EARLY SOCIAL-EMOTIONAL DEVELOPMENT AND THE UTILITY OF A SOCIAL-EMOTIONAL SCREENING TOOL FOR TODDLERS IN TAIWAN

by

FANG YU LIN

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Student: Fang Yu Lin

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

Dr. Jane Squires	Chairperson
Dr. Stephanie De Anda	Core Member
Dr. Stephanie Shire	Core Member
Dr. Cengiz Zopluoglu	Institutional Representative

and

Krista Chronister	Vice Provost for Graduate Studies

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

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DISSERTATION ABSTRACT

Fang Yu Lin

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Title: Early Social-Emotional Development and the Utility of a Social-Emotional Screening Tool for Toddlers in Taiwan

In Taiwan, the high prevalence of emotional and behavioral problems in children has increased public awareness of young children's social-emotional development in recent years. Early identification of social-emotional delays for all young children, and subsequent early intervention (EI) with ongoing monitoring for children with special needs are critical. However, previous social norms regarding early mental health problems, the lack of social-emotional screening, and the scarcity of EI research on social-emotional development in Taiwan have resulted in lack of early social emotional screening and early identification. This study investigates toddler-aged children's social-emotional development in Taiwan and monitors their social-emotional behaviors over time. Two hundred eighty-four children with and without development delays were screened with a social-emotional screening tool, the Traditional Chinese ASQ:SE-2, and then were subsequently followed for six months and retested. Findings indicated a high positive rate of social-emotional risk at 22.9% for 18-month-old children who were not receiving early intervention services, suggesting that additional numbers of children could be identified for EI services early on. Findings also indicated that children with developmental delays or disabilities were 3 to 4 times more likely to have social-emotional risk, and that the risk could increase overtime, emphasizing the needs for monitoring social-emotional

behaviors and the effectiveness of interventions. To address early identification and ongoing monitoring, the present study suggests the use of the Traditional Chinese ASQ:SE-2 and needs further studies establishing psychometric evidence for toddlers in Taiwan.

CURRICULUM VITAE

NAME OF AUTHOR: Fang Yu Lin

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene
University of Texas at Austin, Austin
China Medical University, Taiwan

DEGREE AWARDED:

Doctor of Philosophy, Special Education, 2022, University of Oregon
Master of Education, Special Education, 2013, University of Texas at Austin
Bachelor of Science, Physical Therapy, 2010, China Medical University

AREA OF SPECIAL INTEREST:

Early Childhood Special Education and Early Intervention
Child Development

PROFESSIONAL EXPERIENCE:

Graduate teaching assistant, Department of Special Education, University of Oregon, Eugene, 2016-2022
Board Certified Behavior Analyst, Little Behavior Consulting, Austin, 2015-2016
Behavior therapist, Williams Community School, Austin, 2013-2015
Research assistant, China Medical University, Taiwan, 2010-2012
Pediatric physical therapist intern, Taipei Veterans General Hospital, Taiwan, 2009-2010

GRANTS, AWARDS, AND HONORS:

Janette Gunther Drew Scholarship, University of Oregon, 2021-2022
General University Scholarship, University of Oregon, 2021-2022

Davis Bricker Scholarship, University of Oregon, 2021

Graduate Teaching Fellowship, Special Education, University of Oregon, 2016-2022

College of Education Competitive Academic Award, University of Texas at Austin, 2012-2013

The Honor Society of Phi Kappa Phi, University of Texas at Austin, 2013

Research Creativity Award, National Science Council, Taiwan, 2008-2009

PUBLICATIONS:

Sun, S. S., Zhu, Y. C., **Lin, F. Y**., Huang, L. C., Su, H. C., Simeonsson, R. J., & Lin, C. H. (2020). Development of the Parents' Perceived Parenting Skills Questionnaire. *Bulletin of Early Intervention,* 2(1), 61-79. DOI: 10.6658/BEI.202012_2(1).0004

Bricker, D. D., Felimban, H. S., **Lin, F. Y**., Stegenga, S. M., & Storie, S. O. (2020). A Proposed Framework for Enhancing Collaboration in Early Intervention/Early Childhood Special Education. *Topics in Early Childhood Special Education*, 00(0), 1-13. DOI: 10.1177/0271121419890683. https://doi.org/10.1177/0271121419890683

Lin, F. Y., Huang, L. C., Su, H. C., Zhu, Y. C., Liu, Y. J., & Sun, S. H. (2018). Interaction Between Professionals and Parent in Early Intervention: A Survey Research. *Bulletin of Early Intervention,* 1(1), 43-62. DOI: 10.6658/BEI.201806_1(1).0003

Sun, S. H., Chang, S. Y., **Lin, F. Y**., Wang, C. B., & Syu, M. S. (2011). *Taiwan Dichyu Fajhan Chihhuan Ertong Siangguan Liaoyu Zihyuan Siankuang Diaocha Jhih Sianchyu Yanjiou [Investigation of Early Intervention Services for Children with Developmental Disability in Taiwan]*. (Report No. GRB-100301100000A1002). Ministry of the Interior, Taiwan

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CHAPTER 1

INTRODUCTION

Social-emotional development is a critical process that facilitates children's learning how to understand and express their emotions in order to positively interact with others and the environment, and to meet their needs, and achieve their goals (Squires et al, 2015). Researchers have suggested that early childhood social-emotional development is essential for foundational learning that links to school readiness, academic success, and quality of life (e.g., Domitrovich et al., 2017; D. E. Jones et al., 2015; Maggi et al., 2010). In many Western countries, the prevalence rates of children with emotional and behavioral disorders have drawn researchers' attention to early identification and interventions for social-emotional problems (Squires et al., 2013).

Without doubt, culture and context matter and should be considered as we study early social-emotional competence (Carter et al., 2004; Squires et al., 2015). Children learn and develop their social-emotional behaviors from their living and learning experiences. Cultural differences and diversity in cultural practices in children and families could influence children's social-emotional behaviors (C. Y. Chen et al., 2015; Rescorla et al., 2011; X. Chen & Rubin, 2011). Thus, studies in young children's social-emotional development across cultures and in diverse families are particularly important (Chou & Hwang, 2011; Squires et al., 2012).

In Taiwan, similar to many other East Asian cultures (e.g., China and Japan), cultural expectations include being modest, grateful, and diligent, having self-control, and maintaining harmony in society (Chang & Algoe, 2019; Jerrim, 2015; Saad et al., 2015; Tsai, 2019). A group's cohesiveness and goals are valued over individuals' benefits or emotions (Saad et al., 2015). With these cultural expectations, children in Taiwan learn moral emotions and behaviors

earlier than their American peers (Chou & Hwang, 2011). Many schools and families in Taiwan also reflect these underlying cultural values and emphasize discipline, hard-work ethic, and academic success (Chang & Lay, 2018; Tsai, 2019).

Although there are strengths and benefits of these cultural characteristics, children's and students' personal emotions are often suppressed under the pressure of cultural expectations and academic competition, resulting in reduced interpersonal interactions and more internalizing behavioral problems (Butler et al., 2007; Yang et al., 2000). Under the suppression of emotions and the prevailing value of sacrificing for group harmony in the past decades, it has been rare that parents talk about or help their children learn to recognize, express, and regulate their emotions (Chou & Hwang, 2011). Because of cultural factors and lack of knowledge and research in social-emotional development in Asian countries, issues surrounding children's social-emotional development have not been widely addressed until recently in Taiwan.

Growing Awareness in Social-Emotional Development in Taiwan

With the high prevalence rate of mental health disorders in children, there has been growing literature and attention on social-emotional development and amelioration of behavior problems. In 2000, research showed that adolescent students in Taiwan were reported to have lower levels of social-emotional competence and more internalizing behavioral problems when compared to American students (Yang et al., 2000). In another international study comparing total problem scores on the Child Behavior Checklist (CBCL), preschool children in Taiwan were reported to have scores greater than 7.1 (1 SD) above the mean, suggesting higher levels of emotional and behavioral problems, compared to many other countries (Rescorla et al., 2011).

In a large-scale study in Taiwan, researchers investigated the prevalence of preschoolers' behavioral and emotional problems measured by the CBCL (Y. T. Wu et al., 2012). The findings

indicated that the prevalence rate of behavior problems in preschoolers aged 24 to 71 months was about 25.0% in Taiwan. Similarly, a recent epidemiological study investigated the prevalence rate of mental health disorders listed in Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) and reported that the lifetime and 6-month prevalence rates were 31.6% and 25.0%, respectively, with a sample of 4,816 school-age children (Y. L. Chen et al., 2020). The lifetime prevalence rate in Taiwan (31.6%) was much higher than in Japan (20.3%; Ishikawa et al., 2016) and China (16.6%; Huang et al., 2019). Based on these data, it appears that mental health disorders are common in Taiwan and there is a need for early identification, universal screening, early intervention (EI), and public awareness of social-emotional development in young children (Carter et al., 2004; Y. L. Chen et al., 2019).

The Lack of Social-Emotional Screening in Taiwan

The EI system in Taiwan provides services for children from birth to 6 years through the following four processes: (a) child find and referral, (b) case management, (c) evaluation and eligibility determination, and (d) intervention and placement (Taiwan Ministry of Health and Welfare, Aug. 2020). Screening for developmental and social-emotional problems is included in the process of child find and is usually conducted in health centers or preschools (Sun & Yang, 2006). The widely used screening tool in Taiwan is a brief parent-report questionnaire with only few items for social-emotional development, making it difficult for identifying young children with social-emotional risks.

Recently, more screening and assessment tools for social-emotional development have been developed in local studies or adapted from Western countries. Two parent-report instruments for universal screening social-emotional development in toddler-aged children, the Ages and Stages Questionnaires: Social-Emotional and the Brief Infant Toddler Social

Emotional Assessment, were adapted and validated with the Taiwan population in order to identify children with social-emotional problems early on, and to address cultural contexts in Taiwan (C. Y. Chen et al., 2020; Liang et al., 2020). Both measures demonstrated promising psychometric evidence supporting their use as screeners in Taiwan for young children. In particular, the ASQ:SE-2 is more robust because of its comprehensiveness and wider age range (from birth to 72 months). However, the clinical use of these instruments is still limited in Taiwan because these tools are relatively new and more research is needed to emphasize the importance of social-emotional screening in early ages.

Social-Emotional Development in Young Children with Special Needs

Children with development delay or disabilities have more risks in social-emotional development (B. L. Baker et al., 2003; Crnic et al., 2004; Irwin et al., 2002) and the risks are likely to increase without interventions (Keenan et al., 2019). To support their social-emotional development, in addition to early identification, EI services and ongoing monitoring are critical. With appropriate assessment tools, research that includes monitoring and follow-up can help provide a glance of changes in social-emotional development overtime and promote EI approaches addressing social-emotional needs (Pontoppidan et al, 2020).

In addition, although literature has suggested several EI approaches for promoting social-emotional development (Case-Smith, 2013), only a few studies in Taiwan provide evidence on how EI services impacted social function or emotional regulation over time (Ho & Lin, 2020; Hwang et al., 2013; Wu et al., 2014) and little is known about current EI services for young children with social-emotional risks in Taiwan, suggesting the need for more exploratory research to enlighten future studies. Monitoring changes in social-emotional behaviors for

children with social-emotional risks and describing their current EI experience may help provide future directions for research and suggestions for practitioners in Taiwan.

Thus, in this study, my primary aim is to conduct social-emotional screening and monitoring of social-emotional behaviors in young children in Taiwan through the use of a promising social-emotional assessment tool. Specifically, I conducted the screening of a population of toddler-aged children with and without developmental delay and disabilities, using the parent-completed ASQ:SE-2. I then monitored changes in ASQ:SE-2 scores of these children at follow-up. I also gathered data from parents on their reactions of completing this social-emotional screening to understand the overall utility of the ASQ:SE-2 from parents' perspectives in Taiwan,

CHAPTER 2

LITERATURE REVIEW

In this chapter, I will review literature that include social-emotional development in very young children and social-emotional screening in Taiwan EI system. For the literature review on social-emotional development, I will first define terms, describe the importance of social-emotional competence, and review available tools to assess social-emotional development in Taiwan. Next, I will review literature regarding current practice of social-emotional screening in Taiwan. Finally, the purpose of this study will be described.

Social-Emotional Development

Social-emotional development is an integrative and functional process. Through this process, children increase their abilities to recognize, express, and regulate emotions, which enable them to interact and develop positive relationships with others. Children who are socially and emotionally competent are more likely to adapt to a new learning environment and achieve their goals. In order to define and measure social-emotional competence and identify problems, researchers described that social competence and emotional competence are two distinct but overlapping developmental areas (Squires et al., 2015).

Social competence refers to a set of behaviors that allow children to interact with others positively and effectively (Jones & Bouffard, 2012; Raver & Zigler, 1997; Rose-Krasnor, 1997). For example, a three-year-old boy verbally requests for help from parents and engages in play with peers appropriately. Such behaviors are considered to be social competent and helpful for the child to develop positive relations with others. On the other hand, emotional competence is defined as the ability to interpret, express, and manage emotions to achieve one's goals (Campos et al., 1994; Saarni, 2000). For example, a three-year-old girl may cry when her parents drop her

off at preschool but is able to calm herself within 15 minutes. Such self-regulation of emotions is part of emotional competence.

Similarly, some researchers framed social-emotional competence as two types of skill sets: intrapersonal skills and interpersonal skills (Domitrovich et al., 2017). Intrapersonal skills are the internal abilities that help a child to recognize and regulate his own emotions, perceptions, thoughts, and attitudes, whereas interpersonal skills are the needed abilities for successful and positive interactions with others. Thus, intrapersonal skills can be considered as emotional competence, such as self-regulation, positive mindsets, and coping strategies. Interpersonal skills, on the other hand, can be considered as social competence, such as listening to others, communication, collaboration, and problem-solving skills.

Literature provides definitions for social skills and emotional competence, which has helped researchers develop measurements for social-emotional development. Although separating social competence and emotional competence is useful for measuring these constructs, research also shows that the two constructs are connected and overlap (Halle & Darling-Churchill, 2016; Squires et al., 2015). To have a comprehensive picture of children's social-emotional development, it is important to evaluate both constructs and address the connections.

Importance of Social-Emotional Development for Children with Developmental Disabilities

Social-emotional development has been linked to school readiness and is essential for foundational learning for very young children (Domitrovich et al., 2017; Mann et al., 2017; Thompson & Raikes, 2007). Raver and Knitzer (2002) indicated that preschoolers with insufficient social-emotional competence had less classroom participation and interaction with others, and consequently, were less likely to perform well on academic tasks in first grade. Briggs-Gowan and Carter (2008) found that the lag in the social-emotional development of

toddlers between 12 to 36 months predicted teacher-reported behavioral problems later in elementary school years. Children are frequently expelled from preschools and schools for behavioral problems, indicating that they may be less likely to succeed in school learning (Whitted, 2011). Some researchers also found that early childhood social-emotional development was linked to future success and wellness in terms of education, employment, criminal activities, and mental health. (Jones et al., 2015).

For those children with developmental delay or disabilities, social-emotional competence may be even more critical because social-emotional development is intertwined with other developmental areas. Research suggests that young children with developmental disabilities are more likely to have social-emotional problems identified later in preschools by teachers and parents (B. L. Baker et al., 2003; Crnic et al., 2004; Irwin et al., 2002). One previous study examined 225 three-year-old children with and without developmental delay and found that children with developmental delays were 3 to 4 times more likely to have clinical significant behavior problems, which also caused higher parental stress (B. L. Baker et al., 2003). Lee and colleague (2016) reported that preschool children with multiple disabilities tended to have lower social-emotional performance and more behavioral problems. Similarly, a recent study (Wu et al., 2021) suggests that toddlers with cerebral palsy had more externalizing problems and poorer social-emotional competence, comparing to their typically developing peers. It also suggested that for preterm children, social-emotional development was the most concerning developmental area when comparing to other developmental areas (Cheong et al., 2017).

Among the developmental areas, cognitive and language development are especially important to social-emotional development. Researchers suggested that cognition and emotion are linked and work together in order to process social information and make decisions (Barrett

et al., 2007; Bell & Wolfe, 2004; Heatherton & Wagner, 2011). Fanti and Henrich (2010) found that young children with lower cognitive skills were more likely to have externalizing behavioral problems and poor social adjustment. Previous studies suggest that children with a lower level of language skills were associated with more teacher- or parent-reported behavioral problems and less peer interaction (Hartas, 2011a; Irwin et al., 2002; Rose et al., 2018; Kerch et al., 2020). In Rose et al (2018) study, children's language development at age 3 was also found to be a critical predictor of emotional regulation at age 8 ($\beta = .20$, $p < .05$).

The presence of social-emotional problems is substantial in children with developmental disabilities and may be present as early as three-month-old for preterm infants (Crnic et al., 2004; Moe et al., 2016). Keenan et al. (2019) also found that social-emotional risk increased over time for children with traumatic brain injuries, indicating the needs for monitoring and EI services. It is suggested that children with developmental delay or disabilities, especially with linguistic and/or cognitive developmental delay, should be regularly screened and monitored for social-emotional development (Carter et al., 2004).

Assessment Tools for Social-Emotional Behaviors in Very Young Children

Early identification and effective evaluation are critical for timely receipt of EI services for young children. It is also important to choose appropriate and promising measures when monitoring changes in social-emotional behaviors and evaluating EI effects. This section provides a review of assessment tools for social-emotional development in young children and describe their use in screening and monitoring procedures.

