



# Using the More Than Words Program With Chinese Families: A Case-Control Study

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This study investigated the effectiveness of the Hanen More Than Words® (HMTW) program amongst parents of children with autism spectrum disorder (ASD) in Hong Kong. In this prospective cohort study, 31 Cantonese-speaking young children with ASD and their parents were divided into either the HMTW group ( $n = 26$ ) or a control group ( $n = 5$ ). The HMTW intervention was provided over 11 weeks. The children's communication abilities were measured prior to the intervention (Time 1) and 1 month after the end of the intervention (Time 2), and the results were compared between the two groups. The parents' attributes and demographic information were measured at Time 1. The results showed a significant increase in children's communication and social skills in the HMTW group compared with the control group. Children of parents with lower levels of Time 1 parenting self-efficacy exhibited facilitated growth in communication and social skills. These findings provide evidence of the effectiveness of the HMTW program in a Chinese cultural setting and demonstrate an important link between parenting self-efficacy and the effectiveness of the HMTW program.

**Keywords:** autism spectrum disorder, hanen "more than words", parent-implemented intervention, early intervention, language development, parental self-efficacy, chinese culture

## INTRODUCTION

Autism spectrum disorder (ASD) is a complex developmental disorder characterized by persistent challenges in social communication and the presence at a young age of repetitive and restricted behaviors (American Psychiatric Association, 2013). Globally, the median ASD prevalence is estimated to be 62 per 10,000 (Elsabbagh et al., 2012). In Hong Kong, referrals are made for children as young as 12–24 months (Child Assessment Service, 2007). However, a vast majority of ASD diagnoses are only confirmed in children aged between 2 and 4 years, which is when the signs became more apparent and pervasive (Child Assessment Service, 2007). The past decade has seen substantial advances in ASD research, such as incorporating prospective research designs (Zwaigenbaum et al., 2007) and modern technologies to help detect the early emergence of ASD (Elsabbagh et al., 2013; Jones and Klin, 2013). These advances have made early and accurate ASD diagnosis possible.

## EARLY INTERVENTION FOR YOUNG CHILDREN WITH ASD

With this greater likelihood of early diagnosis, evidence-based early interventions developed specifically for children with ASD have become more prevalent. In relation to children's

communication and social development, the first early intervention programs included Socially Synchronous Engagement (Landa et al., 2011) and the Early Social Interaction Project (Wetherby and Woods, 2006). An underlying objective of these early interventions was to take advantage of the high levels of brain plasticity in young children to reduce undesirable symptoms of ASD by changing the trajectory of brain development (Dawson and Zanolli, 2003). The benefits of early interventions for children with ASD have been well documented (Prelock and McCauley, 2012). Early interventions not only improve long-term outcomes for individuals (Vismara and Rogers, 2010), but are also considered to be more cost-effective than management strategies introduced in later years (Schweinhart, 2005). The mean saving over the lifetime of a child who receives early and intensive interventions has been estimated at 1.6 million U.S. dollars (Larsson, 2013). The substantial reduction in societal costs is associated with the greater independence and workplace productivity of these children in the future.

Two crucial guiding principles for early language interventions are to deliver family-centered services and to enhance children's development in their natural environment (American Speech-Language-Hearing Association, 2008). It is generally agreed that parents play a vital role in interventions for young children with ASD (Zwaigenbaum et al., 2009). With parental involvement, the skills that children acquire from the intervention may be more likely to be sustained through the maintenance phase (White, et al., 1992), because parents can create more opportunities in their natural environment for the generalization of skills (Roper and Dunst, 2003).

In Hong Kong, direct consultation by speech and language pathologists (SLPs) is the most common service delivery model for ASD intervention. Children's performance can be maximized in this model due to the professional knowledge of SLPs and their understanding of the child's situation (Hartas, 2004). Nonetheless, the capacity of children to generalize their skills might be restricted under this model. Generalizing newly acquired skills to other contexts is often a challenge for children with ASD (Klinger and Dawson, 2001), and additional efforts are needed for this generalization to succeed. Thus, other modes of service delivery may be even more beneficial to young children with ASD.

Gascoigne (2006) put forward the model of intervention types and levels of support as a guide for delivering intervention. There are three levels in this model, namely, universal, targeted, and specialist. Gascoigne (2006) highlighted that SLPs should be involved in all three levels across different settings. The universal level is located at the bottom of the pyramid where healthcare services involve the entire population and where such services aim to reduce the possibility of secondary and future problems. For example, the Let's Read program is an early literacy program that promotes book reading among children in Australia (Shoghi et al., 2013). At the next level, targeted interventions are provided to individuals at risk of a particular problem, and such interventions can be referred to as "target-selective" (Law et al., 2017). The emphasis of this level is to decrease the prevalence of a particular problem, and one example is the Sure Start program,

which provides support services for socioeconomically disadvantaged parents and children in the United Kingdom (Glass, 1999). Finally, specialist intervention, at the top of the pyramid, focuses on specific high-risk individuals. Interventions at this level aim to lessen the influence of impairment and increase individual participation. For instance, the Lidcombe Program is designed for people who stutter (Onslow et al., 1997).

With reference to Gascoigne (2006) model of intervention types and levels of support, the present study explored a type of "targeted" intervention. The objective of targeted interventions is to train caregivers in the child's immediate environment to serve as the intervention agent in the child's daily life. The SLP's role is thus switched from a direct interventionist to a mediator who coaches and guides caregivers so that they can learn the skills needed to enhance children's social communication outcomes (Woods, et al., 2011).

## EFFICACY OF THE HANEN MORE THAN WORDS PROGRAM

Hanen More Than Words® (HMTW) program is a training program designed for parents of children with ASD. The program was developed based on a social interactionist theory of language acquisition, in which a child's language development is viewed as a result of the social interactions between the child and his or her social environment. Parent's involvement is considered to be the key component in the child's language and communication development as the family context is the immediate social environment of the children (Sussman and Lewis, 1999). The HMTW program focuses on providing support and knowledge for parents on daily practical skills of social communication with ASD children with three main goals: 1) equip the parents with adequate knowledge of basic language and communication development stages and concepts, 2) provide social support for the parents, 3) teach and provide guidance for parents to implement early communication interventions. The program consists of eight weekly parent group sessions and three individual coaching sessions for each parent-child dyad. The sessions are led by the Hanen-certified SLP who teach and coach the parents to use strategies to interact and communicate effectively with the child, aiming to facilitate the child's language and social skills development. Examples of communication strategies include how to start an interaction with the child and respond to maintain the interaction, how to provide opportunities for the child to initiate interaction, how to facilitate the child's play activities (Sussman, 2012). There are different levels of evidence supporting the effectiveness of the HMTW program. Three studies have directly evaluated the effectiveness of the program. The first study, by Girolametto, et al. (2007), was a clinical case series with the parents of three preschool children with ASD. The second study, by McConachie, et al. (2005), was a quasi-experimental study of 51 preschool-aged children with language problems and suspected ASD. The third study, by Carter et al. (2011), was a randomized controlled trial with parents of 62 children with ASD. Positive growth in parenting behaviors and the number of words children that

