Development and Implementation of Evidence-based Interventions for Social Skills Interventions of Children with Autism Spectrum Disorder in Central Taiwan

Shin-Yi Wang, Ph.D. and Cheng-Yea Ma*, M.D.
Department of Child and Adolescent Psychiatry,
Tsao-Tun Psychiatric Center, Nan-Tou, Taiwan.
doc3311j@ms7.hinet.net

Abstract

In order to meet the needs for children with autism spectrum disorder (ASD) and their families living in the rural area in Central Taiwan, we intend to implement an evidence-based program for social skills interventions (SSIs) of out-patient clients with ASD with the incorporation of clients' needs and values, professional expertise, and research evidences. We first reviewed the empirically-supported interventions for participants with ASD and the distinctiveness of existing clients and their families as well as the capability of the clinicians, then we developed a treatment program to target social skills as well as communication and behavioral difficulties in children with ASD called Multimodal Social Skills, Communication and Behavioral Intervention: MSSCB. Social validity of the intervention was measured by the surveys of family participants. In this paper, we described the integration of the intervention program implementation and the empirically-supported strategies that were based on the reviews of empirically-supported research. The development, guideline, and protocol of the program and samples of intervention activities/ schedule were illustrated. Family participants had recognized the positive outcomes of MSSCB intervention through surveys. In conclusion, the current study had established an evidence-based program for SSIs of participants with ASD at a rural district in Taiwan. The outcomes of social validity surveys and limitations of the MSSCB program were illustrated. In the future, more efforts should be placed in order to fill out the gap between empirical research and clinical application.

Keywords : autism spectrum disorder, evidence-based practice, social skills training

Introduction

Autism spectrum disorder (ASD) represented a group of developmental disorders that include autistic disorder, pervasive developmental disorders not otherwise specified (PDD-NOS), Asperger's disorder (AS), Rett's disorder or syndrome, and childhood disintegrative dis order (National Institute of Mental Health, 2009; Spector & Volkmar, 2006). The prevalence rate of clients with ASD has been increasing in recent decades (Curran & Bolton, 2009; Hall, 2009). The prevalence rate for children with ASD was 1 in 88 children estimated by Center for Disease Control and Prevention (CDC, 2012) in contrast to 1 in 150 children collected by CDC in 2000. The annual numbers of clients with ASD aged between 3 and 17 year-old have increased from 3995 to 8072 between Year 2004 to 2010 based on the data of the National Disability Registry of Taiwan (Lai, Tseng, Hou, & Guo, 2012).

Impaired social interaction along with

difficulties with communication and restricted or stereotyped behavioral patterns have been recognized as the core symptoms in clients with ASD in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) (American Psychiatric Association, 2000) as well as in the International Classification of Diseases, Tenth Edition (ICD-10) (World Health Organization [WHO], 1992). Compared with behavioral and communication problems, difficulties with social interaction are more persistent in clients with ASD and are the most crucial features that differentiate them from the clients with other diagnoses (Carter, Davis, Klin, & Volkmar, 2005; Krasny, Williams, Provencal, & Ozonoff, 2003; Reichow & Volkmar, 2009). Social skills interventions (SSIs) with the aims to facilitate interaction with others are important to clients with ASD, especially for clients with high functioning autism (HFA), PDD-NOS, or AS (Rao, Beidel, & Murray, 2008). Besides, the trend of inclusive education can place greater challenges for clients with ASD as tasks of social interaction increase dramatically. White, Keonig, and Scahill (2007) indicated that clients with ASD are more likely to be rejected in the mainstream educational settings.

A multiplicity of SSI methods including behavior modification, peer-mediated training, social story, pivotal response training, joint attention training, and buddy system were applied to SSIs for clients with ASD (Matson, Matson, & Rivet, 2007; Bass & Mulick, 2007; Scattone, 2007). SSI models can be sorted such as one-on-one or group instruction (Krasny et al., 2003) or on the targeted social behaviors such as eye contact, turn-taking, compliment-giving, and joint attention (Machalicek et al., 2008). SSIs can also be embedded in the comprehensive programs that are guided by varied theoretical orientations such as behavioral, neobehavioral, or developmental approaches (NCR, 2001). Among these approaches, behavioral programs have been consistently proved to contribute to varied improvements of children with ASD (Howlin, Magiati, & Charman, 2009; Magiati, Charman, & Howlin, 2007; Smith, 2008). Behavioral strategies such modeling, reinforcement, imitation, and prompts have been utilized in applied behavioral analysis and also have been widely applied to varied types of intervention programs (Reichow & Volkmar, 2009). A variety of SSI programs may combine and adopt varied strategies such as the ones listed above.