Social-emotional competence and problems can be evaluated by parent questionnaires, observational assessments, and interviews (Carter et al., 2004). Parent-report questionnaires are usually utilized as the first step to detect social-emotional problems because they are more

accessible and cost-effective. Parents are valuable informants when evaluating social-emotional problems because they are usually the ones who are familiar with the child's daily life and behaviors, especially at a very young age (Squires et al., 2001). Furthermore, through these parent-report tools and regular screening procedure, parents may increase their awareness of the importance of social-emotional development and be more likely to seek EI services during children's early ages.

Previous studies provide evidence and support the use of parent-completed assessment tools. When comparing parent ratings of social-emotional problems and competence on the Infant-Toddler Social and Emotional Assessment (ITSEA; Carter et al., 2003) to professional assessment, associations were found between maternal ratings and observation measures of emotional reactivity, regulation, coping behaviors, and attachment, suggesting that parents can provide coherent and valuable information of their children's social-emotional problem and competence (Carter et al., 1999). In another study, parent ratings of red flag items for autism on the Ages & Stages Questionnaires: Social-Emotional, Second Edition (ASQ:SE-2; Squires et al., 2015), demonstrated correct prediction of diagnosis of autism spectrum disorders (Dolata et al., 2020).

A number of screening and assessment tools that can be completed by parents and caregivers have shown sound psychometric evidence and been recommended by researchers (Bagner et al., 2012; C. Y. Chen et al., 2020; Kamara et al., 2020; Liang et al., 2020; Pontoppidan et al., 2017), including the Child Behavior Checklist 1 ½-5 (CBCL 1 ½-5; Achenbach & Rescorla, 2000); Behavior Assessment System for Children, Third Edition Behavioral and Emotional Screener (BASC-3; Kamphaus & Reynolds, 2015); the ASQ:SE-2 (Squires et al., 2015); the ITSEA (Carter et al., 2003); and the brief version of ITSEA, the Brief

Infant Toddler Social Emotional Assessment (Briggs-Gowan et al., 2004). Among these tools, the CBCL 1 ½-5, ASQ:SE-2, and ITSEA have been recommended and widely utilized in EI practices and research for young children under age of three because of their age coverage, psychometric evidence, and comprehensiveness (Bagner et al., 2012; C. Y. Chen et al., 2020; Pontoppidan et al., 2017). The three assessment tools are reviewed in the following paragraphs.

Child Behavior Checklist 1 ½-5 (**CBCL 1 ½-5).** The CBCL 1 ½-5 was designed for identifying emotional and behavioral problems in children aged from 18 months to 5 years. It contains two broadband scales: internalizing and externalizing problems with seven narrowband scales, such as sleep problems and attention problems. The factor structure of the CBCL 1 ½-5 has been validated across several cultures and sample, and shows acceptable model fit (Neo et al., 2021). Research (Achenbach & Rescorla, 2000) also shows that the CBCL 1 ½-5 demonstrates high internal consistency (α = .95) and test-retest reliability (ICC = .90). The CBCL 1 ½-5 has been widely used in previous studies to measure problem behaviors and examine intervention effects for children (e.g., Kynø et al., 2012; Schaub et al., 2019; Verkerk et al., 2012; Welch et al., 2015; Y. C. Wu et al., 2014). However, the CBCL 1 ½-5 is usually administered by professionals and mainly focuses on identifying emotional and behavioral problems in children older than 18 months. It may not be the most appropriate and family-friendly tool for measuring social-emotional competence in young children, as it is exclusively problem based. In addition, although the CBCL 1 ½-5 has been adapted in Taiwan, the adaptation and validation were done decades ago (Huang et al., 1994) and it has not been re-normed since then.

Infant Toddler Social Emotional Assessment (**ITSEA).** The ITSEA (Carter et al., 2003) was designed for young children aged from 12 to 36 months. It comprehensively measures two

broad scales: social-emotional problems and competence, with 169 items. There are 88 items in the problem scale, 37 items in competence scale, and others in additional indices. The overall ITSEA demonstrated acceptable to good internal consistency for scales (α = .80 ~ .90), in which the competence scale had the best Internal Consistency (α = .90). The competence scale also showed acceptable model fit (RMSEA = .059, CFI = .957, NNFI = .945). In addition, while the problem scores showed mixed patterns across age groups, the Competence scores increase with age (Carter et al., 2003) and are significantly correlated with children's developmental level on the Infant Mullen Scales of Early Learning and the Vineland Adaptive Behavior Scales Socialization domain (Briggs-Gowan & Carter, 2007), suggesting that the Competence scale is an appropriate tool for monitoring young children's social-emotional development.

Thus, the ITSEA has been used in many EI studies in the U.S. (e.g., Cheong et al., 2017; Colditz et al., 2015; Lowell et al., 2011; Mahoney & Perales, 2005; Van Doesum et al., 2008). In Mahoney and Perales (2005), researchers examined the pre-post effects of a relationship-focused intervention for young children with pervasive developmental disorders or developmental disabilities. After one year of intervention, findings show significant improvement in social-emotional competence, self-regulation, and internalizing problems on the ITSEA for all 26 children under age of 5 (F = 3.92 ~ 6.74, p < .05). Another example of using the ITSEA is demonstrated in Van Doesum et al. (2008). The researchers examined the effects of a home-visit program compared to a telephone consultation program for depressed mothers of 71 young children aged 12 months and under. After 6 months of intervention, although there were no group differences on the problem scale of the ITSEA, children in the home-visit program had significant higher scores on the competence scale of the ITSEA (t = -2.64, p < .01), suggesting better growth of social-emotional competence for children in the home-visit program.

Although the ITSEA demonstrated capability in measuring social-emotional development in young children, the narrow age range and lengthy questionnaire have limited its clinical use in screening and monitoring (Xie et al., 2019). Considering the needs for regular screening, researchers and examined the validity and reliability of the brief version of the ITSEA (BITSEA; Briggs-Gowan et al., 2004). The BITSEA has 42 items with a similar structure as the full version and is more applicable in clinical screening. Several studies use the BITSEA as an outcome measure (e.g., Gonya et al., 2018; Haapsamo et al., 2012; Kaminski et al., 2013; Kim et al., 2015), yet, only a few research (Haapsamo et al., 2012) has been done on monitoring social-emotional development with the BITSEA competence scale.

Ages & Stages Questionnaire: Social-Emotional, 2nd edition (ASQ:SE-2). The third tool is the ASQ:SE-2 which is designed for children aged from 1 to 72 months. The ASQ:SE-2 and its first edition has been widely used for screening and monitoring the risk of social-emotional development in young children because of the following features: (a) it has an extensive age range, (b) it is family-friendly and easy to administer, (c) it covers both social-emotional competent and problem behaviors, and (d) it has sound psychometric evidence with robust overall reliability (α = .84), sensitivity (81%), and specificity (84%) (C. Y. Chen et al., 2020; Smith et al., 2020; Squires et al., 2015). According to the recent survey (Smith et al., 2020), eight states in the U. S. require the use of ASQ:SE and 30 states recommend its use.

In addition to the extensive use in clinical settings, several studies selected the ASQ:SE-2 or the first edition as one of their outcome measures to evaluate the changes in social-emotional behaviors and intervention effects (e.g., Meadan et al., 2019; Molnar et al., 2018; Pontoppidan et al., 2020; Salomonsson et al., 2021; Wang et al., 2020; Worku et al., 2018). In Molnar et al. (2018), researchers used the first edition of the ASQ:SE to measure the growth in social-

emotional development for 225 children aged from 0 to 5 in vulnerable families, such as families with low income. The findings from the individual growth model projections suggest that children who initially were identified for social-emotional problems by scoring above the cutoff would score in the normal range after 12 months of intervention ($x^2 = 74.73$, $p < .001$), indicating the significant improvement in social-emotional development overtime after the intervention. Researchers also visually analyzed the average item scores of the ASQ:SE which gradually improved at 6th month and 12th month of intervention, showing that the ASQ:SE can be used for monitoring the changes in social-emotional competence and risk behaviors.

Similarly, researchers evaluated the long-term effects of the Incredible Years Parents and Babies Program comparing to usual care with the ASQ:SE-2 and other outcome measures (Pontoppidan et al., 2020). The researchers randomly assigned 112 birth to 4-month-old infants to the intervention group and control group, and monitored their developmental status at the baseline, 4 months after intervention, and one-year follow-up. Although the findings show no intervention effect on the ASQ:SE-2, both groups of children showed significant improvement on the ASQ:SE-2 at one-year follow-up compared to the baseline. But the results from regression does not indicate significance from baseline to follow-up (B = .05, $p > .05$).

In Keenan et al. (2019), researchers monitored the changes in social-emotional behaviors for a group of toddlers after traumatic brain injuries with the use of ASQ: SE. The results from the multivariate model show significantly increased social-emotional problems and risk in toddlers with severe brain injuries 3 and 12 months after the onset of injury ($p < .05$). It is also noteworthy that only 5% of the participating children received EI services in this study, suggesting that children with severe brain injuries may have a higher risk of social-emotional problems later if they do not receive EI services in time.

A recent study conducted by Salomonsson and colleagues (2021) monitored changes in ASQ:SE scores for 100 infants aged from 1 to 23 months, after a short-term psycho-dynamic infant-parent intervention targeting mothers with distress. Researchers collected data at the baseline, 3rd month, and 9th month, and analyzed the data with the multilevel modeling. The model was significant with effect size (d) of .40 for infants in intervention group, suggesting significant decreases overtime on ASQ:SE scores.

Two studies compared the use of these assessment tools (Kamara et al., 2020; Xie et al., 2019). In Kamara et al (2020) study, researchers compared the ASQ:SE-1, CBCL 1 ½-5, and BITSEA. Research findings indicate substantial agreement between the ASQ:SE-1 and BITSEA, provide initial support for the use of BITSEA and ASQ:SE-1 as an autism screener for young children with developmental delay. In Xie et al (2019) study, researchers examined the convergent validity of Chinese ASQ:SE-1 and compared it to the Chinese CBCL 1 ½-5 and Chinese ITSEA in the context of China. Results provide convergent validity between the ASQ:SE-1 and competence scale of ITSEA in China. It appears that the ASQ:SE, ITSEA, and BITSEA measure similar constructs of social-emotional development.

In Taiwan, researchers have translated and adapted the ASQ:SE-2 and BITSEA (C. Y. Chen et al., 2020; Liang et al., 2020). Chen and colleagues examined the psychometric properties with a Rasch model and reported acceptable item fit (.88 ~ 1.26) and overall acceptable reliability (EAP/PV = .79) for the ASQ:SE-2 with a sample of 3,005 preschool children. As for the psychometric evidence of the BISTEA in Taiwan, Liang and colleagues reported marginal internal consistency (α = .65 ~ .68), substantial concurrent validity, and partial evidence of construct validity (AVE = .14 ~ .17, CFI = .54, SRMR = .00, RMSEA = .06) with 504 toddlers. Because both tools were translated and adapted recently, little research has been done using these

tools with young children in EI programs. However, sound psychometric evidence encourages the further use of these two screening tools with Taiwanese population.

This section has reviewed several assessment tools and their use for screening and monitoring social-emotional development. CBCL 1 ½ -5 is a well-researched tool for identifying behavioral problems, but it may not be appropriate for measuring social-emotional competence and the Traditional Chinese version has not been re-normed and updated since its first validation in Taiwan decades ago. ITSEA is a comprehensive tool that can assess social-emotional problems and competence, but it is lengthy and can only cover few age groups, limiting its clinical use in terms of screening. Previous studies suggest the use of the ASQ:SE-2 and BITSEA as screening tools in Taiwan. Both instruments have shown promising psychometric evidence in terms of measuring social-emotional problems and competence for young children Taiwan. Considering the wider age coverage, ASQ:SE-2 is robust for regular screening and long-term monitoring the changes in social-emotional behaviors and was thus chosen as the appropriate outcome measure for this study.

Social-Emotional Screening in Taiwan

As mentioned previously in the introduction, due to high prevalence of mental health disorders in school-aged children (Y. L. Chen et al., 2020), researchers in Taiwan suggested regular screening and early identification for social-emotional development for young children. However, there is a lack of social-emotional screening tools for young children in the child find system in Taiwan, and in the past there has been mixed reaction of parents to screening for social-emotional delays.

Development screening is often done in health centers for children younger than 3 years and in preschools for children between 3 to 6 years. Sometimes, local governments or

organizations host public fair to encourage families to take screening tests for their children (Sun & Yang, 2006). The screening tool that has been widely used for young children in Taiwan is Taipei Children Developmental Checklist 2nd Edition (Taipei-II; Liao et al., 2008; Taipei City Government, 2017). Taipei-II is a brief checklist which covers all developmental areas including social-emotional development and has 13 age intervals. However, because it is brief and only includes 10 to 13 items in each age interval, the number of items for social-emotional development is very limited. For example, in the 18-month interval of Taipei-II, there are only 5 items related to social-emotional development.

In addition to Taipei II, another similar development screening instrument in Taiwan is the Taiwan Birth Cohort Study-Developmental Instrument (TBCS-DI; Lung et al, 2020) which is also a brief parent-report questionnaire with limited items for social-emotional development. The developers of TBCS-DI recognized the importance of social-emotional development and developed the 8-year-old scale which adds specific dimensions of cognition, social-communication, and emotion. However, these dimensions are not addressed for younger age groups in TBCS-DI. Lung and colleagues (2020) later found that the social dimension in the 18-month scale of TBCS-DI could highly predict the performance of these social-emotional dimensions in the 8-year-old scale, suggesting that 18 months could be a critical period for social-emotional screening.

Unfortunately, early identification for children younger than age of 2 in Taiwan is currently unsuccessful, based on the report of the National Health Research Institute Forum for Children with Developmental Delay in 2017. The EI service rate for children younger than 2 years was 15.9% in 2020, according to Taiwan Directorate-General of Budget, Accounting, and Statistics (2021). Considering the lack of social-emotional screening in current instruments in

Taiwan, there is a need for social-emotional screening for 18-month-old children with a more comprehensive tool. For such young age group, a quick and family-friendly social-emotional screening tool could be helpful for early identification. Since the ASQ:SE-2 has been adapted and validated in Taiwan (C. Y. Chen et al., 2020), the field is able to move forward to address the needs with the ASQ:SE-2 and assess its utility for toddler-aged children in Taiwan.

Summary

A review of the literature indicates the need for social-emotional screening and monitoring of children younger than age of 2 in Taiwan. It is suggested that the period of 18 to 24 months could be a critical period for social-emotional screening, and the ASQ:SE-2 could be a promising and useful assessment tool for early identification and monitoring of social-emotional behaviors for young children in Taiwan.

Purpose

Given the needs and research gaps that are identified in the literature review, the research aim of this study was to investigate the current status and changes of social-emotional development with the ASQ:SE-2 for toddlers with and without developmental delay or disabilities in Taiwan. Three specific research questions were asked:

(1) What are overall social-emotional competence and risk behaviors measured by the ASQ:SE-2 for a population of toddlers with and without developmental disabilities in Taiwan?

(2) What are changes in social-emotional competence and risk behaviors for a population of toddler-aged children with and without developmental disabilities in Taiwan, as measured by the ASQ:SE-2?

(3) What is the utility of the ASQ:SE-2 from parents' perspectives?

CHAPTER 3

METHOD

The primary aim of this study was to explore toddler's social-emotional development and the utility of a social-emotional screening tool for toddlers in Taiwan. In this chapter, the information about the research design, participants' characteristics, instruments, recruitment and consent procedures, and data analysis are described in order to address the three research questions described in the previous chapter.

Research Design

This was a six-month exploratory and observational study with two data collection points: baseline and 6-month follow-up, to provide social-emotional screening and monitor the changes in social-emotional competence and risk behaviors. The 6-month time frame was chosen because previous studies suggest that 6 months or longer period is needed to detect changes in social-emotional behaviors (e.g., Salomonsson et al., 2021; Van Doesum et al., 2008). The timeline of research procedures is described in Table 1. This study mainly collected quantitative data using both paper-pencil and online versions of survey packets. The online version of survey packets was administered using the Qualtrics platform. The survey packets contained ASQ:SE-2 for measuring social-emotional behaviors and questionnaires which gathered information about the participants and the utility of the ASQ:SE-2. Qualitative data were also collected through open-ended questions to complement the quantitative data. Detailed description of instruments is provided in the next section.

Table 1. *Research timeline and procedures*

Timeline	Procedures and instruments
Preparation: November 2020 – February 2021	Human subject approval Set up online questionnaires Proposal approval
Baseline: June 2021 – September 2021	Collect demographic and EI service information (i.e. Service types, frequency, Family-FINESSE) Administer ASQ:SE-2 and Utility Survey
Follow-up: January 2022 – April 2022	Administer ASQ:SE-2 Collect EI service information
Data analysis: September 2021 – June 2022	Descriptive analysis Welch's t-test Paired t-test Qualitative content analysis

Participants

The research used convenience sampling and recruited 303 participants in Taiwan at the baseline. Parents were recruited between June and September in 2021 and the 6-month follow-up was conducted between February and April in 2022 using online and paper-pencil versions. Recruitment methods included digital flyers on social medias and direct recruiting through EI programs. The detailed recruitment procedure is described on page 29.

Participants whose children aged between 15 to 21 months and had not received EI services were categorized in TD group. Participants' children who were between 15 to 21 months of chronological age and enrolled in EI programs would be categorized in EI group. The age range for young children was chosen for the following reasons. First, previous studies

suggest that 18 to 24 months of age can be a golden period for screening social-emotional development and with some ability to predict future behavior problems (Briggs-Gowan & Carter, 2008; Cheong et al., 2017; Lung et al., 2020). Second, the maximum maternal leave in Taiwan is 2 years. Children in Taiwan usually enter preschools between 2 and 3 years of age.

