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Social Skills Interventions for Adolescents with ASD, ADHD, and Other Comorbidities

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Social Skills Interventions for Adolescents with ASD, ADHD, and Other Comorbidities

April 26, 2017

This evidence project, submitted by

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has been approved and accepted
in partial fulfillment of the requirements for the degree of
Master of Science in Occupational Therapy from the University of Puget Sound.

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Project Chairperson: Sheryl Zylstra, DOT, OTR/L

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Key words: social skills, adolescen*, ASD, ADHD, intervention

Abstract

This project was part of a research initiative to collaborate with Kristin Brubaker, MSOT, OTR/L, practicing pediatric occupational therapist at the Center for Therapeutic Intervention (CTI). CTI is an outpatient, private pediatric occupational therapy clinic in Gig Harbor, WA. The purpose of our project was to determine existing and effective interventions to improve social skills in adolescents, ages 11 to 18 years, with autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), sensory processing disorder (SPD) and other sensory processing issues. Our search of the literature yielded a total of 22 research studies, with the majority representing group-based interventions. Limited research was found pertaining to ADHD and no research was found pertaining to either SPD or sensory processing issues. Future research recommendations include a focus on developing and studying effective interventions for individuals with ADHD and SPD. Our knowledge translation products were specifically designed for CTI and included an in-service presentation detailing our research and findings, a proposed social skills program for a specific group of adolescents at CTI, and reference tools to use in creating future group-based programs. Post-presentation responses and feedback were overwhelmingly positive and well received.

Executive Summary

The clinician had noticed a steady increase in adolescent clients with social skills deficits seeking services at her clinic and expressed a desire to know what the literature reported regarding effective social skills interventions regarding this age group. Therefore, the purpose of this research project was to determine the evidence for effective interventions to improve social skills in adolescents, ages 11 to 18 years, with ASD, ADHD, SPD and other sensory processing issues.

The following databases were searched: CINAHL, Cochrane, EBSCO, PsychINFO, PubMed, and Primo. Inclusion criteria were as follows: intervention studies that addressed social skills for adolescents with ASD, ADHD, and SPD as primary diagnoses, studies that included participants between ages of 11-18 years old, and participants could include family members. Exclusion criteria included: school-based interventions, participants with intellectual disabilities and any other psychiatric disorders with the exception of oppositional defiant disorder, and articles published before 2000. A total of 22 research studies were collected for this project.

Our key finding was that many of the effective social skills programs were group-based. Additionally, group-based programs were found to be more prevalent in the literature than individually-based programs. While a variety of treatments exist to improve social skills for adolescents with ASD, programs for adolescents with ADHD were limited and literature pertaining to either SPD or sensory processing issues was not found. Additional findings of note were the parent education and didactic topic components found in a variety of programs. Thus, clinical implications for social skills interventions are that programs should: be group-based, include didactic components, and include a parent education component.

Our knowledge translation strategy included the development of a group-based social skills

program for specific clients currently receiving occupational therapy services at CTI. The identities of the clients were not disclosed, however, the individuals were coded for communication and study identification purposes. Following the development of this program, we provided an in-service workshop which included our product presentation and recommendations pertaining to the client sample. Our product included: a social skills intervention components list, intervention components descriptions, didactic lesson topics cross-referenced with diagnoses, and didactic lesson themes. Following the presentation, the CTI staff completed a survey containing qualitative and quantitative questions. The general responses and feedback from the therapists were found to be positive and helpful.

Critically Appraised Topic (CAT) Paper

Focused Question:

> What are effective interventions to improve social skills in adolescents, ages 11 to 18 years, with Autism Spectrum Disorder, Attention Deficit Hyperactivity Disorder, Sensory Processing Disorder and other sensory processing issues?

Collaborating Occupational Therapy Practitioner:

> Kristin Brubaker, MSOT, OTR/L

Prepared By:

> Meg Batson, Sarah Elliott, Gary Lam, and Nora Seimears

Chair:

> Sheryl Zylstra, DOT, OTR/L

Course Mentor:

> Renee Watling, PhD, OTR/L, FAOTA

Date Review Completed:

> 10/17/2016

Clinical Scenario:

> The Center for Therapeutic Intervention (CTI) is a private pediatric outpatient clinic in Gig Harbor, WA. The clinic serves children from birth to 18 years of age for a range of issues including sensory processing, autism, and attention deficit hyperactivity disorder. The clinician has noticed an increase in adolescent clients with social skills deficits seeking services at her clinic and is expressing a desire to know what the literature reports regarding effective social skills interventions regarding this age group.

Review Process
Procedures for the selection and appraisal of articles
Inclusion Criteria:

> Intervention studies that address social skills for adolescents with ASD, ADHD, and SPD as primary diagnoses. Age range of 11 - 18 years old, (75% of n is within this age range OR the mean age is within this range). Participants can include family members.

Exclusion Criteria:

School-based interventions; participants with Intellectual Disabilities (ID) and any other psychiatric disorders with the exception of Oppositional Defiant Disorder (ODD); and articles published before 2000.

