, using the paper version. Parents who agreed to answer the ASQ-3 and participate in a subsequent interview received (n = 31) an incentive of $10 gift certificates.

Measures

Three measures were used: a) Ages and Stages Questionnaires, 3rd Edition, (Spanish and English versions), b) demographic form, and c) parent interview. Each measurement tool is described below.

Ages & Stages Questionnaires

The Ages and Stages Questionnaires: A Parent-Completed, Child-Monitoring System, Third Edition (ASQ-3) (Squires & Bricker, 2009) is a screening tool designed to accurately identify infants and young children with suspected developmental delay who may benefit from further assessment and intervention (Squires et al, 2009). The ASQ-3 is a comprehensive first-level developmental screening system that identifies children who might be at risk for developmental delays. It is a low cost and easy to administer tool composed of a series of 21 questionnaires, for children between 1 and 66 months of age. Each questionnaire includes 30 items organized in five developmental areas: communication, gross motor, fine motor, problem solving, and personal social with a section with general questions to address parental concerns related to their child's development.

The ASQ-3 item response options are: *Yes*, indicating that their child is able to consistently perform the behavior specified in each item; *Sometimes*, indicating that the described behaviors are emerging or they are being performed occasionally; and *Not yet*, indicating that the behavior described is not performed by the child at that time. Although the ASQ-3 system utilizes parents/caregivers' knowledge to observe and complete the questionnaire, it also requires professional participation to score the questionnaire and provide the appropriate feedback for families who participate in the screening process. Trained personnel convert responses to a score or point value for each developmental domain and compare the domain scores with established screening cutoff scores (Squires et al., 2009). The screening tool incorporates an information summary section for scoring

and relevant information about the child and parents' concerns, plus graphic information that summarizes the child's results.

The ASQ-3 is a flexible system that can be used in many ways, responding to families' needs and their preferences, such as mail out using a paper version, online, through interview (in person or over the phone), and during home visits (Squires et al., 2009). Families and service providers can select the best procedure for completing the questionnaire according to family needs.

The mail-out approach is one option that provides the appropriate questionnaire to parents who complete and return it by mail. A second method is the ASQ Family Access online questionnaire completion system. Through this system, service providers and professionals can direct families to a secure web site to complete the ASQ. The online version ensures that the correct questionnaire (interval) is selected and verifies data and scores the answers. Screening results are saved for records (Squires et al., 2009). Both the English and the Spanish translation of the ASQ-3 are available in these two approaches or formats. A study of administration mode invariance examining both paper and the online version formats of the ASQ second edition suggests that there is little DIF across the paper and the online mode, indicating the versions are equivalent (Yovanoff, Squires, & McManus, in press).

Ages & Stages Questionnaires Spanish Version. The Spanish translation of the ASQ has the same number of questions and identical format as the original English version and was reviewed by experts from pediatric and educational fields. Translation errors that were found in the second edition were corrected. Only preliminary unpublished studies (Chen, Squires, & Pomés, 2010) have been conducted to study the

item equivalence between the English and the Spanish translation of the ASQ Second Edition. Results showed that 95 unique ASQ-2 items indicated DIF across all age intervals and domains. In the Spanish translated items, 12 out of the 95 unique items were discovered to either provide fewer examples than in the English version or to contain minor grammatical errors.

The authors suggested similar cutoff scores for the Spanish translation as for the English. Differences were present between versions but not in a consistent direction when English and Spanish risk samples were compared (Squires et al., 2009). There are no research results comparing third edition versions published to date.

Demographic Form

Parents who were contacted directly by the researcher received a demographic form that included general questions related to the child's developmental status, and his/her parents characteristics, the child's gender, date of birth and whether or not the child has been identified as having delays or a disability, mother's age at child's birth, mother's level of education, family income level, number of adults and number of children in home, and ethnic group were included (See Appendix A.)

Parent Interview

The parent interview was a structured interview with closed and open-ended questions. The open-ended questions were presented first so parents were able to spontaneously mention parental qualities they considered important without being guided by the subsequent qualities listed in the closed-ended portion of the interview. In addition, the interview incorporated questions related to parent's level of satisfaction with the ASQ-3. Thirty parents who completed the ASQ-3 and signed a specific consent form

were recruited to participate in a follow-up interview. They agreed to participate by signing a specific consent form. The interview with the parents was conducted over the phone, and included questions related to language spoken at home, years in the country, attendance at childcare, language spoken at childcare, parental qualities and developmental expectations, and questions about items on the ASQ-3 that were not applicable or were difficult to answer. The questions were organized and worded to facilitate accurate and complete parent response (Sheatsley, 1983). (See Appendix B.)

Procedures

The Office for Protection of Human Subjects of the University of Oregon approved the research procedures. Parents' participation was voluntary and parents had the option to withdraw their consent at any time without penalty. Confidentiality for the on-line data was assured using de-identified data. Data were summarized to report findings. Family phone number and address were used only to conduct the phone interview and to send the gift cards after completing the ASQ-3 and the interview. No individual results were reported.

Step one: The first step included activities related to the collection of data. Information was gathered from parents using the following instruments: a) consent form to participate; b) the demographic form that included general questions about the family; c) age and language appropriate ASQ-3 for parents; and d) a separate consent form for participating in the follow-up phone interview.

The researcher mailed forms to service providers and interested parents. Postage and envelopes to return the completed material were also provided. Direct support for parents to complete the questionnaires was provided by the researcher when it was

necessary. Mailed paper questionnaires returned to the University of Oregon were scored by the researcher and screening results were coded and saved. Questionnaires completed online were scored by the online management system. Families of children who were identified as at risk for developmental delays after both paper-pencil and on-line completion were contacted, and suggestions were provided in order to help them to access the type of support required. Data collected during step one were used to answer research question 1.

Step two: The second step included a parent follow-up interview conducted over the phone, related to the utility and level of satisfaction with the Spanish translation of the ASQ-3. Thirty families who agree to participate in the interview phase were contacted by the researcher. The interview took between 7 and 10 minutes. Each interview protocol included a cover sheet to easily identify the date and the outcome of each phone interview. Data collected during step two were used to answer research questions 2 and 3. These procedures are summarized in Table 2.

Table 2. Steps and procedures of the study

Steps	Procedures
Step 1	a) Researcher sent set of materials to childcare centers and interested parents.
	b) Center directors, teachers and researcher distributed sets to parents.
	c) Parents completed: (1) consent form, (2) ASQ-3, (3) demographic form, (4) agreement to participate in the phone interview.
	d) Parents returned materials.
	e) On-line ASQ-3 data were retrieved, organized and combined.
Step 2	a) Researcher contacted parents who agree to participate in the follow-up interview.
	b) Researcher conducted the follow-up interview.

Data Analyses

Data were analyzed using appropriate procedures to answer each research question. A summary of procedures is shown in Table 3.

Research Question 1: Do 9, 18 and 30 Months Items Function Invariantly Across the Spanish and English Language Version of the ASQ-3?

The first research question was answered using IRT modeling, specifically testing for item characteristic invariance across the English and Spanish versions of the ASQ-3. The specific analysis was differential item functioning (DIF) (Embretson & Reise, 2000). To determine whether items were functioning equally on the Spanish and English translation, data analyses were conducted in two steps. In the first step, IRT modeling was used to estimate item characteristic parameters for the two language versions by domain (e.g., communication, fine motor, problem solving). Polytomously scored responses (i.e., 0 = not yet; 5 = sometimes; 10 = always) were analyzed using

WINSTEPS 3.66 computer software (Linacre, 2008). The second step included the revision of items identified as DIF by four native Spanish-speaking experts related to the field of early intervention and linguistics.

Item Response Theory (IRT)

IRT models specify a relationship between the ability or trait level of individuals measured by an instrument and the item response (DeMars, 2010). The main objective of an IRT model is to estimate the probability of a specific item response based on examinee skill and item difficulty. The response pattern of an examinee to a particular set of items provides the foundation for estimating the ability level (Embretson & Reise, 2000). IRT modeling is an effective and recommended psychometric procedure for examining test appropriateness for culturally diverse populations (Reise, Ainsworth, & Haviland, 2005; Sireci, 2011). A one-parameter logistic (1PL) partial credit model was used to estimate item parameters for the two language versions of the ASQ-3.

One Parameter Logistic Model (1PL)

Within the IRT modeling framework, the 1PL model assumes items are equally reliable and that they differ with respect to difficulty only (Embretson & Reise, 2000). Thus, given the examinee's ability, when an item becomes more difficult, the probability of a correct response for that examinee decreases. As the ability of a person increases, the probability of endorsing an item correct also increases (Yovanoff & Tindal, 2007).

Partial Credit Model (PCM)

The partial credit model (PCM) (Masters & Wright, 1984) is a 1 PL model for polytomously scored item responses such as the ASQ-3 responses format (i.e., 0 = not yet; 5 = sometimes; 10 = always) Consistent with the 1PL model, the PCM assumes that

item discrimination (reliability) is equal across items. Unlike items scored dichotomously, the PCM requires estimation of an item step difficulty. The step difficulty value is interpreted as the point on the latent trait scale at which two consecutive category response curves intersect, indicating where on the latent-trait scale the response of one category becomes more likely than the preceding one. It means that the intersection parameters considered as step difficulties are associated with the transition from one category to the next one; in this manner, the examinee must complete several steps in order to respond in the highest category. For instance, the examinee needs to decide between *not yet* and *sometimes* response categories and also between *sometimes* and *yes* to meet the higher response level. In the PCM, the step difficulty parameter represents the relative difficulty of each step. Equation 1 is the Partial Credit model for estimating the probability *P* of response to item *i* with a step difficulty □, when responded to by person *n* with ability □.

$$\log\left(P_{nij} \middle/ P_{ni(j-1)}\right) = \theta_n - \beta_{ij}$$

$\log (P_{nij}/P_{ni(j-1)}) = \square_{.n} - \square_{ij}$

According to equation 1 the odds of responding in category j rather than category j-1 depends on the difference between respondent's ability and the item category's difficulty. As the respondent's ability increases beyond the item category difficulty, then the odds of responding in the next higher category increases.

Differential Item Functioning (DIF)

Using Differential Item Functioning (DIF) analyses, the equivalence of adapted forms of a test such as language translation can be evaluated. DIF provides the

opportunity to examine features of a test item between subpopulations of examinees with the same level of ability and helps to detect possible biased items for one of the populations (Kamata & Vaughn, 2004). DIF analyses estimate the item parameters (item category difficulties in equation 1) independently for a referent group (i.e. English-speaking population) and a focal group (in this case, the Spanish-speaking population). After examinees are matched on ability or trait level, the language used by each subgroup should not affect child's performance on a particular item (Qi & Marley, 2009). DIF analysis has an important role ensuring equity and fairness of assessments. When items are free from DIF, they are considered equitable for all individuals (Wyse & Mapuranga, 2009). It has been recommended that studies using DIF analysis also include at least three steps to identify evidence for DIF: (a) use of statistical procedures to detect DIF, (b) utilize experts' judgments to determine sources of DIF, and (c) determine whether the source of DIF is irrelevant or not to make the decision of removing an item from the instrument (Takala & Kaftandjieva, 2000; Uiterwijk & Vallen, 2005; Van de Vijver & Poortinga, 2005).

After data were gathered and IRT-based DIF analyses conducted, the second step for answering the research question 1 included the revision of items identified as having DIF. Three native Spanish-speaking specialists related to the field of early intervention and one to the field of linguistics reviewed DIF items in order to determine whether the translations were appropriate and if modifications need to be made. The panel of experts examined the equivalence between the English and the Spanish translation of the ASQ-3 following two recommended principles for cross-cultural development and adaptation of assessments purposed by Peña (2007): (a) linguistic equivalence based on the revision of

the direct translation of DIF items, ensuring that the words and linguistic meaning are the same in both versions; and (b) functional equivalence to examine whether the DIF items are targeting the same developmental skills in both Spanish and English ASQ-3 versions.

Research Questions 2 and 3: What Is the Cultural Appropriateness of the Spanish Translation of the ASQ-3 as Evaluated by Spanish-Speaking Parents? What Is the Readability and Utility of the Spanish Translation of the ASQ-3 as Evaluated by Parents?

The second and third questions pertain to Spanish-speaking parents' perception of the cultural appropriateness, readability, and utility of the ASQ-3 were investigated using parent interviews. The follow-up phone interview was conducted with 31 Spanish-speaking parents as shown in Table 3.

Answers from the parent interview were analyzed for the level of satisfaction of parents with completing the Spanish translation of the ASQ-3 and with the translation and individual test items. Information gathered from the interviews was categorized and analyzed. Response frequencies were also calculated. Cultural equivalence between the ASQ-3 English and Spanish and appropriateness were examined from the information collected through the interviews in order to identify how members of the Spanish-speaking group view, understand, and interpret the meaning of items, and respond to the questions on the Spanish translation of the ASQ-3 based on their beliefs, and their developmental expectations for their children (Peña, 2007).

Coding the Interview

Information compiled from the interview was coded to facilitate its organization and analysis. Coding analysis included the revision of a set of responses and notes

previously synthesized and the meaningful division of the information, maintaining the relations between the components. Codes were assigned to the data attached to response units (i.e., word, phrase, sentence or paragraph) gathered from the study (Miles & Huberman, 1994). The method of building the codes was inductive; which means that labels were assigned after the responses from parent interviews were collected (Glaser &Strauss, 1967).

Coding was also checked for accuracy. A second Spanish-speaking researcher reviewed the coding process of the same data set in order to establish intercoder reliability. Once agreement and redefined codes were established, pattern codes or categories were determined. Patterns identified an emergent theme, summarizing segments of data. Figure 3 shows the process that was followed in the analysis and interpretation of data from the coding step to the development of a theory.

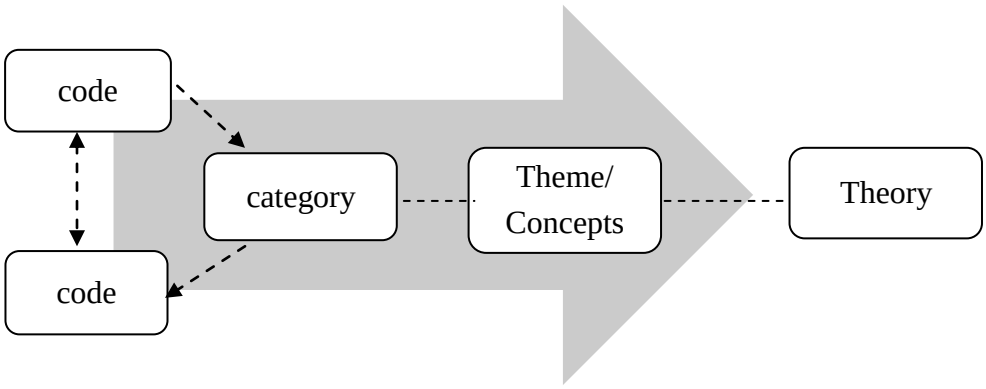

Figure 3. From coding to theory. Coding process that allow for the establishment of categories and subsequently the development of a theory. Adapted from "The Coding Manual for Qualitative Researchers" by J. Saldaña, 2009. p. 12.

When the major coding categories are compared with each other and consolidated in various ways, the researcher may be able to transcend the concrete nature of the data and move toward the thematic, conceptual, and theoretical dimension of the analysis (Saldaña, 2009). Codes understood as linking are then able to function as a first step in the emergence of categories, and later serve in developing a more elaborate and complex theme that includes all the features previously found in the data. A reiterative and cyclical process of coding and recoding, categorizing and recategorizing data occur until a theme is solidly established.

Table 3. Summary of research questions, measurement tools and data analyses

Research questions	Measurement tool	Data analyses
Do 9, 18 and 30 months items function invariantly across the Spanish and English language version of the ASQ-3?	Consent form Invitation form ASQ-3 (English/Spanish)	Item Response Theory (IRT) modeling, one parameter logistic (1PL) partial credit model (PCM) Differential item functioning (DIF) analysis Language Equivalence Functional Equivalence
What is the cultural appropriateness of the Spanish translation of the ASQ-3 as evaluated by Spanish-speaking parents? What is the readability and utility of the Spanish translation of the ASQ-3 as evaluated by parents?	Demographic form Individual interview (over phone and in person)	Qualitative analysis Percentage of answers, frequency of responses. Cultural Equivalence and appropriateness

CHAPTER IV

RESULTS

Results are presented in this chapter addressing the three research questions. First, participants' demographic information is described. Second, the function of items for both the English and Spanish ASQ-3 and their equivalence in the translation are presented. Finally, cultural appropriateness, utility and readability of the Spanish ASQ-3 as evaluated by Latino parents are reported.

Participants

The sample included 798 parents and their children approximately 9, 18 and 30 months old. Of these, 374 parents completed the ASQ-3 in English and 424 parents used the Spanish translation. More parents of boys (n = 419) than girls (n = 379) participated. ASQ-3 interval, version and sample are shown in Table 4.

Table 4. Participants by ASQ-3 interval completed and language version

	Version		
ASQ-3 interval	English	Spanish	Total
9 month	112	108	220
18 month	135	139	274
30 month	127	177	304
Total	374	424	798

ASQ-3 data were gathered using different methods. A total of 376 families completed the ASQ-3 using the on-line system created by the Early Intervention Program at the University of Oregon, and 386 families from different agencies around the U.S completed the ASQ-3 using paper administration, from which results were entered into a data-base generated by the ASQ-3 publisher. Data provided by the Early Intervention program and the publisher were de-identified. Limited or difficult to match demographic information was obtained through these data bases. The remaining 36 families completed the Spanish ASQ-3 and were recruited by the researcher at locations serving Latino families and their children (e.g., WIC program, local churches, Latino family centers, programs for parents of young children, non-profit organizations). Within a period of four months, 36 families completed the Spanish ASQ-3 and 31 of them participated in the follow-up phone interview.

Ninety-two percent of questionnaires were completed directly by mothers or other caregivers (e.g., father, grandparents, foster parents) and the remaining 8% were completed during home visits with the help of a teacher or specialist. Ninety-four percent of the participants reported their ethnicity. The majority ethnic group was Hispanic/Latino (*n* = 52.1%), followed by White/Caucasian (*n* = 29.2%), mixed ethnicity (*n* = 7.3%), African American (*n* = 2.5%), and Asian (*n* = 1.4%). Table 5 depicts participants' ethnicity and the language used by parents when they completed the ASQ-3.

ASQ-3 Scores

Analysis of ASQ-3 scores was conducted as a preliminary step to describe the sample and identify how results were distributed across groups. The overall scores obtained by children for each ASQ-3 interval (i.e., 9, 18, 30 months) by developmental

domain (e.g., communication, gross motor, personal social) are presented in Table 6. Each developmental area has a possible total score of 60 points and each age interval has a specific cutoff score used to determine if a child is developing as expected or if he/she is at risk for developmental delays.

Table 5. Ethnicity and language used by participants

			ASQ-3 version	
Ethnicity	Frequency	Percent	English	Spanish
Hispanic/Latino	416	52.1	17	399
White/Caucasian	233	29.2	232	1
African American	20	2.5	17	3
Asian	11	1.4	11	0
Native American	6	0.8	6	0
Pacific Islander	1	0.1	1	0
Other	1	0.1	1	0
Missed	48	6	48	0
Total	750	94	326	424

A cutoff score of 2 standard deviations below the mean domain score appeared to be the best cut off score to avoid over and underidentification of children (Squires et al., 2009). Results showed that the ASQ-3 normative means (Squires et al., 2009) seemed to be higher on the 18 and 30 month intervals for both English and Spanish means than the mean scores obtained from the current sample. The gross motor normative mean for the 9 month interval was also higher than the current obtained means. The Spanish translation

of the ASQ-3 showed higher means than the normative and English means at 9 month interval on communication, problem solving and personal social domains. Only the personal social domain at 18 month was higher than the normative and English means for this domain. The English mean for communication at 30 month was higher than the normative and Spanish means. Results are presented in Table 6.

A multivariate analysis of variance (MANOVA) was performed for each ASQ-3 interval to test the differences between the groups. Communication, gross motor, fine motor, problem solving and personal social standard scores were the dependent variables and ASQ-3 language version was the independent variable, with two levels, English and Spanish. The analysis was performed using SPSS 17.0 for Windows. Using Wilk's test of multivariate significance for the 9 month interval, language version considered as independent variable was statistically related to the weighted multivariate combination of dependent variable measures, $\Lambda = 0.89$, F (5, 208) = 5.17, $p < .05$, $\eta 2 = 0.11$. For the 18 month ASQ-3 interval, language version was also statistically related to the multivariate combination of dependent variables, $\Lambda = 0.88$, F (5, 256) = 6.90, $p < .05$, $\eta 2 = 0.12$. In the same way, for the 30 month interval, the independent variable was statistically related to the multivariate combination of dependent variables, $\Lambda = 0.94$, F (5, 281) = 3.89, $p < .05$, $\eta 2 = 0.06$. Table 7 summarizes MANOVA results.