used were reported by Girolametto et al. (2007) and McConachie et al. (2005), while Carter et al. (2011) found no significant intervention effects in terms of parental responsiveness or children's communication. Carter et al. (2011) explained that the program might not be equally effective for all families. While the factors influencing the effectiveness of the program were not established, parents' attributes might be a possible factor. A recent study further confirmed the effect of the HMTW program on increasing parental self-efficacy and the secondary effect on facilitating children's language and social communication skill development (Noyan Erbas et al., 2021). Each of these studies was conducted in Western societies. There is evidence attesting that parent-child verbal interaction patterns are culturally specific (Ochs and Schieffelin, 1984; To, 2015). Vigil (2002) reported significant cultural differences between British and Chinese parents, in terms of their attention regulation, object manipulation, and pragmatic input when they interacted with their young children. For attention regulation behavior, Chinese parents tended to direct their infant's attention more often than British parents and British parents maintained their attention on the infant's initiation for longer than Chinese parents. For object involvement, Chinese parents manipulated objects, and the infant's hands while handling an object, more frequently than British parents. In terms of pragmatic input, Chinese parents produced more behavioral directives while British parents produced more descriptive and performative input. Given these cultural differences in parent-child interactions, it is not clear to what extent the HMTW program is applicable among other cultural groups, such as Chinese families.

## EXTERNAL FACTORS IN TRAINING EFFECTIVENESS

A meta-analysis concluded that parent-implemented language interventions were generally effective (Roberts and Kaiser, 2011), but that not all families showed the same degree of improvement after the program. Some families found parent-implemented programs rewarding because the learnt skills were generalizable and sustainable. Other families gained little from parent-implemented programs for a variety of reasons, and these families may benefit more from direct and intensive intervention provided by specialists. It appears that a precise match between the type of intervention and the child's and his/her family's characteristics might be crucial to a successful outcome.

Socio-economic status (SES) was identified as a significant factor in parental engagement in children's learning in a meta-analysis of 63 studies of training given to parents of children with behavioral problems (Reyno and McGrath, 2006). Children from high-SES families benefited more than those from low-SES families. It is possible that high-SES families are more resourceful than disadvantaged families. Another important factor might be parenting self-efficacy, which refers to the self-perception of an individual regarding his or her ability to competently perform the parenting role (Jones and Prinz, 2005). A range of positive outcomes, such as better parent-child interaction skills, have been consistently found in

parents with higher levels of parenting self-efficacy (Wittkowski et al., 2017). In addition, a parent's mental health status is clearly associated with parent training outcomes: one study reported that poor treatment outcomes were correlated with the mother suffering from mental health issues such as depression (Reyno and McGrath, 2006).

## THE PRESENT STUDY

The primary objective of the present study was to evaluate the effectiveness of a parent-implemented social communication intervention (HMTW) when it was offered to parents of young children with ASD in Hong Kong. Second, the potential moderating roles of two pretreatment parent characteristics, parenting self-efficacy, and SES, on the effectiveness of the HMTW program (DesJardin, 2006; Harris and Goodall, 2008) were explored.

## METHODS

### Participants

Thirty-eight children (32 boys and 6 girls) and their parents were recruited from the Heep Hong Society (HHS), which is a non-government organization providing rehabilitation services to children with special needs. The mean child age at enrollment was 4.77 years (SD = 0.91; range = 2.87–6.33). Written consent was received from all the participants at the beginning of the study. **Figure 1** summarizes the flow of participants throughout the study.

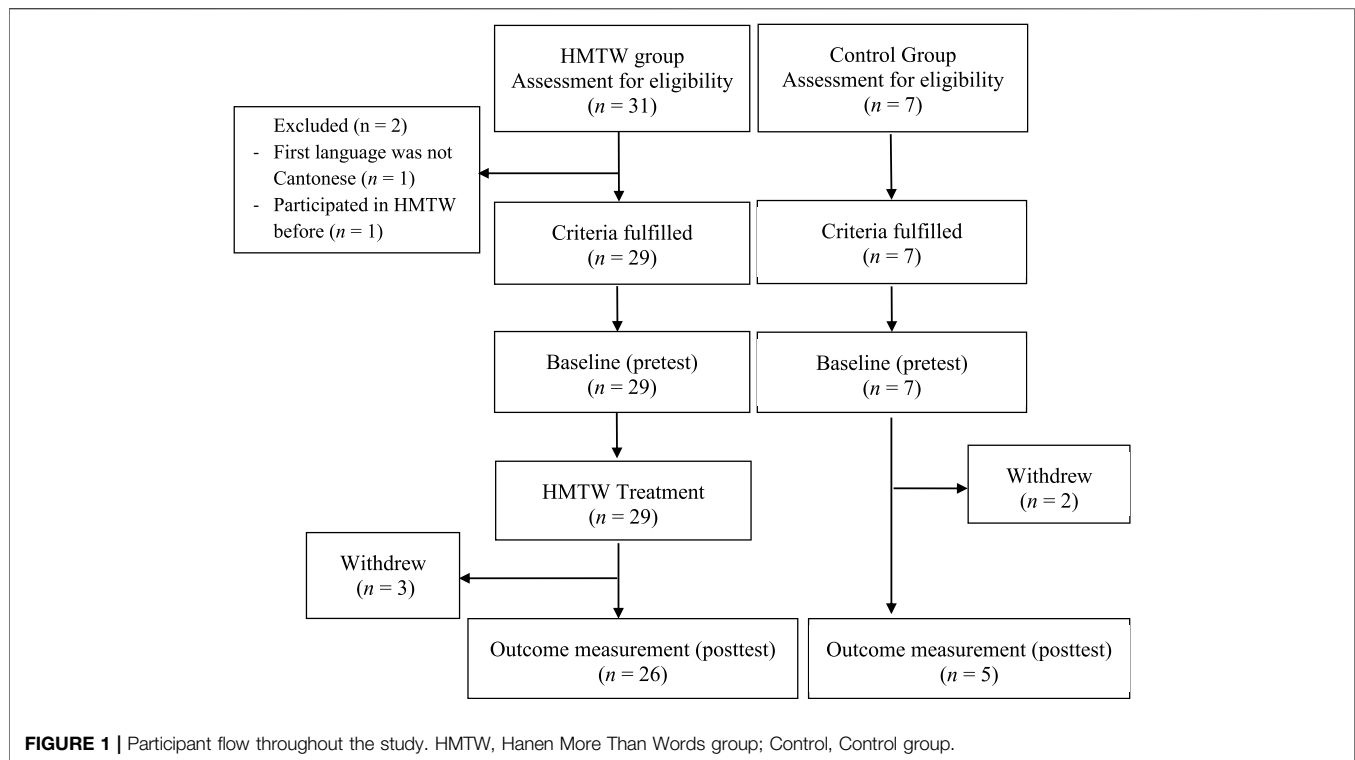
The inclusion criteria were that participants should be children who 1) were between 2 and 7 years of age; 2) had received a clinical diagnosis of ASD from a pediatrician or a clinical psychologist; 3) showed no evidence or history of genetic disorders or neurological dysfunction other than ASD (e.g., Down's syndrome); 4) were referred by SLPs, schoolteachers, or parents as having language and communication problems; and 5) spoke Cantonese as their native language. Parents of children in this study should 1) not have attended an HMTW program before and 2) be native Cantonese speakers. During the study period, both the HMTW and the control continued with the services in the centres as status quo.