Search Strategy

Categories	Key Search Terms
Patient/Client Population	Ages 11-18 years old or adolescents with ASD, Autism, Autism Spectrum Disorder, Asperger's Syndrome, PDD, Pervasive Developmental Disorder. Ages 11-18 years old or adolescents with ADHD, Hyperkinetic disorder. Age 11-18 years old or adolescents with SD, SPD, Sensory Processing Disorder, sensory processing issues
Intervention (Assessment)	Social skills, social skills training, intervention, treatment, cognitive behavioral intervention, psychosocial therapy, therapy
Comparison	N/A
Outcomes	Improvement in social skills and/or decrease in social impairment and engagement in social interaction

Databases and Sites Searched
CINAHL, Cochrane, EBSCO, PsychINFO, PubMed, Google Scholar, Primo

Quality Control/Review Process:

Before we began searching, our research question was refined from effective interventions for all adolescents between the ages of 11 and 18 to adolescents with ASD, ADHD, SPD, and/or sensory processing issues between the ages of 11 and 18. Inclusion and exclusion criteria were created before the search and adjusted as our search progressed. Adding "not in schools", the age filter and only considering articles published after 2000 was effective in limiting the scope to only relevant articles for our research question.

Results of Search

Table 1. Search Strategy of databases.

Search Terms	Date	Database	Initial Hits	Articles Excluded	Total Selected for Review
SPD and social skills and intervention not school	**9/22**	PsychINFO	**0**		**0**
SPD and social interaction and intervention not school	**9/22**	PsychINFO	**0**		**0**
SPD and social training and therapy not school	**9/22**	PsychINFO	**1**	**1**	**0**
ASD and social skills and intervention not school	**9/22**	PsychINFO	**70**	**67**	**3**
(social skills) AND (adolescents) AND (interventions) AND (adhd) NOT (school)	**10/16**	PsychINFO	**45**	**42**	**3**
ADHD or attention deficit hyperactivity disorder and intervention not school	**9/25**	**CINAHL**	**7**	**5**	**2**

(social skills or social skill training) AND (adhd OR attention deficit hyperactivity disorder) AND (treatment) NOT (SCHOOL)	**10/12**	**CINAHL**	**6**	**6**	**0**
Social skills* and cognitive-behavioral therapy and adhd or hyper kinetic disorder	**10/12**	PsychINFO	**9**	**7**	**0**
ADHD Mesh terms and "cognitive therapy" major and "social skill" or "social skills" or "social skills training" and intervention	**10/13**	**PubMed**	**52**	**52**	**0**
ADHD Mesh terms and "social skill" or "social skills" or "social skills training" and intervention	**10/13**	**PubMed**	**79**	**77**	**2**

ADHD Mesh terms and "social skill" or "social skills" or "social skills training" and intervention and social behavior	**10/13**	**PubMed**	**79**	**79**	**0**
"Social skill training" and "autism spectrum" or "ASD" and adolescent 13-18	**10/13**	**PubMed**	**19**	**17**	**2**
"Social skill* training" and "intervention" and "child" or "adolescent"	**9/23**	**Cochrane**	**552**	**551**	**1**
"Social skill*" and "therapy" and "autism" and "adolescent"	**9/23**	**Cochrane**	**1**	**0**	**1**
"Social skill*" and "therapy" and "child" and "adolescent" and age filter 13 - 18	**9/23**	**CINAHL**	**16**	**12**	**4**
"Social skill*" and "intervention" and "child" and "adolescent" and age filter 13 – 18	**9/23**	**CINAHL**	**32**	**23**	**9**

"Social awareness" and "intervention" and "child" and "adolescent" and age filter 13 - 18	**9/23**	**CINAHL**	**3**	**3**	**0**
"Social skills training" and "intervention" and "child" and "adolescent" and age filter 13 - 18	**9/23/**	**CINAHL**	**9**	**3**	**6**
"Interpersonal competence" and "intervention" and "child" or "adolescent" and age filter 13 - 18	**9/23**	**CINAHL**	**0**	**0**	**0**
Adhd AND adolescents; (exact phrase) social skills intervention NOT school	**10/16**	**Google Scholar**	**26**	**26**	**0**
social skills adolescents AND interventions AND adhd NOT school	**10/16**	**Primo**	**11**	**11**	**0**
"Social skills" and "Intervention" and age filter 13-18	**9/22**	**PsychInfo**	**7,284**	**5,493**	**11**
"Social skills" and "intervention" and age filter 13-18	**10/8**	**PsychInfo**	**7,302**	**5,509**	**56**

"Social skills" and "intervention"not "child*" and age filter 13-18	**10/8**	**PsychInfo**	**7,302**	**6,652**	**16**
"Social skills" and "Program" and age filter 13-18	**10/8**	**PsycInfo**	**1,984**	**1,027**	**14**
"Social skills" and "intervention" and age filter 13 - 18	**10/15**	**PubMed**	**4068**	**9**	**0**
"Social skills" and "intervention" and age filter 13 - 18 and not in school (in title or abstract)	**10/15**	**PubMed**	**3083**	**2**	**0**
"Social skills" and "intervention" and age filter 12 - 18, not in schools (in title or abstract), and publication date 2000 and later	**10/15**	**PubMed**	**711**	**702**	**9**

Table 2. Articles from reference tracking.