Table 6. Scores for each ASQ-3 age and domain by language version

ASQ-3 Interval	Domain	Language		ASQ-3 *M* (Cutoffs)
		English (*n* = 374) *M* (*SD*)	Spanish (*n* = 424) M (*SD*)	
9 month	Communication	**44.37** (12.95)	**48.74** (10.90)	38.55 (13.97)
	Gross Motor	44.69 (15.88)	44.03 (15.60)	46.72 (17.82)
	Fine Motor	51.99 (12.10)	53.13 (9.92)	52.31 (31.32)
	Problem Solving	50.41 (11.75)	50.92 (11.63)	49.51 (28.72)
	Personal Social	**42.12** (12.12)	**47.01** (11.79)	42.47 (18.91)
18 month	Communication	34.09 (17.22)	36.75 (16.95)	42.30 (13.06)
	Gross Motor	52.51 (12.71)	52.54 (13.84)	55.46 (37.38)
	Fine Motor	48.89 (11.51)	48.54 (12.58)	52.44 (34.32)
	Problem Solving	41.58 (13.12)	43.92 (12.24)	45.99 (25.74)
	Personal Social	**44.26** (12.99)	**50.96** (10.30)	47.90 (27.19)
30 month	Communication	46.82 (15.37)	44.05 (16.53)	43.81 (33.30)
	Gross Motor	51.19 (11.54)	51.30 (10.46)	53.54 (36.14)
	Fine Motor	**38.70** (16.80)	**42.64** (14.53)	46.78 (19.25)
	Problem Solving	43.58 (14.69)	41.17 (14.53)	50.18 (27.08)
	Personal Social	46.25 (12.31)	47.08 (12.37)	51.87 (32.01)

Note. ASQ-3 normative means and cutoff scores were obtained from "ASQ-3 User's Guide," by J. Squires, E. Twombly, D. Bricker, and L. Potter, 2009, p.171. Copyright 2009 by Paul H. Brookes. Means (*M*) and standard deviations (*SD*) were derived from this sample. Means in bold indicate statistically significant differences between language version used.

Table 7. ASQ-3 Domain score MANOVA results by interval

ASQ-3 age	Source	Wilk's Lamda Λ	F	df	error	η^2
9 month	Language	0.89	5.17**	5	208	0.11
18 month	Language	0.88	6.90**	5	256	0.12
30 month	Language	0.94	3.89**	5	281	0.06

Note. MANOVA dependent variables consist of ASQ-3 domains (i.e., communication, gross motor, fine motor, problem solving, personal social). All *F* statistics are exact, **p*, .05; ***p*, .01.

In addition, univariate ANOVAs on each of the five measures comprising the multivariate composite on each age interval were conducted. The analysis for the 9 month interval revealed statistically significant mean differences between language versions on communication, F (1, 212) = 8.33, MSE = 141.24, $p < .05$, and personal social domains, F (, 212) = 14.41, MSE = 129.96, $p < .05$. For the 18 month interval, statistically significant mean differences were obtained on the personal social domain, F (1, 260) = 23.87, MSE = 137.38, $p < .05$. Finally, for the 30 month interval, statistically significant mean differences were found on the fine motor domain, F (1, 285) = 5.85, MSE = 240.33, $p < .05$. Table 8 presents ANOVA results. Results found regarding the examination of test items are presented below.

Table 8. ASQ-3 domain score ANOVA results by interval

ASQ-3 age	Source	*df*	error	*MSE*	*F*
9 month	Language on communication	1	212	141.24	8.33**
	Language on personal social	1	212	129.96	14.41**
18 month	Language on personal social	1	260	137.38	23.87
30 month	Language on fine motor	1	285	240.33	5.85*

Note. All *F* statistics are exact. **p*, .05; ***p*, .01.

Research Questions

Research Question 1: Do 9, 18 and 30 Months Items Function Invariantly Across the Spanish and English Language Version of the ASQ-3?

The first research question was addressed in two steps. The first was related to the examination of the equivalence of items between the English and Spanish translation of the ASQ-3. Differential Item Functioning (DIF) was selected as a model for examining the test's internal features to detect whether the relations of items vary across the observed groups. Using Item Response Theory (IRT), a Rasch partial credit model (PCM) (Masters & Wright, 1984) DIF model for polytomous items was fitted to the data to test the hypothesized invariance model. Following the PC model requirements, only the difficulty parameter was considered. Consistent with the Rasch model, the item discrimination and guessing parameters were constrained to one and zero respectively. WINSTEPS 3.66 computer software (Linacre, 2008) was used to test the invariance model specifying the English participants as the reference group and the Spanish sample

as the focal group. The measured order of items, the item fit statistics, and how the response structure was predicted were investigated before conducting the DIF analysis in order to confirm whether the model fit the ASQ-3 data for the English and Spanish translation.

Item Fit

The Rasch model provides a probabilistic relation between observed responses and item difficulty, given the examinee's trait level. The mean-square (MNSQ) fit statistic indicates if the Rasch partial credit model fits the observed data. A MNSQ range from 0.5 to 1.5 is considered acceptable fit. Values above 1.5 are considered an underfit to the data, indicating that items do not provide sufficient information about what is being measured due to excessive randomness. In this case, the item may not be sensitive enough. Values below 0.5 overfit the data, indicating overpredictability. Ninety ASQ-3 items on each language were examined. Only 16 items presented misfit. Table 9 presents the findings regarding item fit on the ASQ-3 items by domain and each age interval.

Order Difficulty of Items

Order of items was also explored. ASQ English items are hierarchically presented in each interval following the natural progression of these developmental skills. During the ASQ development process, the selection of items for each questionnaire interval was made by including only items that targeted a skill in the middle to low end of the developmental range for each age interval (Squires et al., 2009). In the current study, out of 180 items (i.e., 90 English items and 90 Spanish items) that were examined, only a few seemed to follow a different difficulty order considering the probability of success for a person on an item, as shown in Table 10.

Table 9. Mean square statistic by ASQ-3 language, interval and domain

Version/age interval	Domain	Item (MNSQ)
English 9 month	Gross motor	1 (9.90)
		2 (4.40)
		3 (0.38)
Spanish 9 month	Gross motor	1 (2.24)
		2 (2.98)
English 18 month	Communication	1 (2.81)
	Problem solving	5 (4.20)
Spanish 18 month	Communication	1 (3.52)
	Gross motor	1 (2.33)
		2 (0.41)
	Problem solving	3 (0.39)
English 30 month	Gross motor	2 (0.44)
	Problem solving	2 (2.51)
	Personal social	3 (2.22)
Spanish 30 month	Fine motor	1 (2.06)
	Problem solving	2 (2.78)

Note. Mean-square fit statistics values > 1.5 item is off-variable noise is greater than useful information. Values < 0.5 item is overly predictable, item are measuring unexpected variables.

Table 10. ASQ-3 Items that follow an unexpected developmental order

ASQ-3 version	Age interval	Domain /order of items
English	18 month	Fine motor (4-6-1-2-3-5)
		Personal social (1-5-4-3-6-2)
	30 month	Fine motor (3-4-5-2-6-1)
Spanish	18 month	Personal social (1-5-6-4-2-3)
	30 month	Fine motor (5-4-2-3-6-1)

Note. Expected order of items should be approximate to 6-5-4-3-2-1 (easier to more difficult)

Response Categories

A partial credit model was used to examine how probable the observation of each category relative to the item measure was and how well categories were being used by respondents. Each item was studied according and its response structure was modeled. The probability curves indicated how the response structure is predicted to work for any future sample. A disordered threshold indicated that the category is relatively rarely observed, (i.e., uses a narrow interval on the latent variable, and so may indicate substantive problems with the rating or partial credit). Thresholds are the points at which adjacent category probability curves intersect. Figure 4 shows an item (i.e., 6, and fine motor) that used all the category responses on the 18-month Spanish version.

Out of 180 items examined, only 10 presented an unexpected structure. The most recurrent situation was having only two category responses used by respondents (i.e., 5 = *sometimes* and 10 = *yes*), observed on the English 9 month interval for communication

(item 1 and 3), and gross motor (item 2), and on the Spanish translation for the fine motor (item 1) domain. Also it was observed on the 18 month English version for fine motor (item 5), and on the 30 month interval, gross motor domain (item1).

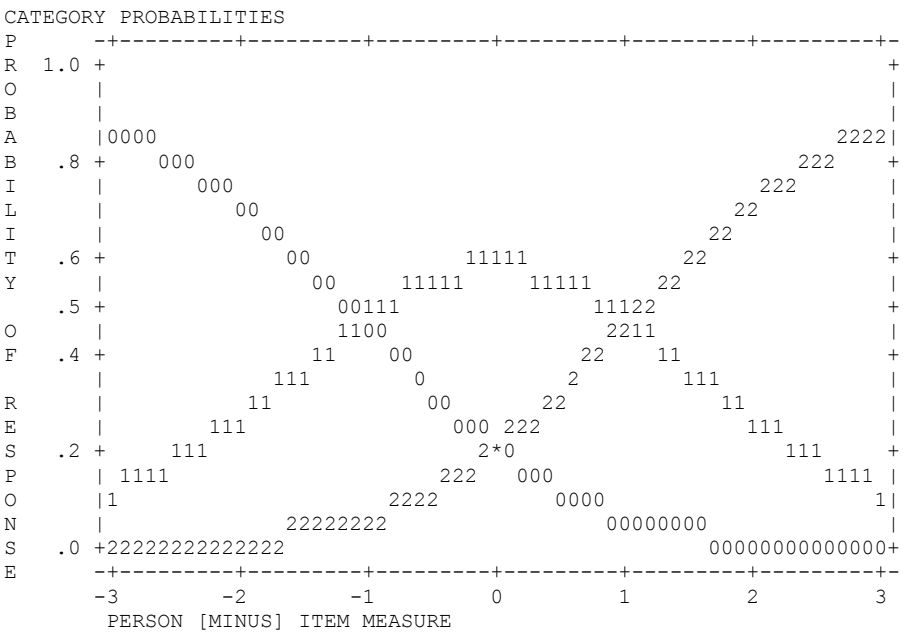

Figure 4. Structure of an item with all category responses well used

In other cases, even though all response categories were present, one category (e.g., *sometimes*) did not intersect with the subsequent one in the graph (e.g., *yes*). This means that not all categories were used, resulting in a misfit of the partial credit model to the observed data for that item. This situation was observed on the Spanish 9 month interval on fine motor (item 2), 18 month problem solving (item 3), 30 month gross motor (item2) and personal social (item 6). The remainder of ASQ-3 items had an expected response structure where all response categories were used. Figure 5 presents an example of the structure of an item when respondents used only two responses or

categories. The graph corresponds to item 1 for the English group of respondents on the 30 month interval, gross motor domain.

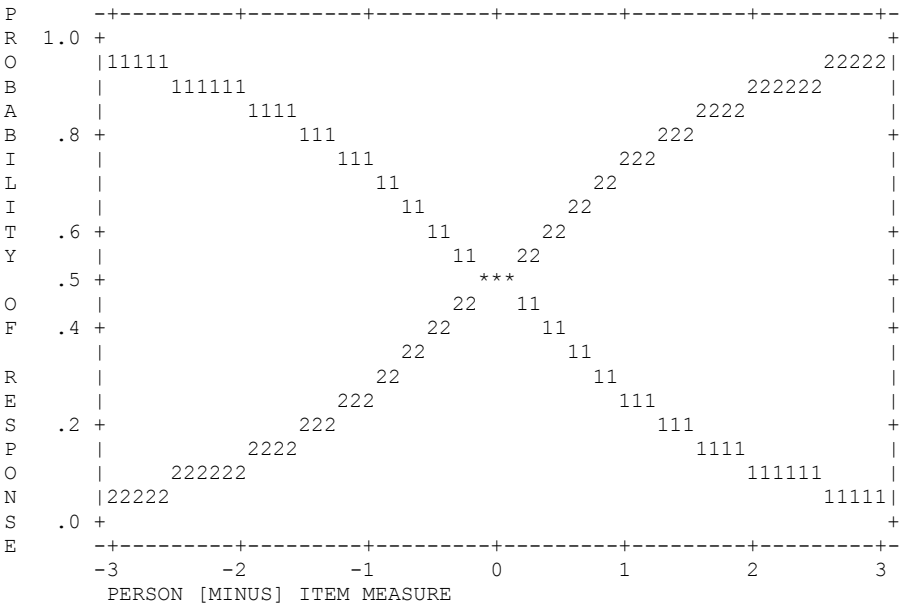

Figure 5. Structure of an item with two response categories used

DIF Analyses

The following section describes the findings regarding item function for the reference group (English-speaking families) compared with the focal group (Spanish-speaking families), by domain and by each age interval. DIF analyses identified 27 out of 90 items (30%) functioned differently for each group (alpha value .05), showing a significant difference. Table 11 shows the ASQ-3 items that were found to function differently between the two language versions by interval and developmental domain. The calibration of items seemed to be represented evenly across languages and domains.

Fourteen items appeared to be more difficult for the Spanish-speaking population and 13 items were more difficult for English-speaking participants.

Table 11. ASQ-3 items that function differently by age and domain

ASQ-3 interval	ASQ-3 domain	DIF items
9 month (n = 5)	Communication	1(S), 3(S), 5(E)
	Gross motor	-
	Fine motor	-
	Problem solving	-
	Personal social	5(S), 6(E)
18 month (n = 11)	Communication	3(S), 5(E)
	Gross motor	1(S), 3(S), 4(E), 5(E)
	Fine motor	5(S)
	Problem solving	2(E), 6(S)
	Personal social	1(E), 2(S)
30 month (n = 11)	Communication	3(S), 5(E)
	Gross motor	2(E), 3(S), 5(E), 6(S)
	Fine motor	3(E), 5(S)
	Problem solving	2(E), 3(E), 5(S)
	Personal social	-

Note. Item calibration for each language is represented as more difficult. S = item more difficult for Spanish-speaking participants. E = item more difficult for English-speaking participants.

The second step to answer research question 1 included the revision of the 27 items identified as having DIF. Three native Spanish-speaking specialists in the field of early intervention and in the field of linguistics reviewed DIF items in order to determine whether the translations were accurate, and whether modifications needed to be made. As mentioned earlier, the panel of experts examined the equivalence between the English and the Spanish translation of the ASQ-3 following two recommended principles for cross-cultural development and adaptation of assessments: (a) linguistic equivalence based on the revision of the direct translation of DIF items, examining the words used and their meaning in both versions; and (b) functional equivalence based on whether the DIF items were measuring the same developmental skills in both Spanish and English ASQ-3 versions (Peña, 2007). A digital form including all DIF items in both English and Spanish was sent to each bilingual expert, including questions that addressed the principles for adapting assessments previously mentioned. (See Appendix C.) A brief description of the expert's experience and field of professional development is presented below.

Expert 1 ("L") is a native Spanish-speaker multicultural specialist. She provides assistance to parents and providers in accessing child care resource and referral information services as well as professional development opportunities especially for those who are culturally and ethnically diverse, with limited English proficiency or monolingual in Spanish only. She has 10 years of experience working with families and their young children in the community.

Expert 2 ("R") is a native Spanish-speaker Peruvian linguist who received her Ph.D. in Linguistics from the University of Oregon in December 2010. Her research is

centered in Amazonia, and integrates theoretical and typological linguistics, documentary and descriptive linguistics, and bilingualism in language contact situations.

Expert 3 ("G") is a native Spanish-speaker who works at an specialized agency that provides early intervention and early childhood special education to infants, toddlers and preschool age children in Lane County from birth to school age with developmental needs in the areas of behavior, speech and language, cognitive, fine and gross motor, self-care and social skills. She works as interpreter and home visitor for Latino families and their children offering and coordinating specialized services.

Expert 4 ("A") is a native Spanish-speaker who has worked with Latino families for 19 years in Lane county, building a bridge between home and school, helping children to be ready to enter Kindergarten. She also works with parents and providers by conducting parenting groups and providers training throughout Oregon to help them provide better support to Spanish-speaking parents in their communities.

Expert's Evaluation

Expert 1 ("L") found 12 out of 27 DIF items that were not linguistically equivalent (9m-CM5, 9m-PS5, 9m-PS6, 18m-CM5, 18m-GM-4, 18m-FM5, 18m-PS1, 30m-CM5, 30m-GM5, 30m-FM3, 30m-FM5). According to "L", the selection of some words used for the Spanish translation appeared to be inappropriate or inaccurate to the original English item. The expert also noted some grammatical differences in the way in which the Spanish questions were worded in the ASQ-3 (e.g., the lack of the subject in some of the question, a complex way to organize the sentence). Four questions appeared not to be measuring the same developmental level of skills in the English and Spanish translation

of the ASQ-3 (9m-communication item 5, 9m-personal social item 5, 18m-problem solving item 1, and 30m-communication item 5).

Expert 2 ("R") found 5 Spanish items whose translation was not accurate (18m-gross motor item 3, 18m-personal social item 1, 30m-fine motor item 3, 30m-fine motor item 5, 30m-personal social item 3), and suggested that even though the translation for some items was similar, their meaning could be different and thus might be measuring different skills. R. found that 15 Spanish items were not measuring the same skill as the English version (9m-commnication item 5, 18m-gross motor item 1, 18m-gross motor item 4, 18m-gross motor item 5, 18m-fine motor item 5, 18m-problem solving item 2, 18m-problem solving item 6, 18m-personal social item 1, 30m-communication item 3, 30-communication item 5, 30m-gross motor item 3, 30m-fine motor item 3, 30m-fine motor item 5, 30m-cognitive item 2, 30m-cognitive item 3). Most of these are related to the meaning of the question in Spanish that was different from the original English meaning. For example, the Spanish version used the word "enseñar" (i.e., in English "teach") when translating the English word "show." The correct word in Spanish should be "mostrar."

Expert 3 ("G") found 10 questions that presented translation differences. According to her analysis, 8 of those 10 questions were not measuring the same construct due to translation problems (9m-personal social item 6, 18m communication item 5, 18m-gross motor item 1, 18m-gross motor item 5, 18m-fine motor item5, 30m-communication item 5, 30m-gross motor item3, 30m-fine motor item3, 30m- fine motor item 5, 30m-problem solving item 3) "G" mentioned that in some cases the translation was unclear or may lead parents to misunderstanding the meaning of the questions. The selection of

specific words, the explicit use of subjects in the question, and the syntactic organization of the question were the reasons that were noted as concerns.

Expert 4 ("A") found four items that indicated an inaccurate Spanish translation (9m-personal social item 6, 18m-problem solving item 6, 30m-fine motor item 3, and 30m-fine motor item 5) According to "A" all these items showed semantic differences and their meaning could be interpreted differently by parents, and they could be measuring different skills across Spanish and English-speakers. Table 12 shows the items that were indicated as measuring different constructs. (See Appendix D for details of the Spanish item reviews.).

Research Question 2: What Is the Cultural Appropriateness of the Spanish Translation of the ASQ-3 as Evaluated by Spanish-Speaking Parents?

Follow-up phone interviews were conducted with 31 Latino parents who agreed to participate. Twenty-nine parents completed only one ASQ-3 and two parents completed two questionnaires because two of their children at different ages participated. Parents completed the interview after completing the age-appropriate Spanish ASQ-3. The time elapsed between the completion of the ASQ-3 and the interview was less than 7 days.

Participant Interviews

Descriptions of the 31 Latino participants who completed the phone interviews are presented first in order to provide a more comprehensive understanding of their responses in the interview. Cultural equivalence between the English and Spanish ASQ-3 was examined to identify how Latino families viewed, understood, interpreted the

meaning of items and explored whether parents' developmental expectations and beliefs corresponded to the items and developmental areas on the ASQ-3 (Peña, 2007).

The interviews were conducted between June and October 2011. All interviews were completed in Spanish by the researcher over the phone. Seventeen closed questions and two open-ended questions were included, taking approximately 10-15 minutes for parents to answer all the questions.

Table 12. Items that might measure different constructs

ASQ-3 interval	ASQ-3 domain	DIF items	Items measuring different construct			
			L	R	G	A
9 month (n = 5)	communication	1(S), 3(S), 5(E)	5	5		
	gross motor	-				
	fine motor	-				
	problem solving	-				
	personal social	5(S), 6(E)	5		6	6
18 month (n = 11)	communication	3(S), 5(E)			5	
	gross motor	1(S), 3(S), 4(E), 5(E)		1,4,5	1,5	
	fine motor	5(S)		5	5	
	problem solving	2(E), 6(S)		2,6		6
	personal social	1(E), 2(S)	1	1		
30 month (n = 11)	communication	3(S), 5(E)	5	3,5	5	
	gross motor	2(E), 3(S), 5(E), 6(S)		3	3	
	fine motor	3(E), 5(S)		3,5	3,5	3,5
	problem solving	2(E), 3(E), 5(S)		2,3	3	
	personal social	-				

Note. S = item more difficult for Spanish-speaking group; E = item more difficult for English-speaking group

A written record was completed for each answer and entered in a digital data base. Parents responded to questions related to country of origin, immigration generation, years living in the U.S, their children's country of birth, preferred language spoke at home, and participation in activities in the community.