### HMTW Group

Thirty-one parent-child dyads showed an interest in this study. Twenty-five of the participating parents were mothers and six were fathers. These parents attended HMTW workshops across seven HHS centers served by four SLPs. Of these 31 parent-child dyads, two dyads were excluded on the basis of the inclusion criteria. Three parent-child dyads were lost to follow-up and failed to complete the posttest for personal reasons. Therefore, 26 dyads were included in the HMTW group.

### Control Group

Seven parent-child dyads participated in this study. These children were also studying in two HHS special childcare



centers and received active speech therapy service in the centre. Of these seven parent-child dyads, one was lost to follow-up and failed to complete the posttest for personal reasons, and another was excluded for participating in the HMTW program during the middle of the study. Therefore, five dyads were included in the study as the control group. All the participating parents in this group were mothers.

## Measures

### Child Outcome Measure (at Time 1 and 2)

Each child was assessed using the Communication and Symbolic Behavior Scales (CSBS; Wetherby et al., 1998), which is a standardized assessment tool for children up to 6 years old who exhibit developmental problems. The CSBS was selected because it is a comprehensive language, social, and symbolic test for preschool children. It consists of a range of rating scales grouped into seven categories, namely 1) communicative functions, 2) gestural communicative means, 3) vocal communicative means, 4) verbal communicative means, 5) reciprocity, 6) social-affective signaling, and 7) symbolic behavior. The CSBS has good internal consistency, test-retest reliability, face validity, content validity, construct validity, and criterion validity (Wetherby and Prizant, 2002; McCathren et al., 2000; Watt et al., 2006). Gains in the total scores on the CSBS were used as child communication outcomes. Higher scores indicate more competent communication, social, and symbolic abilities. Trained research assistants who were blind to the treatment group carried out the ratings and codings for all videotaped procedures. Inter-rater and intra-rater reliability

were estimated through blind, independent coding of a random selection of approximately 10% of the sessions. The inter-rater and intra-rater reliability was 0.88 and 0.96, respectively.

### Parent Measures (at Time 1)

The Chinese version of the Parenting Sense of Competence Scale (C-PSOC; Ngai, et al., 2007) was used to assess parents' perceptions or thoughts about their capabilities to manage the demands of parenting. The C-PSOC has good internal consistency, test-retest reliability, and construct validity (Ngai, et al., 2007). There are 16 items in the C-PSOC, divided into two subscales: Efficacy (C-PSOC-E) and Satisfaction (C-PSOC-S). The Efficacy subscale measures a parent's self-perception of his/her ability to competently perform the parenting role, while the Satisfaction subscale measures to what extent a parent is satisfied with the parenting role. Higher scores indicate higher parenting self-efficacy and satisfaction in parenting. Time 1 scores of Efficacy and Satisfaction were analyzed as putative moderators.

The Chinese Parental Stress Scale (PSS-C; Cheung, 2000) was used to measure parents' subjective feelings of parenting strains and stress levels. The validated PSS-C is a 16-item instrument with good internal consistency, test-retest reliability, and construct and content validity (Cheung, 2000). A composite score was obtained by summing up the items after the scores of the appropriate items were reversed. Higher PSS scores indicate higher stress level of the respondents. Time 1 total scores of C-PSS were analyzed as putative moderators.

## Pretest

Each child participant was assessed individually by an undergraduate student of the Speech and Hearing Sciences program at The University of Hong Kong using the CSBS in an HHS center. Before administration, the student received training on the CSBS by an SLP who was experienced in using the instrument. The implementation of CSBS was carried out according to the procedure and guidelines provided in the CSBS user's manual. The assessment lasted approximately 1 hour and was video recorded. During the assessment, parents were invited to fill out 1) a questionnaire regarding the child and his/her demographic information, 2) the C-PSOC (Ngai, et al., 2007), and 3) the PSS-C (Cheung, 2000).

## Intervention

### Procedures

The HMTW intervention delivered in this study generally followed the standard protocol of the HMTW program. In the intervention, parents/caregivers attended eight group training sessions conducted by an HMTW-certified SLP who had successfully completed the standard training workshop offered by the Hanen Training Centre. All of the SLPs were fluent in both Cantonese and English and the medium of instruction in the workshop was English.

During the parent group training sessions (each of which lasted 3 h), the SLP discussed and demonstrated child-oriented strategies with parents. Role-playing activities were often used to illustrate those strategies. Parents were encouraged to practice the strategies with their child at home between training sessions. Besides these group training sessions, parents/caregivers and children participated in three individual video feedback sessions with the SLP. During these video sessions, the parent tried out recently acquired strategies in an everyday activity with his/her own child. The SLP provided immediate coaching to the parent when necessary, and provided feedback based on the videotaped interaction to enhance the parent's knowledge and awareness of his/her interactive behaviors.