With more efforts placed into systematic review of intervention studies, a few specific treatment programs and methods have been identified to be effective for clients with ASD (Stahmer, Collings, & Palinkas, 2005). However, there is a significant gap between research-supported interventions and their application at community settings. These empirically sound treatment programs and methods are more likely to be limited in research settings and applied to the clients in North America, but applying them into community intervention programs for clients with different cultural background is scarce. Based on the definition of evidence-based practices (EBPs) made by American Psychological Association (APA), empirical evidences, clinical expertise, and clients' distinctiveness are three major elements that construct EBP (APA, 2005). Brookman-Frazee, Taylor, and Garland (2010) indicated that community context along with children's characteristics and parents' viewpoints can all play important roles in EBP implementation. Therefore, familial involvement, values, and opinions along with children's symptoms and developmental status, and familial and sociocultural standards should all be taken into consideration while we employ EBP at community settings.

There were few SSI studies applied to the students in Taiwan. Feng, Lo, Tsai, & Cartledge (2008) successfully improved social interaction and theory-of-mind scores of Taiwanese students with HFA. Additionally, positive effects of SSIs had been

found in the study of a pull-out and small-group of Taiwanese students who are at risk for emotional and behavioral disorders using social validity measures (Wu, Lo, Feng, & Lo, 2010). However, the studies of outpatient-based SSIs in Taiwan were limited.

Objective

In order to fill the gap between empirical research and clinical practices as well as to facilitate EBP in Taiwan, we first examined SSI reviews and studies for participants with ASD. Based on integration of the research reviews, clinician expertise, and clients' characteristics, we developed evidence-based and outpatient-based SSIs, called Multimodal Social Skills, Communication and Behavioral Intervention: MSSCB, for our clients living in the rural area of Central Taiwan. We used the surveys for social validity to briefly state the outcome measurement of our MSSCB groups.

Methods

Recruitment

Child participants and family participants were recruited via the clinics of Child and Adolescent Psychiatry at a rural Psychiatric Center. Child and adolescent psychiatrists made referral for SSI groups after they had confirmed the diagnosis of these participants with ASD based on DSM-IV-TR criteria and psychological evaluation. In order to be qualified for SSI groups, child participants must had ASD diagnosis with normal range of intelligent abilities (IQ score of 70 or above), aged between four to 12 year-old, and one of their family members should be willing to accompany them throughout the session.

Participants' Characteristics

Twenty-one Taiwanese children with ASD aged of 4 to 11 years have enrolled MSSCB groups. All of the child participants have a clinically psychiatric diagnosis of either HFA, AS, or PDD-NOS using DSM-IV-TR (American Psychiatric Association, 2000). Notably, none of participants has currently been prescribed any psychiatric medication. All child participants have an average IQ and compatible verbal IQ function based on the outcomes of WPP-SI-R/WISC-R (Wechsler, 1989 & 2003) or PPVT-R (Dunn & Dunn, 1981). Their scores of Vineland Adaptive Behavior Scales-Second Edition (Vineland-II; Sparrow, Balla, & Cicchetti, 2005) documented their difficulties in social interaction and adaptive behavior. Eight of them, aged 4 to 5 years, were at MSSCB group for preschoolers. Five of them, aged 6 to 8 years, were at MSSCB group of grade one to three. Eight of them, aged 9 to 11 years, were at MSSCB group of grade four to six. Among the child participants at MSSCB group of grade four to six, one boy had a co-morbidity diagnosis of ADHD, one boy suffered from chronic form of Tic disorder, and one boy has once experienced a transient episode of visual hallucination. The mean of intervention duration for the child participants was 12.72 months (N = 18, SD = 8.72 months). The mean of intervention duration was 17 months (N = 7, SD = 9.02 months) for preschooler group, 21 months (N = 3, SD = 5.20 months) for the group of grade 1 to 3, and 5.88 months (N = 8, SD = 2.42 months) for the group of grade 4 to 6. Table 1 showed the demographic information of the child participants at each group. This study was approved by the Institutional Review Board of Tsao-Tun Psychiatric Center.