On average, parents had been living in the U.S 11.5 years (in a range between 28-2 years) and 100% (n = 33) of their children were born in the U.S. All children included in this sample were typically developing children and only six of them were attending child care at the time of the interview. Thirteen parents completed the 9 month ASQ-3 interval, 8 parents the 18 month questionnaire, and 10 participants the 30 month interval. Demographic information is presented in Table 13.

Eighty percent of the parents mentioned that their country of origin was Mexico. The remaining 20% was distributed among El Salvador, Chile, Perú, and USA. Thirty-nine percent of the parents who completed the questionnaire reported to have completed the preparatory level (1^{st} to 6^{th} grade) as their highest educational level, 23% had some preparatory school, 16% had some college or university education, 6% had a bachelor degree and also 6% of the participants had earned a master degree. Figures 6 to 8 depict participant demographic information.

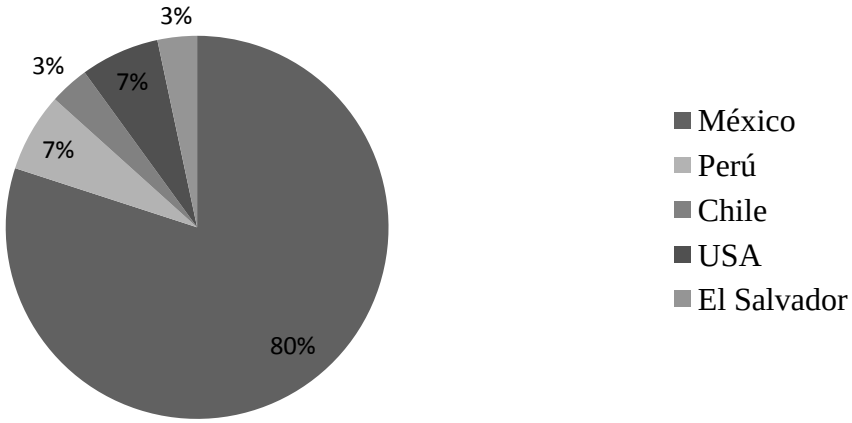

Figure 6. Parent country of origin

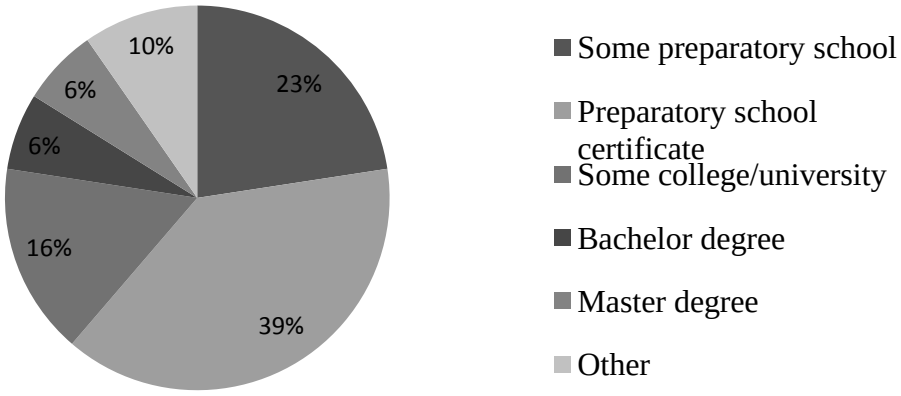

Figure 7. Parent level of education

Family income was also reported. Thirty-nine percent of the families mentioned their annual income range was $12,001 - $24,000 for a family of four people. Twenty-six percent had an annual income between $0 and $12,000 and 10% indicated an annual income between $24,001 and $40,000.

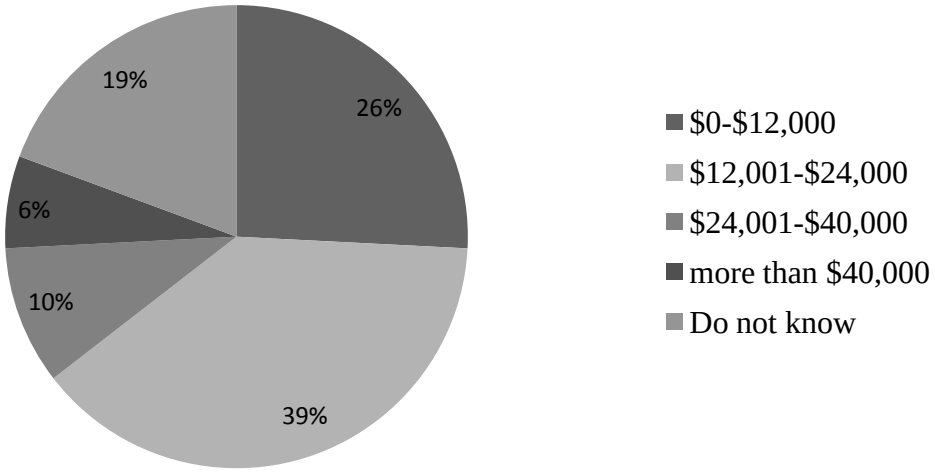

Figure 8. Family income

Table 13. Demographic information of families who responded to the interview

Topic	*N*	*%*
Preferred language spoke at home		
English	1	3
Spanish	27	87
English and Spanish	2	7
Misteco and Spanish	1	3
Person who completed the interview		
Mother	28	90
Father	2	6
Grandparent	1	3
Participation in activities at the community		
Library	12	38
Church	14	45
Parent's classes	7	22
Museum	5	16
None	5	16
Immigration generation		
First	23	74
Second	8	25
Third	4	12
Do not know	1	3

Note. n values for participation in the community topic do not sum to the total of participants; some parents reported more than one activity.

Cultural equivalence and appropriateness of the ASQ-3 was examined using data collected through the open-ended questions and three closed questions from the phone interview. Responses for the open-ended questions were first coded and then analyzed. An inductive procedure for coding was followed in which labels were assigned to data after the responses from parents were gathered. Reliability of the coding was also conducted. A second native Spanish-speaking researcher reviewed the responses and elaborated codes and extracted the corresponding categories and themes. Intercoder reliability was established and percentage of agreement between the categories developed by each researcher.

$$\text{Reliability} = \frac{\text{number of agreements}}{\text{Total number of agreements + disagreements}}$$

The second researcher, blind to the codes and themes established by the first researcher, coded the responses and finally defined themes that emerged from the data code process, using the digital transcription of the interview. A high level of agreement was found with the researchers codes (98%). Codes and categories established by the two coders were combined in order to develop a more comprehensive analysis and interpretation of the parents' responses. The second researcher is a Bolivian native Spanish-speaker doctoral candidate in the Romance Languages program at the University of Oregon. She has taught Spanish classes for undergraduate students for more than 6 years and had a bachelor's degree in social communication and a master's in Romance Languages.

The first open-ended question asked parents to mention the qualities or personality traits (e.g., abilities, skills) that they would like their children to learn at three

years old. Five themes emerged from this question: Pro-social development; pre-academic skills; independent behavior; physical skills and health; and finally effective communication. The strongest theme was pro-social development in terms of the frequency and elaboration of references provided by parents (20 responses), followed by effective communication (18 responses), independent behavior (17 responses), pre-academic skills (12 responses), being physical skills and health the category with less frequency representation (9 responses). Based on the codes and categories elaborated by the researchers from parents' responses, descriptions for each developed theme are presented below.

Pro-social development: parents showed a particular interest in encouraging socialization in their children, specifically the ability to establish relationships with peers and other members in their communities. They wanted their children to be able to get along with different people from different cultures. Parents hoped that their children can learn how to share and avoid selfishness, how to follow norms and social rules, and how to be affectionate without using violence or aggressive behavior against others. A collaborative attitude, respect and obedience are expected behaviors that parents wanted their children to learn.

Effective communication: The development of language skills for their children was a recurrent idea expressed by parents. They hoped their children can talk and understand oral language. A complex speaking vocabulary was also expected. In addition, parents wanted their children to be able to communicate with diverse people. Bilingualism was also emphasized. Parents wanted their children to be fluent in English and Spanish in their communities.

Independent behavior: Parents wanted their children to be able to accomplish things by themselves, especially in terms of learning and using adaptive skills (e.g., toileting, eating, and dressing). They hoped their children can make their own decisions, take care of themselves, feel self-sufficient and confident with themselves and be autonomous. Parents also mentioned the importance of children being able to identify dangerous situations and to discriminate between safety and danger around them.

Pre-academic skills: The responses in this area were related to parents expecting their children to be able to learn how to read, write and count numbers. Parents wanted their children to develop study habits and be independent learners. Finally, parents mentioned their interest in art. They wanted their children to develop sensitivity and qualities that allow them to be involved in different kinds of art.

Physical skills and health: Parents mentioned with less frequency the importance of learning new movements and ways of moving (e.g., walking, running), acquiring new abilities (e.g., riding bicycle) and practicing sports. Learning how to eat healthy food was also mentioned.

Two multiple selection questions related to parental expectations and beliefs were presented in the interview after the open-ended question (This order was to avoid influencing parents' responses.) A consistent pattern was observed when parents answered the multiple selection question related to their expectations on qualities or trait that should be learned by their children. The options for parents to select in this question were: *make decisions on his/her own, work through problems on his/her own, obey adults without questioning, respect adults and people in authority, and help with domestic labors.* Table 14 summarizes parents' choices.

The second open-ended question asked parents to list the values they thought were most important in order to properly raise infants and toddlers. Data gathered from this question were coded into categories and subsequently into themes by the two researchers. Five themes emerged: positive parental attitude; parents as providing affective and emotional support; a couple's positive relationship and family dynamic; parents as providing knowledge, stimulation and morality; and finally modeling and transferring values and beliefs.

Table 14. Themes, codes and frequencies related to opened-ended question 1

Theme	Frequency	Codes
Pro-social development	20	sociability, sharing, generosity, take turns, behave well, play nicely, affectionate, unselfish, helper, respectful
Effective communication	18	bilingual, talk well, communicate well, using new words, vocabulary
Independent behavior	17	security, independency, adaptive skills, self-care, self-sufficient
Pre-academic skills	12	learn colors, shapes, letters, and numbers, reading, drawing, writing, arts, study.
Physical skills and health	9	being healthy, sports, healthy food

Note. Question 1: Could you tell me the most important qualities or personality traits that you would like your child to have at 3 years old?

The most salient theme was parents as affective and emotional support, which was mentioned more frequently than the others (25 responses). Twenty-three responses were categorized as a positive parental attitude, followed by parents as providers of

knowledge, stimulation, and morality (with 18 responses). Modeling and transferring values and beliefs was mentioned in 8 responses while couple's positive relationship and family dynamics was mentioned by 4 parents. A description of each theme is presented below.

Parents as providing affective and emotional support. The most recurrent answers were related to parents showing interest in their children's development, growth, and outcomes. Parents' understanding and comprehension of their children's feelings, needs and interest were other elements frequently mentioned under this theme. Love for children was identified by parents as a core aspect to properly raising their children. Communication between parents and children was another frequently mentioned element. Parents said that was very important to talk with their children and ask them questions related to their feeling and needs. Finally, parents usually mentioned that having time and dedication were crucial aspects to give children all the attention that they need. According to the responses, being present and available for their children and being alert to their needs were essential characteristics that parents should exhibit when raising their children in a positive way.

Positive parental attitude. Patience and tolerance were features that almost all parents mentioned as essential values when raising their children (understanding these qualities as the ability to not get mad or anxious too easily). Knowing how to show authority and set up clear limits were other elements that were mentioned. Talking to children calmly, softly, without screaming or using physical punishment were elements identified by parents as positive. Finally, another quality mentioned was that parents should be willing to ask question of experts in the field of child development (e.g.,

pediatrician, social worker) related to their children's well being, and also be able to receive and follow advice, provided by those experts. Being an informed parent and willing to learn about child's growth and development would promote a positive parental attitude according to parents' opinions.

Parents as providing knowledge, stimulation and morality. This theme includes a recurrent idea of teaching and providing education to children (understanding education as a holistic capital, as a social value). As parents, they were supposed to be didactic, able to play with their children, and help them to learn well. Parents should have enough economic resources to provide different experiences and opportunities to help their children to know the "world" (i.e., their surrounding). Another quality mentioned by parents was teaching their children how to "fight" for the things they wanted, without giving the answers, but encouraging them to search, investigate and explore the world. Reading and writing with them, giving them the best, and encouraging their children to keep going were other noted elements. As parents mentioned, taking good care of their children would be an effective way to avoid dangerous situations. Teaching children to respect others and not to be vulgar or rude will promote a positive sense of self.

Modeling and transferring values and beliefs. Parents mentioned the importance of providing their children with strong personal integrity through examples and modeling desired behaviors and attitudes. Generosity, honesty, kindness, and spirituality were values that should be modeled and transferred to the next generation according to parents' opinions. In addition, talking well to children, using correct words, and using age appropriate examples were listed as promoting positive developmental outcomes.

Couple's positive relationship and family dynamics. Communication and a good relationship in marriage as well as defined roles as a couple and consistency while following norms and consequences were listed as important aspects to promote a healthy and positive family dynamic. Stability, unity and compromise in the family were solid foundations that will guide children's growth and development.

The multiple choice question offered participants the following alternatives: *be understanding, have trust in your children, be creative, have economic resources, set limits, be loyal to the family, be religious/spiritual as parents.* Consistency between parents' preferred choices and their own spontaneous views was possible to observe. Table 15 shows a summary of codes for the second open-ended question, themes and their corresponding codes.

Another aspect considered in examining the cultural equivalence of the Spanish ASQ-3 is the appropriateness of items responding to children's development in the context of a specific culture. When parents were asked if the questions included in the ASQ-3 completed by them were appropriate to the age of their children, 100% of parents answer "yes".

Table 15. Themes, codes and frequencies related to opened-ended question 2

Theme	Frequency	Codes
Parents providing affective and as emotional support	25	comprehension, understanding, show interest, love, time and dedication, asking, being present, trust
Positive parental attitude	23	patience, set limits, communication, be aware and informed, kindness
Parents providing knowledge, stimulation and morality	18	teach, education, providing opportunities, resources, values and moral, help to discover, encouragement, motivation
Modeling and transferring values and beliefs	8	model, examples, being good, talking well
Couple's positive relationship and family dynamic	4	relationship, communication, defined roles, unity, commitment, rule consistency

Note. Question 2: Please list the values you thought are most important in order to properly raise infants and toddlers

Research Question 3: What Is the Readability and Utility of the Spanish Translation of the ASQ-3 as Evaluated by Parents?

Readability and utility of the Spanish ASQ-3 were examined using frequencies and percentages of responses transcribed from the parent interview. Seven multiple choice questions related to utility, readability and level of satisfaction were included in the interview. Questions related to time spent completing the questionnaire, whether parents needed help answering the ASQ-3, how difficult it was to understand it, ease of understanding the items in the way written, and whether pictures and examples were

helpful in completing the questionnaire were included in this portion of the phone interview.

Sixty-four percent of parents (*n* = 20) indicated that they spent between 10 and 20 minutes in competing the questionnaire; 19.35% of participants (n = 6) indicated that they spent between 20 and 30 minutes; 16.12% (*n* = 5) said that they spent less than 5 minutes. Only 4 participants (12.9%) mentioned that they needed some help to respond to the ASQ-3. The remaining 27 parents indicated that they did not need any help for answering the ASQ-3. Thirty parents (96.7%) affirmed that questions were easy to understand, and only 1 parent said that *sometimes* questions were easy to understand. Parents also indicated the kind of impact that responding the ASQ-3 has for them. Fifty-eight percent of the time parents indicated that answering the ASQ-3 helped them to think about their children's development, and 40% of the time parents said that completing the questionnaire was interesting. Sixteen participants (51.6%) selected both alternatives (completing the ASQ-3 was interesting and helped me think about my child's development), 12 parents (38.7%) said that using the ASQ-3 helped them to think about their children's development, and 3 parents (9.6%) indicated that using the ASQ-3 was interesting. When parents were asked to indicate whether it was easy to understand the way questions were presented, 100% of them responded *yes*. In the same way, 30 parents indicated that pictures and examples were helpful for answering the questions and only 1 parent affirmed that *sometimes* they were useful. Table 16 shows a summary of responses and Figure 9 presents parents' perceptions of the ASQ-3.

Table 16. Readability and utility of the Spanish ASQ-3

Interview question	Yes (%)	No (%)	Sometimes (%)
Was the ASQ-3 easy to understand?	30 (96.7)	-	1 (3.2)
The questions were appropriate for my child's age	31 (100)	-	-
Was it easy for you the way how items were presented?	31 (100)	-	-
Were the pictures and examples helpful for answering the items?	30 (96.7)	-	1 (3.2)

Finally, participants were asked how they would change the ASQ-3 to make it better. Twenty-seven parents (87%) indicated that they would not introduce any changes to the questionnaire; they included comments such as “it is excellent”, “it is very complete”, “it is well written and clear” “it was easy to complete”. Four parents (12.9%) made some suggestions to improve the ASQ-3. One parent mentioned it would be better if gender was consistent through the questionnaire. She also mentioned that it would be positive to provide more examples for some of the objects included in the questions (e.g., beads or “cuentas” in Spanish) to be more clear for Spanish-speaking countries. Another parent indicated the importance of including questions about safety and accident prevention. Another parent mentioned that the first page of the questionnaire where identification information is asked should be clarified, specifically the last box (program information). She was not sure who should complete the information in that box. Finally, one parent indicated that the picture in question 4 for Problem solving, 30 month was a little confusing. The question was: “*when you point to the figure and ask your child what*

is this? Does your child say a word that means a person or something similar? (Mark yes for responses like "snowman", "boy", "man", "girl", "daddy", "spaceman", and "monkey") Please write your child response here". According to her, the picture presented in this question should be clearer.

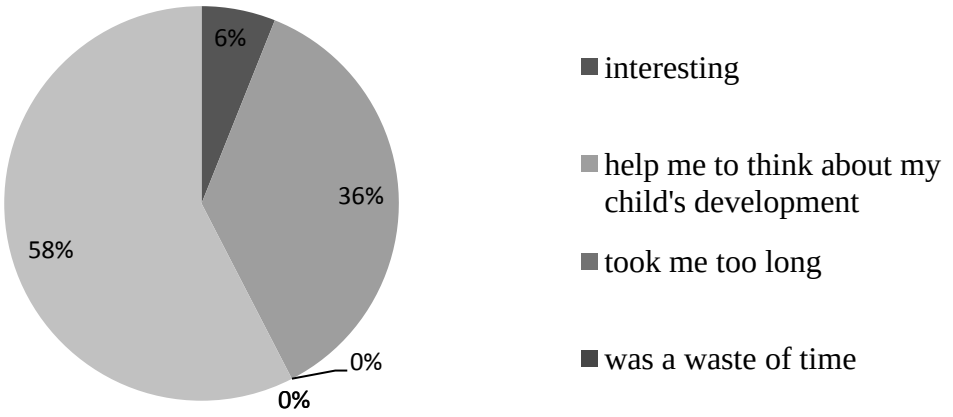

Figure 9. Parents' perceptions of the ASQ-3

In summary, results from the examination of the equivalence and cultural appropriateness of the ASQ-3 versions were presented. Parents' perceptions of the utility and readability of ASQ-3 items were also reported. Demographic information and ASQ-3 scores were described to provide a more complete understanding of participants. Three research questions were addressed in order to meet the purpose of study. First, item functioning was studied and reported from four perspectives (i.e., fit of items to know the productivity level of information provided by each item; order difficulty of items; use of response categories included in the ASQ-3; and differential item functioning across ASQ-3 versions). Items identified as having DIF were linguistically examined by four native

Spanish-speaking experts in the field of early intervention and their observations were presented.

Second, results on cultural appropriateness of the Spanish ASQ-3 version were described based on information gathered through the parents' interview. Finally, qualitative and quantitative information was reported to answer the third research question related to the utility and readability perceived by parents after completing the Spanish ASQ-3 version. Discussion of these results is presented in the following chapter.

CHAPTER V

DISCUSSION

Immigrant populations are growing and permanently changing the demographic profile of the United States. Diverse cultural and linguistic backgrounds are manifested in each community, imposing new demands and challenges to organizations and agencies that provide services in these communities. A large population of immigrant families, especially first and second generations, experiences a process of acculturation while they are adapting to a new country. Acculturation is a bidirectional process in which individuals and communities are able to preserve their inherited culture but at the same time to acquire practices and cognitions from another culture (Bornstein & Cote, 2006). A successful acculturation process may be delayed or become extremely stressful for different reasons. Higher levels of poverty, limited educational opportunities, difficulty in identifying cultural patterns in a new context, and linguistic barriers may decrease and slow the adaptation process, affecting the quality of individuals' lives.