### Modifications of the HMTW Program

Given the cultural and linguistic differences in the Hong Kong context, certain modifications were necessary. The Hanen Centre granted to the HHS the permission to make the following changes. First, the teaching materials, including the HMTW PowerPoint slides, handouts to be distributed to parents, and checklists, were translated into Chinese. Chinese subtitles were added to demonstration video clips. All of the verbal productions in each video clip were first transcribed verbatim and then translated by an SLP who was certified in HMTW. The translations were then cross-checked by an SLP graduate who is equally proficient in Cantonese and English. All translated materials were then reviewed and approved by The Hanen Centre. All of the parent group sessions were conducted in Cantonese, which was the native language of all of the participants and the SLP trainer. Second, the venue of the video feedback sessions was changed to the HHS center rather

than the clients' homes. This decision was made because of the often small living space of families in Hong Kong. A large number of households in Hong Kong occupy high-density flats, where it would have been infeasible to set up the recording equipment and host an SLP to conduct the observation. Therefore, the video feedback sessions were conducted in HHS centers.

### Goals and Strategies

The strategies introduced in the HMTW program are based on research findings focused on promoting social interaction in children with ASD. There are four specific goals: 1) enhanced back-and-forth interaction, 2) more usual and conventional ways of communicating, 3) communicate to serve a greater variety of social purposes, and 4) better comprehension of language (Sussman and Lewis, 1999). In general, these strategies aim to promote children's communication intention and attention.

### Posttest

After the 11 group and individual sessions, parents were given 4 weeks to consolidate the skills learned in the HMTW program. During this time, parents were instructed to continue to practice the strategies they had learned with their child at home, but without regular contact with the SLP. All the children were then assessed with the CSBS (Wetherby and Prizant, 2002) by a trained student clinician. The procedures of the posttest were the same as those of the pretest.

### Treatment Fidelity

Treatment fidelity was conceived as how close the implementation of the HMTW program was to the Hanen-recommended content and teaching quality and style. The SLPs who delivered the HMTW intervention had been trained by certified Hanen® instructors in a 3-days HMTW certification workshop. The manual explained The Hanen Center's teaching methodology and provided a clear script for each session. The SLPs were also requested to document the progress of each session that they delivered by stating the treatment frequency and the procedures and activities of each intervention. The SLPs indicated that they followed the manual when delivering the intervention in each HMTW workshop. The delivery of the intervention was recorded.

### Blinding

One trained student clinician received formal training on the administration and analysis of the CSBS and conducted the assessments under supervision. Six research assistants, who also received training, were involved in the coding of the results. These personnel were blind to the group membership (i.e., HMTW or control group) of the target child and the time of data collection (i.e., pretest or posttest).

### Statistical Analysis

To examine the significance of the group difference in the CSBS score (i.e., HMTW vs. control group), analyses of covariance (ANCOVAs) were conducted with the posttest outcome measure

**TABLE 1** | Participants' characteristics and pretest scores.

	HMTW	Control	Group difference		
	( <i>n</i> = 26)	( <i>n</i> = 5)	<i>dfs</i>	<i>F</i>	<i>p</i>
Sex (Female:Male)	6:20	0:5			
Age (years), <i>M</i> ( <i>SD</i> )	4.63 (0.91)	5.44 (0.61)	1, 29	0.66	0.07
Age range (years)	2.87–6.33	4.80–6.12			
Pretest baseline measure CSBS, <i>M</i> ( <i>SD</i> )	65.96 (16.44)	78.40 (7.77)	1, 29	4.22	0.02
Chinese Parental Sense of Competence—Efficacy (C-PSC-E), <i>M</i> ( <i>SD</i> )	26.12 (3.56)	29.20 (2.59)	1, 29	1.02	0.08
Chinese Parental Sense of Competence—Satisfaction (C-PSC-S), <i>M</i> ( <i>SD</i> )	29.08 (4.47)	30.6 (5.68)	1, 29	0.04	0.51
Chinese Parental Stress Scale (PSS-C), <i>M</i> ( <i>SD</i> )	54.92 (12.88)	56.4 (9.45)	1, 29	1.36	0.81
Education level (Mother), <i>M</i> ( <i>SD</i> )	3.65 (1.26)	3.20 (1.79)	1, 29	1.29	0.58
Education level (Father), <i>M</i> ( <i>SD</i> )	3.88 (1.21)	4.20 (0.84)	1, 29	6.28	0.50
Number of siblings, <i>M</i> ( <i>SD</i> )	0.92 (0.89)	0.80 (0.84)	1, 29	0.08	0.78
Household income, <i>M</i> ( <i>SD</i> )	4.73 (1.54)	3.80 (1.48)	1, 29	0.11	0.22

Note. HMTW, *hanen more than word intervention group*; Control, *control group*.

as the dependent variable and the corresponding pretest outcome measure as the covariate. Mixed-effects-model ANCOVAs were also conducted, with the pretest and posttest scores as the within-subject variables and the group as the between-subjects variable, to examine the change in performance over time.

To examine the contribution of the two predictors to the changes in the outcome (CSBS scores), a hierarchical linear regression was then conducted. Using this method, the individual contribution of each variable after controlling for other variables could be observed, and any confounding variables could be controlled for. Univariate analyses were performed using Pearson's correlation coefficient *r* and Spearman's correlation coefficient *r<sub>s</sub>* before the multivariate regression analysis.

## RESULTS

**Table 1** summarizes the participant characteristics and the language performances of the two groups before the intervention phase. There were no significant differences between the two groups in terms of age and sociodemographic characteristics (all *ps* > 0.05), except for the pretest baseline measure CSBS scores (*p* = 0.02). Levene's test of homogeneity of variance was conducted for all Time 1 measures of primary outcome variables to examine the difference of the group equivalence. The results confirmed that the variances of the two groups in the outcome measures were not significantly different (all *p* values > 0.05). To compare the extent of changes before and after the intervention phase in the two groups (HMTW and control group), the effect size on the outcome measure over time was investigated using partial  $\eta^2$ .

### Intervention Effect

**Table 2** summarizes the CSBS pretest and posttest performances of the two groups. A one-way ANCOVA was conducted to compare the effectiveness of the HMTW program. There was a significant growth in the HMTW group over the control group

**TABLE 2** | Main effect of time on primary outcomes (CSBS scores).

Group	Pretest (T1)	Posttest (T2)	<i>F</i>	<i>dfs</i>	<i>p</i>	$\eta^2$
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )				
HMTW ( <i>n</i> = 26)	65.96 (16.44)	72.31 (15.85)	5.35	1, 29	0.03	0.16
Control ( <i>n</i> = 5)	78.40 (7.77)	73.00 (8.16)				

Note. HMTW, *hanen more than word intervention group*; Control, *control group*.

on CSBS scores from Time 1 to Time 2 after controlling for pretest performance,  $F(1, 29) = 5.351$ ,  $p < 0.05$ , partial  $\eta^2 = 0.16$ .