Although 303 parents signed up for participation, 19 participants were excluded because their children' ages were not within the target range or their ASQ:SE-2 were not completed. A total of 284 participants were included in this study, with 231 children in TD group and 53 children in EI group at the baseline. Children who were receiving EI services would be categorized in EI group. At the 6-month follow-up, 204 participants continued participation and completed the ASQ:SE-2. Four children who were in TD group at the baseline entered EI programs at the follow-up. They were classified in EI group at follow-up. There were 162 children in TD group and 42 in EI group. The overall response rate for ASQ:SE-2 was 71.8%. Figure 1 shows the flow chart of participants throughout the research period.

Sociodemographic Characteristics of Participants

The sociodemographic information included children's age, children's gender, premature birth, respondent's relationship with the child, respondent's age, mother's educational level, family income, living areas, and languages used at home. The demographic characteristics of participants at baseline and 6-month follow-up are shown in Table 2.

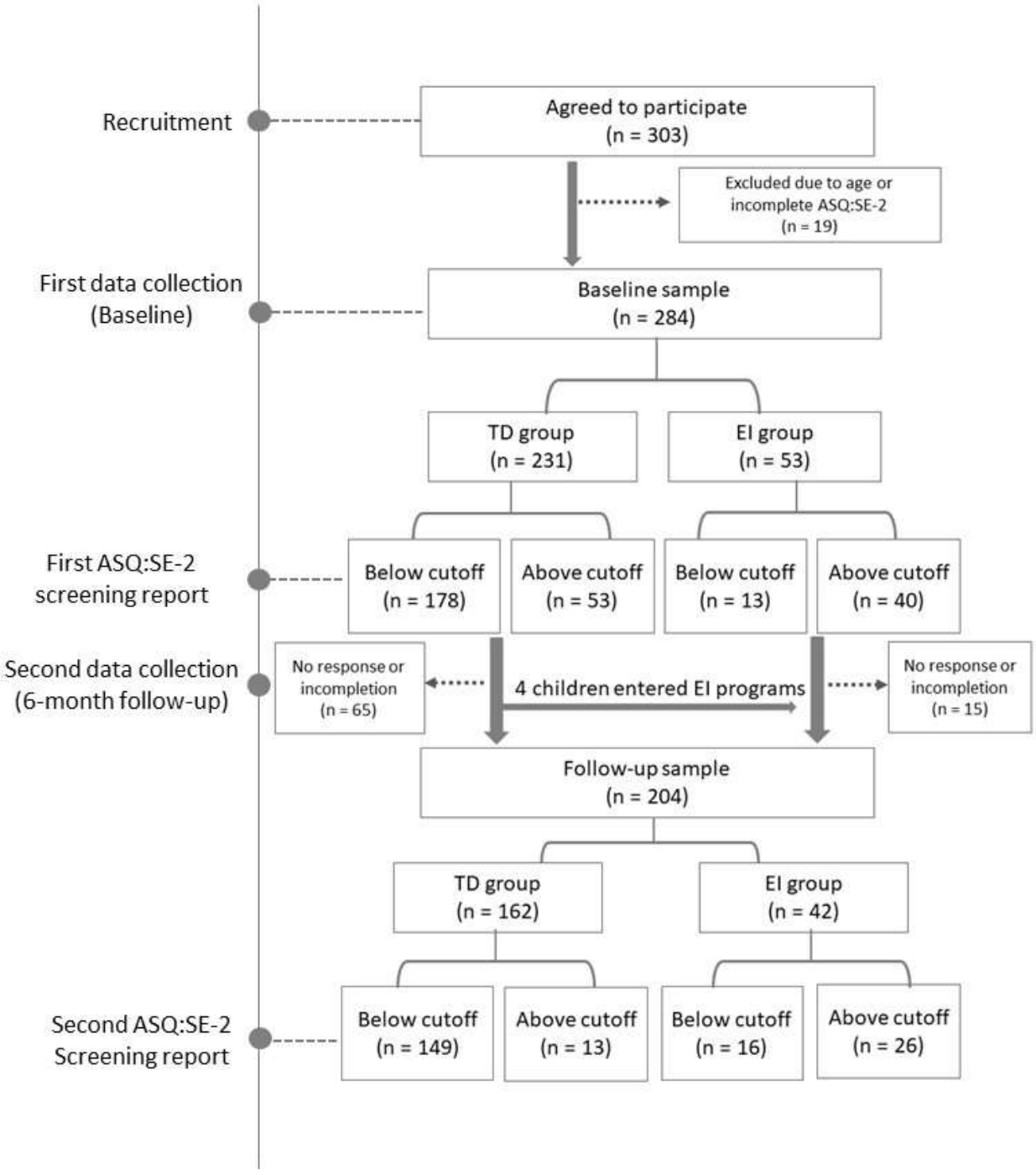

Figure 1. Flow Chart of Participants

During the baseline, a total of 284 parents of young children completed the 18- and 24-month combined ASQ:SE-2 questionnaires without missing values, and they completed the utility survey. Their children were between 15 and 21 months (*M* = 18.13, *SD* = 2.64). There were 231 typically developing (TD) children (81.3%) who did not receive EI services during the baseline, and 53 children (18.7%) who were receiving EI services and were categorized in the EI group. The percentages of females and males were 54.2% and 45.8%, indicating there were more girls participated in this study. About 22% of children EI group were born before 37 weeks of pregnancy, while only 5.6% of TD children were preterm babies.

During the 6-month follow-up, a total of 204 participants completed the 18- and 24-month combined ASQ:SE-2 questionnaires. The response rate was 71.8%. In the follow-up sample, the participating children were between 21 and 27 months (*M* = 23.81, *SD* = 2.08); 162 children (79.4%) in TD group and 42 children (20.6%) in EI group. Four of the 42 EI children in the follow-up sample were in TD group at the baseline but reported receiving EI at the follow-up. Thus, they were classified in EI group at the follow-up.

Table 2. *Sociodemographic Characteristics of Participants at Baseline and 6-month follow-up*

	Baseline						6-month follow-up					
	TD children (*n* = 231)		EI children (*n* = 53)		Full sample (*n* = 284)		TD children (*n* = 162)		EI children (*n* = 42)		Full sample (*n* = 204)	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Child gender												
Female	127	55.0	27	50.9	154	54.2	92	56.8	18	42.3	110	53.9
Male	104	45.0	26	49.1	130	45.8	70	43.2	24	57.1	94	46.1
Child age mean (SD)	18.06 (2.62)		18.42 (2.72)		18.13 (2.64)		23.81 (2.06)		23.81 (2.17)		23.81 (2.08)	
Premature birth	13	5.6	12	22.6	25	8.8	5	3.1	9	21.4	14	6.9
Relation												
Mother	217	93.9	48	90.6	265	93.3	155	95.7	36	85.7	191	93.6
Father	13	5.6	3	5.7	16	1.1	7	4.3	4	9.5	11	5.4
Grandparents	0	0	2	3.8	2	.7	0	0	1	2.4	1	.5
Legal guardian	1	.4	1	1.9	2	.7	0	0	1	2.4	1	.5

Table 2. *Sociodemographic Characteristics of Participants (continued)*

	Baseline						6-month follow-up					
	TD children (*n* = 231)		EI children (*n* = 53)		Full sample (*n* = 284)		TD children (*n* = 162)		EI children (*n* = 42)		Full sample (*n* = 204)	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Respondent age mean (SD)	34.2 (3.4)		35.04 (5.09)		34.36 (3.77)		35.23 (3.24)		36.33 (5.13)		35.45 (3.70)	
Mother education												
High school	4	1.7	6	11.3	10	3.5	1	.6	5	11.9	6	2.9
College	124	53.7	30	56.6	154	54.2	84	51.9	22	52.4	106	52.0
Postgraduate	103	44.6	16	30.2	119	41.9	77	47.5	14	33.3	91	44.6
Undisclosed	0	0	1	1.9	1	.3	0	0	1	2.4	1	.5
Family income												
Low	3	1.3	1	1.9	4	1.4	1	.6	1	2.4	2	1.0
Middle/high	228	98.7	52	98.1	280	98.6	161	99.4	41	97.6	202	99.0
Immigrant												
Yes	6	.03	3	.06	9	.03	5	.03	3	.07	8	.04
Undisclosed	5	.02	2	.04	7	.02	1	.01	1	.02	2	.01
Language at home												
Mandarin only	103	44.6	29	54.7	132	46.5	75	46.3	20	47.6	95	46.6
2 or more languages	128	55.4	24	45.3	152	53.5	87	53.7	22	52.4	109	53.4
Living area												
Northern	125	54.1	27	50.9	152	53.5	92	56.8	23	54.8	115	56.4
Central	34	14.7	13	24.5	47	16.5	25	15.4	7	16.7	32	17.2
Southern	59	25.5	6	11.3	65	22.9	35	21.6	7	16.7	42	20.6
Eastern	7	3.0	2	3.8	9	3.2	4	2.5	2	4.8	6	2.9
Islands	6	2.6	5	9.4	11	3.9	6	3.7	3	7.1	9	4.4

Most participants were mothers (93.3%). During the baseline, about 86.8% of mothers' education levels were university/college or postgraduate level. This ratio was higher in the 6-month follow-up (96.6%). Approximately half of the participants lived in northern area (53.5~56.4%) which reflected the population sizes of different regions of Taiwan (Ministry of the Interior, 2016). No group differences were found between TD and EI group for participants' characteristics.

For children in EI group, 39 participants at baseline and 29 at the follow-up shared information about their children's diagnosis and EI services (Table 3). Among these participants, approximately 62% of children were diagnosed with a developmental delay and 31-36% of

children were considered high risk for developmental delay. Other diagnoses reported in this study included cerebral palsy, autism spectrum disorders, congenital genetic disorders (i.e. Williams Syndrome), and emotional behavioral disorders. Most children's profiles showed developmental delay in 2 to 3 developmental areas at the baseline (n = 18, 46.2%) and follow-up (n = 12, 41.4%).

The common types of EI services for these participants' children were physical therapy, occupational therapy, and speech/language therapy. The majority of children received EI services 1 to 2 times per week and 30 to 45 minutes per time. At the baseline when children were 18-months-old, 17 of the 39 EI children (43.6%) had received EI services for more than 1 year, indicating that they started receiving EI service during their infancy. Eleven children (28.2%) had received EI services for 1 to 3 months, indicating that some children were identified around age of 18 months.

Table 3. *EI Group Service Profile at Baseline and 6-month Follow-up*

	Baseline (n = 39)		6-month follow-up (n = 29)	
	n	%	*n*	%
Child diagnosis				
High risk for developmental delay	14	35.9	9	31.0
Developmental delay	24	61.5	18	62.1
Cerebral palsy	3	7.7	2	6.7
Autism spectrum disorders	3	7.7	4	13.8
Congenital genetic diseases	2	5.1	1	3.4
Emotional behavioral disorders	0	0	2	6.7
Other (e.g., physical disability, tumor)	3	7.7	1	3.4
Areas of developmental delay				
Gross motor	27	69.2	16	55.2
Fine motor	26	66.7	18	62.1
Speech and language	22	56.4	19	65.5
Cognition	15	38.5	12	41.4
Social-emotional	11	28.2	13	44.8
Adaptive function	7	17.9	9	31.0

Table 3. *EI Group Service Profile at Baseline and 6-month Follow-up (Continued)*

	Baseline (n = 39)		6-month follow-up (n = 29)	
	n	%	*n*	%
Types of services				
Physical therapy	31	79.5	19	65.5
Occupational therapy	25	64.1	16	55.2
Speech/language therapy	18	46.2	17	58.6
Cognitive therapy	4	10.3	7	24.1
Behavior therapy	0	0	1	3.4
Parent support and counseling	3	7.7	1	3.4
Parent-child group	1	2.6	3	10.3
EI expense was covered by				
National health insurance	37	94.9	28	96.6
Self-pay	8	20.5	7	24.1
Other	2	5.1	2	6.9
EI time				
Less than 1 month	4	10.3	1	3.4
1~3 months	11	28.2	2	6.9
4~6 months	3	7.7	5	17.2
7~12 months	4	10.3	9	31.0
More than 1 year	17	43.6	12	41.4
EI frequency				
Less than 1 time/week	8	20.5	4	13.8
1~2 times/week	23	59.0	16	55.2
3~4 times/week	7	17.9	7	24.1
5 or more time/week	1	2.6	2	6.9
EI duration/visit				
Less than 30 minutes	3	7.7	3	10.3
30~45 minutes	19	48.7	14	48.3
46~60 minutes	11	28.2	9	31.0
More than 1 hour	6	15.4	4	13.8
Do you and your child have an intervention plans provided by professionals?				
Yes, we have an intervention plan.	15	38.5	10	34.5
No, we do not have a plan.	4	10.3	5	17.2
I am not sure, but I know my child's intervention goals or what my child will learn.	20	51.3	14	48.3

Instruments

For Screening and Monitoring Social-Emotional Behaviors

First, the Traditional Chinese version of Ages & Stages Questionnaires: Social-Emotional, Second Edition (Traditional Chinese ASQ:SE-2; C. Y. Chen et al., 2020) was used to assess social-emotional development for all participating toddlers. The ASQ:SE-2 is a well-studied and family-friendly parent-report instrument with robust overall reliability (α = .84), sensitivity (81%), and specificity (84%) that can be used for screening and monitoring in order to identify the risk of social-emotional problems (Squires et al., 2015). As mentioned above, initial translation, adaptation, and exploratory studies have been conducted on the ASQ:SE-2 in Taiwan. Further studies with the ASQ:SE-2 will assist in determining the psychometric properties and utility of using this instrument to screen large populations of toddlers in Taiwan.

ASQ:SE-2 can be used for children from 1 to 72 months with 9 age intervals: 2, 6, 12, 18, 24, 30, 36, 48, and 60 months of age. Each interval has a unique questionnaire for the specific age window. For example, the age interval of 24 months covers the 21- to 27-month span. Based on the description of behaviors, parents select how often the behavior occurs, using three options: (a) often or always, (b) sometimes, and (c) rarely or never. Each option generates 0, 5, or 10 points, depending on the item descriptions. When the item describes a competence behavior (e.g., *does your child look at you when you talk to him*?), the choice of "often or always" scores 0 points. When the item addresses a problem behavior (e.g., *when you leave, does your child stay upset and cry for more than an hour?*), the choice of "often or always" scores 10 points. Parents also select whether the behavior is a concern. If it is a concern, this selection will generate additional 5 points. Each item has a unique score that ranged from 0 to 15. With different cut-scores in each age interval, a total score falls in one of the three zones: no or low

risk, monitor, and refer. Higher total scores on the ASQ:SE-2 suggest more risk in social-emotional development.

In this study, the Traditional Chinese version of the ASQ:SE-2 was used. Due to the need for social-emotional screening, previous Taiwanese researchers translated and adapted the ASQ:SE-2 into Traditional Chinese version in Taiwan (C. Y. Chen et al., 2020). Rigorous translation and adaptation procedures were performed following the *International Test Commission Guidelines for Translating and Adapting Tests* (International Test Commission, 2017) to ensure the cultural appropriateness and linguistically equivalent. The detailed process of adaptation is also reported (C. Y. Chen et al., 2020). In Chen et al. (2020) study, the Traditional Chinese translation of the ASQ:SE-2 has shown sound psychometric properties using results from Rasch model with overall acceptable reliability (EAP/PV = 0.79) and acceptable item fit (.88 - 1.26) in Taiwan with a sample of 3,005 preschool children. The overall adaptation met the recommendations of cultural and linguistic adaptations (Cycyk et al., 2021), including explaining purpose of adaptation, demonstrating formal adaptation process, providing information of adapted components, and evaluating the adaptation.

The age interval of 18 and 24 months was chosen for all participating children in the present study. The cutoff points for 18 and 24 months are the same, 65 points, meaning that children who score at or above 65 points would be categorized in the referral zone. Children who scored between 50 and 65 would be categorized in the monitoring zone. Scoring below 50 points would be categorized in the no or low risk zone. Although no study has been done to examine the sensitivity and specificity for the two age intervals in Taiwan, based on the technical report in the U.S. (Squires et al., 2015), the sensitivity was 80.2% for 18-month interval and 84.0% for 24-

month interval. The specificity was 76.2% for 18-month interval and 88.3% for 24-month interval.

Because this study also aimed to explore the changes between 18 and 24 months, and there are only few items that are different between these two intervals, a questionnaire combining the two intervals was utilized for research purposes and analysis. The total number of items in the combined questionnaire was 34. Therefore, two types of scores were calculated and used for answering research questions. For research question 1, the screening scores that were generated from a single age interval (18 or 24 month) were used to describing the overall social-emotional development among toddlers in Taiwan. For research question 2, the combined scores that were generated from the 18-24 month combined questionnaire were used to test the changes between 18 and 24 months. Table 4 summarizes the scores used in this study.

In addition, the questionnaire for 6-month follow-up contained an open-ended question to ask parents if they had seen differences in their child's behaviors, communication, and emotional regulation after 6 months. If so, parents could explain what differences they had seen in the text box. The information was summarized in the result section and further discussed. The English version of the 18 to 24 Month ASQ:SE-2 used in this study is contained in Appendix A (p. 76-78).

Table 4. *Summary of ASQ:SE-2 Scores Used in the Present Study*

Scores	Description
Screening score	The score is generated from the 18- or 24-month ASQ:SE-2 and used to identify children with social-emotional risk. Each interval has 31 items.
Combined score	The combined score is generated from the 18-24 month combined questionnaire, with 34 items in total.
Average item score	The average item score was the screening score or the combined score divided by the number of items.