Parenting and child development are undoubtedly influenced by multiple factors such as socioeconomic conditions, parents' educational experience, socio-emotional support, and parents' cultural capital. In situations of acculturation and cultural interchange, families are inevitably incorporating or complementing their own backgrounds in new ways to proceed and understand the reality. Children's development will be impacted by the cultural transformation experienced by their families and affected by the way in which the society embraces children's needs and priorities. Sensitive interventions are required to provide effective and adjusted services for children. In this context, continuous adaptations and redefinition of philosophies, policies, guidelines, and

materials need to be completed by organizations and agencies responsible to provide those services for a culturally and linguistically diverse U.S population.

Limited funding, insufficient qualified bilingual personnel working in specialized agencies, lack of awareness about the importance of adjusted and culturally sensitive services, and lack of reliable intervention materials deteriorate the quality of early childhood and early intervention services offered for cultural minority groups. Accurate and culturally sensitive assessment instruments are not always available for professionals to use and psychometric properties of those instruments are not always thoughtfully studied when tools are translated or adapted. As a consequence, families might not receive valid and reliable information on their children' performance when they are suspected to have developmental delays. Exploration of the psychometric properties of currently used screening tools is required in order to be responsive to the needs and priorities of families from culturally and linguistically diverse backgrounds, and thus to ensure families will obtain accurate results and prompt referral for needed services.

This study was aimed at examining the item invariance of the Ages and Stages Questionnaires 3rd Edition (ASQ-3) for the 9, 18 and 30 month intervals and the cultural appropriateness of the Spanish ASQ-3 version. Function of items in both the English and the Spanish versions was analyzed along with parents' evaluation of the cultural appropriateness, utility and readability of the Spanish ASQ-3 version. This chapter discusses the results found through the analyses. Each research question is addressed and conclusions are presented as well as implications and directions for further research in this area of study.

Interpretation of Results

Accurate and culturally appropriate measurement instruments are highly needed especially in a culturally diverse society. In a context of continuous social transformation, families and their young children from minority groups have to transit and find ways to adapt to new customs and access services, but at the same time, they have the intrinsic necessity to preserve their values and beliefs, holding their own social capital in coexistence with a newly adopted culture. As a consequence, naturalistic and culturally sensitive assessment procedures are required to offer reliable ways to recognize children's abilities, needs, strengths, developmental patterns and emergent skills. Screening as a first and general assessment stage should effectively allow practitioners and families to identify children who might be at risk for disabilities. These opportunities should be available to a vast population of children during their first years of life. Thus, valid early identification systems may facilitate children's access to specialized services and improve their developmental outcomes.

Test item examination is an essential condition when studying cultural appropriateness and equivalence of measurement tools to ensure equity and avoid test bias. Before raising conclusions about a specific group performance, especially when an adapted or translated tool is being used, exploration of invalidity sources should be conducted. Poor item translation, item ambiguity, low content appropriateness, and inappropriate format of items may affect the quality of answers and results obtained by using an instrument that may present sources of bias (Hambelton, 2005; Hambleton & Zenisky, 2011). Presence of test or item bias might lead to misinterpretation of results and misleading conclusions about a particular group. However, having a comprehensive

view of a measurement instrument that includes the examination of several elements such as the test specificity, item parameters, linguistic examination of each item across both target and source language, may prevent measurement inequity and sources of bias. Results obtained from the examination of the English and Spanish versions of the ASQ-3 items are discussed below.

ASQ-3 Scores

The sample included 798 participants; of those, 374 were English-speaking and 424 were Spanish-speaking parents. Even though multiple ethnicities were incorporated in this sample, they were not representative percentages of the U.S population. A convenience sample was recruited and the inclusion criteria for participating in the study indicated that parents should be English or Spanish-speakers living in the U.S at the time of data collection. For this reason, the Hispanic/Latino origin population appeared to be overrepresented in this sample. Furthermore, 48 participants from the English-speaking group did not report their ethnicity. Table 17 shows U.S number and percentages of population by origin and the corresponding number and percentages of participants included in this study.

Matching demographic information between English and Spanish-speaking populations was not possible due to limited existence of data across groups. Information that was available for one group, there was not available for the other. Existing data for the English-speaking group were income level and mother's level of education. This information was a valuable resource to know important information about the referent group. Table 18 shows available demographic information for the 374 English-speaking participants.

Table 17. U.S. population and participants included in the study

Population origin	Population number	Percentage of total population	Total sample number	Sample percentage
Total U.S population	308,745,538	100	798	-
Hispanic/Latino	50,477,594	16.3	416	52.1
White/Caucasian	196,817,552	63.7	233	29.2
African American	38,929,319	12.6	20	2.5
Native American and Pacific Islander	540,013	0.2	21	2.6
Asian	14,674,252	4.8	11	1.4
Some Other Race	19,107,368	6.2	1	0.1
Not Hispanic or Latino	258,267,944	83.7	286	35.3

Note. Sources: U.S. Census Bureau, 2010 Census Redistricting Data (Public Law 94-171)

The ASQ-3 overall scores obtained by children participating in this study were compared using one-factor multivariate analysis of variance (MANOVA). For each of the three intervals considered in the analysis, the independent variable (i.e., ASQ-3 language version used by parents) was statistically related to the weighted multivariate combination of dependent variable measures (i.e., communication, gross motor, fine motor, problem solving, and personal social domains). A univariate analysis of variance (ANOVAs) was also performed showing statistically significant mean differences on communication and personal social domains on the 9 month interval, personal social

domain on the 18 month interval, and fine motor domain on the 30 month interval. In all cases, score means were higher for the Spanish-speaking population.

Table 18. Demographic information of the English-Speaking group

Information	Frequency	Percentage of English-speakers
Income level	*N*	(%)
0-12,000	72	19.25%
12,001-24,000	128	34.22%
24,001-40,000	174	46.52%
Mother's education level		
less than high school	27	7.21%
high school	172	45.98%
AA degree	67	17.91%
4 year college or above	106	28.34%
Do not know	2	0.53%

The results obtained based on the ASQ-3 scores need to be considered with caution; differences even statistically significant may be associated to the functionality of items across ASQ-3 versions. Interpretation of these results needs to be made based on the establishment of item equivalence between groups. Differences observed between groups scores could be related to different cultural backgrounds. It would be consistent to findings reported by several international studies where ASQ domain scores (e.g., communication, personal social, fine motor) showed differences across groups due to

cultural differences (e.g., Borman et al., 2010; Dionne et al., 2006; Heo et al., 2008; Kapci et al., 2010; Kerstjens et al., 2009; Sarmiento et al., 2010; Tsai et al., 2006). Current score results should be interpreted with caution. Data gathered for this study were mostly de-identified. The possibility of matching specific variables between groups was not available for this data set. Variables that could be considered as risk factors for a child' development (e.g., income level, mother's educational level, etc) were not available for all participants. Therefore, interpretation and explanation of the current ASQ-3 scores could not be associated with specific demographic variables. Language used at the time of completing of the ASQ-3 and participants' ethnicity were the relevant variables considered in this study. Performance results and group differences might be related to cultural differences but also may be affected by item properties and psychometric qualities of the ASQ-3 that were examined through the analyses and reported below.

Function of ASQ-3 Items

Evaluating how items function across different groups is a necessary condition when measurements are being used with culturally diverse populations. Item function was examined using IRT; a Rasch partial credit DIF model for polytomous items was fitted to the data to test item invariance across groups. According to this model, analysis of differences in item functioning is performed after assuming that individuals from different groups match on the same measured trait (Sireci, 2011). The assumption that children's developmental patterns are mostly consistent across cultures and countries supports the premise that typically developing children from different cultural groups would be able to perform similarly across ASQ domains. It is possible to assume that

English and Spanish-speakers children would follow similar developmental trajectories, and show similar ability level. Thus, examination of sources of item bias is justified in this context and needs to be conducted.

Item Fit

Item fit and order of items were examined first. Misrepresentation of the measurement was evaluated through the mean-square (MNSQ) fit statistic. A range from 0.5 to 1.5 was considered acceptable fit. (values above 1.5 and below 0.5 are less productive items). Out of 180 items examined, only 16 items presented misfit. Equal number of items were found to be less productive across ASQ-3 versions (n = 8 English, n = 8 Spanish). The remainder of the ASQ-3 items for the 9, 18 and 30 month intervals seemed to provide useful information about children's performance.

Developmental screening tools are general measurement instruments that target a wide array of relatively stable domains and skills. Human development domains are interrelated and interdependent; modifications that occurred in one area will affect the performance in other domains (Copple & Bredekamp, 2009). In the same way, items included in a screening instrument like the ASQ-3 sometimes might appear connected and less specific. For that reason, some items measured the same abilities. Overlap on the abilities and skills that were being measured may explain the misfiting items. Gross motor and problem solving for both English and the Spanish ASQ-3 translation were the domains that presented the largest number of misfited items (i.e., underfit and overfit items). Actions that a child is able to perform related to motor skills, as well as cognitive abilities to solve a problem are difficult to isolate. For instance, for the gross motor domain, movements need to be performed in a context and follow a sequence or a plan in

order to be functional. These movements then become part of a more complex process that requires cognitive, physical and even emotional processes. In the same way, solving a problem requires cognitive processes but also needs motor and other skills that allow children to be successful when solving the task. Developmental domains function in an interrelated manner and one set of abilities are built and applied in conjunction with others (Berk, 2008; Copple & Bredekamp, 2009). This complexity may explain why a few ASQ-3 items seemed to be random and be less productive in providing the sought information. Table 19 summarizes items that did not fit according to ASQ-3 domain and interval.

Order Difficulty of Items

Another item characteristic that was examined was the order difficulty of items on the ASQ-3. Results showed that the 18 and 30 month questionnaires for both English and Spanish versions on fine motor and personal social areas presented an unexpected order difficulty (i.e., five domains across the 2 intervals). In these cases, one or two items of a total of 6 included in each domain seemed to be out of place. More difficult items (i.e., ones appearing at the end of the domain) were more likely to be responded to correctly.

For example, an item that should be less difficult and more likely to be mastered (e.g., "*yes"*) appeared to have less probability of being endorsed correctly.

Originally, the ASQ was developed by including only items that targeted skills in the middle to low end of the developmental range for a particular chronological age interval (i.e., a developmental quotient of 75-100). In most cases, each domain has two items with developmental quotients of approximately 75, two items with developmental

quotients of approximately 85, and two items with developmental quotients of approximately 100 (Squires et al., 2009).

Table 19. ASQ-3 Items that presented underfit and overfit

ASQ-3 domain	ASQ-3 version	Age interval	Values above 1.5	Values below 0.5
Communication	English	18 month	item 1	
	Spanish	18 month	item 1	
Gross motor	English	9 month	item 1,2	item 3
	Spanish	9 month	item 1,2	
	Spanish	18 month	item 1	item 2
	English	30 month		item 2
Fine motor	Spanish	30 month	item 1	
Problem solving	English	18 month	item 5	
	Spanish	18 month		Item 3
	English	30 month	item2	
	Spanish	30 month	item 2	
Personal social	English	30 month	Item 3	

Note. Values above 1.5 (underfit) do not provide sufficient information. Values below 0.5 (overfit) are too sensitive.

Moreover, the inclusion of several developmental domains in a single screening questionnaire imposes a difficult task of selecting general and functional skills to represent a particular domain using only a few questions. This task is even more difficult at more advanced developmental ages when skills become more complex and hard to

break down. This situation may explain why some ASQ-3 domains on the 18 and 30 month intervals presented an unexpected difficulty order.

It was possible to observe a consistent pattern among items that presented a different order across languages and domains. For example, the personal social domain at 18 months on both English and Spanish translations showed a different order difficulty, with item 1 appearing as the most difficult to endorse correctly when it should be the easiest one. The same situation was observed for fine motor on the English and the Spanish translations where item 6 was unexpectedly located at the low end of the developmental range for that domain and at that age.

Response Categories

Examining how responses were used and the features of the response structure of each item are important aspects to ensure an efficient and accurate gathering data process. The probability of observing each ASQ-3 response category (i.e., "*yes", "sometimes", "not yet"*) for each item was analyzed, utilizing a partial credit model (PCM) to examine the response structures. Ten items showed that response categories were not being used appropriately by participants, resulting a misfit of the partial credit model to the observed data for those items. Most frequently using only two category responses rather than all three was observed. Five of these six items were assigned only 10 and 5 points (i.e., "*yes"* and "*sometimes"*) by responders; the "*not yet*" response category was not used. Most of these items were located at the low end of the developmental range (items 1, 2 and 3). They are supposed to be the easiest items for each age interval. This finding can explain why most of these items may appear extremely easy by the group of examinees. For instance, if the category "*no yet*" was never used, then this item is too easy for that

age interval, and the ability level of examinees exceeded the complexity level of that item. That situation was observed for the English version in communication, gross motor, and fine motor domains. In the four other cases, even though all response categories were used, the "*sometimes*" response presented a low probability to be endorsed regardless of participants' ability level. This means that not all categories were optimally used across domains, and some items were not scored using the three possible response categories. Table 20 presents items that used two response categories and items where one of the categories was not well used.

Table 20. Items that did not use all the response categories

ASQ-3 version	Domain	Interval/Item using well two out of three response categories	Interval/Item using only two response categories
English	communication		9 month, item 1, 3
	gross motor		9 month, item 2
	fine motor		18 month, item 5
	gross motor		30 month, item1
Spanish	fine motor		9 month, item 1
	fine motor	9 month, item 2	
	problem solving	18 month, item 3	
	gross motor	30 month, item 2	
	personal social	30 month, item 6	

Differential Item Functioning

Equivalence of measurement tools and items is a important feature to be examined when test translation takes place in cross-cultural studies. Differential item functioning was explored comparing the English and Spanish ASQ-3 versions. The analyses identified 27 out of 90 items (30%) that were functioning differently between groups. Items seemed to be functioning differently, mostly at the older age intervals. Gross motor was the domain that had the most non-equivalent items between the focal and reference groups at 18 and 30 months, followed by the personal social domain at 30 months and the communication domain at 9 months. Direction of the difficulty level was distributed evenly across intervals and domains. Fourteen items appeared to be more difficult for the Spanish-speaking group and thirteen presented higher difficulty for the English-speaking group.

An unpublished study that examined the item function of the second edition of the ASQ (ASQ-2) comparing the English and Spanish versions showed that out of 253 unique ASQ items across the 4-60 month intervals, 76 items (30%) functioned differently between the two versions ($p \leq .05$) (Chen et al., 2010). The problem solving domain (20 items) and the 24 month interval (15 items) had the most items showing DIF. This study also reported some linguistic differences on those items flagged as having DIF. Seventeen items were found to either provide fewer examples on the Spanish translation than on the English version or to contain minor grammatical errors. Only two items showed different meanings in the English and the Spanish versions. In addition, 16 items on the ASQ-2 presented DIF across intervals. The English-speaking population had a higher probability to score higher ("*yes"*) on 9 items, while the Spanish-speaking

population was more likely to perform higher on 7 items (Chen et al., 2010). It is important to mention that the Spanish ASQ-3 was significantly revised in terms of order of items, word usage, addition of examples, inclusion of 2 new intervals, and revised cut off scores, making comparisons between the two editions difficult.

Regardless of edition differences, it was possible to observe that differences in item functioning from the second edition were consistent with differences found in the third edition. More DIF items were found at the 30 month interval on the ASQ-2, similarly to those observed on the ASQ-3. In both examinations, the older age intervals showed more differences (e.g., 18, 24 and 30 month) than younger ages. These disparities may be associated with cultural differences that become more evident at older ages, but also they might be related to language discrepancy and poor item translation. Table 21 presents item features, including the items that were identified having DIF on the third and second ASQ editions.

Having assessment instruments that are cross-culturally equivalent is an important goal to pursue when tools are used across different populations. Equivalence can be easily threatened by biased items that do not have the same meaning across cultures (Sireci, Patsula, & Hambleton, 2005; van de Vijver & Leung, 2011); therefore, bias and equivalence are concepts that need to be considered and evaluated in the context of cross-cultural studies. Measurements only are equivalent within and across cultures when they are free from bias (van de Vijver & Leung, 2011).Thus, establishing instrument equivalence requires unbiased questions or prompts that participants from different context are capable to understand, and items must be able to retrieve the desired information independently from cultural particularities.

Table 21. Summary of item functioning

ASQ-3 interval	ASQ-3 domain	ASQ-3 DIF items	Order difficulty	MNSQ	Resp. patterns	ASQ-2 DIF items
9 m	CM	1(S), 3(S), 5(E)			1,3(E)	2
	GM	-		1,2,3(E),1, 2(S)	2(E)	3,6
	FM	-			1,2(S)	
	Probl.S	-				
	PS	**5**(S), 6(E)				**5**
18 m	CM	**3**(S), 5(E)		1(E), 1(S)		**3**,6
	GM	1(S), 3(S), 4(E), 5(E)		1,2(S)		
	FM	**5**(S)	4-6-1-2-3-5(E)		5(E)	4,**5**
	Probl.S	2(E), 6(S)		5(E), 3(S)	3(S)	
	PS	**1**(E), **2**(S)	1-5-4-3-6-2(E) 1-5-6-4-2-3(S)			**1**,**2**,4,5
30 m	**CM**	**3**(S), **5**(E)				2,**3**,**5**,6
	GM	2(E), 3(S), **5**(E), **6**(S)		2(E)	1(E),2(S)	**5**,4,**6**
	FM	**3**(E), **5**(S)	3-4-5-2-6-1(E) 5-4-2-3-6-1(S)	1(S)		**3**,**5**,6
	Probl.S	2(E), **3**(E), **5**(S)		2(E), 2(S)		**3**,**5**
	PS	-		3(E)	6(S)	1,5

Note. Bolded values represent consistent DIF between ASQ editions. Bolded domains indicated concerns across item test results. MNSQ = mean square values. E = English; S = Spanish

DIF items in a measurement tool may be a source of inequity in cross-cultural testing; for that reason, items with DIF need to be thoughtfully examined to avoid bias and misleading conclusions. Specific considerations of bias are useful to better understand equivalence. Differences due to bias are not random; they usually are systematic, meaning that using a biased instrument several times will produce the same biased results after each application. In addition, items or instruments are not intrinsically biased, but bias might appear as a consequence of applying an instrument or item with a particular group (van de Vijver & Leung, 2011). For that reason, it is imperative to detect sources of bias to prevent systematic misunderstanding of minority groups' performance. Instruments that are culturally biased should not be considered as equivalent or equally representative of the construct of interest in the group that is being studied (van de Vijver & Poortinga, 2005).

Using the ASQ-3 across different cultural groups (i.e., English-speakers and Spanish-speakers) possibly carries the risk that some items may function differently, especially at older ASQ ages when differences were more evident. The ASQ-3 items were examined and DIF items were identified as part of the recommendations and proposed guidelines for adapting tests and establishing score equivalence suggested by the International Test Commission (ITC), the American Educational Research Association (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME) (Hambleton, 2005; ITC, 2010).

Another crucial aspect for adapting test and exploring cross-cultural equivalence in testing is the linguistic revision of items identified as having DIF. Reasons why items may work differently across cultures can be many and hard to determine, but linguistic

equivalence and quality of the translation are powerful elements that can narrow or widen the gap (Hambleton, 2005; Hambleton & Zenisky, 2011; Peña, 2007; van de Vijver & Leung, 2011). Following this premise, four native Spanish-speaking experts revised the ASQ-3 items that were identified as having DIF, in order to gain a more comprehensive view of items that were functioning differently across groups. Two aspects were considered by the experts: (a) linguistic equivalence, examining the words used and their meaning in both ASQ-3 versions; and (b) functional equivalence, evaluating whether the DIF items were measuring the same developmental skills in both Spanish and English ASQ-3 versions (Peña, 2007).

Linguistic and Functional Equivalence

Based on the linguistic equivalence examination, semantic and syntactic concerns about the Spanish translation were indicated (See Appendix D for more details.) Agreement among the experts was not consistent across the DIF items. Most of the comments regarding syntactic concerns were related to the lack of using the subject in some of the ASQ-3 questions. According to the experts, in some cases it was not clear to whom the question was directed, and this situation more evident when the subject was not explicitly presented in the question. Other times, the order or structure of the questions was found as unclear or confusing. In these cases, the meaning of the questions could be compromised. Agreement of at least three experts on semantic concerns were met in the following items: 9 month communication item 5, 18 month fine motor item 5; 30 month communication item 5, 30 month gross motor item 3, 30 month fine motor item 3, and 30 month fine motor item 5. These concerns were related to the meaning of expressions translated from English to Spanish, and some words used in the Spanish

version that did not have the same interpretation across languages. Experts also mentioned that some questions seemed ambiguous in the way they were structured in the Spanish version. (See Appendix D for more details.) Again, agreement among experts was more consistent at older intervals, showing that the inequivalence of items might be associated with translation problems at those ages.

Examination of the functional equivalence was also conducted. Experts agreed that 40.7% of the DIF items (n = 11) may be measuring different constructs across the two ASQ-3 versions studied as shown in Table 22. The direction of the item difficulty was evenly distributed across languages, meaning that language translation challenges were not associated with items showing more difficulty for Spanish or English-speaking participants. According to these findings Table 22 shows items that were identified as problematic. Consistently these items have been flagged as critical items that showed DIF in the second and third edition of the ASQ, and that reflected linguistic concerns by experts.