## Association Between Different Variables and the Changes in the CSBS Scores

### Univariate Analyses

**Table 3** summarizes the results of the univariate analyses with Pearson's and Spearman's correlation coefficient and *p* values. C-PSOC-E scores and having a domestic helper at home were found to correlate significantly with changes in the CSBS scores, while the other variables were not significant. However, given the inconsistent findings of previous studies regarding the impact of SES on the effectiveness of parent training, SES was included in the regression model to explore its potential contribution to the effectiveness of the HMTW program.

### Hierarchical Linear Regression Analyses

An ordering based on the importance of different variables as described in the literature and the degree of correlation with the outcome measure was used to assign the variables into the model. Only three variables were chosen in the hierarchical linear regression analyses due to the limited sample size. Given the considerable evidence of the relation between parenting self-efficacy and parent training effectiveness, C-PSOC-E was entered into the model first; this was followed in the second stage by having a domestic helper at home, given its significant correlation with the outcome. The variable of household income was placed into the model in the

**TABLE 3** | Correlations of different variables with CSBS scores at time 2 in HMTW group.

Variable	<i>r/r<sub>s</sub></i> <sup>a</sup>	<i>p</i>
Sex	0.07	0.75
Age	-0.05	0.82
Chinese Parental Sense of Competence—Efficacy (C-PSOC-E)	-0.40*	0.04
Chinese Parental Sense of Competence—Satisfaction (C-PSOC-S)	-0.09	0.67
Chinese Parental Stress Scale (C-PSS)	0.08	0.69
Education level (Mother)	0.30	0.14
Education level (Father)	0.29	0.15
Number of siblings	-0.05	0.79
Household income	0.25	0.22
Presence of a domestic helper at home	0.49*	0.01

<sup>a</sup>Ratio data (i.e., age) was calculated using Pearson's *r*; ordinal and nominal data (i.e., sex, household income, paternal education, maternal education, number of siblings, and domestic helper) were calculated using Spearman's *r<sub>s</sub>*.

\**p* < 0.05.

**TABLE 4** | Hierarchical linear regression analyses predicting the variances in children's CSBS scores.

Variables added	<i>R</i> <sup>2</sup>	$\Delta R^2$	$\Delta F$	<i>B</i>	95% CI	<i>p</i>
Constant	-	-	-	27.29	[0.25, 54.34]	0.048
C-PSOC-E	0.16	0.16*	4.69	-0.94	[-1.82, -0.06]	0.038
Domestic helper	0.34	0.17	5.99	6.82	[-1.12, 14.75]	0.089
Household income	0.34	0.001	0.03	0.21	[-2.37, 2.80]	0.865

\**p* < 0.05.

third series because the literature on SES reports a significant positive correlation with positive program outcomes in Western societies (Reyno and McGrath, 2006). The results of the final model of the hierarchical linear regression are summarized in **Table 4**. The multiple *R*<sup>2</sup> of all these variables indicates that about 34% of the variance in the composite score was explained by the three predictors.

The differences in *R*<sup>2</sup> using partial *F* tests show the contributions of each individual variable in explaining the variance of the CSBS scores. C-PSOC-E was entered in the equation first and explained a substantial proportion (16%) of the variance in the CSBS scores. Having a domestic helper at home accounted for the largest proportion (17%) of the variance in the CSBS scores after keeping C-PSOC-E constant. After the 34% of variance attributed to C-PSOC-E and having a domestic helper at home was controlled for, household income explained a further 0.1% of the variance.

The strength and direction of the predictive power of each variable can be observed from the estimated coefficients (i.e., the *B* and *p* values) in the final model. Having a domestic helper and household income were not useful in predicting a child's CSBS scores (all *p* values > 0.05). When other variables were controlled for, C-PSOC-E was the most vital and significant predictor with a coefficient of -0.94, which suggested a negative relationship between C-PSOC-E and the child's CSBS scores. With the effects of having a domestic helper and household income controlled, this value indicated that as C-PSOC-E decreased by one point the CSBS score of the child increased by 0.94. In summary, with all three variables entered into the regression analysis, the final model explained approximately 34% of the

variance in the changes of the child's CSBS scores, and the overall model was significant,  $F(3, 25) = 3.73$ , *p* < 0.05.

## DISCUSSION

This study set out to examine 1) the effectiveness of the HMTW program for young children with ASD in Hong Kong, and 2) external factors that impact on the effectiveness of the HMTW program. The findings attested that the children in the HMTW group had significant gains in the outcome measure when compared with the control group. It can therefore be considered feasible to implement the HMTW program on Hong Kong families, after certain modifications. C-PSOC-E was a significant predictor of the effectiveness of the HMTW program.

### Effectiveness of the HMTW Program for Young Children With ASD in Hong Kong

The HMTW appears to be applicable in the Hong Kong context. The treatment group demonstrated growth in social communication skills as measured by the CSBS, whereas the control group showed minimal gains. The claim that social communication growth in the HMTW group was likely to be an intervention-induced effect was supported by the more robust and specific discrepancy in the change of the communication behaviors of the children and the effect size of the intervention between the HMTW group and the control group.

The observation that the HMTW program was effective for Cantonese-speaking preschool children with ASD in Hong Kong contrasts with that of Carter et al. (2011), who reported no significant residualized gains in child outcome measures from pretest (Time 1) to posttest (Time 2) or maintenance (Time 3) among English-speaking young children with ASD. In that study, children with lower levels of Time 1 object interest demonstrated facilitated growth in communication while no such growth was found in children with higher levels of Time 1 object interest. The discrepancy between the current findings and those in the study by Carter et al. (2011) might be due to the different choice of outcome measure for assessing gains in child communication.

Carter et al. (2011) used three different tasks to assess a child's initiation of joint attention, initiation of behavioral requests, frequency of intentional communication, and nonverbal communication. In the present study, a standardized CSBS assessment was used for outcome measurement. Several child outcome aspects that were not included in Carter et al. (2011) were assessed in the present study, including social-affective signaling and symbolic behavior. These areas are in line with the goals of the HMTW program, which aims to 1) promote social interactions, 2) enhance play skills, and 3) boost imitation skills (Sussman and Lewis, 1999). The inclusion of these measures in the current study may therefore make the intervention effect more robust. It is assumed that specific strategies introduced to parents in the HMTW program will facilitate his/her child's development in respective areas. Along with the findings reported in Carter et al. (2011), the specificity of the intervention effect in the child's communication further highlights that the effect was induced by the prescribed intervention.