Table 1: Demographic Information of Child Participants by Group

	Preschooler group n(%)	Grade 1 to3 group n(%)	Grade 4 to 6 group n(%)
Sex			
Boys	5(63%)	3(60%)	7(88%)
Girl	3(27%)	2(40%)	1(12%)
DSM-IV-TR			
HFA	4(50%)	2(40%)	0(0%)
AS	2(25%)	3(60%)	5(63%)
PDD-NOS	2(25%)	0(0%)	3(37%)
	Mean (range)	**Mean (range)**	**Mean (range)**
Age	5y3m	7y5m	10y4m
IQ	(4y7m -5y9m)	(6y4m -8y11m)	(9y2m -11y7m)
Full IQ	107 (84-134)	96 (78-113)	110 (94-125)
Verbal IQ	89 (84-135)	95 (81-111)	113 (93-132)
Vineland-II			
PR of Adaptive behavior	27 (13-42)	8 (4-12)	34 (7-86)
PR of Socialization	26 (6-53)	10 (2-21)	12 (1-50)

Note. PR stands for Percentile Rank.

Reviews of Empirically-Supported Interventions for Participants with ASD

In order to establish the EBP principles, develop a clinical intervention protocol, and implement evidence-based SSI, we have reviewed a series of empirically-supported interventions studies that focused on participants with ASD. The principles of our intervention program are based on the reviews of evidence-based interventions, including the ones done by American Academy of Pediatrics (Meyer, Johnson, and the Council on Children with Disabilities, 2007), Dawson and Osterling (1997), Iovannone, Dunlap, Huber, and Kinkaid (2003), National Research Council (2001), and Rogers and Vismara (2008). The program principles will be described in details in Results

In terms of empirically-supported strategies we applied to our program, we have integrated findings from the ones published by American Academy of Pediatrics (Myers, Johnson, & The Council on Children with Disabilities, American Academy of Pediatrics, 2007), IMPAQ International (Young, Corea, Kimani, &Mandell, 2010), Missouri Autism Guidelines Initiative (2012), National Professional Development Center (Autism Internet Modules, 2011), National Research Council (2001), National Autism Center (National Standards Report, 2009), and Reichow and Volkmar (2011). These

reviews are selected because they have represented the updated comprehensive synthesis of treatment effectiveness of intervention studies for clients with ASD as well as they have defined the intervention strategies or approaches more clearly and categorized the intervention studies based on the definitions. Because of intervention model or participants' characteristics of our program, comprehensive intervention programs or some specific intervention methods that have been empirically-supported are less suitable. For example, comprehensive behavioral intervention programs (CBIP) and Discrete Trial Training (DTT) have been recognized as effective treatment by different researchers. Both of them require intensive one-on-one direct instruction, and CBIP generally demands two or more years and 25 to 40 hours a week for intervention implementation. Therefore, they will not fit our program that is based on a group model and our children with ASD and their families are more likely to attend the intervention sessions for 45 to 90 minutes long and once a week.

Similarly, daily prearranged thorough activities and environment characterized by structured teaching or TEACCH or written stories to improve specific performance based on the unique needs of an individual with ASD are not applicable to our clinical setting and therapeutic model. Nevertheless, important ingredients from effective comprehensive programs such as targeting the crucial symptoms of ASD, setting a structured setting, and adopting predictable schedules, and highlighting self-initiation, self-management, and motivation to interact with others, and multiple cues have been stressed in our program principles. In contrast to comprehensive programs, the strategies will be more applicable and generalizable to our program and better fit the distinctiveness of our clients and clinicians. We have selected the strategies that are identified as the effective ones at least by one of these reviews and embedded them in our intervention activities depending on their viability and their match with participants' characteristics and clinician expertise.

In addition, some evidence-based strategies were not chosen due to our program limitation or inappropriateness for our participants, For instance, we did not use Picture Exchange Commmunication System, Speech Generating Devices (SGD), or Voice Output Communication Aid (VOCA) because all of our children can be motivated to speak and can communicate with others using short sentences at least.

Interventionists

Two registered clinical psychologists are responsible for the implementation of MSSCB groups and they would discuss about the design and modification of intervention activities. One of the interventionist is the chief investigator who is a PhD-level clinical psychologist and has worked with participants with ASD for over 10 years. The other interventionist is a master-level clinical psychologist and has worked with participants with ASD for over 2 years.

Intervention Groups

Based on the concepts of evidence-based practice, we have developed a rolling, open-ended, and group-based intervention program that targets social interaction, communication, and behavioral difficulties of clients with ASD called Multimodal Social Skills, Communication, and Behavioral Intervention: MSSCB. Following the confirmation of ASD diagnosis and family's consent for treatment referral, the child with ASD and his or her family were assigned to an MSSCB group matching child's developmental status.

Currently, there are three MSSCB groups that are for preschoolers, children of grade one to three, and children of grade four to six respectively. Each group comprised one to two interventionists and five to eight children. One family members of

child participant will attend child or family sessions. Children with ASD and their family members subsequently attended seven to eight consecutive weekly sessions for two months. Participants can continue their treatment at successive MSSCB groups later on as they wish to.