Cultural Appropriateness of the Spanish Translation of the ASQ-3

Screening instruments are general assessments that usually are available for a large and diverse population. For that reason, cultural sensitivity and appropriateness are essential features for screening tools. The ASQ-3 is a parent-completed developmental screening widely used in the U.S and internationally to identify children at risk for developmental delays or disabilities, using a family centered and naturalistic approach. In this context, prompts and activities presented to children are selected from children's everyday routines and daily experiences so they are easy to elicit by parents or caregivers (Meisels, Wen, & Beachy-Quick, 2010). It is of primary interest that the ASQ-3 can offer

appropriate items that effectively respond to the needs and characteristics of diverse groups. Thus, assessment procedures involving the ASQ-3 must be psychometrically sound and appropriate for culturally and linguistically diverse populations.

Table 22. Experts' agreement regarding language concerns on DIF items

ASQ-3 interval	ASQ-3 domain	DIF items	Items measuring different construct				Semantic agreement
			L	R	G	A	
9 month (*n* = 5)	**CM**	1(S), 3(S), 5*(E)	5	5			item 5
	GM	-					
	FM	-					
	Pr.S	-					
	PS	5*(S), 6(E)	5		6	6	
18 month (*n* = 11)	CM	3(S), 5(E)			5		
	GM	1(S), 3(S), 4(E) 5(E)		1,4,5	1,5		
	FM	5*(S)		5	5		
	Pr.S	2(E), 6(S)		2,6		6	
	PS	1*(E), 2(S)	1	1			
30 month (*n* = 11)	**CM**	3*(S), 5*(E)	5	3,5	5		item 5
	GM	2(E), 3*(S), 5(E), 6(S)		3	3		item 3
	FM	3*(E), 5*(S)		3,5	3,5	3,5	item 3, item 5
	Pr.S	2(E), 3(E), 5(S)		2,3	3		
	PS	-					

Note. Note. CM = communication; GM = gross motor; FM = fine motor; Pr.S = problem solving; PS = personal social. E = item more difficult for English-speakers; S = item more difficult for Spanish-speakers. Items marked (*) are the critical items.

Data from the 2010 Census demonstrated diversity of the United States. According to these data, 50.5 million (16%) of the people that resided in the U.S were Latino, showing that this population grew by 43% and increased by 15.2 million between 2000 and 2010. The examination of ethnic group distributions nationally shows that the Mexican origin population represented the largest Latino group (63%) and increased by 54% (11.2 million), growing from 20.6 million in 2000 to 31.8 million in 2010 (U.S. Census Bureau, 2011). Recognizing this reality is crucial when culturally sensitive services are offered.

Cultural appropriateness of the Spanish ASQ-3 items was explored using information gathered from a follow-up phone interview with 31 Latino parents. A qualitative approach was used to analyze the interviews and to discuss the cultural equivalence and appropriateness of the Spanish ASQ-3. Demographic information was collected through multiple choices questions. Parent beliefs regarding child development expectations and rearing practices were gathered using open-ended questions. A second researcher coded and categorized parent responses. Intercoder agreement was calculated and themes emerged from the analyses.

Participants had been living in the U.S an average of 11.5 years and 80% of them come originally from Mexico. Spanish was the preferred language spoke at home for 27 parents. Most parents were first generation immigrants (n = 23). Knowledge about children' outcomes in Latino immigrant families can be gained from different points of view. Studies indicate that while 92% of Latino children are born in the U.S, 58% of all Latino children live in immigrant families with at least one foreign parent. As a consequence, accessing available services in the community for citizen children who

have an immigrant parent may be slowed or prevented, especially when undocumented parents feel afraid to be contacted by federal and state agencies (Ceballos & Bratton, 2010; Mather & Foxen, 2010). On the other hand, first-generation immigrant families hold a series of protective factors that help their children achieve positive behavioral and academic outcomes, higher levels of engagement at school, and lower levels of delinquency than later generation peers. For instance, studies report that first-generation Mexican immigrant mothers show the healthiest prenatal practices of any ethnic group, including Whites mothers (Fuller et al., 2010). It is possible to observe that in many cases higher levels of acculturation involve a decline on developmental outcomes. This phenomenon is known as the immigrant paradox (García-Coll & Kerivan-Marks, 2011).

In addition, educational and income level information was included in the interview. Thirty-nine percent of the parents reported have completed the preparatory level (1^{st} to 6^{th} grade) and 39% of the families mentioned their annual income range was $12,001 - $24,000. Those results are consistent with recent studies reporting that the majority of Latino children live in low-income families and experience lower academic attainment (Hill & Torres, 2010; Leidy, Guerra, & Toro, 2010; Mather & Foxen, 2010). In this respect, studies mentioned that Latino families are exposed and more vulnerable to experience risk factors such as higher likelihood of having low socioeconomic status, parents with less education and limited English proficiency, and lower school participation (Fuller et al., 2009). Failure to consider these indicators might prevent changes on the negative outcome trend, especially for those later immigrant generations (Mather & Foxen, 2010).

The ASQ-3 relies on parents' observations to assess children's developmental trajectories. Parents' opinions have been described as an essential resource for screening young children regardless of socioeconomic status, parent's education, and geographic location (Coplan, 1982; Glascoe & MacLean, 1990; Glascoe, 1999; Glascoe, 2003). Considering that parents' opinions are a great source for obtaining information about a child's growth, activities and questions need to be pertinent and clear enough to elicit the information that is being sought. All parents participating in the interview pointed that the ASQ-3 questions were appropriate to the age of their children, evidence of the age appropriateness of the Spanish version of the ASQ-3 as evaluated by Latino participants.

Cultural appropriateness was explored comparing areas and activities included in the questionnaires with parent beliefs regarding child developmental expectations. Parent responses were coded by two researchers and five themes emerged, summarized in Table 23.

Latino families have been defined as a collectivist culture that values and expects social interdependence and develops interpersonal interactions (Bornstein & Cote, 2006; White, Roosa, Weaver, & Nair, 2009). This characterization is consistent with the first two themes that emerged from the current analysis, where families emphasized that their young children should learn how to be generous, to behave well, play and communicate nicely, be affectionate, unselfish, and respectful. There is a well founded tendency to believe that Latino families support values and beliefs that are centered on social relationships, adhering to values such as focus on the family (i.e., familismo), understanding this concept as a sense of belonging, being part of and committed to family by demonstrating loyalty, solidarity among its members.

Table 23. Codes and themes emerged from parents' responses for question 1

Codes	Themes
Sociability, sharing, generosity, take turns, behave well, play nicely, affectionate, unselfish, helper, respectful	Pro-social development
Bilingual, talk well, communicate well, using new words, vocabulary	Effective communication
Security, independency, adaptive skills, self-care, self-sufficient	Independent behavior
Learn colors, shapes, letters, and numbers, reading, drawing, writing, arts, study	Pre-academic skills
Being healthy, new movements, sports, healthy food	Physical skills and health

Note. Question 1: Could you tell me the most important qualities or personality traits that you would like your child to have at 3 years old?

Other values are respect, referred to as manifestations of courtesy and politeness in relation to other people **(**Calzada, Fernández, & Cortés, 2010; Fischer, Harvey, & Driscoll, 2009), good attitude, cooperation, and caring for others (Galindo & Fuller, 2010).

During the phone interview, families also indicated they would like their children to be able to develop qualities such as independence, self-care, self-sufficiency, especially in the context of adaptive skills. A complementary perspective indicates that Latino families that are experiencing an acculturation process in the U.S can be expected to adopt more individualistic practices and beliefs similarly to those found in European-origin families. Coexistence of independence and interdependence is thus possible; dimensions of these two cultural models can function complementarily, bringing families

an enriched way to participate in the community (Suizzo et al., 2008). A combination of independence and interdependence values was observed when parents selected qualities related to learning expectations for their children. “Respect for adults and people in authority” was the quality most frequently selected along with “work through problems on his/her own”, and “make decisions on his/her own”. “Help with domestic labors” and “obey adults without questioning” were the traits less frequently selected by parents.

The second open-ended question asked parents to mention the values they thought were most important in order to properly raise infants and toddlers. The degree of individualism or collectivism assumed by families certainly affects child development and parenting practices (Bornstein & Cote, 2006). Frequently, descriptions of parenting practices among Latino families have emphasized qualities such as parental control, child's affection towards other members of the family, respect to parental authority, obedience, and family loyalty (Fischer, Harvey, & Driscoll, 2009). Latino parents are believed to transfer and preserve these qualities in their children. In this way, the family serves a primary role in providing social and emotional support to children, encouraging respect, family dependability, and religious closeness, which are related to the experience of raising their children in a foreign country (Calzada, Fernández, & Cortés, 2010). Consistently, parents indicated that providing social and emotional support to their children is an essential quality for properly raising them. Among the qualities mentioned were comprehension, patience, love, time and dedication, and the provision of opportunities, resources, values and moral. “Parents as a model of social behavior” was another quality highlighted, reaffirming the essential role of bridging two generations and transferring cultural capital. The value of family unity, commitment, and consistently

following through with rules were also mentioned under the "couple's positive relationship and family dynamic" theme. The identification of these five themes was confirmed by parents indicating "be understanding," and "have trust in your children" as consistent with the idea of parents providing social and emotional support. Table 24 presents codes and themes based on parents' responses.

Codes and themes that emerged from parents' responses corresponded to the content of the ASQ-3 domains and activities included across age intervals. Most of the qualities that parents desired for their children to learn are included within the prompts provided on the ASQ-3. In this context, the selected cultural and social capital that Latino families would like to transfer to the new generation was convergent with the ASQ items on the 9, 18 and 30 month intervals.

The preference given by Latino parents for the development of social skills ("pro-social development") is undoubtedly consistent with the ASQ-3 items such as engagement in social play activities, reciprocity, communication with significant adults, follow directions or commands, and establishment of social interchanges as elements able to identify children's social development. Figure 10 shows the relationship between parental priorities identified from parents' responses and the content of ASQ-3 items.

The "effective communication" theme represents for Latino parents qualities such as being bilingual, talking well, communicating effectively with others, using new words and vocabulary. The development of these skills is based on language competences which correspond to receptive and expressive oral language ASQ-3 items.

Table 24. Codes and themes emerged from parents' responses for question 2

Codes	Theme
Comprehension, understanding, show interest, love, time and dedication, asking, being present, trust	Parents providing affective and emotional support
Patience, set limits, communication, be aware and informed, kindness	Positive parental attitude
Teach, education, providing opportunities, resources, values and moral, help to discover, encouragement, motivation	Parents providing of knowledge, stimulation and morality
Model, examples, being good, talking well	Modeling and transferring values and beliefs
Relationship, communication, defined roles, unity, commitment, rule consistency	Couple's positive relationship and family dynamic

Note. Question 2: Please list the values you thought are most important in order to properly raise infants and toddlers

An effective oral communication is an important quality to be learned, as Latino families highlighted the importance of specific abilities such as listening and understanding oral messages, reproducing sounds, producing words and complete ideas to communicate with others.

Assigning less value but related to pro-social practices, independence, development of adaptive skills, self-care, and self-sufficiency were qualities identified by parents under the "independent behavior" theme. Several ASQ-3 items, especially those in the personal social domain consider independence and adaptive skills as competences to be measured. Self-care activities such as dressing, feeding, and recognizing significant adults and him/herself are ASQ-3 items. "Pre-academic skills" was another theme of

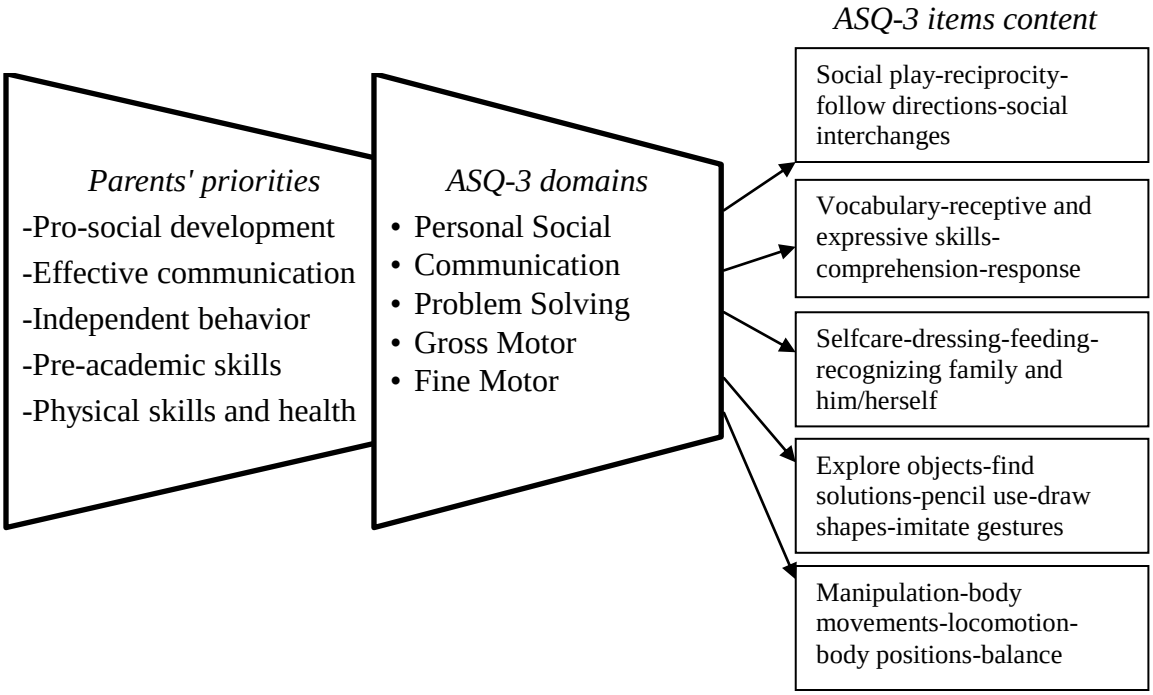

Figure 10. Parents' responses and the corresponding ASQ-3 items and domains

Parents' responses that correspond ASQ-3 items. For instance, parents said that learning colors, shapes, letters, and numbers are important abilities to be developed by their children at early ages as well as reading, drawing, and writing. Problem solving items, where cognitive competences such as exploration of objects, finding solutions, imitating gestures and sequence of actions, and using pencils and draw are ASQ-3 activities that allow a better understanding of children's development. These skills are the foundations for successful learning experiences in the future.

Finally, parents mentioned that physical skills and healthy lives were important. Fine and gross motor domains include different types of manipulative activities, body movements, locomotion, body position and balance. These are competencies that allow

children to explore the surrounding world, interact with the environment, peers, and significant adults and acquire new skills.

Themes that emerged from the second open-ended question were related to qualities or values that parents identified as important in order to properly raise young children. The strong tendency of Latino parents to emphasize the provision of emotional support and the construction of close and loving relationships with their children is consistent with the ASQ philosophy of empowering families, providing opportunities for parents and caregivers to be the primary source of information regarding their children development. Thus, ASQ items ask about the parent-child relationship, offering natural alternatives for family interaction, respecting parents' knowledge, their judgments, and concerns.

Readability and Utility of the Spanish Translation of the ASQ-3

The ASQ-3 screening system has been extensively studied, especially within the U.S population. Psychometric properties, utility and user's satisfaction have been examined to improve the quality and effectiveness of the different editions of this tool. Recent technical reports and empirical studies conducted in medical and educational settings indicated that the ASQ is an effective and useful screening tool (e.g., Gollenberg, Lynch, Jackson, McGuinness, & Msall, 2010; Jee et al., 2010; McCrae, Cahalane, & Fusco, 2011; Thompson, Tuli, Saliba, DiPietro, & Nackashi, 2010). International and cross-cultural research on the ASQ also has been conducted, including evaluations of their appropriateness and usefulness as perceived by diverse populations, obtaining positive results in different cultural environments and in different professional contexts (e.g., Borman et al., 2010; Kapci et al., 2010; Kerstjens et al., 2009; Troude, Squires,

L'Helias, Bouyer, & La Rochebrochard, 2011). Although different ASQ versions and translations have been studied, there was insufficient information on the level of satisfaction of U.S Latino families with the Spanish ASQ-3. Utility and readability are valuable properties that need to be evaluated and recognized in order to offer a more effective screening tool for this particular and growing population.

Time spent, ease of questionnaires, usefulness of examples and pictures included on items, and impact on parents after responding to questions were the topics addressed by the phone interview. Feedback provided by parents was positive. All parents noted that it was easy for them to understand the way in which items were presented, and 87% of them indicated that they would not introduce any changes to the questionnaire. Most of them stated the questionnaire was very complete, well written, clear and easy to respond. Some suggestions for improving the questionnaires included the addition of words (synonyms) to represent more Spanish-speaking countries, and be consistent using gender across each questionnaire. Most parents indicated that completing the ASQ-3 was interesting and helped them to think about their children's development, meeting important goals for parental involvement, respecting the right and responsibility of family members to participate in the assessment and decision making process (Squires et al., 2009). A developmental screening tool that is clear, easy to understand and complete, time efficient and allows parents to "celebrate" their children growth and better understand their children' development can be described as a useful and readable instrument. Limitations with a self-selected sample that included those parents who were more trusting of service providers and willing to participate in the study may be considered when utility and readability results are interpreted.

Conclusions

Valid and appropriate developmental screening opportunities need to be accessible for young children regardless of their ethnicity, geographic location or language. Qualified professionals in the fields of early intervention and early childhood are aware of the relevance of providing responsive and culturally sensitive services. However, the availability of resources and materials that meet the standards for accurate and unbiased interventions is crucial to valid assessment. Screening agencies employ qualified personnel capable of recognizing families' needs in the context of their values, believes and priorities, facilitating the acculturation experience for those foreign families. High quality services that allow families to preserve their cultural capital and complement it with new practices and ways to understand their new reality may assist parents in supporting a positive developmental trajectory as their children begin the adaptation process. From these fundamental principles, the examination of cultural equivalence and appropriateness of the Spanish version of the ASQ-3 was justified and sustained.

Based on the analyses conducted and results obtained on the examination of the ASQ-3 items for the 9, 18, and 30 month intervals, it is possible to establish that most of the items are productive in gathering the expected information, present an adequate difficulty arrangement, are properly using the response categories included in the tool, and that most of the items are functioning invariantly across versions. Twenty-seven items were identified as having DIF, most of them on the older intervals (i.e., 18 and 30 month intervals), and suggestions were made for modifying these items.

From a different perspective, items also were examined for their appropriateness and correspondence to parental expectations of child development. Most of the values and qualities selected by parents are congruent to the content of activities included on the ASQ-3 items.

Most of the Latino families were able to complete the questionnaires without help in a short period of time (i.e., 10 -20 minutes). Examples and pictures were a useful support in assisting the ASQ completion. The language used and the way in which questions are presented were easy to understand according to parents. Most relevant was that parents felt questions were interesting and help them to think more about their children's development. Accessible and easy to complete instruments may facilitate the inclusion of families and increase the number of children correctly identified as having developmental risk regardless of ethnicity or linguistic background.

Limitations of the Study

Although results of the examination of ASQ-3 items and parental feedback were positive, several limitations should be considered. These limitations are related to (a) sample demographic information, and (b) recruitment procedures.

Demographic Information

Even though the sample size was adequate for applying the selected procedures of analysis, limited demographic information was included. English-speaking families were recruited from the ASQ website where parents voluntarily completed the age-appropriate questionnaire along with some demographic data (i.e., income level, mother's educational level). These data were not available for the most of the Spanish-speaking group. Therefore, comparison between groups could not be conducted. Data from the focal

group (Spanish-speaking) were retrieved from the ASQ-3 publisher website. Gender, ethnicity and language used at the time to complete the ASQ-3 were the only available variables. Although ethnicity was a known variable for the entire sample, it was not possible to determine the country of origin for Latino participants or the immigration generation status, which are important variables to consider especially for conducting cross-cultural studies. The Latino population is not a homogeneous population and particularities from each subgroup should be considered and analyzed in future studies.

Recruitment Procedures

Time available to recruit participants was insufficient, especially when requesting specialized agencies to collaborate with the data collection process. Considering the amount of time and effort that is required to set up and install new procedures, a thorough planning process is necessary. Contact with new agencies and generation of collaborative networks require a careful design and a great amount of time to allow agencies to make all the necessary arrangements, including changing internal procedures. Completing all the steps for working in collaboration with agencies was not always possible due to limited the available time frame.

A direct recruitment strategy also took place. Direct contact with Latino families was sought in various ways, but again, time was insufficient to follow up with each participant that was invited to participate and to generate new alternatives when initial procedures were not effective. Families need to generate a sense of trust with the researcher and research procedures. That trust needs to be built based on the provision of clear information, ensuring confidentiality and security elements that require investing a significant amount of time. Recruitment for Latino families was more successful when a

face to face contact was used or when the contact was made by a family member or a friend who directly invited a parent to participate. These requirements were difficult to meet in a limited time, thus restricting the number of Latino participants who were contacted directly by the researcher to complete follow-up interviews. For this reason, the Latino group interviewed was formed by a convenience sample. Results, especially those related to the utility and readability of items may be associated to parents voluntarily accepting to participate. Families that were willing to participate may want to know more information about their children's development. Parents reported they did not need additional help completing the ASQ-3 and that items were easy to understand and provided meaningful information. Utility and readability evaluation may change when a random sample is interviewed.