The Utility Survey

The ASQ:SE-2 Utility Survey (Squires et al., 2015) was used to assess parents' acceptance and the overall utility in Taiwan during the baseline. All participants who completed the ASQ:SE-2 during baseline also completed the utility survey. The survey was developed along with ASQ:SE-2 and included in the User's Guide (Squires et al., 2015). It measures the acceptance, appropriateness, and usefulness, as rated by parents. The survey contains 5 questions with multiple choices and 1 open-ended question. The first question asks participants about the amount of time that they take to complete the ASQ:SE-2. The second and third question ask participants whether the questions of the ASQ:SE-2 are easy to understand and appropriate for their children. The fourth question asks what participants think and fell about completing ASQ:SE-2. The fifth question is about how much the participant enjoy the screening program. The last open-ended question asks participants to leave any comments about the ASQ:SE-2. The open-ended question asked participants to leave any comments about the ASQ:SE-2. Questions are listed in Table 13 (p. 46).

Background Information

Information including demographic information and service information was collected in the background information form which is contained in Appendix B (p. 79). Demographic information of participants was collected for all participants, such as relationship to the child, gender, age, mother's education level, and living area. Participants also reported their children's chronological age, gender, premature birth, and language used at home.

For participants in EI group, they reported their children's medical diagnoses, and developmental areas of delays. The information on EI service intensity and service types was collected from parents in EI group. The information of EI services collected included: (a)

diagnosis, (b) areas of developmental delay, (c) types of services (e.g., physical therapy, occupational therapy, language therapy, parent support, and counseling), (d) EI expense coverage, (e) period of time receiving EI, (f) frequency of EI services (times/week), and (g) EI duration for each time of service. Participants in EI group were also invited to complete an additional questionnaire, the Family Experience with Families in Natural Environments Scale of Service Evaluation (Family-FINESSE; McWilliam, 2015). The questionnaire measures overall extent of family-centered EI approaches by asking parents to rate the typical practices they had experienced and the ideal experience they expect. The detailed description and results of Family-FINESSE were reported as a supplemental document to describe the current EI approaches experienced by families of toddlers with social-emotional risk (Appendix C, p. 80-83).

Recruitment Procedure

During the 2 months of the recruitment phase, parents were recruited via two methods: online and via EI programs. For online recruitment, a flyer with the recruitment letter was posted on social media platforms; parents who are eligible for the study and interested in participating will contact the PI directly via email to determine eligibility for participation. Eligible parents received a survey link which automatically directed them to the consent form and the questionnaires. At each time point, parents were sent reminder letters immediately before data collection begins with the link to forms. Parents needed to complete the forms within 10 days.

For recruitment through EI programs, program administrators in rural and urban areas were contacted through social media platforms and emails. The PI posted information through social media and email directly to any programs with which PI is familiar. EI programs that were interested in having their parents participate and willing to distribute information to them, contacted the PI via emails. The EI programs could discuss preferred methods of survey

completion with their families. For those families wanting paper completion of forms, the paper survey packets were mailed to the participating EI programs. The EI programs helped distribute, collect, and return the paper survey packets with the prepaid envelopes at each time point. For parents who would like to use the online survey, the procedure was the same as the online recruitment described previously.

The recruitment letters for online and paper-pencil versions of questionnaires are contained in Appendix D (p. 84-87), describing the research purpose and what participants would receive after completing the survey. All participants received incentives of about a $6 gift card (150 NTD) for completing the ASQ:SE-2 within 10 days at baseline. Participants received a total of 15-dollar gift cards (400 NTD) if they completed both baseline and follow-up ASQ:SE-2. Participants received additional 10-dollar gift cards for completing an additional survey about Family FINESSE and $10 gift card for providing copies of their children's intervention plans. In addition to incentives, the results of ASQ:SE-2 and a handout of social-emotional development guidelines and activities were offered to all participants via emails. Although the screening reports were provided, no referral to additional services was to be made by the principal investigator. However, participants could email the investigator if they had any questions or needed detailed screening records and could discuss follow-up.

Consent Process and Confidentiality

All participants were recruited in compliance with Human Subjects guidelines. Human subjects approval was obtained at the University of Oregon in the U.S. Approvals were also obtained via emails from the EI programs who were interested in participating. The consent form for parents were provided at the beginning of the survey packet. The consent form stated the research purpose, voluntary nature of participation, time commitment, and how confidentiality

would be protected (see Appendix E, p. 88-89). Participants needed to sign at the bottom of the consent forms to participate in this research. Participants who chose to complete the survey online needed to read the consent form at the beginning and click on a button to agree to participate. After clicking the button, the participants were directed to the survey questionnaires. Participants were encouraged to email the PI anytime if they had any questions or concerns about this research or would like to obtain their full answers on ASQ:SE-2. They also had right to choose to discontinue their participation at any time.

The survey was not fully anonymous because the PI needed to identify the participants and track the questionnaires received. Participants were assigned subject numbers that were used during the study, with a master list of names and numbers available only to the PI. Data collected for this study was only used by the PI who will ensure that the raw research data and identity of the participants will be kept confidential. Only the PI and the faculty advisor had access to research data. Emails, consent forms, and any digital processing and storage of research data were kept in the PI's computer with password protection. All aggregate data associated with the study will be destroyed approximately one year after study completion.

Data Analysis

The first research question focused on describing overall social-emotional behaviors measured by the ASQ:SE-2 for a population of toddlers with and without developmental disabilities in Taiwan. To answer this question, I first conducted a descriptive analysis using SPSS to describe the ASQ:SE-2 screening scores for toddlers with and without developmental delay or disabilities at baseline and 6-month follow-up. Listwise deletion was utilized for missing data when conducting *t*-tests. Any participants with missing values were removed from the dataset. A sample of 284 participants at baseline were used for this analysis with 231 in TD

group and 53 in EI group. The follow-up sample size was 204 with 162 in TD group and 42 in EI group. Then, a Welch's *t*-test was conducted to test the group differences in ASQ:SE-2 scores at the baseline and 6-month follow-up. The Welch's *t*-test was used because of unequal group size (West, 2021).

The second research question described changes in social-emotional competence and risk behaviors for a population of toddler-aged children with and without developmental disabilities in Taiwan. To answer this question, a paired *t*-test was conducted to analyze the difference in the ASQ:SE-2 18-24 combined scores between baseline and 6-month follow-up for two groups of toddlers with a sample of 162 children in TD group and 42 in EI group. The qualitative responses to the additional open-ended questions on the ASQ:SE-2 about the overall changes at 6-month follow-up were analyzed by qualitative content analysis. The inductive coding procedure was conducted to gather themes that emerges (Vaismoradi et al., 2013). The definition and examples of codes are provided in Table 11 (p. 43).

The third research question focused on the overall utility of the ASQ:SE-2 from parents' perspectives. To address this question, the descriptive analysis was conducted to report the results of each question on the ASQ:SE-2 Utility Survey. Because the last question was open-ended for participants to leave any comments about the ASQ:SE-2, the content analysis with inductive coding procedure was conducted to analyze participants' comments and capture emerging themes. The definition and examples of codes are provided in Table 13 (p. 46).

In addition, because of study attrition, any differences in the characteristics of follow-up non-respondents and respondents needed to be explored. There were 80 participants who did not respond to or complete the follow-up survey. Thus, I conducted a descriptive analysis for these non-respondents as well as the Welch's *t* test to compare their 18-month screening scores to

other respondents' scores to examine the attrition and its potential impact to the results. The information regarding the non-respondents are reported in the results and potential limitations are discussed.

CHAPTER 4

RESULTS

Results will be summarized in this chapter to address the following research questions: (1) What are overall social-emotional competence and risk behaviors measured by the ASQ:SE-2 for a population of toddlers with and without developmental disabilities in Taiwan? (2) What are changes in social-emotional competence and risk behaviors for a population of toddlers with and without developmental disabilities in Taiwan, as measured by the ASQ:SE-2? (3) What is the utility of the ASQ:SE-2 from parents' perspectives?

Research question 1: What are overall social-emotional competence and risk behaviors measured by the ASQ:SE-2 for a population of toddlers with and without developmental disabilities in Taiwan?

The 18-Month ASQ:SE-2 Screening Scores

Social-emotional competence and risk were measured by the ASQ:SE-2 questionnaires. The cutoff score of the 18-month ASQ:SE-2 is 65 points. Children who score above the cutoff fall into a referral zone, indicating higher risk of social-emotional development problems. Children who score between 50 to 65 are in the monitor zone. Scores below 50 points indicate no or low risk of social-emotional development problems. Based on this sample, 178 children (77.1%) scored below the cutoff of 18-month ASQ:SE-2 in TD group with 24 children in monitor zone, while 53 children (22.9%) scored at or above the cutoff and were identified in referral zone. Among the 53 children in EI group, 40 children (75.5%) scored above the cutoff, 9 children (17.0%) in monitor zone, and 4 children (7.5%) in low-risk zone. Table 5 summarizes the numbers of children in each screening outcome category.

Table 5. *ASQ:SE-2 Scoring Zones at 18-month and 24-month Intervals*

	Baseline						6-month follow-up					
	TD children (*n* = 231)		EI children (*n* = 53)		Full sample (*n* = 284)		TD children (*n* = 162)		EI children (*n* = 42)		Full sample (*n* = 204)	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Referral zone	53	22.9	40	75.5	93	32.7	13	8.0	26	61.9	39	19.1
Below cutoff	178	77.1	13	24.5	191	67.3	149	92.0	16	38.1	165	80.9
Monitor zone	24	10.4	9	17.0	33	11.6	22	13.6	5	11.9	27	13.2
Low/no risk	154	66.7	4	7.5	158	55.6	127	78.4	11	26.2	138	67.6

Table 6. *Group Differences in 18-month ASQ:SE-2 Scores*

ASQ:SE-2 scores	TD (*n* = 231)		EI (*n* = 53)		*F*(1, 282)	*p*	η^2
	M	*SD*	*M*	*SD*			
18-month screening score	40.91	32.45	115.75	64.39	148.78	< .001	.345
18-month average item score	1.32	1.05	3.73	2.08	148.78	< .001	.345
18-24 month combined score	47.68	35.38	130.38	70.90	151.80	< .001	.350
18-24 month average item score	1.40	1.04	3.83	2.09	151.80	< .001	.350

Note. The TD group (*n* = 231) refers to typical children who did not receive EI services during the first data collection. EI group (*n* = 53) refers to children who were receiving EI services during the first data collection. The Welch's t-test was conducted for unequal groups.

The Welch's *t*-test was conducted to analyze the difference in social-emotional development between TD children and EI children. Significant group differences were found in 18-month scores, 18-month average item scores, 18-24 month combined scores, and 18-24 month average item sores (Table 6). The 231 TD children (*M* = 40.91, *SD* = 32.45) compared to the 53 children who received EI services (*M* = 115.75, *SD* = 64.39) demonstrated significantly

lower 18-month screening scores, $F(1, 282) = 148.78$, $p < .001$, with large effect size ($\eta^2 = .345$; 95% CI [.260, .422]). The SPSS outputs for this analysis are included in the Appendix F (p. 90).

The 24-Month Screening Scores

Table 5 presents the numbers of children in each screening outcome category at the 6-month follow-up. Among the 162 typical children who did not receive EI services, 13 children (8.0%) fell into referral zone, 22 children (13.6%) in monitor zone, and 127 (78.4%) in low-risk zone. It is noteworthy that 10 of the 53 children in TD group who were identified in the referral zone at baseline did not complete the follow-up questionnaires. Among these 53 children, 4 children started receiving EI services. Thus, they were categorized as in the EI group in the follow-up sample. There were 42 children in the EI group with 26 children (61.9%) in referral zone, 5 children (11.9%) in monitor zone, and 11 (26.2%) in low-risk zone.

Table 7. *Group Differences in 24-month ASQ:SE-2 Scores*

ASQ:SE-2 scores	TD (n = 162)		EI (n = 42)		$F(1, 202)$	p	η^2
	M	*SD*	*M*	*SD*			
24-month screening score	32.62	21.30	104.40	77.85	107.97	< .001	.348
24-month average item score	1.05	.69	3.37	2.51	107.97	< .001	.348
18-24 month combined score	34.32	22.30	112.26	83.28	112.30	< .001	.357
18-24 month average item score	1.01	.66	3.30	2.45	112.30	< .001	.357

Note. The TD group (n = 162) refers to typical children who did not receive EI services during the first data collection. EI group (n = 42) refers to children who were receiving EI services during the first data collection. The Welch's t-test was conducted for unequal groups.

The Welch's t-test was conducted to analyze the difference in social-emotional development between TD children and EI children. Significant group differences were found in 24-month scores, 24-month average item scores, 18-24 month combined scores, and 18-24

month average item sores (Table 7). The 162 typical children (M = 32.62, SD = 21.30) compared to the 42 children who received EI services (M = 104.40, SD = 77.85) demonstrated significantly lower 24-month screening scores, $F(1, 202) = 107.97$, $p < .001$, with large effect size ($\eta^2 = .348$; 95% CI [.247, .437]). The original SPSS output is included in the Appendix F (p. 92).

Research Question 2: What are changes in social-emotional competence and risk behaviors for a population of toddler-aged children with and without developmental disabilities in Taiwan, as measured by the ASQ:SE-2?

Changes in ASQ:SE-2 scores between 18 and 24 months

In addition to the screening scores of ASQ:SE-2, to better detect the changes in social-emotional development from age of 18 to 24, this study combined the 18- and 24- intervals of the ASQ:SE-2 and generated the combined scores. Overall, there were significant differences in the combined scores between baseline and 6-month follow-up for 204 Taiwanese toddlers (Table 8). The 6-month follow-up (M = 50.37, SD = 52.85) compared to the baseline (M = 59.83, SD = 52.18) demonstrated significantly lower combined scores, $t(203) = 4.19$, $p < .001$, with a small to medium effect size (Cohen's d = .29; 95% CI [.153, .433]).

Table 8. *Results of the Difference in ASQ:SE-2 Scores between Baseline and Follow-Up*

ASQ:SE-2 scores	Baseline		6-month follow-up		*t*(203)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Screening score	52.08	47.58	47.40	49.30	2.16	.032	.15
Average item score	1.68	1.53	1.53	1.59	2.16	.032	.15
Combined score	59.83	52.18	50.37	52.85	4.19	< .001	.29
Combined average item score	1.76	1.59	1.48	1.59	4.19	< .001	.29

Note. Sample size n = 204.

In Table 9, for children in TD group, the 18- and 24-month combined questionnaire scores at the follow-up (M = 34.32, SD = 22.30) were significantly lower than at baseline (M = 45.15, SD = 30.51), $t(161) = 5.00$, $p < .001$, with small to medium effect size (Cohen's d = .31; 95% CI [.232, .552]). However, no significant changes were found in the ASQ:SE-2 screening scores for EI children (see Table 10). Although there was a decrease in the combined scores for children in EI group, no statistical significances were found between baseline (M = 121.25, SD = 74.13) and 6-month follow-up (M = 110.13, SD = 85.17), $t(41) = 1.83$, $p = .08$. The original SPSS output is included in the Appendix F (p. 94).

Table 9. *Results of the Difference in ASQ:SE-2 Scores between Baseline and Follow-Up for Children in TD Group*

ASQ:SE-2 scores	Baseline		6-month follow-up		$t(161)$	p	Cohen's d
	M	SD	M	SD			
Screening score	38.67	27.76	32.62	21.30	2.92	.004	.23
Average item score	1.25	.89	1.05	.69	2.92	.004	.23
Combined score	45.15	30.51	34.32	22.30	5.00	<.001	.39
Combined average item score	1.33	.90	1.01	.66	5.00	<.001	.39

Note. Sample size n = 162.

Twenty-eight of the 53 TD children who scored at or above the cutoff of 18-month ASQ:SE-2 completed the follow-up survey. At the follow-up, four of them reported receiving EI services and re-classified in EI group. On the other hand, twenty-six of the 40 EI children who scored at or above the cutoff of 18-month ASQ:SE-2 completed the follow-up survey. To explore how children shifted between scoring zones from baseline to follow-up, Figure 2 demonstrates the changes in ASQ:SE-2 screening scores between 18 and 24 months for each

subgroup of children categorized by their scoring zones at baseline. Children who were in low or no risk zone at the baseline remained the same low risk at the follow-up. TD and EI children who were categorized in monitor zone with medium risk at baseline had similar downward trends shifting them from monitor zone to low risk zone. For children who did not receive any EI services (N = 24) but scored above cutoff at the 18-month baseline (M = 81.67, SD = 16.31), the score shifted to the low-risk zone at the follow-up (M = 44.38, SD = 24.89). Among the 24 children in this particular subgroup, only one child showed increases in the ASQ:SE-2 screening scores, while others had decreases in the scores. For children who had receive EI services and fell into referral zone at the baseline (n = 30), there was a slight decreasing trend from 18-month ASQ:SE-2 scores (M = 135.36, SD = 61.25) to 24-month scores (M = 128.93, SD = 78.98), but both scores remained high in the referral zone.

Table 10. *Results of the Difference in ASQ:SE-2 Scores between Baseline and Follow-Up for Children in EI Group*

ASQ:SE-2 scores	Baseline		6-month follow-up		t(41)	p	Cohen's d
	M	*SD*	*M*	*SD*			
Screening score	108.38	67.39	102.25	79.88	1.04	.31	.16
Average item score	3.50	2.17	3.30	2.58	1.04	.31	.16
Combined score	121.25	74.13	110.13	85.17	1.83	.08	.29
Combined average item score	3.57	2.18	3.23	2.50	1.83	.08	.29

Note. Sample size n = 42.