Measurement of Social Validity

A chart of 13-item global impression questionnaire (GIQ) has been developed by authors to assess social validity of our MSSCB intervention. Family participants were invited to complete the GIQ after they had attended MSSCB intervention for a period of time. The GIQ is a 5-point Likert scale designed to measure the overall level of improvement, symptom severity, parental efficacy, and customer satisfaction. The measurement of improvement after intervention and the symptom severity by comparing to typical peers cover three domains of MSSCB targets including social-interpersonal, communicative, and behavioral-emotional functioning. The outcome scores range from 1 (improved a lot/similar to peers) to 3 (no improvement/moderately delayed) to 5 (much worse/ profoundly delayed). The social-interpersonal domain of global impression included four sub-dimensions that focus on the interaction with classmates, teachers, siblings, and parents respectively. The improvement for parental efficacy is rated by 5-point Likert scale. The measurements of customer satisfaction are measured via the consent of family participants and child participants to continue the intervention, ranging from 1 (highly expected) to 3 (indifference) to 5 (never expected at all). In the end of GIQ, there is one opened-ended question for further feedbacks.

Results

The Intervention Principles for MSSCB Intervention Program

Based on the reviews and studies of evidence-based interventions mentioned in Methods, the principles of our MSSCB intervention program are listed and illustrated as the followings:

- Early intervention: Once the children were suspected to be the ones with ASD, they would complete their psychological evaluation no later than two months. With the confirmation of clinical assessment and psychological evaluation, the children would be diagnosed and referred to one of SSI groups immediately as long as their parents consent to further intervention.
- Inclusion of family members: One family participant will accompany child participant during the intervention session or attend family session right after child session depending on the group that the child is enrolled. Throughout the session, family participants will learn about the intervention targets and how they can generalize the training and facilitate children's progress outside the therapeutic setting.
- Accentuation of behavior management: The interventionists prioritize the management of child's behavioral problems through the application of positive behavioral supports during child and family sessions.
- Promotion of interactions with peers: Interaction with peers will be stressed during each session and in homework.
- Highlight of the intervention of core deficits such as social and communication: The targets of intervention sessions focus on the development of social and communication skills including verbal initiation and response, reciprocal communication, nonverbal communication, emotional expression and comprehension, joint attention, play skills, compliment-giving, turn-taking, greeting, sharing, perspective-taking, friends making, relationship establishment and maintenance, interpersonal problem-solving, and emotional management and relaxation.
- Emphasis of generalization: Through diverse activities, homework, and family training,

the children will be encouraged to practice the targeted skills with different people and at home, community, or school.

■ Professional-parent collaboration: The interventionists collaborate with family members to support them, promote skill generalization, and manage behavioral issues outside the therapeutic setting.

■ Incorporation of child's interests: Intervention activities and reinforcers are chosen based the exploration of children's interests.

■ Provision of highly-structured activities: The intervention sessions are constructed and supported using predictable schedule, visual cues, and lucid rules.

Program characteristics and Intervention Schedule

MSSCB intervention commenced with the child group that comprised 45 to 60 minutes of child-only or family-child therapeutic session. For preschoolers with ASD, one of their family members would accompany them throughout the therapeutic activities. The interventionist would demonstrate the strategies that can help children learn the targets, generalize the skills, and work on homework. The family members of grade 1 to 6 children would not attend the child sessions. Instead, they would attend 15 to 30 minutes of small group/family sessions right after child session. During family session, the interventionist would elucidate the goals of the session and child's performance as well as demonstrated how to practice targeted behavior through homework. Intervention schedules, therapeutic themes, and activity goals for each group are illustrated in Table 2 and 3. Throughout these sessions, the interventionist would collaborate with family members and instruct, role play, and provide feedback using evidence-based strategies listed in the following protocol to help children with ASD attain and practice positive social and communication skills as well as emotion/behavior management skills.