Another limitation related to the recruitment process was the different methodologies that parents used to complete the questionnaires. The ASQ-3 screening system is available in a paper and pencil format and also on-line, allowing parents to complete the items via the internet. A mixture of completion formats was utilized by parents. The English-speaking participants used the on-line format through the ASQ websites, and Spanish-speaking parents used either paper and pencil or on-line formats. A recent study examined both paper and the online version formats of the ASQ second edition, suggesting that there is little DIF between questionnaires that were answered by parents using the paper or the online version. Results indicated that both format versions are equivalent (Yovanoff, Squires, & McManus, in press). If possible, the ASQ-3 completion format should be controlled in future research, especially when cross-cultural studies are being conducted to avoid additional variability.

Implications for Practice

Developmental screening and monitoring opportunities should be available for families on a regular basis, due to the rapid changes and growth that characterize human development at early ages. Screening is an effective strategy to distinguish between children who might need further evaluation and those who might not. This assessment process is located as a first and general step within the linked system of intervention opportunities and ongoing evaluation. Thus, the identification process will result in better developmental outcomes for children and their families, when this occurs as an interrelated and cyclical process (Pretti-Frontczak & Bricker, 2004). Screening and monitoring of a child's development should be available to the general population and must be responsive and sensitive to minority groups in the community. Having an accurate and unbiased screening tool that is appropriate for families from diverse linguistic and cultural backgrounds in the U.S will increase the likelihood that children who might be at risk for developmental delays will be effectively identified.

Study findings may guide the selection of intervention materials and screening practices that will enhance the inclusion of families from diverse cultural and linguistic backgrounds. All children and their families should have access to appropriate services, especially culturally sensitive assessment options. Results of the current study support the recommendations provided by early childhood professional organizations for developmentally and culturally appropriate practices (DEC, 2005; NAEYC, 2009; NAEYC & NAECS/SDE, 2003), adding new evidence on the equivalence and appropriateness of the Spanish ASQ-3. Recommendations indicate the use of culturally and linguistically responsive assessment procedures, high level of family involvement

into the assessment and decision making processes, consideration of the child's natural environment as a context for developing assessments, and the utilization of evidence-based practices.

This study supports research on parent-completed questionnaires as an effective strategy for screening and monitoring young children's development. Parent involvement in the screening process is crucial to gather meaningful information and to support the child's development. As reported by Latino parents, providing social and emotional support to their children along with a positive parental attitude were the most important attributes of parents in order to properly take care of their children. Using parent-completed screening tools might be an effective strategy to support these parental values. When completing the ASQ-3, parents may have the opportunity to use quality time to observe, recognize children's strengths, and interact with them in a natural environment.

An increase of cultural awareness and a better understanding of the situation experienced by immigrant families, additional training for personnel who work with diverse population, and increased funding are without doubt, necessary elements for improving the quality of services provided to immigrant families. Yet, using better adapted and culturally appropriate screening materials will facilitate the establishment of a much more positive first step towards a linked system of intervention, boosting and scaffolding the challenge of serving diverse populations of young children. In addition, agencies and personnel that provide early intervention services for a diverse population may benefit from the opportunity to use an appropriate and reliable screening system, enhancing parent-professional relationships and offering better and culturally adapted services.

Well-child checks, as recommended by the AAP, take place at 9, 18 and 30 (or 24) month of age for all children (AAP, 2006). Universal screening and surveillance at these ages is highly important in order to prevent late identification of delays and disabilities (Hix-Small et al., 2007; Jee et al., 2010; Sand, Silverstein, Glascoe, Gupta, Tonniges, & O'Connor, 2005). The ASQ screening system is a widely used tool among pediatricians and medical personnel, and recommended as an effective and cost-efficient instrument. Ensuring the appropriateness and equivalence of the Spanish version at these age intervals may constitute a strategic way to expand the coverage of a reliable and proofed screening instrument that is responsive to the needs and priorities of Latino families, increasing the likelihood of identifying young children in need.

Implications for Research

Results from the current study provide additional evidence to the existing literature on the equivalence of parent-completed screening instruments used across different cultures. In the context of cross-cultural research, the interest in studying the psychometric properties of translations and adaptations of the ASQ-3 is increasingly growing. Only preliminary studies have been conducted on the current Spanish ASQ version that is been used in the U.S. Findings from the current study, even though not conclusive, add new insights on cultural appropriateness and item equivalence of screening tools and will help interested researchers to design and implement complementary studies in this area. New questions may be asked and improved methodologies may be applied, based on the results and limitations of this study.

Ongoing research oriented to study the equivalence of items in different cultural environments is highly recommended. The ASQ-3 is a screening and monitoring system

that is commonly used in the educational, medical, and children welfare fields where diverse population access those services, including Latino families. Translation flaws detected through research may guide improvements on item accuracy, adequacy, and productivity. In particular, examining the item properties of the ASQ-3 allowed the identification of questions that were functioning differently across versions, and some of them were associated to linguistic differences. A few items were identified as containing more than predicted randomness; some domains were found to present an unexpected order difficulty in respect the arrangement of items, and for a small number of questions, all the response categories were not used. Revising the identified flaws on some of the items for the 9, 18 and 30 month intervals may increase the effectiveness of the Spanish ASQ-3 with Latino children.

Cross-cultural research will be expanded and improved to the extent in which measurement instruments can be proved and calibrated to the specific properties of diverse cultural groups. Before analyzing and comparing children performances across cultures, the sensitivity and accuracy of those instruments have to be ensured. Research studies designed to examine test and item bias will assist the process of guaranteeing fairness in testing. Thus, examining item functioning and cultural appropriateness of the Spanish ASQ-3 from a comprehensive perspective may contribute to the growing body of knowledge on cross-cultural research that might be done.

Future Directions

There is a critical need for sensitive and culturally appropriate screening tools for use with minority groups within the U.S. This study has examined ASQ-3 items on the 9, 18 and 30 month intervals, contributing to improved understanding of how items function across cultures, and how Latino families perceive their utility and readability. Important values and expectations for children's growth and development were also investigated. From preliminary findings, new research questions and methodological approaches can be generated such as questions related to item functioning across different Latino groups living in the U.S and across Latinos who live in their own country of origin. Studies of item invariability across different generations of immigrant families in the U.S. may also be valuable to examine.

Items were analyzed using one parameter logistic model, which predicts the probability of success for a person on an item. The parameter included was the difficulty level, meaning that items differed only in difficulty, with probabilities increasing with trait level for each item. Other parameters might be included in future research, such as discrimination and guessing level, providing a more complete understanding of items based on examinees' characteristics.

Inclusion of a more diverse Latino population for the evaluation of item functioning, and of appropriateness and utility of the ASQ-3 may provide a more complete view of strengths and priorities of Latino immigrant families in the U.S. Variables such as diverse income level, educational preparation, number of years living in the country, geographic location, type of neighborhoods, and availability of services will be rich sources of valuable information that can be analyzed in the context of validity

and reliability of the Spanish ASQ-3. After assuring sound psychometric properties of translated versions of a measurement instrument, study of the scores and comparisons of performance level might be conducted. Results presented here are promising and suggest further research in cultural appropriateness and equivalence of parent-completed screening tools is needed and will be worthwhile.

APPENDIX A

PARTICIPANT INFORMATION FORM

1. Child's gender:

___ Female
___Male

2. Child's date of birth (mm/dd/yy):_____

3. Is the child receiving early intervention services?

___Yes
___No

If you answered Yes, What is your child's disability?_____
_____
_____

Services that your child is receiving:

___None
___Speech and Language
___Occupational Therapy
___Physical Therapy
___Feeding
___Respite
___Parent Class
___Other

4. Number of children (including child) living in the child's home:_____

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

6. Mother's level of education:

___Some High School
___High School Graduate
___Some Community College
___Two Year or Vocational Degree
___Four Year Degree
___Master's Degree
___Doctoral Degree
___Other:

7. Was the mother younger than 19 at the child's birth?
___Yes
___No
___Don't know

8. Which range better represent your annual family income?

___ $0 -$12,000
___ $12,001 - $24,000
___$24,001 - $40,000
___$More than $40,000
___Don't know
___Other

9. Person answering the questions:

___Mother
___Father
___Guardian
___Grandparent
___Foster parent
___Other:

10. Did someone assist you in completing the assessments?

___Yes
___No

If yes, how did they assist?

___Reading Items
___Providing extra examples
___Trying the activities with your child before answering the questions.
___Other

11. Are you willing to participate in an interview related to using the ASQ-3?

___Yes (see consent form attached in your material set)
___No

12. If you agree to participate in the interview, please write your city's name and your phone number. You will receive activities and games for your child.

City:_____ State:_____

Telephone number: _____

Thank you for completing the Participant Information Form!

SPANISH FORM

FORMULARIO DE INFORMACIÓN DE LOS PADRES/CUIDADORES

1. Sexo del niño/a:

___Femenino
___Masculino

2. Fecha de nacimiento del niño/a (mes/día/año):_____

3. ¿Recibe el niño/a servicios de intervención temprana?

___Si
___No

Si respondió Si, Por favor díganos cuál es la discapacidad de su niño/a_____
_____

Servicios que recibe actualmente su niño/a

___Ninguno
___Terapia de lenguaje
___Terapia ocupacional
___Terapia física
___Alimentación
___Cuidado "Respite"
___Clase para padres
___Otro

4. Número de niños/as (incluyendo al niño/a participante) que viven en el hogar:_____

5. Número de cuidadores (ej: madre, padre, abuela) que viven en el hogar:_____

6. Nivel de educación de la madre (marque la alternativa que más se ajuste a su realidad):

___Algo de preparatoria
___Certificado de preparatoria
___Algo de colegio/instituto/Universidad
___Dos años de universidad o título vocacional
___Licenciatura
___Maestría
___Doctorado
___Otro:

7. ¿Tenía la madre menos de 19 años cuando el niño/a participante nació?
___Si
___No
___No sé
8. ¿Qué rango representa mejor los ingresos económicos anuales de su familia?

___ $0 - $12,000
___ $12,001 - $24,000
___$24,001 - $40,000
___$Más de $40,000
___No lo sabe
___Otro

9. Persona que ha respondido estas preguntas:

___Madre
___Padre
___Tutor legal
___Abuelo(a)
___Padres de crianza
___Otro:

10. ¿Recibió la ayuda de alguien al completar el cuestionario ASQ-3?

___Si
___No
Si respondió *Si*, ¿De qué forma le ayudaron?

___Leyendo las preguntas
___Dándole más ejemplos en las preguntas
___Realizando las actividades con su niño/a antes de responder el cuestionario
___Otro

11. ¿Desearía usted participar en una breve entrevista sobre el cuestionario ASQ-3?

___Si (vea el formulario de consentimiento en su set de materiales)
___No

12. Por favor escriba el nombre de su ciudad y su número de teléfono para poder contactarle en caso de que usted desee participar en la entrevista. Usted recibirá sugerencias de actividades y juegos para su niño/a.

Ciudad:_____ Estado:_____

Número de Teléfono: _____

¡Gracias por completar esta información!

APPENDIX B

PARENT APPROPRIATENESS-UTILITY INTERVIEW

Please complete this survey after filling out the ASQ-3 on your child.

1.What language does your family speak at home?

2. Where were you born?

3.How many years have you been living in the United States?

4. Where was your child (the participant child) born?

5. Does your child attend childcare or preschool?

6. What language do adults or teacher speak to your child at the childcare or preschool?

7.Could you tell me the most important qualities or personality traits that you would like your child to have at 3 years old?

8. Please, list the values you thought are most important in order to properly raise infants and toddlers

9. Which of these characteristics do you think are more important to be learned for your child?
___make decisions on his/her own
___work through problems on his/her own
___obey adults without questioning
___respect adults and people in authority
___help with domestic labors

10. Could you tell me which of these qualities are the three more important ones in order to properly raise young children?
___ be understanding
___ have trust in your children
___ be creative
___ have economic resources
___ set limits
___ be loyal to the family
___ be religious/spiritual

11. How much time did you spend completing the ASQ-3?
___Less than 10 minutes
___10 – 20 minutes
___20 – 30 minutes
___ More than 30 minutes

12. Did you need help to complete the ASQ-3 questionnaire?
___Yes, I asked some help.
___Yes, I needed a lot of help.
___No, I did not need help.

13. Was the ASQ-3 easy to understand?
___Yes
___Sometimes
___No

14. The questions were appropriate for my child's age.
___Yes
___Sometimes
___No
If no, please indicate which questions seemed inappropriate for your child.

15. The ASQ-3 (Please check all that apply.)
___was interesting.
___helped me think about my child's development.
___took too long.
___was a waste of time.
___didn't tell me much.

16. Was it easy for you the skills targeted by ASQ-3 items?
___Yes
___No
___Some times

17. Were the pictures and examples helpful for answering the questions?
___Yes
___No
___Some times

18. How would you change this ASQ-3 to make it better?

Thank you for taking the time to complete and return these questions!

SPANISH FORM

ENTREVISTA DE UTILIDAD/PERTINENCIA PARA LOS PADRES

Por favor complete esta encuesta después de contestar el ASQ-3 sobre su hijo(a).

1. ¿Qué idioma (lenguaje) habla su familia en la casa?

2. ¿Dónde nació usted?

3. ¿Cuántos años lleva usted viviendo en Los Estados Unidos?

4. ¿Dónde nació su hijo/a sobre quién Ud. ha completado este cuestionario ASQ-3

5. ¿Asiste su niño/a a la guardería (Jardín Infantil)?

6. ¿En qué idioma le hablan a su niño/a en la guardería (Jardín Infantil)?

7. ¿Me podría decir usted las cuáles son las 5 más importantes características o cualidades que a usted le gustaría que su niño/a tuviera a los 3 años de edad?

8. Por favor nombre los valores que usted cree son los más importantes que los padres deben tener para criar apropiadamente a sus bebés o niños/as pequeños

9. ¿Cuáles de estas características son las más importantes que su niño/a pequeño debe aprender?
___tomar decisiones por sí mismo
___solucionar los problemas por sí mismo
___ obedecer a los adultos sin hacer preguntas
___ respetar a los adultos y las personas con autoridad
___ayudar con las labores domésticas

10. ¿Cuál de estas cualidades son las tres más importantes para usted para poder criar apropiadamente a los niños/as pequeños?
___ser comprensiva/o
___tener confianza en los hijos/as
___ser creativo
___tener recursos económicos
___ poner límites claros
___ser leal a la familia
___ser religioso/ir a la iglesia

11. ¿Cuánto tiempo le tomó completar el cuestionario ASQ-3?
___menos de 10 minutos
___10-20 minutos
___20-30 minutos
___más de 30 minutos

12. ¿Necesitó usted ayuda para completar el cuestionario ASQ-3?
___Si, necesité un poco de ayuda.
___Si, necesite mucha ayuda.
___No, no necesité ayuda.

13. El cuestionario ASQ-3 fue fácil de entender.
___Si
___Algunas veces
___No

14. Las preguntas son apropiadas para la edad de mi hijo/a.
___Si
___Algunas veces
___No
Si respondió no, por favor indique cuáles preguntas le parecieron inapropiadas para su hijo(a).

15. El cuestionario ASQ-3 (Por favor marque todas las opciones que correspondan.)
___Fue interesante.
___Me ayudó a pensar sobre el desarrollo de mi hijo/a.
___Tomó demasiado tiempo.
___Fue una pérdida de tiempo.
___No me entregó mucha información.

16. ¿Le fue fácil entender la manera en que las preguntas están presentadas?

___Si
___No
___Algunas veces

17. ¿Fueron los dibujos y ejemplos una ayuda para responder el cuestionario ASQ-3?

___Si
___No
___Algunas veces

18. ¿Cómo cambiaría usted este cuestionario ASQ-3 para mejorarlo?

¡Muchas Gracias por completar estas preguntas!

APPENDIX C

QUESTIONS THAT PRESENTED DIF

ASQ-3 edad (intervalo), área y número de la pregunta	**ASQ-3 Pregunta original en Inglés**	**ASQ-3 Traducción al Español**	**¿Es esta traducción correcta? Si no lo es, por favor díganos por qué.**	**¿Están preguntando ambas preguntas (Inglés y Español) lo mismo? Si no lo están, ¿Cuál sería la diferencia?**	**¿Están ambas preguntas midiendo la misma habilidad en los niños/as?**
9 meses Comunicación pregunta 1	Does your baby make sounds like "da," "ga," "ka," and "ba"?	¿Hace su bebé sonidos como "da," "ga," "ka," y "ba"?			
9 meses Comunicación pregunta 3	Does your baby make two similar sounds leke "ba-ba," "da-da," or "ga-ga"? (the sounds do not need to mean anything.)	¿Puede hacer dos sonidos similares como "ba-ba," "da-da," o "ga-ga"? (no es necesario que los sonidos tengan significado).			
9 meses Comunicación pregunta 5	Does your baby follow one simple command, such as "come here," "give it to me," or "put it back," without your using gestures?	¿Sigue su bebé instrucciones sencillas, como por ejemplo, "ven acá," "dámelo," o "devuélvelo" sin que Ud. le haga gestos para que entienda lo que le está pidiendo?			
9 meses Socio-individual pregunta 5	When you dress your baby, does he push his arm through a sleeve once his arm is started in the hole of the sleeve?	Cuando Ud. viste a su bebé, ¿puede él meter el brazo por la manga de la camisa una vez que Ud. le haya metido la mano en la bocamanga?			
9 meses Socio-individual	When you hold out your	Cuándo Ud. le extiende la mano			

pregunta 6	hand and ask for her toy, does your baby let go of it into your hand?	para pedirle un juguete, ¿su bebé lo suelta para que Ud. lo tome?			
18 meses Comunicación pregunta 3	Does your child say eight or more words in addition to "Mama" and "Dada"?	¿Dice su niño ocho o más palabras además de "mamá" y "papá"?			
18 meses Comunicación pregunta 5	Without your showing him, 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	Sin enseñarle primero, ¿puede señalar con el dedo el dibujo correcto cuando Ud. le dice, "Enséñame dónde está el gatito", o le pregunta, "¿Dónde está el perro?" (Solamente tiene que identificar un dibujo correctamente).			
18 meses Motora gruesa pregunta 1	Does your child bend over or squat to pick up an object from the floor and then stand up again without any support?	¿Puede su niña agacharse para recoger un objeto del suelo y volver a ponerse de pie sin apoyo?			
18 meses Motora gruesa pregunta 3	Does your child walk well and seldom fall?	¿Camina bien su niña sin caerse a menudo?			
18 meses Motora gruesa pregunta 4	Does your child climb on an object such as a chair to reach something he wants (for example, to get a toy on a counter or to "help" you in the kitchen)?	¿Se sube a algún objeto como una silla para alcanzar algo que quiere (por ejemplo, para agarrar un juguete que está arriba del mostrador de la cocina o para "ayudarle" en la cocina)?			
18 meses Motora gruesa pregunta 5	Does your child walk down stairs if	¿Su niño puede bajar las escaleras si usted lo lleva de			

	you hold onto one of her hands? She may also hold onto the railing or wall. (You can look for this at a store, on a playground, or at home.)	la mano? Puede agarrarse de la pared o de la barandilla también. (Ud. puede hacer esta observación en la tienda, en el parque, o en la casa.)			
18 meses Motora fina pregunta 5	Does your child turn the pages of a book by himself? (He may turn more than one page at a time.)	¿Sabe darle la vuelta a las hojas de un libro sin ayuda? (Tal vez pase más de una hoja a la vez.)			
18 meses Resol. de problemas pregunta 2	After you have shown your child how, does she try to get a small toy that is slightly out of reach by using a spoon, stick, or similar tool?	Después de enseñarle a su niña cómo se hace, ¿usa una cuchara, un palo, u otro implemento similar para intentar agarrar un juguete pequeño que está ligeramente fuera de su alcance?			
18 meses Resol. de problemas pregunta 6	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 him how.)	Después de dejar caer una migaja o un Cheerio (cereal de desayuno) en una pequeña botella transparente, ¿pone la botella al revés para sacarlo? (No le muestre cómo hacerlo.)			
18 meses Socio-indiv. Pregunta 1	While looking at herself in the mirror, does your child offer a toy to her own image?	Al mirarse en el espejo, ¿su niña se ofrece un juguete a sí misma?			
18 meses Socio-indiv. Pregunta 2	Does your child play with a doll or	¿Juega su niño con una muñeca o con un muñeco de			