The discrepancy between the findings of the current study and those of Carter et al. (2011) might also indicate the effects of the culturally specific characteristics of parent-child verbal interaction patterns in a Cantonese-speaking population. As mentioned above, cultural differences in parent-child interaction have been observed between Asian and Western populations, in regard to attention regulation, object manipulation, and pragmatic input (Vigil, 2002). HMTW strategies may be more specific in targeting the characteristics of parent-child interaction for Asian families, making it possible that Asian families may benefit more from the HMTW intervention than Western families. Evidence for this claim, however, would require further studies systematically controlling for the pre-treatment parenting responsiveness.

## Factors in the Effectiveness of the Program

The secondary objective of this study was to identify predictors that impact on the effectiveness of the program. SES did not predict changes in the outcome measure. However, C-PSOC-E was a significant predictor of the effectiveness of the HMTW program when the variance contributed by SES and having a domestic helper at home was controlled for.

### Parenting Self-Efficacy

Against our expectations, children of parents with lower C-PSOC-E at Time 1 made greater gains in the outcome measure than those of parents with higher C-PSOC-E. One study has reported that parenting self-efficacy was linked with improved social well-being in parents of children with ASD (Kuhn and Carter, 2006). Other studies have reported that parents with low parenting self-efficacy tend to have lower self-perceived competence, which leads to higher degrees of anxiety and depressive symptoms (Shumow and Lomax, 2002). Studies have also found a relationship between low parenting self-efficacy and poor treatment outcomes in a parent training program (Warren et al., 2011). One interpretation of the contrast between our findings and those of previous studies is that no interactive relationship between parenting self-efficacy

and parenting stress was found. In the present study, parenting stress was not correlated with the child outcome measure or parenting self-efficacy. The relationship between low parenting self-efficacy and poor treatment involvement was based on an assumption that parents with low C-PSOC-E tend to make more internal attributions of failure, leading to poorer parenting skills and a lower likelihood of persisting in challenging situations (Coleman and Karraker, 2000). However, because the HMTW program is a group-based workshop, social support for parents is one of the program objectives. Parents received both formal and informal social support, not captured in the study, that may have had important effects on motivation. A variety of means of support were provided to the participating parents, including formal support from the SLP, who provided interventions, coaching, and counseling, as well as informal support from other parents in the group through the mutual sharing of experiences. Hence, a low parenting self-efficacy at the beginning of the intervention might not necessarily result in the greater levels of parenting stress and distress that might lead to poor parenting or child outcome measures. Instead, through parent training, parents with low parenting self-efficacy might come to better understand their child's individual learning modes and unique sensory preferences so that they can better manage their child. They also acquire knowledge about social communication, which helps to gradually familiarize them with their child's abilities. This might eventually help them to set realistic goals for the child's communication and social interaction. Parents with low-parenting self-efficacy might be even more accepting of the training and more readily convinced that they are able to apply and control the learnt techniques at home. Hence, despite a low parenting self-efficacy, parents in this program may persevere even in difficult circumstances. Although it has been reported that parents with higher parenting self-efficacy were more able to persevere in the face of challenges and show greater improvement in their children's performance, parents with low parenting self-efficacy may also have better outcomes after consistent education, counseling, and practice (Hastings and Brown, 2002).

### Household Income

Household income did not predict changes in the outcome measure. One reason for this finding might be the small sample size in this study compared with previous studies that have demonstrated a significant effect of SES (Lundahl, et al., 2006). The small sample size might have limited the power to detect SES as a predictor. Within the HMTW group ( $n = 26$ ), the majority (31%) of the participants ( $n = 8$ ) had a household income of HKD20,000–HKD29,999 (i.e., USD2,564–USD3,846) per month. Although the range of household income in the study ranged from below HKD6,000 (USD769) to above HKD100,000 (USD12,820) per month, representatives from each income cluster were not sufficient for reliable analysis.

### Clinical Implication

This study is of clinical significance as it provides empirical evidence demonstrating the effectiveness of the HMTW



program for parents of children with ASD in Hong Kong. With appropriate adaptations, the HMTW can be used as an effective early intervention for children with ASD in the Cantonese speaking culture. According to a research study by the Society for Community Organization (2018), Hong Kong has a lower SLP to preschool children with special educational needs (SEN) ratio (1:100) than Australia (1:50). Given the small number of SLPs in Hong Kong and the substantial demand for speech therapy services for preschool children with ASD, the implementation of the HMTW program may allow SLPs to cater for a larger group of families at once without a tradeoff in intervention effectiveness. With the waiting time for speech therapy service shortened, treatment might be more cost-effective, and the quality of services might be improved. Additionally, through providing the training to the parents, it empowered the parents with useful and feasible strategies that they can implement with their child at home easily. By actively involving the parents into the children's treatment process, the children may receive greater support in their language and communication development. The Cantonese version of HMTW teaching materials developed, with adaptations made to fit the context, could form a valid bank of material for training and education. Given that Chinese training materials for parents of young children with ASD were limited when compared to the large English-language resource bank, these teaching materials could provide SLPs and parents of young children with ASD with more easily accessible and culturally appropriate alternatives in treatment.

In addition, our study ascertained the parental predictors of the effectiveness of the HMTW program in a different cultural context to Western populations. Previous studies have examined child-related factors that impacted on the effectiveness of parent training programs, including object interest (Carter et al., 2011). The characteristics of parents are also important because there is no single treatment that is likely to be effective for all parents (Roberts and Kaiser, 2011). The effective matching of specific service delivery models to individuals with different needs, such as various levels of parenting self-efficacy, may improve the likelihood of successful outcomes. With this understanding, a clinician may triage clients to different intervention types or service delivery models for better utilization of resources.

## Limitations and Future Directions

This study improves the understanding of the effectiveness of the HMTW program for children with ASD in Hong Kong. However,

there are limitations that need to be considered. First, the group allocation was not randomized. The blinding of assessors to the type of treatment received by clients was not feasible in this study due to shortage of manpower. The positive findings from this cohort study merit future studies adopting a more rigorous design, such as randomized controlled trials, which can provide higher levels of evidence. Second, only short-term outcomes of the treatment were considered in this study, with no maintenance phase data included. Future studies can report on the longer-term impact of the intervention. Third, the small sample size in this study limits the generalizability of the findings. The estimated sample size was not sufficient for regression analysis due to a limited number of participants signing up for the study at Time 1, which was compounded by attrition.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Human Research Ethics Committee (HREC), The University of Hong Kong. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

## AUTHOR CONTRIBUTIONS

CT conceived of the original study concept. CT and JL developed the research design. CT, JL, and XQ oversaw data collection and analysed the data and wrote the article.