Table 3: Intervention Schedules and Goals for School-aged

Schedules	Themes	Goals
14:00-14:45 (Grade 1 to 3) 16:00-16:50 (Grade 4 to 6)	Fun to learn/play at Classroom	To facilitate the development of positive social behavior and effective communication including play, share, compliment-giving, emotion recognition/expression, friend-making, empathy, emotion management, and problem-solving through varied interesting and developmental-appropriately activities
14:45-15:00 (Grade 1 to 3) 16:50-17:20 (Grade4 to 6)	Family group	To help family participants understand the themes and targets of the intervention session and employ homework for generalization To provide supports and behavioral strategies to family participants and empower them to manage child's emotion/behavior issues at home or school
17:20-17:30 (Grade4 to 6)	Feedback and homework	To provide feedback for their own performance and facilitate self-management ability To provide instruction for homework

The Intervention Protocol for MSSCB

After reviewing the findings from the reviews and studies of evidence-based interventions mentioned in Methods, we have selected a few evidence-based strategies and integrated them into our intervention protocol for MSSCB. Our protocol based on these chosen empirically-supported strategies are listed and illustrated as the followings:

- Antecedent-Based Interventions: The interventionist would examine and modify therapeutic environment, pre-intervention instruction, or intervention curriculums/activities to facilitate successful learning and reduce occurrences of problematic behaviors.
- Cognitive Behavioral Intervention and Social Skills Groups: The interventionist would organize, illustrate, and instruct concepts and behaviors of positive social interaction, emotion recognition and expressions, problem-solving skills, and emotion management strategies in a small group. Children would model, role play, and practice targeted skills as well as receive feedback about their performance.
- Differential Reinforcement: The interventionist would replace less desired behavior with more desired one by differentiating the consequences of these behaviors with placing more reinforcement on the more preferred one.
- Extinction-Through on-site observation and trial, the interventionist would preserve any reinforcer instead of providing it to decrease the occurrence of child's inappropriate behavior.
- Functional Communication Training: The intervention would teach children an alternative way to communicate and negotiate with others whenever they represent a problem behavior to request or avoid demands
- Joint-Attention Teaching: The interventionist would embed the tasks of following eye gaze, pointing to objects, showing (i.e., items, activities, or enjoyment) to others, initiating interaction, and responding to others' requests in varied therapeutic actives to teach children joint-attention skills.
- Modeling and Video-Modeling: Through behavioral demonstration at class or in a video (for video-modeling), the children would imitate the target behavior modeled by the character in a video (for video-modeling), the interventionist, or a more skilled peer.
- Naturalistic Interventions: The interventionist would construct therapeutic settings and activity formats that are similar to the school, and offer incidental teaching, choices, and direct/natural reinforcers to children during the activity.
- Parent Implemented Interventions: While family members accompany children at child sessions or attend family sessions right after child sessions, the interventionist would discuss with family members about how children have performed during the session and how to facilitate the practices of targeted behavior and implement homework at home and/or community.
- Peer Mediated Intervention: The interventionist will first choose and teach the more skillful children targeted skills. Then they will be encouraged to model targeted behavior and teach other children with ASD to facilitate their learning.
- Prompting and Time Delay: To promote errorless learning, the interventionist would provide individualized cues to each child with ASD based on his or her ability and progress while he or she was learning the targeted behavior; however, the interventionist would encourage prompt-free independence by postponing the prompts after the instruction.
- Reinforcement: The interventionist would provide edible foods, substantial objects, amusing activities, tokens, and social rewards that are served as reinforcers during or at the end of the intervention session.
- Response Interruption and Redirection

-The interventionist would immediately interfere and redirect the children to a more appropriate behavior when they engage in an undesired behavior such as self-stimulating or interruptive behavior.

- Self-Management: For the children with ASD who are grade four to six, the interventionist would ask them to evaluate themselves and mark on the behavioral or homework checklist on their own in order to help them independently monitor their own performance or achievement toward the learning targets.
- Schedule and Visual Supports: The intervention always include a agenda of serial activities such as greeting, turning in/checking homework, learning activities, awarding prizes, saying goodbye, and so on. These activities were repeated steadily to support the learning for children with ASD. Additionally, the rules for therapeutic activities were visually represented to children using pictures or written words/sentences, environment arrangement/visual cues, and scripts, so they will be reminded of the schedule, steps, goals, or targeted behaviors. Throughout the session, the interventionist would present the reward system visually to help them know how and what they have progressed.
- Task Analysis: The interventionist would break down the task into small steps based on the child's ability level to facilitate their learning.
- Technology-based/Computer-assisted Instruction: Children with ASD learn to recognize and express a variety of concepts or skills of social interaction, communication, and emotions through pictures, audio sounds, music, and videos played in a MP3 player, tablet, and stereo equipment, or notebook.

GIQ Outcomes

Table 4 revealed the GIQ outcomes. 85 to 90 percents of family participants reported that their children made some kind of improvement in the social-interpersonal, communicative, and behavioral-emotional domains. In terms of the sub-dimension for social-interpersonal domain, 90 to 95 percents the child participants showed some kind of improvement while they interacted with classmates, teachers, and parents. Additionally, 95 % of family participants reported that they made some kind of improvements in terms of their parental efficacy. In the light of customer satisfactions, either family participants or child participants are more willing to continue MSSCB intervention. However, 95 to 100 percents of family participants reported that their children still demonstrated some kind of delays in the social-interpersonal, communicative, and behavioral-emotional domains compared with typical children.