	stuffed animal by hugging it?	peluche, abrazándolo?			
30 meses Comunicación pregunta 3	When you ask your child to point to her nose, eyes, hair, feet, ears, and so forth, does she correctly point to at least seven body parts? (She can point to parts of herself, you, or a doll. Mark "sometimes" if she correctly points to at least three different body parts.)	Al pedirle a su niña que señale la nariz, los ojos, el pelo, los pies, las orejas, etc., ¿puede señalar al menos siete partes del cuerpo? (Las puede señalar en su propio cuerpo, en el de Ud. o en una muñeca. Marque "a veces" si señala correctamente al menos tres partes del cuerpo.)			
30 meses Comunicación pregunta 5	Without giving your child help by pointing or using gestures, ask him to "put the book on the table" and "put the shoe under the chair." Does your child carry out both of these directions correctly?	Sin darle pistas ni señas, ni hacer gestos, dígale a su niño: "Pon el libro encima de la mesa y pon el zapato debajo de la silla". ¿Puede seguir las dos instrucciones correctamente?			
30 meses Motora gruesa pregunta 2	Does your child walk either up or down at least two steps by himself? He may hold onto the railing or wall. (You can look for this at a store, on a playground, or at home.)	¿Su niño sube o baja al menos dos escalones sin ayuda? Puede agarrarse de la pared o de la barandilla. (Ud. puede hacer esta observación en una tienda, en el parque, o en la casa.)			
30 meses Motora gruesa pregunta 3	Without holding onto anything for support, does your child kick	Sin apoyarse en ningún objeto, ¿sabe su niño dar una patada a un balón moviendo la			

	a ball by swinging his leg forward?	pierna hacia atrás y luego hacia adelante?			
30 meses Motora gruesa pregunta 5	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.) She may hold onto the railing or wall.	¿Sube las escaleras su niño poniendo sólo un pie en cada escalón? (El pie izquierdo en un escalón y el derecho en el siguiente.) Puede agarrarse de la barandilla o de la pared.			
30 meses Motora gruesa pregunta 6	Does your child stand on one foot for about 1 second without holding onto anything?	¿Puede pararse su niña en un solo pie por aproximadamente 1 segundo sin agarrarse de nada?			
30 meses Motora fina pregunta 3	Can your child string small items such as beads, macaroni, or pasta “wagon wheels” onto a string or shoelace?	¿Sabe meter un cordón (o agujeta) por el agujero de objetos pequeños como cuentas de madera, sopa de macarrones o de rueditas, por los agujeros de los zapatos?			
30 meses Motora fina pregunta 5	After your child watches you draw a single circle, ask him to make a circle like yours. Do not let him trace your circle. Does your child copy you by drawing a circle?	Después de observarlo/la a Ud. dibujar un círculo como el suyo. No lo deje dibujar encima del suyo ni usar papel transparente. ¿Su niño dibuja un círculo, copiando lo que Ud. hizo?			
30 meses Resol.de probl. Pregunta 2	If your child wants something he cannot reach, does he find a chair or box to stand on to reach it (for example, to	Si quiere algo que no alcanza, ¿busca su niña una silla o una caja para subirse encima y alcanzarlo? (Por ejemplo, para agarrar un juguete que está en el			

	get a toy on a counter or to "help" you in the kitchen)?	mostrador de la cocina, o para "ayudarle" a Ud. en la cocina.)			
30 meses Resol.de probl. Pregunta 3	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.)	Mientras su niña lo/la observa, ponga cuatro objetos como unos cubos o unos carritos en línea recta. ¿Lo/la intenta imitar, poniendo los cuatro objetos en línea recta también? (También puede usar carretes de hilo, unas cajitas u otros juguetes.)			
30 meses Resol.de probl. Pregunta 5	When you say, "say 'seven three'," does your child repeat just the two numbers in the same order? Do not repeat the numbers. If necessary, try another pair of numbers and say, "Say 'eight two'." Your child must repeat one series of two numbers for you to answer "yes" to this question.	Si Ud. le dice a su niña, "Di 'siete tres'," ¿repite únicamente los dos números en el mismo orden? Ud. no debe repetir los números. Si es necesario, intente otro par de números, por ejemplo, "Di 'ocho dos'". (Su niña sólo tiene que repetir una serie de dos números para que Ud. pueda marcar "si" en esta pregunta.)			

Por favor díganos brevemente cuál es su trabajo actualmente y su experiencia previa trabajando con niños/as y sus familias:

¡Muchas Gracias!

APPENDIX D

CONCERNS REGARDING THE SPANISH ASQ-3

Language Concern	Expert1 L	Expert 2 R	Expert 3 G	Expert 4 A
Syntax	-Items should include the subject ("su bebé") as the English version (9m-CM3): *Does your baby make two similar sounds leke "ba-ba," "da-da," or "ga-ga"?* -The structure of the sentence is different. Subjects (who initiate the action and who receive it is confusing) (9m-PS6) -The order of the question should be different (18m-CM3) -The subject is not mentioned in this question (18m-CM5, MG4, Probl.S2, Probl.S6, 30m-Probl.S3) -The question is unclear, the sequence (structure) can be improved (18m-FM5) -The structure of the question is confusing. It is not clear who is offering the toy (18m-PS1).	-The order of the question is confusing also the meaning is different (30m-FM3) -The translation sounds very confusing. It has contradictions (30m-FM5).	- Question needs the subject (9m-CM1 - Instead of gender a neutral for may be used (18m-Probl.S2, 30m-GM6)	
Semantics	-In the Spanish version is not clear if the child need to follow all 3 instructions or only 1(9m-CM5) - The word "bocamanga" is not culturally	-The expression "put it back" is not a simple instruction in Spanish, it has two connotations (9m-CM5) -Questions are different. In English "seldom fall"	-The translation for the expression "put it back" is not accurate (9m-CM5) -The Spanish question is specifying a type of clothing ("shirt") when the English	-The translation is unclear (9m-PS6) -The translation is confusing (18m-Probl.S6) -The translation is incorrect. The

	appropriate. The original question says “push through” which is different to the Spanish word “meter” (9m-PS5) -Parents may have difficulties understanding the differences between the 2 instructions. Do they need to be followed in the same order, one after the other? (30m-CM5) -The last part of the item may result confusing. It is not clear in the Spanish translation whether the child have to hold onto the railing or wall as a requirement to get the item correct (30m-GM5) -The meaning of the item is different. The Spanish version includes the word “soup” (“sopa”) and ask the child to string small items onto the eyelets (30m-FM3) -The words trace and copy in Spanish were not well translated (30m-FM5)	appeared as a possibility in Spanish is not (18m-GM3) -The expression “hold onto one of her hands” in the Spanish version implies that the adult have the complete control (18m- GM5) -The Spanish version is using the word “know” that means that one ability has been learned. The English question does not have that connotation(18m-CM5, FM5) -The Spanish version use the word “enseñar” that means teach instead of “show” (“mostrar”). These words may be confusing in this question (18m-CG2). -The expression “turn the bottle upside down to dump out” is not clear in the Spanish version (18m-CG6) -The ambiguity of offering an object to her image in a mirror is canceled in the Spanish version (18m-PS1). -Following the Spanish translation, there is a possibility that the adult repeats one body part or that the child identifies a same part in her own and in a picture	version is not (9m-PS5). -The translation is incorrect, the two questions included in the item resulted confusing (9m-PS6) -The Spanish translation uses the expression “without teaching” instead of “without showing” It may result confusing (18m-CM5). -The translation is incomplete. It missed the verb “squat” (18m GM1). -The translation used in the Spanish version for the word counter is not accurate (18m-GM4, 30m-Probl.S2) -The probability introduce by the word “may” was not considered in the Spanish translation (18m-GM5) -The translation is poor. It should be completed, especially for the expression “turn the pages of a book” (18m-FM5) -The Spanish translation uses the word “teach” instead of “show”. It has different meaning in Spanish too (18m-Probl.S2, 30m-FM3). -The Spanish	Spanish version changes the last part asking the child string small items onto the eyelets (30m-FM3) -The translation is confusing. The words trace and copy are not well used in the Spanish translation (30m-FM5)

		(30m-CM3). -It is not clear (in English and Spanish) if instructions are provided at the same time or not. Does the child need to follow both instructions one after the other? (30m-CM5). -The expression "mover la pierna hacia atrás" is not included in the English version, even though the word "swing" has that connotation. (30m-GM3) -The Spanish question asks the child to pass a shoelace onto the eyelets (30m-FM3). That is not an option in the English questions (it is more difficult) -The words copy and imitate are not been clearly used in this question (30m-FM5). -In English it is clear that is the child who needs something. In the Spanish translation it is not (30m-CG2). -The question in English asks the child to line up four objects. The Spanish question is asking for the child's intention for doing it (30m CG3).	translation uses the word "can your child" instead of "does your child…" (30m-CM5, 30m-GM3). -The translation is incomplete the expression "holding onto anything for support" missed the support part (30m-GM3). -The Spanish translation included an extra word that is not necessary "transparent paper"(30m-FM5)	

REFERENCES CITED

Abell, N., Springer, D. W, & Kamata, A. (2009). *Developing and validating rapid assessment instruments.* New York: Oxford.

American Academy of Pediatrics (2006). Identifying infants and young children with developmental disorders in the medical home: An algorithm for developmental surveillance and screening. *American Academy of Pediatrics, 118,* 405-420. doi: 10.1542/peds.2006-1231

American Educational Research Association, American Psychological Association, and national Council on Measurement in Education. (1999). *Standards for educational and psychological testing.* Washington, DC: American Educational Research Association.

Babbie, E. (1990). Survey research methods. Belmont, CA: Wadsworth.

Bagnato, S. J. (2007). *Authentic assessment for early childhood intervention.* New York: The Guilford Press.

Bagnato, S. J., Neisworth, J. T, & Munson, S. M. (1998). *Linking assessment and early intervention. An authentic curriculum-based approach*. Baltimor: Paul.H. Brookes.

Bagnato, S. J., Neisworth, J. T., & Pretti-Frontczak, K. (2010). *Linking authentic assessment and early childhood intervention. Best measures for best practices.* Baltimor: Paul.H. Brookes.

Bagnato S. J. & Yeh Ho, H. (2006). High stakes testing with preschool children: Violation of professional standards for evidence based practice in early childhood intervention. *KEDI Journal of Educational Policy, 3*(1), 23-43.

Barnett, W. S., & Belfield, C. R. (2006). Early childhood development and social mobility. The Future of Children, 16(2), 73-98.

Berk, L. E. (2008). *Infants and children. Prenatal through middle childhood*. Boston: Pearson.

Berkeley, S., Bender, W., Peaster, L., & Saunders, L. (2009). Implementation of Response to Intervention: A snapshot of progress. *Journal of Learning Disabilities, 42*(1), 85-95.

Berry, J. W. (2006). *Acculturation: A concept overview*. In Bornstein, M. H., & Cote, L. R. (Eds.), *Acculturation and parent-child relationships. Measurements and development.* (pp. 13-30). New Jersey: Lawrence Erlbaum Associates.

Birman, D. (2006). *Measurement of the acculturation gap in immigrant families and implications for parent-child relationships.* In Bornstein, M. H., & Cote, L. R. (Eds.), *Acculturation and parent-child relationships. Measurements and development.* (pp. 113-134). New Jersey: Lawrence Erlbaum Associates.

Borman, J., Sevcik, R. A., Romski, M., & Kyeong Pae, H., (2010). Successfully translating language and culture when adapting assessment measures. *Journal of Policy and Practice in Intellectual Disabilities, 7,* 111-118.

Bornstein, M. H., & Cote, L. R. (2006). *Introduction to acculturation and parent-child relationships.* In Bornstein, M. H., & Cote, L. R. (Eds), *Acculturation and parent-child relationships. Measurements and development*. (pp 3-12). New Jersey: Lawrence Erlbaum Associates.

Bornstein, M. H., & Cote, L. R. (2006). *Parenting cognitions and practices in the acculturative Process.* In Bornstein, M. H., & Cote, L. R. (Eds.), *Acculturation and parent-child relationships. Measurements and development*. (pp 173 - 196). New Jersey: Lawrence Erlbaum Associates.

Brassard, M. R. & Boehm, A. E. (2007). *Preschool assessment, principles and practices*. New York: The Guildford Press.

Bricker, D., Squires, J., & Clifford, J. (2010). Developmental screening measures: Stretching the use of the ASQ for other assessment purposes. *Infants and Young Children, 23*(1), 14-22.

Brothers, K. B., Glascoe, F. P., & Robertshaw, N. S. (2008). PEDS: Developmental milestones – An accurate brief tool for surveillance and screening. *Clinical Pediatrics, 47,* 271-279. doi: 10.1177/0009922807309419

Bruckman, M., & Blanton, P. W. (2003).Welfare-to-work single mothers' perspectives on parent involvement in Head Start: Implications for parent–teacher collaboration. *Early Childhood Education Journal, 30,* 145-150.

Bruder, M. B. (2010). Early childhood intervention: A promise to children and families for their future. *Exceptional Children, 76,* 339-355.

Burger. K. (2010). How does early childhood care and education affect cognitive development? An international review of the effects of early interventions for children from different social backgrounds. *Early Childhood Research Quarterly 25,* 140-165. doi:10.1016/j.ecresq.2009.11.001

Buysse, V., Castro, D. C., & Peisner-Feinberg, E. (2010). Effects of a professional development program on classroom practices and outcomes for Latino dual language learners. *Early Childhood Research Quarterly, 25,* 194-206. doi: 10.1016/j.ecresq.2009.10.001

Calzada, E. J., Fernández, Y., & Cortés, D. E. (2010). Incorporating the cultural value of respeto into a framework of Latino parenting. *Cultural Diversity and Ethnic Minority Psychology, 16,* 77–86. doi: 10.1037/a0016071

Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development & Psychopathology, 12,* 467-488.

Ceballo, R. & Hurd, N. (2008). Neighborhood context, SES, and parenting: including a focus on acculturation among Latina mothers. *Applied Developmental Science, 12,* 176-180. doi: 10.1080/10888690802387997

Ceballos, P. L. & Bratton, S. C. (2010). Empowering Latino families: Effects of a culturally responsive intervention for low-income immigrant Latino parents on children's behaviors and parental stress. *Psychology in the Schools, 47,* 761-775. doi: 10.1002/pits.20502

Center for Immigration Studies. Camarota, S. A. (2007). Immigrants in the United States, 2007: A Profile of America's Foreign-Born Population**.** Retrieved from http://www.cis.org/immigrants_profile_2007

Chen, C-I., Squires, J., & Pomés, M. P. (2010, October). *Testing cultural fairness of translations of a developmental screening test.* Unpublished manuscript.

Coplan, J. (1982). Parents' estimate of child's developmental level in high-risk population. *American Journal of Diseases of Children, 136,* 101-104.

Copple, C., & Bredekamp, S. (Eds.). (2009). *Developmentally appropriate practice in early childhood programs serving children from birth through age 8.* Washington, DC : National Association for the Education of Young Children.

Danaher, J., Goode, S. & Lazara, A. (Eds.). (2010). *Part C updates* (11th ed.). Chapel Hill: The University of North Carolina, FPG Child Development Institute, National Early Childhood Technical Assistance Center.

DeMars, C. (2010). *Item Response Theory.* New York, NY: Oxford.

Derman-Sparks, L. & Olsen, J. (2010). *Anti-bias education for young children and ourselves*. Washington, DC : National Association for the Education of Young Children.

Diamond, K. E. & Squires J. (1993). The role of parent report in the screening and assessment of young children. Journal of Early Intervention, *17,* 107-115. doi: 10.1177/105381519301700203

Dionne, C., Squires, J., Leclerc, D., Peloquin, J., & McKinnon, S. (2006). Cross-cultural comparison of a French Canadian and U.S. developmental screening test. *Developmental Disabilities Bulletin, 34*(1-2), 1-56.

Division of Early Childhood. (2010). *Responsiveness to all Children, Families, and Professionals: Integrating Cultural and Linguistic Diversity into Policy and Practice*. Retrieved from http://www.dec-sped.org/uploads/docs/about_dec/position_concept_papers/Position%20Statement_Cultural%20and%20Linguistic%20Diversity_updated_sept2010.pdf

Downs, A., & Strand, P. (2006). Using Assessment to Improve the Effectiveness of Early Childhood Education. *Journal of Child & Family Studies, 15*(6), 671-680. doi: 10.1007/s10826-006-9080-7

Drotar, D., Stancin, T., Dworkin, P., Sices, L., & Wood, S. (2008). Selecting developmental surveillance and screening tools. *Pediatrics in Review, 29*, 52-58. doi: 10.1542/pir.29-10-e52

Elbers, J., Macnab, A., McLeod, E., & Gagnon, F. (2008). The ages and Stages Questionnaires: Feasibility of use as a screening tool for children in Canada. *Canadian Journal of Rural Medicine, 13*(1), 9-14.

Embretson, S. E & Reise, S. P. (2000). *Item response theory for psychologists*. New York, NY: Psychology Press.

Fischer, C., Harvey, E. A., & Driscoll, P. (2009). Parent-centered parenting values among Latino immigrant mothers. *Journal of Family Studies, 15,* 296-308.

Fry, R. & Passel, J. S. (2009). Latino children: A majority are U.S-born offspring of Immigrants. Report Pew Hispanic Center.

Fuller, B., Bridges, M., Bein, E., Jang, H., Jung, S., Rabe-Hesketh, S., Halfon, N., & Kuo, A. (2009). The health and cognitive growth of Latino toddlers: At risk or immigrant paradox? *Matern Child Health, 13,* 755-768. doi: 10.1007/s10995-009-0475-0

Galindo, C. & Fuller, B. (2010). The social competence of Latino kindergartners and growth in mathematical understanding. *Developmental Psychology, 46,* 579–592. doi: 10.1037/a0017821

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research an introduction.* Boston: Pearson.

García-Coll, C & Kerivan-Marks, A. (2011). *The immigrant paradox in children and adolescents: Is becoming American a developmental risk?* Washington, D.C: American Psychological Association.

Garhart, C. (2000). *Theories of childhood. An Introduction to Dewey, Montessori, Erikson, Piaget and Vigotsky.* MN: Redleaf Press.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research.* New York: Aldine Publishing Company.

Glascoe, F. P. (1999). Using parents' concerns to detect and address developmental and behavioral problems. *Journal for Specialists in Pediatric Nursing, 4,* 24-36. doi:10.1111/j.1744-6155.1999.tb00077.x

Glascoe, F. P. (2003). Parents' evaluation of developmental status: How well do parents' concerns identify children with behavioral and emotional problems? *Clinical Pediatrics, 42,* 133-138. doi: 10.1177/000992280304200206

Glascoe, F. G. (2005). Screening for developmental and behavioral problems. *Mental Retardation and Developmental Disabilities, 11,* 173-179. doi: 10.1002/mrdd.20068

Glascoe, F. G. & MacLean, W. E. (1990). How parents appraise their child's development. *Family Relations, 39,* 280-283.

Gollenberg, A. L., Lynch, C. D., Jackson, L. W., McGuinness, B. M, & Msall, M. E. (2010). Concurrent validity of the parent-completed Ages and Stages Questionnaires, 2nd Ed. with the Bayley Scales of Infant Development II in a low-risk sample. *Child: Care, Health & Development, 36,* 485-490. doi:10.1111/j.1365-2214.2009.01041.x

Grisham-Brown, J., Pretti-Frontczak, K. & Hubbell, S. (2011). *Recommended practices in identifying children for special services.* In Grisham-Brown, J., Pretti-Frontczak, K. (Eds), *Assessing young children in inclusive settings. The blended practices approach* (pp.121-148). Baltimor: Paul.H. Brookes.

Guralnick, M. J. (1998). Effectiveness of early intervention for vulnerable children: A developmental perspective. *American Journal on Mental Retardation, 102,* 319-345.

Guralnick, M. J. (2008). International perspectives on early intervention. A search for common ground. *Journal of Early Intervention, 30,* 90-101. doi: 10.1177/1053815107313483

Guralnick, M. J. (2011). Why early intervention works. A systems perspective. *Infants & Young Children, 24*(1), 6-28.

Hambleton, R. K., (2005). *Issues, designs, and technical tests into multiple languages and cultures.* In R. K. Hambleton, P. F. Merenda, & C. D. Spielberger (Eds.), *Adapting educational and psychological test for cross-cultural assessment.* New Jersey, NJ: Lawrence Erlbaum Associates.

Hambleton, R. K., & Zenisky, A. L. (2011). *Translating and adapting test for cross-cultural assessments.* In Matsumoto, D. & Van de Vijver, F. J. R. (Eds.), Cross cultural research methods in psychology (pp. 46-74). New York: Cambridge.

Harris, S. R. (1994). Parents' and caregivers' perceptions of their children's development. *Developmental Medicine & Child Neurology, 36,* 918-923. doi: 10.1111/j.1469-8749.1994.tb11783.x

Harwood, R. L. & Feng, X. (2006). *Studying acculturation among Latinos in the United States*. In M. H. Bornstein, & L. R. Cote, (Eds.), *Acculturation and parent-child relationships. Measurements and development*. (pp. 197-222). New Jersey, NJ: Lawrence Erlbaum Associates.