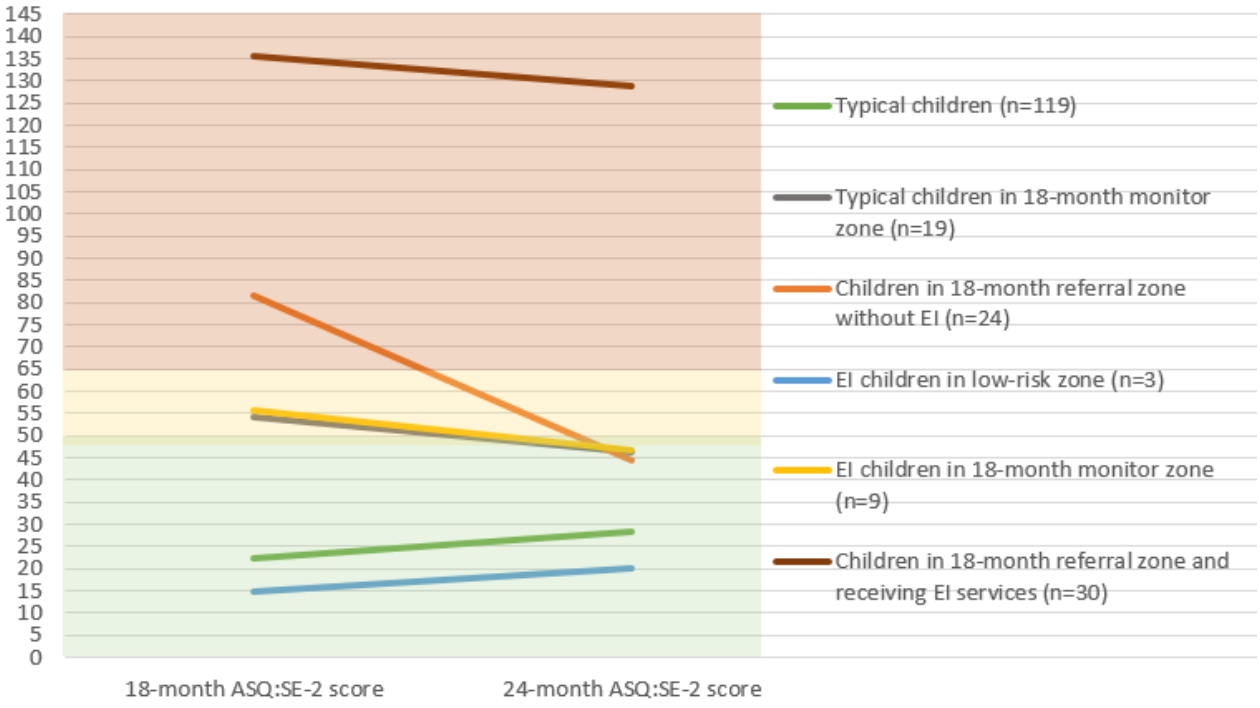

Figure 2. Changes in ASQ:SE-2 scores from 18 months to 24 months

Qualitative data regarding changes in social-emotional behaviors

In order to complement the quantitative data, the follow-up questionnaire added an open-ended question to ask participants if they observed any changes regarding their children's behaviors or social-emotional competence. For children in the TD group, three common themes of changes emerged: (a) improved language and communication, (b) better self-regulation, and (c) fewer night-waking incidents (see Table 11). However, for children in the EI group, only 8 participants reported improved language or communication, 4 reported better self-regulations, and 2 reported better sleeping quality. Some participants in the EI group did not feel any changes or did not answer this question. Four participants in the EI group reported that they observed increasing frequency of tantrums or that was more difficult to calm their children.

Table 11. *Perceived Changes in Social-Emotional Behaviors in the Past 6 Months*

Discourse and dimension	TD group example quote	*n*	EI group Example quote	*n*
Language and communication Improvement in expressive language, receptive language, or overall communication.	"My child is better at communicating her needs and expressing her feelings" (Lauren, age 37) "He is able to use words now, not just crying" (Julie, age 30) "He is able to understand and follow more directions" (Lai, age 29)	91	"Her expressing language skills is better, but I felt it is not sufficient." (Chen, age 35) "He started imitating and learning to communicate his needs." (Tseng, age 37) "There are more interactions between my child and her sibling or other kids." (Tina, age 35)	8
Self-regulation The ability to respond to the ongoing demands of experience with the range of emotions in a manner that is socially acceptable.	"She can calm herself within a shorter period of time" (Liao, age 33) "The frequency of tantrums is decreasing recently." (Hsu, age 38) "She would try to distract and calm her anger or frustration by herself." (Chang, age 34)	69	"My child is sensitive, but it takes shorter time to calm my child." (Ge, age 34) "I felt her emotions are more stable." (Huang, age 31) "He would try to calm himself, not just crying and kicking." (Lu, age 33)	4
Sleep Decreased frequency of night-wakings or improved sleeping quality.	"The sleeping quality is much better now!" (Cindy, age 31) "She can fall asleep more easily and seldom wakes up at nights." (Chang, age 35) "She can sleep overnight more often now. If she wakes up, it is easier to put her back to sleep." (Amy, age 32)	53	"There are fewer night-wakings." (Pan, age 30) "He still wakes up at nights, but it easier to fall asleep after he wakes up. And he does not cry." (Su, age 29)	2

Research Question 3: What is the utility of the ASQ:SE-2 from parents' perspectives?

The Utility Survey

All participants completed the ASQ:SE-2 Utility Survey during baseline. Table 12 summarize the results of utility questions. More than 90% of participants reported that the amount of time they took to complete the ASQ:SE-2 was less than 20 minutes. Overall, participants reported positively about the ASQ:SE-2 and enjoyed participating in the screening process, showing that social-emotional screening using the ASQ:SE-2 was widely accepted by parents of toddlers in Taiwan. The majority of participants thought that the questions were easy to understand (92.96%) and appropriate for their children (91.90%). In addition, about 91% of participants indicated that completing the ASQ:SE-2 helped them think about their children's development.

Qualitative Data

Some participants (n = 63) provided additional feedback or asked questions about social-emotional development. Table 13 summarize the qualitative findings from participants' comments. Most comments (n = 37) were positive about the ASQ:SE-2 and its use for identifying children with needs. Participants (n = 16) also left comments related to parental awareness of children's social-emotional development. Some participants commented that the questions helped them think and examine their children's social-emotional behaviors and some asked questions about how to further support their children. Ten participants provided suggestions and/or describe their uncertainty while filling out the ASQ:SE-2. It was suggested that adding more text boxes for parents to provide more details regarding their children's behaviors and situations could be helpful.

Table 12. *Results of the Utility Survey (N = 284)*

Question		*n*	%
1	How long did you take to complete ASQ:SE-2?		
	Less than 10 minutes	117	41.20
	10 ~ 20 minutes	144	50.70
	21 ~ 30 minutes	21	7.39
	31 ~ 60 minutes	0	0
	More than 1 hour	1	.35
	Missing	1	.35
2	Was ASQ:SE-2 easy to understand?		
	Yes	264	92.96
	Sometimes	13	4.58
	No	5	1.76
	Missing	2	.70
3	Were ASQ:SE-2 questions appropriate for your child?		
	Yes	261	91.90
	Sometimes	15	5.28
	No	1	.35
	Missing	7	2.46
4	The ASQ:SE-2 questionnaires was… (Check all that apply)		
	Fun to do	83	29.23
	Took too long	9	3.17
	Helped me think about my child's development	259	91.20
	Waste of time	0	0
	No opinion	24	8.45
5	Did you enjoy participating in this screening program?		
	Very much	119	41.90
	Much	141	49.65
	Little	17	5.99
	Very little	1	.35
	Missing	6	2.11

Table 13. *Participants' Comments about the ASQ:SE-2*

Participants' comments	Examples
Positive feedback (*n* = 37)	
Participants' comments were positive about the questionnaire or its use.	Hope this screening tool can be used widely to identify more children with needs. I am glad to participate in this research. The screening is very meaningful and helpful. I am a mother and an occupational therapist. I think the questions are very easy to understand and relevant.
Increasing parental awareness (*n* = 16)	
Participants' comments were about being more aware of children's social-emotional development.	The screening helped me re-examine my child's social-emotional behaviors and daily life. Some questions are interesting and I didn't know before.
Participants raised questions regarding their children's social-emotional development.	I didn't know that sleep problem could be a sign for social-emotional risk. Should I consult a doctor? What resource should I look for? Would parenting style impact social-emotional development? Where can I get more information? How to address childhood trauma and support social-emotional development?
Suggestions for the ASQ:SE-2 (*n* = 10)	
Participants commented about the clarity of questions and provided suggestions.	I think some questions can be more specific or provide text boxes for parents to describe more details about child's behaviors. For some questions, it was difficult to determine the frequency of the behaviors. I think more description about the situations may be helpful. A few questions were difficult to answer during the pandemic because of social-distancing.

Non-Respondents

There were 80 participants who did not responded to or completed the follow-up survey. Table 14 showed their demographic information. No differences were found between these non-respondents and other 204 respondents in terms of their demographic background. There were no significant differences in 18-month screening scores at the baseline between non-respondents (*M* = 62.00, *SD* = 54.42) and respondents (*M* = 52.08, *SD* = 47.58), *p* = .155 (see Table 15).

Table 14. *Demographic Information of Non-Respondents*

	Non-respondent					
	TD children (*n* = 65)		EI children (*n* = 15)		Full sample (*n* = 80)	
	n	%	*n*	%	*n*	%
Child gender						
Female	35	53.9	9	60.0	44	55.0
Male	30	46.1	6	40.0	36	45.0
Child age mean (SD)	18.84 (3.62)		19.35 (2.52)		18.95 (3.51)	
Premature birth	7	10.8	4	26.7	11	13.8
Relation						
Mother	59	90.8	15	100	74	92.5
Father	5	7.7	0	0	5	6.3
Grandparents	0	0	0	0	0	0
Legal guardian	1	1.5	0	0	1	1.2
Respondent age mean (SD)	34.13 (3.91)		34.06 (4.23)		34.12 (3.95)	
Mother education						
High school	3	4.6	1	6.7	4	5.00
College	40	61.5	8	53.3	48	60.0
Postgraduate	22	33.8	6	40.0	28	35.0
Undisclosed	0	0	0	0	0	0
Family income						
Low	2	3.1	0	0	2	2.5
Middle/high	63	96.9	15	100	78	97.5
Immigrant						
Yes	1	1.5	0	0	1	1.3
Undisclosed	3	4.6	2	13.3	5	6.3
Language at home						
Mandarin only	28	43.1	9	60.0	37	46.3
2 or more languages	37	56.9	6	40.0	43	53.7

Table 14. *Demographic Information of Non-Respondents (continued)*

	TD children (*n* = 65)		EI children (*n* = 15)		Full sample (*n* = 80)	
	n	%	*n*	%	*n*	%
Living area						
Northern Taiwan	30	46.2	7	4.7	37	46.3
Central Taiwan	10	15.4	5	33.3	15	18.8
Southern Taiwan	23	35.4	0	0	23	28.8
Eastern Taiwan	2	3.1	1	6.7	3	3.8
Islands	0	0	2	13.3	2	2.5

Table 15. *Differences in 18-month ASQ:SE-2 Scores between Non-Respondents and Respondents*

ASQ:SE-2 scores	Non-respondents (*n* = 80)		Respondents (*n* = 204)		*F*(1, 282)	*p*	η^2
	M	*SD*	*M*	*SD*			
18-month screening score	62.00	54.42	52.08	47.58	2.30	.155	.008
18-month average item score	2.00	1.76	1.68	1.53	2.30	.155	.008

Summary of Findings

Key findings that answer the research questions are summarized below. First, 22.9% of TD children and 75.5% EI children scored at or above the cutoff of 18-month ASQ:SE-2. Children in EI group scored significant higher on 18- and 24-month ASQ:SE-2, compared to their typically developing peers, indicating more social emotional problem behaviors. Second, both groups of toddlers showed decreases in ASQ:SE-2 scores indicating fewer social-emotional problem behaviors; only children in the TD group had statistically significant improvement in the combined scores, while children in EI group did not. Three common changes in social-emotional behaviors reported by participants were: (a) improved language skills, (b) improved self-regulation, and (c) better sleeping quality. Third, overall results of ASQ:SE-2 utility showed

that ASQ:SE-2 could be done by participants in a short period of time and participants were positive about its use in social-emotional screening.

CHAPTER 5

DISCUSSION

This exploratory study is the first study to investigate and monitor social-emotional development of toddler-aged children in Taiwan. Key findings addressed three research questions were detailed and summarized in the previous chapter. The following section provides the interpretation of the findings from this investigation. First, I will discuss the participants' characteristics. Second, I will interpret the screening results of social-emotional development for 18-month-old children in Taiwan. The difference in social-emotional development between typically developing children and children in EI programs will also be discussed. Third, I will interpret and discuss the changes in social-emotional behaviors between the age of 18 and 24 months. Fourth, the utility and parents' acceptance of the ASQ:SE-2 for screening toddler-aged children in Taiwan will be discussed. Fifth, limitations of this study and considerations will be reported. Finally, implications for the field and recommendations for future research on young children's social-emotional development will be discussed along with concluding remarks.

Participants

The baseline sample of 284 participants was recruited between June and September 2021. About 88% of participants were recruited through the online survey and only 18 participants completed the paper-pencil survey. More than 90% of the participants in this study were mothers with higher education levels. Approximately half of the participants lived in northern urban areas (53.5~56.4%) and only 4 participants reported that they were qualified as low-income families. A possible explanation is that mothers were the main caregivers for young children in Taiwan and for those mothers with higher education levels, they were more likely to access the Internet and complete the online survey and research questionnaires (Chen et al., 2020). In addition, in

June 2021 and March 2022, Taiwan government-imposed lockdown measures because of the increased risk of Covid-19 pandemic. Many EI service providers lost contact with families or couldn't provide paper-pencil questionnaires. Participants living in urban areas with higher family incomes and higher education were also more likely to access stable Internet and devices for completing the online survey at the baseline and 6-month follow-up. Generalizability could be a potential limitation. More research on families with lower SES and migrant parents is needed.

Among the 284 children at the baseline, 53 children (18.7%) were receiving EI services. Because of research purposes, 35 children in EI group were recruited purposefully through EI programs and EI websites. The percentage of receiving EI services in this study was higher than the EI service rate (15.9%) for children under the age of 2 reported by Taiwan Directorate-General of Budget, Accounting, and Statistics (2021). In addition, the overall percentage of preterm birth was 8.8% in this study with 5.6% in TD group and 22.6 in EI group, while the preterm birth rate in 2020 in Taiwan was 11.58% (Ministry of Health and Welfare, 2021). Previous studies suggest that children born early before 37 weeks of pregnancy are usually at risk of developmental delay or disabilities (Soleimani et al., 2014) and more than 50% of premature children might be identified for EI services before age of 3 in Taiwan (Chiu et al., 2017).

Overall Social-Emotional Development of 18-month-old Toddlers in Taiwan

The overall rate of children who scored at or above the cutoff was 32.7%, with 22.9% for children in TD group and 75.5% for children in EI group. Because the majority of children in EI group was recruited purposefully through EI websites and EI programs, the overall rate of at-risk (32.7%) was much higher than previous findings in the U. S. and China, which was 14% (Briggs

et al., 2012) and 15.63% (Bian et al., 2017), respectively. Both previous studies used the first edition of the ASQ:SE and included six or more age intervals of the ASQ:SE with representative samples. In Briggs et al. study (2012), 3,169 participants were recruited with 494 participants completing the 18-month ASQ:SE-1. In the Bian et al., study (2017), there were 2,528 participants, with 320 participants completing the 18-month ASQ:SE-1. In a recent study conducted in China (Xie et al., 2021), researchers screened 2,830 children with the ASQ:SE-2. The positive rate or children over the cutoff scores for the 18-month ASQ:SE-2 for 316 children was only 9.81%, with a mean score of 34.06 (SD = 31.62). It appears that children scored higher on 18-month ASQ:SE-2 in this study and the positive rates were particularly high.

Although the study sample may not be representative of the overall toddler population, the high positive rate of children in TD group might reveal some critical issues regarding the early identification of social-emotional problems for young children in Taiwan. According to Taiwan Directorate-General of Budget, Accounting, and Statistics (2021), the EI service rate was 15.9% for children under the age of 2 in 2020 and 32.4% for children aged between 2 and 3. Researchers also found that the prevalence rate of behavior problems in preschoolers aged 2 to 5 was about 25.0% in Taiwan (Y. T. Wu et al., 2012). Based on the sample of TD group in this study, 22.9% of children scored at or above the cutoff of 18-month ASQ:SE-2 but were not receiving EI services. With the overall sensitivity of 81% of ASQ:SE-2 (C. Y. Chen et al., 2020; Smith et al., 2020; Squires et al., 2015), about 18.5% of these 18-month-old children who were not in EI programs might be identified with social-emotional problems or developmental delay later.

The high positive rates among children who were not receiving EI services also indicated some other possible issues in Taiwan, including that the waiting period for EI services in Taiwan

could be too long or parents and professionals in Taiwan tended to take a wait-and-see approach to child's development when children were younger than the age of 2. Based on the report of the National Health Research Institute Forum for Children with Developmental Delay in 2017, EI researchers and professionals suggested needs for increasing early identification for young children and improving the waiting period for evaluation and EI services. Figure 3 shows the prevalence rates of mental health disorders and problem behaviors presented in previous studies in Taiwan, the positive rates of the ASQ:SE-2 in the present studies, and the EI service rate in Taiwan, suggesting the issue of insufficient early identification in Taiwan.