Table 4 : The Outcome Measures of the Global Impression Questionnaire

GIQ-Improvement	Improved a Lot	Improved Slightly	No improvement	Slightly Worse	Much Worse
Social-interpersonal domain	20%	70%	10%		
To classmates	60%	35%	5%		
To teachers	50%	40%	10%		
To siblings*	26%	53%	21%		
To parents	50%	40%	5%	5%	
Communicative domain	30%	60%	10%		
Behavioral-emotional domain	30%	55%	5%	10%	
GIQ-Severity	**Similar to Peers**	**Mildly Delayed**	**Moderately Delayed**	**Severely Delayed**	**Profoundly Delayed**
Social-interpersonal domain	10%	90%			
Communicative domain	20%	75%	5%		
Behavioral-emotional domain	20%	75%	5%		
Parental Efficacy	**Much Improved**	**Improved Slightly**	**No improvement**	**Slightly Worse**	**Much Worse**
	30%	65%	5%		
Customer Satisfaction	**Highly Expected**	**Slightly Expected**	**Indifference**	**Reluctant**	**Never Expected at all**
Family Participant	90%	10%	5%		
Child Participant	85%	10%			

Note. The number represents the percentage of the family participants have marked at that level comparing with all family participants

*Not available for one participant.

Discussion

In this paper, we aimed to develop and implement an evidence-based out-patient SSI program for participants with ASD at a rural community in Central Taiwan to fill the gap between intervention research and clinical practice. We had established the principles and developed the protocol for our SSI program called MSSCB. We illustrated in details how we integrate empirical-supported strategies into the practice of MSSCB intervention to fit the needs and characteristics of our participants and their families. The survey of social validity supported familial acceptability and satisfaction with this intervention program. 85 to 90 percents of the family participants reported their children with ASD had made improvement in social, communication, or behavioral/emotional areas. 95 to 100 percents of both family and child participants looked forward to continuing MSSCB intervention.

A few of limitations for the current study must be addressed. First of all, there are shorts of objective measurement before and after the intervention for the examination of treatment effectiveness of MSSCB intervention. With the absence of a randomized group and control design, it is difficult to support the treatment effectiveness forcefully. However, ethical concern may arise if

we randomly select child participants and place some of them on the waiting list and the others in the intervention group. After all, the child participants were merely recruited and referred based on clinical needs instead of experimental requirements. In order to balance participants' needs for intervention and the needs for examination of intervention outcomes, new participants should be encouraged to complete a comprehensive pre-intervention assessment that cover intervention targets as well as adaptive behavior. The participants who are already in the intervention group may take a comprehensive assessment every four or six months in order to track their progress.

Secondly, our program has limitations in terms of individualized instruction and intervention intensity that both can be important factors for treatment effectiveness and have been emphasized in different intervention reviews for clients with ASD. How to modify activities and instruction to better fit individual needs and intensify the intervention frequency will be great challenges for MSSCB intervention which is delivered once a week and using group-format. Furthermore, treatment fidelity should be examined as soon as possible to ensure the interventionists have implemented evidence-based strategies as stated in the protocol. Besides, pre-intervention and ongoing training and supervision for the interventionists will be recommended in order to help interventionists be familiar with the evidence-based strategies and the intervention protocol. As well, participants with typical autism or severe behavioral and emotional problems will gain minimal benefits from MSSCB groups because they generally require intensive training and monitoring in addition to individualized therapy.

In addition to the above, social validity of MSSCB intervention was limited by the small sample size, lack of validity and reliability of the surveys, and the biases and expectations of family participants. The design and delivery of social validity survey should be modified in order to reflect participants' opinions more validity and more comprehensively. Implicit description of different items, adoption of 7-point Likert scales, and anonymous surveys should be considered for the revision of social validity survey. .

In conclusion, the study has established and implemented a clinically outpatient-based and group-based SSI program preliminarily for children with high-functioning ASD. The principles and protocol of our MSSCB intervention have been based on empirically-supported research and strategies. Family participants have recognized the contributions of MSSCB intervention through a brief outcome of the social validity surveys. However, greater efforts should be placed to modify and examine MSSCB intervention in order to progress evidence-based practice at community for participants with ASD.

Acknowledgements

The authors wish to express their sincere gratitude to the supports of all colleagues at Department of Child and Adolescent Psychiatry, Tsao-Tun Psychiatric Center.