Hawkins, S. H., Pretty-Frontczak, K., Grisham-Brown, J., Brown, T. L., & Moore, L. (2011). *Assessment for program planning purposes.* In Grisham-Brown, J., Pretti-Frontczak, K. (Eds.), *Assessing young children in inclusive settings. The blended practices approach* (pp.149-174). Baltimor: Paul.H. Brookes.

Hebbeler, K., Spiker, D., Bailey, D., Scarborough, A., Mallik, S., Simeonsson, R.,Singer, M., & Nelson. L. (2007). *Early intervention for infants and toddlers with disabilities and their families: Participants, services, and outcomes. Final Report of the National Early Intervention Longitudinal Study (NEILS).* Retrieved from http://www.sri.com/neils/pdfs/NEILS_Report_02_07_Final2.pdf

Heckman, J., Grunewald, R., & Reynolds, A. (2006). The dollars and cents of investing early: Cost-benefit analysis in early care and education. *Zero to Three, 26,* 10 -17.

Heo, K. , Squires, J. , & Yovanoff, P. (2008). Cross-cultural adaptation of a pre-school screening instrument: Comparison of Korean and U.S populations. *Journal of Intellectual Disability Research, 52,* 195-206. doi: 10.1111/j.1365-2788.2007.01000.x

Hill, N. E. & Torres, K. (2010). Negotiating the American dream: The paradox of aspirations and achievement among Latino students and engagement between their families and schools. *Journal of Social Issues, 66,* 95-112.

Hix-Small, H., Marks, K., Squires, J., & Nickel, R. (2007). Impact of implementing developmental screening at 12 and 24 months in a pediatric practice. *Pediatrics,120,* 381-389. doi: 10.1542/peds.2006-3583

International Test Commission (2010). *International Test Commission guidelines for translating and adapting test*. Retrieved from http://www.intestcom.org/guidelines/index.php

Janson, H. & Squires, J. (2004). Parent-completed developmental screening in a Norwegian population sample: A comparison with US normative date. *Acta Paediatrica, 93,* 1525-1529. doi: 10.1080/08035250410033051

Jee, S. H., Szilagyi, M., Ovenshire, C., Norton, A., Conn, A. M., Blumkin, A., & Szilagyi, P. G. (2010). Improved detection of developmental delays among young children in foster care. *Pediatrics, 125,* 282-289. doi: 10.1542/peds.2009-0229

Johnson, K. M. & Lichter, D. T. (2010). Growing diversity among America's children and youth: Spatial and temporal dimensions. *Population and Development Review, 36,* 151-176. doi: 10.1111/j.1728-4457.2010.00322.x

Kamata, A. & Vaughn, B. K. (2004). An introduction to differential item functioning analysis. *Learning Disabilities: A Contemporary Journal 2*(2), 49-69.

Kapci, E. G., Kucuker, S., & Uslu, R. I. (2010). How applicable are Ages and Stages Questionnaires for use with Turkish children? *Topics in Early Childhood Special Education 30,* 176-188. doi: 10.1177/0271121410373149

Kerstjens, J. A., Bos, A. F.,Vergert, E., Meer. G., Butcher, P, R., & Reijneveld, S. A. (2009). Support for the global feasibility of the Ages and Stages Questionnaire as developmental screener. *Early Human Development, 85,* 443-447. doi:10.1016/j.earlhumdev.2009.03.001

Leidy, M. S., Guerra, N. G., & Toro, R. I. (2010). Positive parenting, family cohesion, and child social competence among immigrant Latino families. *Journal of Family Psychology, 24,* 252–260. doi: 10.1037/a0019407

López, D. E. & Stanton-Salazar, R. D. (2001). Mexican Americans: A second generation at risk. In Portes, A., Rumbaut, R. G. (Eds.), Ethnicities. *Children of Immigrants in America.* (pp. 57-90). California: University of California Press.

Lucas, A., Hurth, J., & Kasprzak, C. (Eds.) (2010). *Essential elements of high performing, high quality Part C systems* (NECTAC Notes no. 25). Chapel Hill: The University of North Carolina, FPG Child Development Institute, National Early Childhood Technical Assistance Center.

McCrae, J. S., Cahalane, H. C., & Fusco, R. A. (2011). Directions for developmental screening in child welfare based on the Ages and Stages Questionnaires. *Children and Youth Services Review 33,* 1412–1418. doi:10.1016/j.childyouth.2011.04.011

Magnuson, K. A., Ruhm, C., & Waldfogel, J. (2007). Does prekindergarten improve school preparation and performance? *Economics of Education Review, 26,* 33-51. doi: 10.1016/j.econedurev.2005.09.008

Masters, G. N. & Wright, B. D. (1984). The essential process in a family of measurement models. *Psychometrika, 49,* 529-544. doi: 10.1007/BF02302590

Mather, M. & Foxen, P. (2010). *America's future: Latino child well-being in numbers and trends*. Retrieved from the National Council La Raza website: http://www.nclr.org/index.php/publications/americas_future_latino_child_well-being_in_numbers_and_trends/

Meisels, S. J., Atkins-Burnett, S. (2005). *Developmental screening in early childhood. A guide.* Washington: National Association for the Education of Young Children.

Meisels, S. J., Wen, X., & Beachy-Quick, K. (2010). Authentic assessment for infants and toddlers: Exploring the reliability and validity of the Ounce Scale. *Applied Developmental Science, 14*(2), 55-71. doi: 10.1080/10888691003697911

Messick, S. (1989). Validity. In R.L. Linn (Ed.), E*ducational measurement* (pp. 13-103). New York, NY: Macmillan.

Miles, M.B., & Huberman, A.M. (1994). *Data coding. Qualitative data analysis.* California CA: Sage Publications.

Myers, N. D., Wolfe, E. W., Feltz, D. L., & Penfield, R. D. (2006). Identifying differential item functioning of rating scale items with the Rasch model: An introduction and an application. *Measurement in Physical Education and Exercise Science*, *10*, 215-240.

National Association for the Education of Young Children. (2005). *Screening and assessment of young English-language learners. Supplement of NAEYC and NAECS/SDE on joint position statement on early childhood curriculum, assessment, and program evaluation.* Washington, DC. Retrieved from http://www.naeyc.org/files/naeyc/file/positions/ELL_Supplement_Shorter_Version.pdf

National Association of for the Education of Young Children (NAEYC) & National Association of Early Childhood Specialists in State Departments of Education (NAECS/SDE). (2003). Early Childhood Curriculum, Assessment, and Program Evaluation, Building and Effective, Accountable System in Programs for Children Birth through Age 8. Retrieved from http://www.naeyc.org/files/naeyc/file/positions/CAPEexpand.pdf

Newborg, J., Stock, J., Wnek, L., Guidubaldi, J., & Svinicki, J. (1988). *Battelle Developmental Inventory.* Chicago: Riverside.

Nores, M., & Barnett, W.S. (2009). Benefits of early childhood interventions across the world: Investing in the very young. Economics of Education Review, in press doi:10.1016/j.econedurev.2009.09.001

Orlando, M. & Marshall, G. N. (2002). Differential Item Functioning in a Spanish translation of the PTSD checklist: Detection and evaluation of impact. *Psychological Assessment, 14*(1), 50-59. doi: 10.1037//1040-3590.14.1.50

Peña, E.D. (2007). Lost in translation: Methodological considerations in cross-cultural research. *Child Development, 78,* 1255-1264.

Pérez, M. E., & Fox, R. A. (2008). Parenting Latino toddlers and preschoolers. *Hispanic Journal of Behavioral Sciences, 30,* 481-499. doi: 10.1177/0739986308324791

Pfeiffer-Fiala, C., Pretti-Frontczak, K., Moore, L., & Lyons, A. N. (2011). *Performance monitoring within a tiered instructional model.* In Grisham-Brown, J., Pretti-Frontczak, K. (Eds.), *Assessing young children in inclusive settings. The blended practices approach* (pp.193-218). Baltimor: Paul.H. Brookes.

Pinto-Martin, J. A., Dunkle, M., Earls, M., Fiedner, D., & Landes, C. (2005). Developmental stages of developmental screening: steps to implementation of a successful program. *Understanding and Addressing the Challenges of Disability, 95,* 1928-1932. doi:10.2105/AJPH.2004.052167

Pizur-Barnekow, K., Erickson, S., Johnston, M., Bass, T., Lucinski, L., Bleuel, D. (2010). Early identification of developmental delays through surveillance, screening, and diagnostic evaluation. *Infants and Young Children, 23,* 323-330.

Portes, A., Rumbaut, R. G., Fernández-Kelly, P., & Haller, W. (2006). Growing up American. The new second generation. In Portes, A., Rumbaut, R. G. (Eds.), *Immigrant America. A portrait* (pp. 244-298). California: University of California Press.

Pretti-Frontczak, K. & Bricker, D. (2004). *An activity-based approach to early intervention.* Baltimor: Paul.H. Brookes.

Pretti-Frontczac, K. & Shannon, N. R. (2011). *Recommended practices for determining technical adequacy.* In Grisham-Brown, J., Pretti-Frontczak, K. (Eds.), *Assessing young children in inclusive settings. The blended practices approach* (pp. 91-117). Baltimor: Paul.H. Brookes.

Qi, C. H. & Marley, S. C. (2009). Differential item functioning analysis of the Preschool Language Scale–4 between English-speaking Hispanic and European American children from low-income families. *Topics in Early Childhood Special Education, 29,* 171-180. doi: 10.1177/0271121409332674

Ramey, C., & Ramey, S. (1998). Early Intervention and Early Experience. *American Psychologist, 53,* 109-120.

Ramey, C. T., & Ramey, S. L. (2004). Early learning and school readiness: Can early intervention make a difference? *Merrill-Palmer Quarterly, 5,* 471-491.

Reise, S. P., Ainsworth, A. T., & Haviland, M. G. (2005). Item Response Theory. Fundamentals, applications, and promise in psychological research. *Current Directions in Psychological Science, 14,* 95-101.

Reynolds, A. J. &Temple, J. A. (2008). Cost-effective early childhood development programs from preschool to third grade. *The Annual Review of Clinical Psychology, 4,* 109-139. doi:10.1146/annurev.clinpsy.3.022806.091411

Reynolds, A.J., Magnuson, K., & Ou, S. (2010). Preschool-to-third grade programs and practices: A review of research. *Children and Youth Services Review 32,* 1121-1131. doi:10.1016/j.childyouth.2009.10.017

Richter, J., & Janson, H. (2007). A validation study of the Norwegian version of the ages and stages questionnaires. *Acta Paediatrica, 96,* 748-752. doi: 10.1111/j.1651-2227.2007.00246.x

Robbins, S. H., Pretti-Frontczak, K. & Grisham-Brown, J. (2011). *Recommended practices for assessing children with diverse abilities.* In Grisham-Brown, J., Pretti-Frontczak, K. (Eds.), *Assessing young children in inclusive settings. The blended practices approach* (pp.61- 90). Baltimore: Paul.H. Brookes.

Rumbaut, R. G & Komaie, G. (2010, Spring). Immigration and Adult Transitions .*The Future of Children, 20*(1), 43-66.

Rydz, D., Srour, M., Oskoui, M., Marget, N., Shiller, M., Birnbaum, R., Majnemer, A., & Shevell, M. I. (2006). Screening for developmental delay in the setting of a community pediatric clinic: A prospective assessment of parent-report questionnaires. *Pediatrics, 118,* 1178-1186. doi: 10.1542/peds.2006-0466

Saenz, R. (2010). *Latinos in America 2010* (Population Bulletin December 2010) Retrieved from Population Reference Bureau website: http://www.prb.org/Publications/PopulationBulletins/2010/latinosupdate1.aspx

Saldaña, J. (2009). *The coding manual for qualitative researchers.* London: Sage.

Salvia, J., Ysseldyke, J. E., & Bolt, S. (2009). *Assessment: In special and inclusive education*. Belmont: Wadsworth.

Sameroff. A. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development, 81,* 6-22.

Samaroff, A., & Mackenzie, M. J. (2003). Research strategies for capturing transactional models of development: The limits of the possible. *Development and psychopathology, 15,* 613-640. doi: 10.1017.s0954579403000312

Sand, N., Silverstein, M., Glascoe, F. P., Gupta, V. B,,Tonniges, T. P., & O'Connor, K. G. (2005). Pediatricians' reported practices regarding developmental screening: do guidelines work? Do they help? *Pediatrics,116,* 174 –179.

Sandall, S., Hemmeter, M., Smith, B. J., & McLean, M. E. (2006). *DEC recommended practices: A comprehensive guide for practical applications in early intervention/early childhood special education*. Denver, CO: Sopris West.

Saracho, O. N. & Spodek, B. (2010). Contemporary Perspectives on Language and Cultural Diversity in Early. Retrieved from http://books.google.com/books?hl=en&lr=&id=a6EGgeCDrjEC&oi=fnd&pg=PA43&dq=Latin+american+population+and+immigrant+in+the+US+and+2010&ots=kYcTzIfEb4&sig=DL6pkpjMK778ZNd79_Wnx_DuxIs#v=onepage&q&f=false

Sarmiento, J. A., Squires, J., & Ponte, J. (2010). Universal developmental screening: preliminary studies in Galicia, Spain. *Early Childhood Development and Care. 1,* 1-11. doi: 10.1080/03004430903458007

Shackelford, J. (2006). *State and jurisdictional eligibility definitions for infants and toddlers with disabilities under IDEA* (NECTAC Notes No. 21). Chapel Hill: The University of North Carolina, FPG Child Development Institute, National Early Childhood Technical Assistance Center.

Sheatsley, P. B. (1983). *Questionnaire construction and item writing*. In Rossi, P. H., Wright, J. D., & Anderson, A. B. (Eds.), Handbook of survey research (pp.195-230). New York: Academic Press.

Shields, M. K. & Behrman, R. E. (2004) Children of immigrant families: Analysis and recommendations, *The Future of Children, 14*(2), 4-15, Retrieved from http://www.princeton.edu/futureofchildren/publications/docs/14_02_1.pdf

Shonkoff, J. P. (2009). Mobilizing science to revitalize early childhood policy. *Issues in Science and Technology, 26*(1), 79-85.

Shonkoff , J. P.(2010). Building a new biodevelopmental framework to guide the future of early childhood policy. *Child Development, 81,* 357-367.

Simeonsson, R. (1991). Primary, secondary, and tertiary prevention in early intervention. *Journal of Early Intervention,15,* 124-134. doi: 10.1177/105381519101500202

Sireci, S. G., Pastula, L., & Hambleton, R. K. (2005). *Statistical methods for identifying flaws in test adaptation process.* In Hambleton, R. K., Merenda, P. F., & Spielberger, C. D. (Eds.), Adapting Educational and Psychological tests for cross-cultural assessment (pp. 93-115). New Jersey: Lawrence Erlbaum Associates.

Sireci, S. G. (2011). *Evaluating test and survey items for bias across languages and cultures*. In Matsumoto, D. & Van de Vijver, F. J. R. (Eds.), Cross cultural research methods in psychology (pp. 216-240). New York: Cambridge.

Soodak, L. C., & Erwin, E. J. (1995). Parents, professionals and inclusive education: A call for collaboration. *Journal of Education and Psychological Consultation, 6,* 257-276.

Snow, C. E., & Van Hemel, S. B. (Eds). (2008). *Early childhood assessment. Why, what, and how.* Washington, DC: The National Academies Press.

Snyder, T.D., and Dillow, S.A. (2010). *Digest of Education Statistics 2009* (NCES 2010-013). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Squires, J. &. Bricker, D. (1999). *Ages and Stages Questionnaires: A parent-completed child-monitoring system. 2nd ed.* Baltimore: Paul H. Brookes.

Squires, J., & Bricker, D. (2009). *The Ages and Stages Questionnaires: A parent completed, child-monitoring system* (3r ed.) Baltimore: Paul Brookes.

Squires, J., Nickel, R., & Bricker, D. (1990). Use of parent-completed developmental questionnaires for child-find and screening. *Infants & Young Children,3,* 46-57.

Squires, J., Potter, L., Bricker, D., & Lamorey, S. (1998). Parent-completed developmental questionnaires: Effectiveness with low and middle income parents. *Early Childhood Research Quarterly, 13,* 345-354.

Squires, J., Twombly, E., Bricker, D., & Potter, .L. (2009). *ASQ-3 User's guide.* Baltimore: Paul H. Brookes.

Suárez-Orozco, C., Suárez-Orozco, M., & Todorova, I. (2008). *Learning a new land.* Massachusetts: Belknap Press.

Suizzo, M., Chen, W., Cheng, C., Liang, A. S., Contreras, H., Zanger, D., & Robinson, C. (2008). Parental beliefs about young children's socialization across U.S ethnic groups: Coexistence of independence and interdependence. *Early Childhood Development and Care,178,* 467-486. doi: 10.1080/0300440600823917

Takala, S. & Kaftandjieva, F. (2000). Test fairness: a DIF analysis of an L2 vocabulary test. *Language Testing, 17,* 323-340. doi: 10.1177/026553220001700303

Thompson, L. A., Tuli,S. Y., Saliba, H., DiPietro, M., & Nackashi, J. A. (2010). Improving developmental screening in pediatric resident education. *Clinical Pediatrics, 49,* 737–742. doi: 10.1177/0009922810363818

Troude, P., Squires, J., L'Helias, L., Bouyer, J., & La Rochebrochard, E. (2011). Ages and Stages Questionnaires: Feasibility of postal surveys for child follow-up. *Early Human Development, 87*(10), 671-676.

Tsai, H., McClelland, M., Pratt, C., & Squires, J. (2006). Adaptation of the 36-month ages and stages questionnaire in Taiwan: Results from a preliminary study. *Journal of Early Intervention, 28,* 213-225. doi: 10.1177/105381510602800308

Uiterwijk, H., & Vallen, T. (2005). Linguistic sources of item bias for second generation immigrants in Dutch tests. *Language Testing, 22,* 211-234.

United Nations Educational, Scientific and Cultural Organization. (2007). EFA global monitoring report. Strong foundations: Early childhood care and education. Retrieved from http://unesdoc.unesco.org/images/0014/001477/147794E.pdf

U.S Census Bureau. (2005) American Community Survey. Retrieved from http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ds_name=ACS_2006_EST_G00_&ts=

U.S Census Bureau. (2009). American Community Survey Retrieved from http://www.census.gov/acs/www/

U.S Census Bureau. (2011). The 1022 statistical abstract. Retrieved from http://www.census.gov/compendia/statab/cats/education/elementary_and_secondary_education_completions_and_dropouts.html

U.S Census Bureau. (2011). The Hispanic population: 2010. Census briefs. Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-04.pdf

U.S Department of Education, Office of Special Education Programs, Data Analysis System. (2009). *Children with Disabilities Receiving Special Education Under Part B of the Individuals with Disabilities Education Act* (DANS OMB #1820-0043).Retrieved from https://www.ideadata.org/arc_toc10.asp#partcCC.

U.S Office of Special Education Programs. Child Find. Retrieved from http://www.childfindidea.org/overview.htm

Van de Vijver, F. J. R., & Leung, K. (2011). *Equivalence and bias: A review of concepts, models, ad data analytic procedures.* In Matsumoto, D. & Van de Vijver, F. J. R. (Eds.), Cross cultural research methods in psychology (pp. 17-45). New York: Cambridge.

Van de Vijver, F. J. R., & Matsumoto, D. (2011). *Introduction to the methodological issues associated with cross-cultural research.* In Matsumoto, D. & Van de Vijver, F. J. R. (Eds.), Cross cultural research methods in psychology (pp. 1-14). New York: Cambridge.

Vijver, F.J.R., & Poortinga, Y.H. (2005). Conceptual and methodological issues in adapting tests. In Hambleton, R. K, Merenda,P. F., & Spielberger, C. D.(Eds.), *Adapting educational tests and psychological tests for cross-cultural assessment.* (pp. 39-64). New Jersey, NJ: Lawrence Erlbaum.

Wagner, M, & Hebbeler, K. (2010). *Child-based Longitudinal Studies: A firm foundation for improving policy and practice for children and youth with disabilities*. Consortium for citizens with disability. Retrieved from http://www.sri.com/neils/pdfs/CCDbriefing031210.pdf

Weisner, T. S. (2002). Ecocultural understanding of children's developmental pathways. *Human Development, 45*, 275-281.

White, R. M. B., Roosa, M. W., Weaver, S. R., & Nair, R. L. (2009). Cultural and contextual influences on parenting in Mexican American families. *Journal of Marriage and Family, 71,* 61-79.

Worthman, C. M. (2010). The ecology of human development: Evolving models for cultural psychology. *Journal of Cross-Cultural Psychology, 41,* 546-562. doi: 10/1177/0022022110362627

Wyse, A. E. & Mapuranga, R. (2009). Differential item functioning analysis using Rasch item information functions. *International Journal of Testing, 9,* 333-357. doi: 10.1080/15305050903352040

Yovanoff, P., Squires, J., & McManus, S. (in progress). Score equivalence of web-based and paper-pencil administration of a developmental questionnaire for young children.

Yovanoff, P. & Tindal, G. (2007). Scaling early reading alternate assessment with statewide measures. *Council for Exceptional Children, 75*, 184-201.