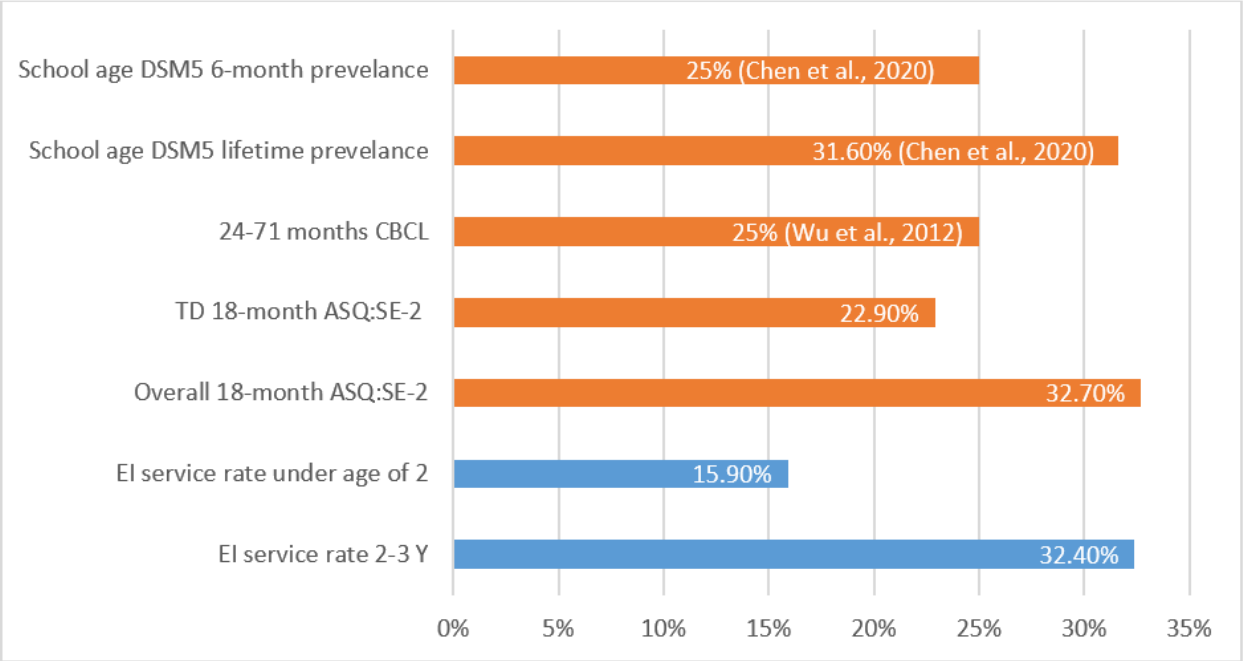

Figure 3. *The prevalence rates, positive rates, and EI service rates in Taiwan.*

More children with social-emotional problems could be identified earlier for EI services before age of 2 with regular social-emotional screening. Previous study demonstrated that 8-year-old children' social-emotional development could be predicted by 18-month-old children's social communication and emotional regulation, suggesting that 18 months could be a critical period for social-emotional screening for toddlers in Taiwan (Lung et al., 2020). Our findings on the positive rates of 18- and 24-month ASQ:SE-2 scores support that social-emotional screening should be emphasized as early as 18 months in Taiwan.

In addition, at the baseline, about 23% of children in TD group scored at or above the cutoff of the 18-month ASQ:SE-2, while more than 75% of children in EI group scored at or above the cutoff. The finding confirmed the previous findings which suggest that, compared to typically developing children, children with developmental delays or disabilities were 3 to 4 times more likely to have clinically significant social-emotional problems (B. L. Baker et al., 2003). Furthermore, at baseline and 6-month follow-up, the ASQ:SE-2 screening scores for TD children were significantly lower than for EI children. More than half of EI children had diagnoses of developmental delay and were reported to delays in 2 or more developmental areas at baseline, and some children were diagnosed with cerebral palsy, autism spectrum disorders, and congenital genetic disease (i.e. Williams Syndrome). The data indicated that children who were already in EI programs at 18 months might have more severe developmental problems and were at higher risk for social-emotional problems. This finding confirms previous studies indicating that children with disabilities or medical diagnoses tend to show more social-emotional or behavioral concerns (e.g., Kerch et al., 2020; Lee et al., 2016; Salomonsson et al, 2021; Wu et al., 2021). Regular screening and long-term monitoring for social-emotional development are suggested for children with developmental delay or disabilities.

Changes in Social-Emotional Behaviors between 18 and 24 Months

Although both groups demonstrated decreases in the ASQ:SE-2 scores, the change was not significant for EI children. In addition to the potential low statistical power for detecting the changes, it is also possible that 6 months is too brief an interval for ASQ:SE-2 to be able to detect significant changes in social-emotional behaviors, especially for children with developmental delay or disabilities. Previous research often finds significant changes in ASQ:SE scores and determines intervention effects for children's social-emotional development after 9 or 12 months of interventions (e.g., Salomonsson et al., 2021). For example, in Molnar et al. (2018) study and Pontoppidan et al. (2020), researchers observed gradual decreases in average item scores at each time-point, but statistically significant improvement was found after 12 months of intervention. In another study, Salomonsson and colleagues (2021) collected ASQ:SE scores at three time-points across 9 months and found significant improvement in social-emotional development for 100 infants in the intervention group. Thus, the changes in social-emotional development within 6 months could be too subtle to be detected by ASQ:SE-2 screening scores.

Besides to ASQ:SE-2 scores, the present study combined 18- and 24-month ASQ:SE-2 and our showed significant improvement in the 18- and 24-month combined scores from 42.74 (*SD* = 29.87) to 34.25 (*SD* = 23.10) for TD children ($p < .001$, Cohen's $d = .31$). Although no significance was found ($p = .08$, Cohen's $d = .29$) for EI children, their combined scores also showed decreases from 121.25 (*SD* = 74.13) to 112.26 (*SD* = 83.28). The combined scores in this study were generated from the questionnaires that combined 18- and 24-month intervals of ASQ:SE-2. Both 18- and 24-month intervals contain 31 items using a rating scale. Three items are different between the two intervals; thus all questions in these two intervals were included. The combined questionnaire contains 34 questions. It might detect the slight differences in

social-emotional development between 18 and 24 months. For example, an item in 18-month interval, which is not included in 24-month interval, asks if the child makes sounds or uses words or gestures to let parents know he wants something. Children who performed better on this item later at 24 months might not show improvement on 24-month screening scores but might demonstrate improvement in the combined scores. The improvement in the combined scores for TD children might suggest some natural growth in social-emotional development between 18 and 24 months.

Most previous studies recruited children within wide age ranges, such as 1 to 5 years, which usually across 3 or more age intervals of ASQ:SE (e.g., Molnar et al., 2018), whereas the present study focused on only one specific age range, which was 18-month interval and followed the same group of children till 24 months with the use of the combined questionnaires. Targeting a specific age range and including more assessment items may help capture the subtle changes in social-emotional development within a shorter period of time. For example, in Van Doesum et al. study (2008), researchers found no changes in ITSEA problem scores but found significant improvement in ITSEA competence scores after 6 months of a home-visit program. The study also focuses on a narrower age range and measures social-emotional development with a more comprehensive assessment tool which includes 88 items in the problem scale and 37 items in the competence scale.

To complement the quantitative data, our qualitative data indicated that more than half of participants in TD group reported that their children's language skills had improved over the past 6 months. Language skills have been associated with social-emotional competence in previous studies (Hartas, 2011a; Irwin et al., 2002; Rose et al., 2018; Kerch et al., 2020). The improved language skills could be one of the contributors to the changes in social-emotiaonal behaviors

from 18 to 24 months. On the contrary, parents of EI children rarely reported these improvement and some reported worsen social-emotional problems. Similar to previous findings (e.g., Keenan et al., 2019), the qualitative data and results of the ASQ:SE-2 show that children with developmental delay or disabilities were more likely to have increased social-emotional risk overtime, suggesting the need for monitoring.

Noticeably, the subgroup of TD children that fell into the referral zone at baseline and had not received EI services made more improvements and shifted to the low-risk zone at the follow-up (Figure 2). In addition to natural growth in social-emotional competence, one possible explanation is that parents' awareness might increase through the screening process. In current investigation about the utility, more than 90% of participants reported that the ASQ:SE-2 was helpful for thinking and learning their children's social-emotional development, showing that completing the social-emotional screening could promote parental awareness in their children's social-emotional behaviors. Previous study also indicates the importance the parental awareness in child development and how it might help promote early identification (Zablotsky et al., 2019).

Furthermore, after completing the ASQ:SE-2, each participant received a screening report and a handout that included social-emotional development guidelines and activities. This information and feedback might facilitate parents' awareness for promoting their children's social-emotional development. Previous findings suggest that parent education or consultation focusing on parent-child interaction had the benefits of enhancing parenting skills and improving children's ASQ:SE scores (Salomonsson et al., 2021; Worku et al., 2018). Thus, better parenting skills could be one of the possible explanations for the improvement in ASQ:SE-2 for young children who did not receive EI services in this study.

Nevertheless, participants' characteristics should be considered when interpreting the changes in ASQ:SE-2 scores. As mentioned previously, most participants in this study were mothers with higher education levels and only 4 low-income families were reported at baseline and 2 at the follow-up. For those 53 TD children who screened positive for social-emotional problems at baseline, only 28 of them completed the follow-up ASQ:SE-2. These participants might have fewer family risk factors that may impact young children's social-emotional development, such as low-income families or low-income neighborhoods (National Center for Children in Poverty, 2009), and lower maternal education levels (Wu et al., 2021).

For EI group, although the downward trend of ASQ:SE-2 scores was observed for children who scored into referral and monitor zones at baseline, the changes in the ASQ:SE-2 scores were relatively small and not statistically significant. Our qualitative data complement this finding, in which many participants did not report or reported no changes were observed, while many participants in TD group reported that their children had improved language skills, improved self-regulation, and better sleep after 6 months. Furthermore, some participants in EI group reported adverse changes, such as greater intensity of tantrums, easier getting frustrated, and more night-wakings. Some stated that they felt it was more difficult understanding their child's emotions and needed more support from professionals.

As discussed previously, children who were in EI programs before age of 18 months had more severe developmental problems as a group and tended to score higher on the ASQ:SE-2. Compared to their typically developing peers, children with disabilities started with a lower level of social-emotional development. Previous research has shown that it may take more than 9 or 12 months to observe significant changes in social-emotional behaviors for children with special needs (e.g., Lowell et al., 2011; Mahoney & Perales, 2005; Salomonsson et al, 2021). In

addition, EI services that children have received could have critically impacted social-emotional development. Researchers suggested that children with disabilities have unique challenges in social-emotional development and that more specific and evidence-based interventions are required to tailor their needs (Lee et al., 2016).

Utility of the ASQ:SE-2 from Parents' Perspectives

Participants in this study reported positively about the utility and acceptance of the ASQ:SE-2 for toddler-aged children, suggesting that it is an acceptable, family-friendly screening tool and can be completed within a short period of time. This is an important finding given that the overt discussion about social-emotional behaviors were avoided in previous social norms and the social-emotional screening procedure is limited in Taiwan. Previous study (Y. L. Chen et al., 2020) strongly suggested the needs for early identification and public awareness on young children's mental health due to the high prevalence of mental health disorders in Taiwan.

In this study, more than 90% of participants indicated that questions of the ASQ:SE-2 were easy to understand and appropriate, which was similar to a prior report included in ASQ:SE-2 User's Guide (Squires et al., 2015) and showed that the Traditional Chinese version was also family-friendly and culturally appropriate from families' perspectives in Taiwan. Moreover, both quantitative and qualitative data showed that parents not only enjoyed participating in the screening process but also thought and learned while completing the ASQ:SE-2, suggesting that such universal screening may help promote parental awareness of child's social-emotional development in early ages.

In addition, our quantitative and qualitative data may provide further improvement for the Traditional Chinese ASQ:SE-2 and screening process. A small percentage of participants reported difficulty or uncertainty when answering questions and determining the frequency of

behaviors. It is suggested that some parents may need additional explanation provided from professionals or more questions could include text boxes for parents to provide more details about their children's social-emotional behaviors.

Although parents were positive about the use of the ASQ:SE-2 in this study, more research is needed before it can be used clinically as a social-emotional screener for toddlers in Taiwan since the age intervals targeting toddlers have not been fully studied. As mentioned in the introduction, cultures and contexts play important roles in social-emotional development. Adapting an instrument cross countries or cultures is not simply the translation between languages (Clifford et al., 2017; Heo & Squires, 2012). Oftentimes, some social-emotional behaviors or situations are not relevant or cannot be translated directly in another culture, and the process of cultural adaptation is necessary.

International researchers have used differential item functioning analyses with the ASQ:SE and a variety of populations (e.g., Brazilian, Korean, Taiwanese). Findings have indicated that beliefs and cultural values can affect how caregivers responded to ASQ:SE items. Nevertheless, the functioning of ASQ:SE items appeared to be acceptable overall. However, researchers have suggested that cultural expectations should be considered when adapting the ASQ:SE and the scoring criteria may need to be revised to reflect the relevant social-emotional experience within a specific culture and specific age group for a new population (Chen et al., 2017; Heo & Squires, 2012; Vaezghasemi et al., 2022).

Limitations and Considerations

Some limitations and considerations need to be addressed in this study. First, although the sample size was sufficient for most statistical analyses planned in this study, the sample was not representative of the Taiwanese population, because of the potential threat of selection bias.

Most participants in this study were mothers with higher education levels and only a few families were reported as low-income families. The lack of diverse participants' characteristics may limit the generalizability of our observations to vulnerable families in Taiwan.

Second, although the follow-up response rate was acceptable (71.8%), sample attrition was observed at the follow-up. Despite there were no differences between non-respondents and respondents in terms of their 18-month screening scores and demographic information collected in this study, there could be some other possible factors affecting the attrition and leading to selection bias. About 50% of participants in this subgroup did not complete the follow-up survey. It is possible that participants with family risk factors not measured in this study might have more difficulty to continue participation or complete questionnaires in time. Thus, it could have compromised our data on this particular subgroup.

Third, a critical consideration is that the current investigation was conducted within the period of Covid-19 pandemic. During the baseline and follow-up, the Taiwan government-imposed lockdown measures and many EI programs suspended their services. Readers must consider that parental stress and adverse childhood experiences might increase significantly during the pandemic (Calvano et al., 2021), which could impact young children's social-emotional development (Crum & Moreland, 2017). Therefore, it is likely that children would show more social-emotional risk during the pandemic.

Implications

This is the first study investigating and monitoring toddlers' social-emotional development in Taiwan. It is also the first study exploring EI service delivery approaches for children with social-emotional problems in Taiwan. This section provides several recommendations for practices and future research.

Recommendations for Practices

First, the present study showed high positive rate among toddlers who were not receiving EI services, indicating the importance of social-emotional screening for children younger than age of 2 in Taiwan. Specifically, the social-emotional screening should be included for 18-month-old toddlers. Considering that most screening and child-find procedures were conducted in health centers for this age group, it is suggested that health practitioners should consider including social-emotional screening in regular checkups. Local agencies or organizations can also distribute social-emotional screening tools in communities or during parent-child activities.

Second, children with development delay or disabilities are more likely to have a higher risk of social-emotional problems and less likely to have significant improvement within a short period of time. The changes in their social-emotional behaviors may be subtle and the risk may increase over time without effective interventions. Long-term monitoring will benefit children with special needs and help EI programs to determine intervention effectiveness.

Third, early and regular screening of social-emotional development is critical for children in their first years so that social-emotional problems can be identified early for EI services. A reliable, low-cost, and family-friendly instrument can help sustain the screening and monitoring process. In the present study, parents found completion of the ASQ:SE-2 was acceptable and helpful for them to think about their children's social-emotional development, showing that the instrument is worth further research and dissemination.

Recommendations for Future Research

Research on social-emotional development in Taiwan is relatively scarce. I hope that this exploratory study can increase public awareness of social-emotional development and provide some groundwork for future research. Some future directions are described below.

First, research on social-emotional development using ASQ:SE-2 and a representative sample is needed for toddlers in Taiwan. Although ASQ:SE-2 has been adapted with a rigorous process and validated with a large sample size in a previous study (C. Y. Chen et al., 2020), the age interval examined was 48 months and the age intervals under 36 months have not been fully researched in Taiwan. Future researchers should focus on age intervals under 36 months (i.e., 2-, 6-, 12-, 18-, 24-, 30-, 36-month) to establish psychometric evidence (i.e., validity, reliability, sensitivity, and specificity) and examine the scoring criteria in order to promote more accurate and effective early identification for Taiwanese toddlers. To better support the clinical use of Traditional ChineseASQ:SE-2 as a screener in Taiwan for children before age of 2, future studies may consider examining concurrent validity, sensitivity, and specificity or determining the cut-off point of 18-month interval.

Second, research on social-emotional development for children in vulnerable families or children of distressed parents is needed. Previous studies suggest that family risk factors and parents' mental health could impact young children's social-emotional development (Crum & Moreland, 2017; National Center for Children in Poverty, 2009). To understand the challenges and needs of this population, future research should gather qualitative data from families and include parental stress as one of the outcome measures.

Third, more empirical research is needed to examine the effects of EI services on toddler's social-emotional development in Taiwan. It is recommended that the outcome measures for social-emotional development should be comprehensive and the research period should take longer than 6 months. The present study also provides a glance of changes in toddlers' social-emotional behaviors between 18 and 24 months, which may help researchers who target this age group find directions for effective interventions and establish empirical evidence.

Conclusion

Social-emotional development is foundational for children's learning and should be addressed at young ages. The high prevalence of social-emotional problems and mental health disorders among children in Taiwan is concerning and relevant research is scarce. This exploratory study lays the groundwork for measuring key social-emotional competence and risk behaviors for toddler-aged children in Taiwan by screening 18-month-old children with ASQ:SE-2 and monitoring the changes after six months. This study demonstrates a high positive rate of social-emotional risk, indicating the need for early identification and supporting the use of ASQ:SE-2 for children under age of 2. Findings confirm previous studies that children with developmental delay or disabilities are 3 to 4 times more likely to screen positive for social-emotional development and their changes in social-emotional behaviors between 18 and 24 months could be subtle, suggesting the importance of long-term monitoring for this population. The overall utility and parent acceptance of the ASQ:SE-2 were high, showing that it is worth further study and that parents were positive about its use for toddlers in Taiwan. However, more research is needed in terms of establishing its psychometric evidence before it is used as a clinical screener for toddler-aged population in Taiwan.