Reffences

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington DC: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington DC: Author.

American Psychological Association. (2005). Policy statement on evidence-based practice in psychology. Retrieved from http://www.apa.org/practice/guidelines/evidence-based-statement.aspx

Bass, J. D., & Mulick J.A. (2007). Social play skill enhancement of children with autism using peers and siblings as therapists. *Psychology in the School, 44,* 727-734.

Brookman-Frazee, L. I., Taylor, R., & Garland, A. F. (2010). Characterizing community-based mental health services for children with autism spectrum disorders and disruptive behavior problems. *Journal of Autism and Developmental Disorders, 40,* 1188–1201

Centers for Disease Control (CDC). (2012). *New data on autism spectrum disorders.* Retrieved from http://www.cdc.gov/Features/CountingAutism/

Carter, A. S., Davis, N. O., Klin, A., & Volkmar, F. R. (2005). Social development in autism. In F. R. Volkmar, R. Paul, A. Klin, & D. A. Cohen (Eds). *Handbook of autism and pervasive developmental disorders* (3rd ed., pp.312-333). Hoboken, NJ: John Wiley.

Cotugno, A. J. (2009). Social competence and social skills training and intervention for children with Autism Spectrum Disorders. *Journal of Autism Developmental Disorders, 39,* 1268-1277.

Curran, S., & Bolton, P. (2009). Genetics of autism. In Y. Kim (Ed), *Handbook of behavior genetics* (pp. 397-410). New York, NY, US: Springer Science

Dawson, G., & Osterling, J. (1997). Early intervention in autism: Effectiveness and common elements of current approaches. In M. J. Guralnick (Ed.), *The Effectiveness of early intervention: Second generation research* (pp. 307–326). Baltimore: Brookes.

Dunn, L. M., & Dunn. L. M. (1981). *PPVT: Peabody Picture Vocabulary Test-Revised Form.* Circle Pines, MN: American Guidance Service.

Feng, H., Lo, Y.-y., Tsai, S., & Cartledge, G. (2008). The effects of theory-of-mind and social skill training on the social competence of a sixth-grade student with autism. *Journal of Positive Behavior Interventions, 10,* 228-242.

Hall, L. J. (2009). Classification and the physiological approach. In L. J. Hall (Ed), *Autism spectrum disorder from theory to practice* (chap. 1, pp. 1-19). Upper Saddle River, NJ: Person Education.

Howlin, P., Magiati, I., & Charman, T. (2009). Systematic review of early intensive behavioral interventions for children with autism. *American Journal on Intellectual and Developmental Disabilities, 114,* 23-41.

Iovannone, R., Dunlap, G., Huber, H., Kinkaid, D. (2003). Effective educational practices for students with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 18,* 150–165.

Kasari, C., & Rotheram-Fuller, E. (2007). Peer relationships of children with autism: challenges and interventions. In E. Hollander & E. Anagnostou (Eds.), *Clinical manual for the treatment of autism. Arlington,* VA: American Psychiatric Publishing.

Krasny, L., Williams, B. J., Provencal, S., & Ozonoff, S. (2003). Social skills interventions for the autism spectrum: Essential ingredients and a model curriculum. *Child and Adolescent Psychiatric Clinics of North America, 12*(1), 107-122.

Machalicek, W., O'Reilly, M. F., Beretvas, S. N., Sigafoos, J., Lancioni, G., Sorrells, A., Lang, R., & Rispoli, M. (2008). A review of school-based instructional interventions for students with autism spectrum disorders. *Research in Autism Spectrum Disorders, 2,* 395–416.

Magiati, I., Charman, T., & Howlin, P. (2007). A two-year prospective follow-up study of community-based early intensive behavioural intervention and specialist nursery provision for children with autism spectrum disorders. *Journal of Child Psychology and Psychiatry, 48,* 803-812.

Matson, J. L., Matson, M. L., & Rivet, T. T. (2007). Social-skills treatments for children with autism spectrum disorders an overview. *Behavior Modification, 31,* 682-707.

Myers, S. M., Johnson, C. P., & The Council on Children with Disabilities, American Academy of Pediatrics. (2007). Management of children with autism spectrum disorders. *Pediatrics, 120,* 1162–1182.