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## REFERENCES

- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington, VA, US: American Psychiatric Publishing.
- American Speech-Language-Hearing Association (2008). Roles and Responsibilities of Speech-Language Pathologists in Early Intervention: Position Statement. Available at: [www.asha.org/policy](http://www.asha.org/policy).
- Carter, A. S., Messinger, D. S., Stone, W. L., Celimli, S., Nahmias, A. S., and Yoder, P. (2011). A Randomized Controlled Trial of Hanen's 'More Than Words' in Toddlers with Early Autism Symptoms. *J. Child Psychol. Psychiatry* 52 (7), 741–752. doi:10.1111/j.1469-7610.2011.02395.x
- Cheung, S. K. (2000). Psychometric Properties of the Chinese Version of the Parental Stress Scale. *Psychologia* 43, 253–261.
- Child Assessment Service (2007). Child Assessment Service Epidemiology and Research Bulletin. Available at: <https://www.dhcas.gov.hk/file/caser/CASER3.pdf>.
- Coleman, P. K., and Karraker, K. H. (2000). Parenting Self-Efficacy Among Mothers of School-Age Children: Conceptualization, Measurement, and Correlates\*. *Fam. Relations* 49 (1), 13–24. doi:10.1111/j.1741-3729.2000.00013.x
- Dawson, G., and Zanolli, K. (2003). "Early Intervention and Brain Plasticity in Autism," in *Autism: Neural Bases and Treatment Possibilities*. Editor M. Rutter (London: Novartis), 266–280.
- DesJardin, J. L. (2006). Family Empowerment: Supporting Language Development in Young Children Who Are Deaf or Hard of Hearing. *Tvr* 106 (3), 275–298. doi:10.17955/tvr.106.3.m.574