This study contributes to the body of knowledge on young children's social-emotional development in Taiwan and adds international data to the existing literature on social-emotional development. It is the hope that the information and recommendations provided in this study can expand our understanding of social-emotional development within diverse cultural contexts and improve EI service delivery approaches both in Taiwan and elsewhere.

APPENDICES

Appendix A: The Ages and Stages Questionnaires: Social-Emotional, 2nd Edition:

Combined 18 and 24 months Questionnaire

	Often or always	Some-times	Rarely or never	Check if this is a concern
1. Does your child look at you when you talk to him?				
2. When you leave, does your child stay upset and cry for more than an hour?				
3. Does your child seem too friendly with strangers? (from 24 month interval)				
4. Does your child laugh or smile when you play with her?				
5. Does your child look for you when a stranger comes near?				
6. Is your child's body relaxed?				
7. Does your child greet or say hello to familiar adults? (from 24 month interval)				
8. Does your child like to be hugged or cuddled?				
9. When upset, can your child calm down within 15 minutes?				
10. Does your child stiffen and arch his back when picked up?				
11. Does your child cry, scream, or have tantrums for long periods of time?				
12. Is your child interested in things around her, such as people, toys, and foods?				
13. Does your child do things over and over and get upset when you try to stop him? For example, does he rock, flap his hands, spin, or _____? (Please describe.) _____				
14. Does your child have eating problems? For example, does she stuff food, vomit, eat things that are not food, or _____? (Please describe.) _____				

The Ages and Stages Questionnaires: Social-Emotional, 2nd Edition: Combined 18 and 24 months Questionnaire (Continued)				
15. Does your child have trouble falling asleep at naptime or at night?				
16. Do you and your child enjoy mealtimes together?				
17. Does your child sleep at least 10 hours in a 24-hour period?				
18. When you point at something, does your child look in the direction you are pointing?				
19. Does your child get constipated or have diarrhea?				
20. Does your child let you know how he is feeling with gestures or words? For example, does he let know when he is hungry, hurt, or tired?				
21. Does your child follow simple directions? For example, does she sit down when asked?				
22. Does your child like to play near or be with family and friends?				
23. Does your child check to make sure you are near when exploring new places, such as a park or a friend's home?				
24. Does your child like to hear stories or sing songs?				
25. Does your child hurt himself on purpose?				
26. Does your child like to be around other children? For example, does she move close to or look at other children?				
27. Does your child try to hurt other children, adults, or animals (for example, by kicking or biting)?				
28. Does your child try to show you things by pointing at them and looking back at you?				
29. Does your child make sounds or use words or gestures to let you know he wants something (for example, by reaching)?				
30. Does your child play with objects by pretending? For example, does your child pretend to talk on the phone, feed a doll, or fly a toy airplane?				

The Ages and Stages Questionnaires: Social-Emotional, 2nd Edition: Combined 18 and 24 months Questionnaire (Continued)				
31. Does your child wake up three or more times during the night?				
32. Does your child respond to her name when you call her? For example, does she turn her head and look at you?				
33. Is your child too worried or fearful? If "sometimes" or often or always," please describe: _____ (From 24 month interval)				
34. Has anyone shared concerns about your child's behaviors? If "sometimes" or often or always," please explain: _____				
Have you observed any difference in child's behavior, communication, or emotional regulation after 6 months? If yes, please explain: _____				

Appendix B: Demographic and Service Information Form

Child's Information

Child's name: _____ Gender: ○Male ○Female

Date of birth: _____ Gestational age: _____

Diagnosis: _____

Areas of developmental delay or disability:

☐Gross motor ☐Fine motor ☐Speech and language ☐Cognition

☐Social-emotional development ☐Other:_____

What types of early intervention services are your child currently receiving?

☐Physical therapy, _____ hours/week

☐Occupational therapy, _____ hours/week

☐Speech therapy, _____ hours/week

☐Psychological therapy, _____ hours/week

☐Behavioral therapy, _____ hours/week

☐Other: _____, _____ hours/week

Person Filling Out Questionnaires

Your name: _____ Gender: ○Male ○Female

Relationship to the child: _____ County: _____

Age: ☐Under 20 ☐20-29 ☐30-39 ☐40-49 ☐50-59 ☐Over 60

Education: ☐Elementary school ☐Middle school ☐High school ☐College or higher

Family income: ☐Normal ☐Low income ☐Don't know

Marital status: ☐Single ☐Married ☐Divorced ☐Other:_____

Appendix C: Family-FINESSE

The Instrument

The Family-FINESSE was used to gather information on EI service delivery approaches and measure the extent of family-centered practices from families' perspectives. Therefore, only families enrolled in EI programs were invited to complete this questionnaire.

Family-FINESSE contains 19 items that ask parents to rate typical practices they have experienced in EI services. Ratings are on a 7-point scale with 4 descriptors representing scores of 1, 3, 5, and 7. For example, item 15 asks about the location of EI services. Four descriptions include: (a) Service providers see me only in clinic, office, center, or hospital; (b) Service providers see me primarily in a clinic, office, center, or hospital but have also made a school visit; (c) Service providers visit my child at child care or preschool; (d) Service providers visit my child or me at home or in the community, including my child's daycare or preschool. Parents can select the description that best describes their experience or rate their experience somewhere between two descriptions. Higher scores of Family-FINESSE indicate more family-centered, natural, and collaborative practices. On the Family-FINESSE, parents are also able to select ideal practices they would like to see in their EI services with the same 7-point rating scale.

Previous studies that FINESSE has good overall internal consistency (Cronbach's α = .93) for family version and professional version (Cronbach's α = .93) with four factors including (a) first encounters, (b) intervention planning, (c) functionality, and (d) professional roles (Fernandez et al., 2017; Garcia-Grau et al., 2020; Valero et al., 2017). Although The professional version of FINESSE has been used in several prior studies to evaluate EI services (García-Grau et al., 2020; Rantala et al., 2009). Researchers have recommended using the FINESSE to measure the extent of family-centered practices and develop service profiles (García-Grau et al.,

2020; Rantala et al., 2009). To adapt the Family-FINESSE in Taiwan, a series of procedures and pilot was conducted before collecting data in the present study. The procedures of translation and adaptation were described in the next section.

Translating and Adapting Family-FINESSE

The original Family-FINESSE is written in English. Thus, a series of translation and adaptation procedures were conducted, following the *International Test Commission Guidelines for Translating and Adapting Test* (International Test Commission, 2017). First, the permission from the developer, Dr. McWilliam, was obtained for translating and adapting the Family-FINESSE. Second, a double-translation and reconciliation procedure have been conducted. The forward translation was conducted by the principal investigator (PI) who is the native speaker of Traditional Chinese. The backward translation was completed by a registered nurse who is a Native speaker of Traditional Chinese and fluent in English. The backward translator has been working with families in the United States and is familiar with EI service delivery process.

After completing the backward translation, both translators reviewed each item and compared the backward translation to the original Family-FINESSE. Any differences between the original version and the backward translation had been discussed to modify the forward translation with the use of a checklist developed by Hambleton and Zenisky (2011). The checklist lists 5 domains with 25 features of a translated test that should be checked. Five domains are (a) general questions about equivalence, (b) item format and appearance, (c) grammar and phrasing, (d) passages and other item relevant materials (if present), and (e) cultural relevance and specificity. Each domain has 4 to 6 questions, such as *"Does the translation introduce changes in the text (omissions, substitutions, or additions) that might influence the difficulty of the test item in the two language versions?"* All domains, except the

fourth domain are applied and discussed during the reconciliation. Both translators agreed upon the modifications made to forward translation.

Step three was to have a panel of Taiwanese EI experts review the modified forward translation with the original version and the checklist (Hambleton & Zenisky, 2011) to assure cultural appropriateness and accuracy. The panel was consisted of four university professors who are fluent in both Traditional Chinese and English and have expertise in EI services. The panel reviewed each item independently and checked if the translation is appropriate by considering the four domains in the checklist. Reviewers provided suggestions for revisions on the review forms.

Step four, after collecting the review forms from the reviewers, the PI and the backward translator reviewed the suggestions to make second modification for the adapted version. The PI contacted the reviewers to discuss any questions occur during the process. Next, a small try-out of the adapted version was conducted with three Taiwanese families in EI programs. The families were interviewed and provided any feedback on the adapted version to make further modifications for the final version. Step five, the PI conducted a pilot study of Family-FINESSE with a sample of 187 Taiwanese families in EI programs to validate the Traditional-Chinese version in Taiwan. The participating families in pilot phase also completed 5 multiple questions regarding the social validity and utility.

Our pilot study with a sample size of 187 participants showed that the Traditional Chinese version of Family FINESSE had overall good reliability with Cronbach's α of .940 and the model fit of 2-facotor model was acceptable ($\chi^2(127) = 227.464$ ($p < .001$), *GFI* = .894, *CFI* = .954, *TLI* = .938, *SRMR* = .045, *RMSEA* = .065.).

The Extent of Family-Centered Approaches Experienced by Families in the Present Study

Family-FINESSE contains 19 items that ask parents to rate typical practices they have experienced in EI services. In this study, item 13 which asks how children receive EI services at their preschools was removed, because most children did not go to preschools and item 13 was not applicable. Therefore, only 18 items of Family FINESSE were analyzed in this study.

Based on the sample of 39 participants at baseline and 29 participants at the follow-up, the average item score of typical practices in Family FINESSE was 4.58 (*SD* = 1.87) at baseline and 4.45 (*SD* = 1.85) at the follow-up, indicating the medium level of family-centered approaches The average item score of ideal experience was 5.88 (*SD* = 1.43) at baseline and 5.75 (*SD* = 1.44) at the follow-up. The average discrepancy was 1.22 (*SD* = 1.68) at baseline and 1.19 (*SD* = 1.60) at the follow-up. The typical practice scores were lower than ideal practice scores for all items, indicating there was room for improvement for overall family-centered approaches. Particularly, item 15, which is about the location of EI services, demonstrated a discrepancy above 2 points at baseline and follow-up, suggesting more improvement is needed on this practice for the population in the present study.

Appendix D: Recruitment Letters (English)

(For pilot phase)

Dear Parent,

I hope you are doing well. I am a researcher from the University of Oregon, USA. I am conducting an online survey for a questionnaire: The Families in Natural Environment Scale of Service Evaluation (Family-FINESSE). This questionnaire aims to understand your experience in early intervention. I am recruiting 150 parents whose children are currently receiving early intervention services in Taiwan to complete the questionnaire.

The first 150 participants can receive electronic 5-dollar gift card via email. It will take about 8-10 minutes to complete the questionnaire. You may refuse to participate at any time.

This online survey will be available from __ to ___. You may access the online survey through the following link: _____.
If you have any questions, please feel free to contact the researcher via email. Thank you for your consideration.

Sincerely,

Fang Yu Lin, M.Ed, BCBA

flin4@uoregon.edu

(For parents of children receiving early intervention services in research phase: online recruitment)

Dear Parent,

I hope you are doing well. I am a researcher from the University of Oregon, USA. I am conducting a 6-month research focusing on early intervention and young children's social-emotional development. The study aims to investigate the current status of the social-emotional development in young children receiving early intervention services as well as current practices of early intervention service delivery. This study will expand our understanding of toddler's social-emotional development and growth and help further improve early intervention services.

I am recruiting 150 parents to participate in this 6-month research and complete two times of survey. You are eligible for participating if your child is (a) 15 to 21 months of chronological age and (b) currently receiving early intervention service. Each participant can receive electronic 5-dollar gift card via email, the results of social-emotional development screening, and an activity sheet for promoting social-emotional development after completing the questionnaires within 10 days at each data collection. The participants will receive a link to questionnaires via emails at the first and sixth month of the research.

There are three online questionnaires including the background information form, the Ages and Stages Questionnaires: Social-Emotional, 2nd edition (ASQ:SE-2), and the Families in Natural Environment Scale of Service Evaluation (Family-FINESSE). The ASQ:SE-2 measure young children's social-emotional development. The Family-FINESSE measures your experience in early intervention services. It will take about 30 minutes to complete the three questionnaires. You may refuse to participate at any time.

If you are interested and think you are eligible for this study, please email me at flin4@uoregon.edu. I will contact you with further information via email. The deadline for this recruitment will be _____. If you have any questions or require additional information, please feel free to email me. Thank you for your consideration. I greatly appreciate your participation.

Sincerely,

Fang Yu Lin, M.Ed, BCBA

flin4@uoregon.edu

(For parents of children receiving early intervention services: through EI programs)

Dear Parent,

I hope you are doing well. I am a researcher from the University of Oregon, USA. I am conducting a 6-month research focusing on early intervention and young children's social-emotional development. The study aims to investigate the current status of the social-emotional development in young children receiving early intervention services as well as current practices of early intervention service delivery. This study will expand our understanding of toddler's social-emotional development and growth, and help further improve early intervention services.

I am recruiting 150 parents to participate in this 6-month research and complete two times of survey. You are eligible for participating if your child is (a) 18 to 21 months of chronological age and (b) currently receiving early intervention service. Each participant can receive 5-dollar gift cards, the results of social-emotional development screening, and an activity sheet for promoting social-emotional development after completing the questionnaires within 10 days at each data collection.

There are three online questionnaires including the background information form, the Ages and Stages Questionnaires: Social-Emotional, 2nd edition (ASQ:SE-2), and the Families in Natural Environment Scale of Service Evaluation (Family-FINESSE). The ASQ:SE-2 measure young children's social-emotional development. The Family-FINESSE measures your experience in early intervention services.

You may choose to complete the survey online or with paper-pencil survey packets. If you would like to complete the survey online, please email the researcher at flin4@uroegon.edu. If you would like to have the paper-pencil packet, you may obtain it from your service provider. However, you will need to return the completed questionnaires with the prepaid envelopes. It will take about 30 minutes to complete the three questionnaires. You may refuse to participate at any time.

The deadline for this recruitment will be _____. If you have any questions or require additional information, please feel free to email me. Thank you for your consideration. I greatly appreciate your participation.

Sincerely,

Fang Yu Lin, M.Ed, BCBA

flin4@uoregon.edu

(For parents of children with typical development)

Dear Parent,

I hope you are doing well. I am a researcher from the University of Oregon, USA. I am conducting a 6-month research focusing on early intervention and young children's social-emotional development. The study aims to investigate the current status of the social-emotional development in Taiwanese toddlers. This study will expand our understanding of toddler's social-emotional development and growth.

I am recruiting 150 parents to participate in this 6-month research and complete two times of survey. You are eligible for participating if your child is 18 to 21 months of chronological age with typical development. Each participant can receive electronic 5-dollar gift card via email after completing the questionnaire.

You will need to complete the online Ages and Stages Questionnaires: Social-Emotional, 2nd edition (ASQ:SE-2). The ASQ:SE-2 measure young children's social-emotional development. It will only take 7-10 minutes to complete. The participants will receive a link to questionnaires via emails at the first and sixth month of the research. You may refuse to participate at any time.

If you are interested and think you are eligible for this study, please email me at flin4@uoregon.edu. I will contact you with further information via email. The deadline for this recruitment will be _____. If you have any questions or require additional information, please feel free to email me. Thank you for your consideration. I greatly appreciate your participation.

Sincerely,

Fang Yu Lin, M.Ed, BCBA

flin4@uoregon.edu

Appendix E: Consent Forms

(For online questionnaires)

Dear Parent,

Thank you for considering participating in this study. The purpose of this 6-month study is to investigate the current status of the social-emotional development in young children with special needs as well as current practices of early intervention service delivery. This study will expand our understanding on how early intervention service delivery approaches link to children's social-emotional competence and developmental risk.

There are one information sheet and three questionnaires. You will need about 30 minutes to complete the questionnaires. You will receive the reminders and link to questionnaires via emails at the first, third, and sixth month. At each data collection, you can receive incentive _____ by completing questionnaires within 10 days. The questionnaires are not anonymous so that we can track and monitor your child's social-emotional development. However, your confidential will be protected and the data will be used in this study only. Please read the following statements and click on "agree" if you agree to participate in this study.

1. I am a volunteer in this study. I may stop participating at any time.

2. I understand this is a 6-month study and I will need to complete questionnaires at the first, third, and sixth month of research period.

3. I understand the questionnaires are not anonymous, but my data and identity will be protected and kept private.

4. I will receive incentive _____ by completing questionnaires within 10 days and leaving my address: _____.

5. I will be offered the results of my child's social-emotional screening as well as the activity sheet for promoting social-emotional development.

6. There is no any known risk by completing the questionnaires.

7. I will be able to contact Fang Yu Lin at flin4@uoregon.edu, if I have any questions later.

8. I understand and agree all of the statements above.

___Agree

___Disagree and quit

(For paper-pencil questionnaires)

Dear Parent,

Thank you for considering participating in this study. The purpose of this 6-month study is to investigate the current status of the social-emotional development in young children with special needs as well as current practices of early intervention service delivery. This study will expand our understanding on how early intervention service delivery approaches link to children's social-emotional competence and developmental risk.

There are one information sheet and three questionnaires. You will need about 30 minutes to complete the questionnaires. Your provider will remind you and provide you the questionnaires at the first, third, and sixth month. At each data collection, you can receive incentive _____ by completing questionnaires within 10 days. The questionnaires are not anonymous so that we can track and monitor your child's social-emotional development. However, your confidential will be protected and the data will be used in this study only. Please read the following statements and sign if you agree to participate in this study.