Missouri Autism Guidelines Initiative. (2012). *Autism Spectrum Disorders: Guide to Evidence-based Interventions.* Retrieved January 13, 2013, from http://www.autismguidelines.dmh.missouri.gov/documents/Interventions.pdf

National Institute of Mental Health. (2009). *Autistic spectrum disorders pervasive developmental disorders.* Retrieved November 05, 2009, from http://www.nimh.nih.gov/health/publications/autism/nimhautismspectrum.pdf

National Autism Center. (2009). *National standards report: The national standards project—Addressing the need for evidence-based practice guidelines for autism spectrum disorders.* Retrieved from http://www.nationalautismcenter.org/pdf/NAC%20Standards%20Report.pdf

National Professional Development Center on Autism Spectrum Disorders (2011). *Evidence-Based Practice Briefs. Retrieved May 7, 2012 from http://autismpdc.fpg.unc.edu/content/briefs*

National Research Council (2001). *Educating children with autism.* Washington, DC: National Academy Press.

Odom, S. L., Brown, W. H., Frey, T., Karasu, N., Smith-Canter, L. L., & Strain, P. S. (2003). Evidence-based practices for young children with autism: Contributions or single-subject design research. *Focus on Autism and Other Developmental Disabilities, 18*(3), 166–175

Rao, P. A., Beidel, D. C., & Murray, M. J. (2008). Social skills interventions for children with Asperger's syndrome or high-functioning autism: A review and recommendations. *Journal of Autism and Developmental Disorders, 38,* 353-61.

Reichow, B., & Volkmar, F. R. (2009). Social skills interventions for individuals with autism: Evaluation for evidence-based practices within a best evidence synthesis framework. *Journal of Autism and Developmental Disorders, 40,* 149-166.

Reichow, B. & Volkmar, F. R. (2010). *Social skills group interventions for autism spectrum disorders in individuals aged 6 to 21 years.* Retrieved September 29, 2013, from http://www.update-software.com/BCP/WileyPDF/EN/CD008511.pdf

Reichow, B., & Volkmar, F. R. (2011). Evidence-based practices in autism: Where we started. In B. Reichow et. al., (Eds), *Evidence-based practices and treatments for children with autism* (pp. 3-24). Springer: New York, NY.

Rogers, S.J., & Vismara, L. A. (2008). Evidence-based comprehensive treatments for early autism. *Journal of Clinical Child and Adolescent Psychology,* 37, 8–38.

Scattone, D. (2007). Social skills intervention for children with autism. *Psychology in the School, 44,* 717-726.

Smith, T. (2008). Empirically supported and unsupported treatments for autism spectrum disorders. *The Scientific Review of Mental Health Practice, 6,* 3-20.

Sparrow, S., Balla, D., & Cicchetti, D. V. (2005). *The Vineland adaptive behavior scales* (2nd ed.). Circle Pines, MN: American Guidance Service.

Spector, S. G.; & Volkmar, F. R. (2006). Autism Spectrum Disorders. In D. A. Wolfe & E. J. Mash (Eds), *Behavioral and emotional disorders in adolescents: Nature, assessment, and treatment* (pp. 444-460). New York, NY: Guilford.

Stahmer, A. C., Collings, N. M., &Palinkas, L. A. (2005). Early intervention practices for children with autism: Descriptions from community providers. *Focus on Autism and Other Developmental Disabilities, 20(2),* 66–79.

Kasari, C., & Patterson, S. (2012). Interventions Addressing Social Impairment in Autism. *Current Psychiatry Reports, 14,* 713-725.

Lai, D. C., Tseng, Y. C., Hou, Y. M., & Guo, H. R. (2012). Gender and geographic differences in the prevalence of autism spectrum disorders in children: Analysis of data from the National Disability Registry of Taiwan. *Research in Developmental Disabilities, 33,* 909–915.

Wechsler, D. (1989). Manual for the Wechsler Preschool and Primary Scale of Intelligence-Revised. San Antonio : Psychological Corporation.

Wechsler, D. (2003). *Wechsler intelligence test for children* (4th ed.). San Antonio, TX: The Psychological Corporation.

White, W. S., Keonig, K., & Scahill, L. (2007). Social skills development in children with autism spectrum disorders: A review of the intervention research. *Journal of Autism and Developmental Disorders, 37,* 1858-1868.

World Health Organization. (1992). *International classification of diseases-Diagnositic criteria for research* (10th ed.). Geneva, Switzerland: Author.

Wu, C., Lo, Y., Feng, H., & Lo, Y. (2010). Social skills training for Taiwanese students at risk for emotional and behavioral disorders. *Journal of Emotional and Behavioral Disorders, 18,* 162-177.

Young, J., Corea, C., Kimani, J., & Mandell, D. (2010). Autism spectrum disorders (ASDs) services: final report on environmental scan. Available from:http://www.impaqint.com/files/4-content/1-6-publications/1-6-2-project-reports/finalasdreport.pdf