- Elsabbagh, M., Divan, G., Koh, Y.-J., Kim, Y. S., Kauchali, S., Marcin, C., et al. (2012). Global Prevalence of Autism and Other Pervasive Developmental Disorders. *Autism Res.* 5 (3), 160–179. doi:10.1002/aur.239
- Elsabbagh, M., Fernandes, J., Jane Webb, S., Dawson, G., Charman, T., and Johnson, M. H., British Autism Study of Infant Siblings Team (2013). Disengagement of Visual Attention in Infancy Is Associated with Emerging Autism in Toddlerhood. *Biol. Psychiatry* 74 (3), 189–194. doi:10.1016/j.biopsych.2012.11.030
- Gascoigne, M. (2006). *Supporting Children with Speech, Language and Communication Needs within Integrated Children's Services*. Royal College of Speech and Language Therapists' Position Paper. London, UK: Royal College of Speech and Language Therapists.
- Glass, M. F. (1999). *The Cooperative Satellite Learning Project (CSLP) in the Classroom Volume I: Program Guide Submitted*.
- Girolametto, L., Sussman, F., and Weitzman, E. (2007). Using Case Study Methods to Investigate the Effects of Interactive Intervention for Children with Autism Spectrum Disorders. *J. Commun. Disord.* 40 (6), 470–492. doi:10.1016/j.jcomdis.2006.11.001
- Harris, A., and Goodall, J. (2008). Do parents Know They Matter? Engaging All Parents in Learning. *Educ. Res.* 50 (3), 277–289. doi:10.1080/00131880802309424
- Hartas, D. (2004). Teacher and Speech-Language Therapist Collaboration: Being Equal and Achieving a Common Goal? *Child. Lang. Teach. Ther.* 20 (1), 33–54. doi:10.1191/0265659004ct262oa
- Hastings, R. P., and Brown, T. (2002). Behavior Problems of Children with Autism, Parental Self-Efficacy, and Mental Health. *Am. J. Ment. Retard* 107 (3), 222–232. doi:10.1352/0895-8017(2002)107<0222:bpcwa>2.0.co;2
- Jones, T. L., and Prinz, R. J. (2005). Potential Roles of Parental Self-Efficacy in Parent and Child Adjustment: A Review. *Clin. Psychol. Rev.* 25 (3), 341–363. doi:10.1016/j.cpr.2004.12.004
- Jones, W., and Klin, A. (2013). Attention to Eyes Is Present but in Decline in 2-6-Month-Old Infants Later Diagnosed with Autism. *Nature* 504 (7480), 427–431. doi:10.1038/nature12715
- Klinger, L. G., and Dawson, G. (2001). Prototype Formation in Autism. *Dev. Psychopathol* 13 (1), 111–124. doi:10.1017/s0954579401001080
- Kuhn, J. C., and Carter, A. S. (2006). Maternal Self-Efficacy and Associated Parenting Cognitions Among Mothers of Children with Autism. *Am. J. Orthopsychiatry* 76 (4), 564–575. doi:10.1037/0002-9432.76.4.564
- Landa, R. J., Holman, K. C., O'Neill, A. H., and Stuart, E. A. (2011). Intervention Targeting Development of Socially Synchronous Engagement in Toddlers with Autism Spectrum Disorder: A Randomized Controlled Trial. *J. Child Psychol. Psychiatry* 52 (1), 13–21. doi:10.1111/j.1469-7610.2010.02288.x
- Larsson, E. V. (2013). Is Applied Behavior Analysis (ABA) and Early Intensive Behavioral Intervention (EIBI) an Effective Treatment for Autism? A Cumulative History of Impartial Independent Reviews. *Autism* 27 (1), 168–182.
- Law, J., Levickis, P., Mckean, C., Goldfeld, S., Snow, P., and Reilly, S. (2017). Child Language in a Public Health Context. doi:10.13140/RG.2.2.25813.63206
- Lundahl, B., Risser, H., and Lovejoy, M. (2006). A Meta-Analysis of Parent Training: Moderators and Follow-Up Effects. *Clin. Psychol. Rev.* 26 (1), 86–104. doi:10.1016/j.cpr.2005.07.004
- McCathren, R. B., Yoder, P. J., and Warren, S. F. (2000). Testing Predictive Validity of the Communication Composite of the Communication and Symbolic Behavior Scales. *J. Early Intervention* 23 (1), 36–46. doi:10.1177/10538151000230010801
- McConachie, H., Randle, V., Hammal, D., and Le Couteur, A. (2005). A Controlled Trial of a Training Course for Parents of Children with Suspected Autism Spectrum Disorder. *J. Pediatr.* 147 (3), 335–340. doi:10.1016/j.jpeds.2005.03.056
- Ngai, F.-W., Wai-Chi Chan, S., and Holroyd, E. (2007). Translation and Validation of a Chinese Version of the Parenting Sense of Competence Scale in Chinese Mothers. *Nurs. Res.* 56 (5), 348–354. doi:10.1097/01.nnr.0000289499.99542.94
- Noyan Erbaş, A., Özcebe, E., and Cak Esen, T. (2021). Investigation of the Effect of Hanen's "More Than Words" on Parental Self-Efficacy, Emotional States, Perceived Social Support, and on Communication Skills of Children with ASD. *Logoped. Phoniatr. Vocif.* 46 (1), 17–27. doi:10.1080/14015439.2020.1717601
- Ochs, E., and Schieffelin, B. (1984). "Language Acquisition and Socialization: Three Developmental Stories and Their Implications," in *Cultural Theory: Essays on Mind, Self and Emotion*. Editors R. Shweder and R. Levine (New York, NY: Cambridge University Press), 276–320.
- Onslow, M., O'Brian, S., and Harrison, E. (1997). The Lidcombe Programme of Early Stuttering Intervention: Methods and Issues. *Eur. J. Disord. Commun.* 32 (2), 231–250.
- Prelock, P. A., and McCauley, R. J. (2012). *Treatment of Autism Spectrum Disorders: Evidence-Based Intervention Strategies for Communication & Social Interactions*. Baltimore, MD: Brookes.
- Reyno, S. M., and McGrath, P. J. (2006). Predictors of Parent Training Efficacy for Child Externalizing Behavior Problems - a Meta-Analytic Review. *J. Child. Psychol. Psychiat* 47 (1), 99–111. doi:10.1111/j.1469-7610.2005.01544.x
- Roberts, M. Y., and Kaiser, A. P. (2011). The Effectiveness of Parent-Implemented Language Interventions: A Meta-Analysis. *Am. J. Speech Lang. Pathol.* 20 (3), 180–199. doi:10.1044/1058-0360(2011/10-0055)
- Roper, N., and Dunst, C. J. (2003). Communication Intervention in Natural Learning Environments: Guidelines for practice. *Infants Young Child.* 16 (3), 215–226. doi:10.1097/00001163-200307000-00004
- Schweinhart, L. J. (2005). *Lifetime Effects: The High/Scope Perry Preschool Study through Age 40*. Ypsilanti, MI: High/Scope Press.
- Shoghi, A., Willersdorf, E., Braganza, L., and McDonald, M. (2013). *2013 Let's Read Literature Review*.
- Shumow, L., and Lomax, R. (2002). Parental Efficacy: Predictor of Parenting Behavior and Adolescent Outcomes. *Parenting* 2 (2), 127–150. doi:10.1207/s15327922par0202\_03
- Society for Community Organization (2018). 學前有特殊教育需要兒童過渡至學齡階段的服務需要. Available at: <https://www.legco.gov.hk/yr17-18/chinese/panels/ed/papers/ed20180302cb4-679-1-c.pdf>.
- Sussman, F., and Lewis, R. B. (1999). *More than Words: Helping Parents Promote Communication and Social Skills in Children with Autism Spectrum Disorder*. Toronto, ON, Canada: The Hanen Centre.
- Sussman, F. (2012). *More than Words: A Parent's Guide to Building Interaction and Language Skills for Children with Autism Spectrum Disorder or Social Communication Difficulties*. Toronto, ON, Canada: The Hanen Centre.
- To, C. K. S. (2015). "Child Language Disorders in Cantonese-speaking Children," in *Multilingual Perspectives on Child Language Disorders*. Editors J. Patterson and B. L. Rodriguez (Bristol: Multilingual Matters).
- Vigil, D. C. (2002). Cultural Variations in Attention Regulation: A Comparative Analysis of British and Chinese-immigrant Populations. *Int. J. Lang. Commun. Disord.* 37 (4), 433–458. doi:10.1080/1368282021000007749
- Vismara, L. A., and Rogers, S. J. (2010). Behavioral Treatments in Autism Spectrum Disorder: What Do We Know? *Annu. Rev. Clin. Psychol.* 6, 447–468. doi:10.1146/annurev.clinpsy.121208.131151
- Warren, J. S., Brown, C. R., Layne, C. M., and Nelson, P. L. (2011). Parenting Self-Efficacy as a Predictor of Child Psychotherapy Outcomes in Usual Care: A Multi-Dimensional Approach. *Psychotherapy Res.* 21 (1), 112–123. doi:10.1080/10503307.2010.531405
- Watt, N., Wetherby, A., and Shumway, S. (2006). Prelinguistic Predictors of Language Outcome at 3 Years of Age. *J. Speech Lang. Hear. Res.* 49, 1224–1237. doi:10.1044/1092-4388(2006/088)
- Wetherby, A. M., and Prizant, B. M. (2002). *Communication and Symbolic Behavior Scales: Developmental Profile*. Baltimore, MD: Brookes.
- Wetherby, A. M., Prizant, B. M., and Hutchinson, T. A. (1998). Communicative, Symbolic, and Symbolic Profiles of Young Children with Autism and Pervasive Developmental Disorders. *Am. J. Speech Lang. Pathol.* 7 (2), 79–91. doi:10.1044/1058-0360.0702.79
- Wetherby, A. M., and Woods, J. J. (2006). Early Social Interaction Project for Children with Autism Spectrum Disorders Beginning in the Second Year of Life: A preliminary study. *Top. Early Child. Spec. Edu.* 26 (2), 67–82. doi:10.1177/02711214060260020201
- White, K. R., Taylor, M. J., and Moss, V. D. (1992). Does Research Support Claims about the Benefits of Involving Parents in Early Intervention Programs? *Rev. Educ. Res.* 62 (1), 91–125. doi:10.3102/00346543062001091
- Wittkowski, A., Garrett, C., Calam, R., and Weisberg, D. (2017). Self-Report Measures of Parental Self-Efficacy: A Systematic Review of the Current Literature. *J. Child Fam. Stud.* 26 (11), 2960–2978.
- Woods, J. J., Wilcox, M. J., Friedman, M., and Murch, T. (2011). Collaborative Consultation in Natural Environments: Strategies to Enhance Family-Centered Supports and Services. *Lang. Speech Hear. Serv. Sch.* 42, 379–392. doi:10.1044/0161-1461(2011/10-0016)

- Zwaigenbaum, L., Bryson, S., Lord, C., Rogers, S., Carter, A., Carver, L., et al. (2009). Clinical Assessment and Management of Toddlers with Suspected Autism Spectrum Disorder: Insights from Studies of High-Risk Infants. *Pediatrics* 123 (5), 1383–1391. doi:10.1542/peds.2008-1606
- Zwaigenbaum, L., Thurm, A., Stone, W., Baranek, G., Bryson, S., Iverson, J., et al. (2007). Studying the Emergence of Autism Spectrum Disorders in High-Risk Infants: Methodological and Practical Issues. *J. Autism Dev. Disord.* 37 (3), 466–480. doi:10.1007/s10803-006-0179-x

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