1. I am a volunteer in this study. I may stop participating at any time.

2. I understand this is a 6-month study and I will need to complete questionnaires at the first, third, and sixth month of research period.

3. I understand the questionnaires are not anonymous, but my data and identity will be protected and kept private.

4. I will receive incentive _____ by completing and returning questionnaires to my early intervention provider within 10 days.

5. I will be offered the results of my child's social-emotional screening as well as the activity sheet for promoting social-emotional development.

6. There is no any known risk by completing the questionnaires.

7. I will be able to contact Fang Yu Lin at flin4@uoregon.edu, if I have any questions later.

8. I understand and agree all of the statements above.

Please sign here: _____

Date: _____

Appendix F: SPSS Outputs

Output for Table 6. *Group Differences in 18-month ASQ:SE-2 Scores*

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Minimum	Maximum
ASQSE18m	typical	231	40.9091	32.44789	2.13491	36.7026	45.1156	.00	245.00
	EI	53	115.7547	64.38613	8.84411	98.0077	133.5017	15.00	270.00
	Total	284	54.8768	49.70658	2.94954	49.0709	60.6826	.00	270.00
AIS18m	typical	231	1.3196	1.04671	.06887	1.1840	1.4553	.00	7.90
	EI	53	3.7340	2.07697	.28529	3.1615	4.3065	.48	8.71
	Total	284	1.7702	1.60344	.09515	1.5829	1.9575	.00	8.71
Combined1	typical	231	47.6840	35.27753	2.32109	43.1107	52.2573	.00	260.00
	EI	53	130.3774	70.89977	9.73883	110.8350	149.9198	15.00	300.00
	Total	284	63.1162	54.55950	3.23751	56.7435	69.4889	.00	300.00
CIS1	typical	231	1.4025	1.03757	.06827	1.2680	1.5370	.00	7.65
	EI	53	3.8346	2.08529	.28644	3.2599	4.4094	.44	8.82
	Total	284	1.8564	1.60469	.09522	1.6689	2.0438	.00	8.82

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
ASQSE18m	Between Groups	241491.784	1	241491.784	148.780	<.001
	Within Groups	457728.902	282	1623.152		
	Total	699220.687	283			
AIS18m	Between Groups	251.292	1	251.292	148.780	<.001
	Within Groups	476.305	282	1.689		
	Total	727.597	283			
Combined1	Between Groups	294788.782	1	294788.782	151.801	<.001
	Within Groups	547628.384	282	1941.945		
	Total	842417.165	283			
CIS1	Between Groups	255.008	1	255.008	151.801	<.001
	Within Groups	473.727	282	1.680		
	Total	728.735	283			

Output for Table 6. *Group Differences in 18-month ASQ:SE-2 Scores (Continued)*

ANOVA Effect Sizes[a]

			95% Confidence Interval	
		Point Estimate	Lower	Upper
ASQSE18m	Eta-squared	.345	.260	.422
	Epsilon-squared	.343	.257	.420
	Omega-squared Fixed-effect	.342	.257	.419
	Omega-squared Random-effect	.342	.257	.419
AIS18m	Eta-squared	.345	.260	.422
	Epsilon-squared	.343	.257	.420
	Omega-squared Fixed-effect	.342	.257	.419
	Omega-squared Random-effect	.342	.257	.419
Combined1	Eta-squared	.350	.264	.426
	Epsilon-squared	.348	.262	.424
	Omega-squared Fixed-effect	.347	.261	.423
	Omega-squared Random-effect	.347	.261	.423
CIS1	Eta-squared	.350	.264	.426
	Epsilon-squared	.348	.262	.424
	Omega-squared Fixed-effect	.347	.261	.423
	Omega-squared Random-effect	.347	.261	.423

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
ASQSE18m	Welch	67.675	1	58.192	<.001
	Brown-Forsythe	67.675	1	58.192	<.001
AIS18m	Welch	67.675	1	58.192	<.001
	Brown-Forsythe	67.675	1	58.192	<.001
Combined1	Welch	68.223	1	58.033	<.001
	Brown-Forsythe	68.223	1	58.033	<.001
CIS1	Welch	68.223	1	58.033	<.001
	Brown-Forsythe	68.223	1	58.033	<.001

a. Asymptotically F distributed.

Output for Table 7. *Group Differences in 24-month ASQ:SE-2 Scores*

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Minimum	Maximum
ASQSE24m	typical	162	32.6235	21.29503	1.67310	29.3194	35.9275	.00	115.00
	EI	42	104.4048	77.85385	12.01311	80.1438	128.6657	5.00	325.00
	Total	204	47.4020	49.29918	3.45163	40.5963	54.2076	.00	325.00
AIS24m	typical	162	1.0524	.68694	.05397	.9458	1.1590	.00	3.71
	EI	42	3.3679	2.51141	.38752	2.5853	4.1505	.16	10.48
	Total	204	1.5291	1.59030	.11134	1.3096	1.7486	.00	10.48
Combined2	typical	162	34.3210	22.30162	1.75218	30.8608	37.7812	.00	125.00
	EI	42	112.2619	83.28033	12.85043	86.3099	138.2139	5.00	340.00
	Total	204	50.3676	52.85203	3.70038	43.0715	57.6638	.00	340.00
CIS2	typical	162	1.0094	.65593	.05153	.9077	1.1112	.00	3.68
	EI	42	3.3018	2.44942	.37795	2.5385	4.0651	.15	10.00
	Total	204	1.4814	1.55447	.10883	1.2668	1.6960	.00	10.00

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
ASQSE24m	Between Groups	171852.889	1	171852.889	107.969	<.001
	Within Groups	321520.150	202	1591.684		
	Total	493373.039	203			
AIS24m	Between Groups	178.827	1	178.827	107.969	<.001
	Within Groups	334.568	202	1.656		
	Total	513.395	203			
Combined2	Between Groups	202611.999	1	202611.999	112.304	<.001
	Within Groups	364435.428	202	1804.136		
	Total	567047.426	203			
CIS2	Between Groups	175.270	1	175.270	112.304	<.001
	Within Groups	315.256	202	1.561		
	Total	490.525	203			

Output for Table 7. *Group Differences in 24-month ASQ:SE-2 Scores (Continued)*

ANOVA Effect Sizes[a]

			95% Confidence Interval	
		Point Estimate	Lower	Upper
ASQSE24m	Eta-squared	.348	.247	.437
	Epsilon-squared	.345	.243	.434
	Omega-squared Fixed-effect	.344	.242	.433
	Omega-squared Random-effect	.344	.242	.433
AIS24m	Eta-squared	.348	.247	.437
	Epsilon-squared	.345	.243	.434
	Omega-squared Fixed-effect	.344	.242	.433
	Omega-squared Random-effect	.344	.242	.433
Combined2	Eta-squared	.357	.256	.446
	Epsilon-squared	.354	.252	.443
	Omega-squared Fixed-effect	.353	.251	.442
	Omega-squared Random-effect	.353	.251	.442
CIS2	Eta-squared	.357	.256	.446
	Epsilon-squared	.354	.252	.443
	Omega-squared Fixed-effect	.353	.251	.442
	Omega-squared Random-effect	.353	.251	.442

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
ASQSE24m	Welch	35.024	1	42.602	<.001
	Brown-Forsythe	35.024	1	42.602	<.001
AIS24m	Welch	35.024	1	42.602	<.001
	Brown-Forsythe	35.024	1	42.602	<.001
Combined2	Welch	36.116	1	42.535	<.001
	Brown-Forsythe	36.116	1	42.535	<.001
CIS2	Welch	36.116	1	42.535	<.001
	Brown-Forsythe	36.116	1	42.535	<.001

a. Asymptotically F distributed.

Output for Table 8. *Results of the Difference in ASQ:SE-2 Scores between Baseline and Follow-Up*

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ASQSE18m	52.0833	204	47.58138	3.33136
	ASQSE24m	47.4020	204	49.29918	3.45163
Pair 2	AIS18m	1.6801	204	1.53488	.10746
	AIS24m	1.5291	204	1.59030	.11134
Pair 3	Combined1	59.8284	204	52.18237	3.65350
	Combined2	50.3676	204	52.85203	3.70038
Pair 4	CIS1	1.7597	204	1.53478	.10746
	CIS2	1.4814	204	1.55447	.10883

Paired Samples Correlations

				Significance	
		N	Correlation	One-Sided p	Two-Sided p
Pair 1	ASQSE18m & ASQSE24m	204	.797	<.001	<.001
Pair 2	AIS18m & AIS24m	204	.797	<.001	<.001
Pair 3	Combined1 & Combined2	204	.812	<.001	<.001
Pair 4	CIS1 & CIS2	204	.812	<.001	<.001

Paired Samples Test

		Paired Differences					t	df	Significance	
					95% Confidence Interval of the Difference					
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			One-Sided p	Two-Sided p
Pair 1	ASQSE18m - ASQSE24m	4.68137	30.89425	2.16303	.41649	8.94626	2.164	203	.016	.032
Pair 2	AIS18m - AIS24m	.15101	.99659	.06978	.01344	.28859	2.164	203	.016	.032
Pair 3	Combined1 - Combined2	9.46078	32.22769	2.25639	5.01182	13.90975	4.193	203	<.001	<.001
Pair 4	CIS1 - CIS2	.27826	.94787	.06636	.14741	.40911	4.193	203	<.001	<.001

Output for Table 8. *Results of the Difference in ASQ:SE-2 Scores between Baseline and Follow-Up (Continued)*

Paired Samples Effect Sizes

				Point	95% Confidence Interval	
			Standardizer[a]	Estimate	Lower	Upper
Pair 1	ASQSE18m - ASQSE24m	Cohen's d	30.89425	.152	.013	.289
		Hedges' correction	30.95147	.151	.013	.289
Pair 2	AIS18m - AIS24m	Cohen's d	.99659	.152	.013	.289
		Hedges' correction	.99843	.151	.013	.289
Pair 3	Combined1 - Combined2	Cohen's d	32.22769	.294	.153	.433
		Hedges' correction	32.28738	.293	.153	.433
Pair 4	CIS1 - CIS2	Cohen's d	.94787	.294	.153	.433
		Hedges' correction	.94963	.293	.153	.433

a. The denominator used in estimating the effect sizes.

Cohen's d uses the sample standard deviation of the mean difference.

Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

Output for Table 9. *Results of the Difference in ASQ:SE-2 Scores between Baseline and Follow-Up for children in TD Group*

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ASQSE18m	38.6728	162	27.75667	2.18077
	ASQSE24m	32.6235	162	21.29503	1.67310
Pair 2	AIS18m	1.2475	162	.89538	.07035
	AIS24m	1.0524	162	.68694	.05397
Pair 3	Combined1	45.1543	162	30.50518	2.39671
	Combined2	34.3210	162	22.30162	1.75218
Pair 4	CIS1	1.3281	162	.89721	.07049
	CIS2	1.0094	162	.65593	.05153

Output for Table 9. *Results of the Difference in ASQ:SE-2 Scores between Baseline and Follow-Up for children in TD Group (Continued)*

Paired Samples Correlations

		N	Correlation	Significance One-Sided p	Significance Two-Sided p
Pair 1	ASQSE18m & ASQSE24m	162	.445	<.001	<.001
Pair 2	AIS18m & AIS24m	162	.445	<.001	<.001
Pair 3	Combined1 & Combined2	162	.490	<.001	<.001
Pair 4	CIS1 & CIS2	162	.490	<.001	<.001

Paired Samples Test

		Paired Differences					t	df	Significance One-Sided p	Significance Two-Sided p
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper				
Pair 1	ASQSE18m - ASQSE24m	6.04938	26.40718	2.07474	1.95216	10.14660	2.916	161	.002	.004
Pair 2	AIS18m - AIS24m	.19514	.85184	.06693	.06297	.32731	2.916	161	.002	.004
Pair 3	COmbined1 - Combined2	10.83333	27.60215	2.16863	6.55071	15.11596	4.995	161	<.001	<.001
Pair 4	CIS1 - CIS2	.31863	.81183	.06378	.19267	.44459	4.995	161	<.001	<.001

Paired Samples Effect Sizes

			Standardizer[a]	Point Estimate	95% Confidence Interval Lower	95% Confidence Interval Upper
Pair 1	ASQSE18m - ASQSE24m	Cohen's d	26.40718	.229	.073	.385
		Hedges' correction	26.46889	.229	.073	.384
Pair 2	AIS18m - AIS24m	Cohen's d	.85184	.229	.073	.385
		Hedges' correction	.85384	.229	.073	.384
Pair 3	Combined1 - Combined2	Cohen's d	27.60215	.392	.232	.552
		Hedges' correction	27.66665	.392	.232	.550
Pair 4	CIS1 - CIS2	Cohen's d	.81183	.392	.232	.552
		Hedges' correction	.81373	.392	.232	.550

Output for Table 10. *Results of the Difference in ASQ:SE-2 Scores between Baseline and Follow-Up for Children in EI Group*

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ASQSE18	108.3750	42	67.39082	10.65542
	ASQSE24	102.2500	42	79.87932	12.63003
Pair 2	AIS18	3.4960	42	2.17390	.34372
	AIS24	3.2984	42	2.57675	.40742
Pair 3	Combined1	121.2500	42	74.13389	11.72160
	Combined2	110.1250	42	85.16566	13.46587
Pair 4	CombinedAIS1	3.5662	42	2.18041	.34475
	CombinedAIS2	3.2390	42	2.50487	.39606

Paired Samples Correlations

				Significance	
		N	Correlation	One-Sided p	Two-Sided p
Pair 1	ASQSE18 & ASQSE24	42	.884	<.001	<.001
Pair 2	AIS18 & AIS24	42	.884	<.001	<.001
Pair 3	Combined1 & Combined2	42	.892	<.001	<.001
Pair 4	CombinedAIS1 & CombinedAIS2	42	.892	<.001	<.001

Paired Samples Test

		Paired Differences							Significance	
					95% Confidence Interval of the Difference					
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	One-Sided p	Two-Sided p
Pair 1	ASQSE18 - ASQSE24	6.12500	37.42492	5.91740	-5.84407	18.09407	1.035	41	.154	.307
Pair 2	AIS18 - AIS24	.19758	1.20726	.19088	-.18852	.58368	1.035	41	.154	.307
Pair 3	Combined1 - Combined2	11.12500	38.55545	6.09615	-1.20563	23.45563	1.825	41	.038	.076
Pair 4	CombinedAIS1 - CombinedAIS2	.32721	1.13398	.17930	-.03546	.68987	1.825	41	.038	.076

Output for Table 10. *Results of the Difference in ASQ:SE-2 Scores between Baseline and Follow-Up for Children in EI Group (Continued)*

Paired Samples Effect Sizes

				Point	95% Confidence Interval	
			Standardizer[a]	Estimate	Lower	Upper
Pair 1	ASQSE18 - ASQSE24	Cohen's d	37.42492	.164	-.149	.475
		Hedges' correction	37.78965	.162	-.148	.470
Pair 2	AIS18 - AIS24	Cohen's d	1.20726	.164	-.149	.475
		Hedges' correction	1.21902	.162	-.148	.470
Pair 3	Combined1 - Combined2	Cohen's d	38.55545	.289	-.030	.603
		Hedges' correction	38.93119	.286	-.029	.597
Pair 4	CombinedAIS1 - CombinedAIS2	Cohen's d	1.13398	.289	-.030	.603
		Hedges' correction	1.14504	.286	-.029	.597

a. The denominator used in estimating the effect sizes.

Cohen's d uses the sample standard deviation of the mean difference.

Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

Output for Table 15. *Differences in 18-month ASQ:SE-2 Scores between Non-Respondents and Respondents*

Descriptives

						95% Confidence Interval for Mean			
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
ASQSE18m	nonrespondent	80	62.0000	54.42217	6.08458	49.8889	74.1111	.00	245.00
	respondent	204	52.0833	47.58138	3.33136	45.5148	58.6518	.00	270.00
	Total	284	54.8768	49.70658	2.94954	49.0709	60.6826	.00	270.00
AIS18m	nonrespondent	80	2.0000	1.75555	.19628	1.6093	2.3907	.00	7.90
	respondent	204	1.6801	1.53488	.10746	1.4682	1.8920	.00	8.71
	Total	284	1.7702	1.60344	.09515	1.5829	1.9575	.00	8.71

Output for Table 15. *Differences in 18-month ASQ:SE-2 Scores between Non-Respondents and Respondents (Continued)*

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
ASQSE18m	Between Groups	5651.103	1	5651.103	2.298	.131
	Within Groups	693569.583	282	2459.467		
	Total	699220.687	283			
AIS18m	Between Groups	5.880	1	5.880	2.298	.131
	Within Groups	721.717	282	2.559		
	Total	727.597	283			

ANOVA Effect Sizes[a,b]

			95% Confidence Interval	
		Point Estimate	Lower	Upper
ASQSE18m	Eta-squared	.008	.000	.041
	Epsilon-squared	.005	-.004	.037
	Omega-squared Fixed-effect	.005	-.004	.037
	Omega-squared Random-effect	.005	-.004	.037
AIS18m	Eta-squared	.008	.000	.041
	Epsilon-squared	.005	-.004	.037
	Omega-squared Fixed-effect	.005	-.004	.037
	Omega-squared Random-effect	.005	-.004	.037

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
ASQSE18m	Welch	2.044	1	128.952	.155
	Brown-Forsythe	2.044	1	128.952	.155
AIS18m	Welch	2.044	1	128.952	.155
	Brown-Forsythe	2.044	1	128.952	.155

a. Asymptotically F distributed.

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