Article	Date	Articles Referenced	Articles Excluded	Total Selected for Review
White et al. (2006)	10/17	Barnhill et al. (2002), Provencal (2003), Webb et al. (2004)	23	3
Wang et al. (2013)	10/15	Argot et al. (2008), Hughes et al. (2011), Lee et al. (2006), Mitchel et al. (2010), Stevenson et al. (2000)	109	5
Total number of articles used in review from reference tracking = 4				

Total number of articles used in review from database searches = 18
Total number of articles used in review from citation tracking = 0
Total number of articles used in review from reference tracking = 4
Total number of articles used in review from UPS Master's Thesis = 0
Total number of articles used in CAT = 22

Summary of Study Designs of Articles Selected for the CAT Table

Pyramid Side	Study Design/Methodology of Selected Articles	Number of Articles Selected
Experimental	___Meta-Analyses of Experimental Trials 7 Individual Randomized Controlled Trials 3 Controlled Clinical Trials 3 Single Subject Studies	13
Outcome	___Meta-Analyses of Related Outcome Studies ___Individual Quasi-Experimental Studies ___Case-Control Studies 6 One Group Pre-Post Studies	6
Qualitative	___Meta-Syntheses of Related Qualitative Studies ___Small Group Qualitative Studies 1 Brief vs prolonged engagement with participants ___triangulation of data (multiple sources) ___interpretation (peer & member-checking) ___a posteriori (exploratory) vs a priori (confirmatory) interpretive scheme ___Qualitative Study on a Single Person	1
Descriptive	__Systematic Reviews of Related Descriptive Studies 1 Association, Correlational Studies 1 Multiple Case Studies (Series), Normative Studies ___Individual Case Studies	2
Comments:		*TOTAL =22*

| AOTA Levels
I - 7
II - 3
III - 7
IV - 4
V - 0
Qualitative - 1 | |

I. Table Summarizing the Evidence for the *PEERS Intervention*

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Chang et al., 2014 Autism	To examine predictors of positive social skills outcomes from the UCLA PEERS intervention for high-functioning adol w/ASD.	O4 Pre-post Level III	N = 60 (49 males), age range:12-17 yo. M(SD): 14.70 (1.29); previous diagnosis of ASD, AS/HFA, PDD-NOS, verbal IQ RANGE: 50-126 M(SD) = 93.67 (18.89)	Tx = UCLA PEERS 90-min/wk for 14wks, parents and adol attend separate concurrent session. OM = SSRS by parent-report; Piers-Harris-2 by adol self-report, only used popularity subscale; Vineland-II, adaptive functioning; KBIT-2	Baseline social functioning on SSRS and Piers-Harris were significant in variance of social skills (p $\leq$00.1). 60% of variance in social skills was accounted by SSRS subscales responsibility and self-control (p $\leq$.001). Adol w/ higher baseline social skill by parent-report and lower self-perceived social functioning demonstrated greater improvement.	Small sample size, lack of independent third-party observation (no teacher measure, school observation)
Dolan et al., 2016 J Autism Dev Disord	To examine the effectiveness of PEERS for improving social skills in adol with ASD.	E2 RCT Level I	N = 58 Tx n = 28 (28 males), age range: M(SD) = 13.64 (1.28) Control n = 30 (25 males), age range: M(SD): 13.16 (1.67) IC: ASD and IQ screening tests. AC: n = 4 (age range: 12-15) IC: Typically developing; 11-16 yo; parents' assent and consent.	Tx = 14wks 90-min weekly session w/ PEERS at the laboratory w/ homework. Control group: delayed PEERS until 3-4 mo. OM = 10-min interaction with AC coded by CASS; TASSK completed pre- and post-tx just prior to peer interaction.	Tx showed statistically significant improvement on vocal expressiveness (p < .037); statistical trend for overall quality of rapport (p < .055). Chi square analyses significant for overall quality of rapport (p < .05). No statistically significant improvement on gestures, positive affect, kinesic arousal, social anxiety, and overall involvement/interest. Tx showed significant improvement on TASSK at post-treatment (p < 0.05).	Limited sample diversity; sample included only males and was 85.7% Caucasian; laboratory setting may have impacted responses; CASS paradigm was developed and tested for role play conditions, thus using it in this way may impact its ability to distinguish differences across other CASS domains.

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Karst et al., 2015 J.Autism Dev Disord	To understand the impact of the PEERS program on family chaos, parenting stress, and parenting self-efficacy.	E2 RCT Level I	N = 64 parent/child dyads (32 in Tx group, 32 in control group). IC: adol interested in program, commitment to regular attendance, adol IQ score >70, age range: 11-16 yo, enrolled in middle or high school, and possess a diagnosis of ASD.	Tx: PEERS intervention 1wk/14wks. Parent and teen sessions lasted 90min/wk Control group: Free to access community services and resources OM: CHAOS, SIPA, PSOC	Tx: Wilks Lambda = 0.936, $F_{(1, 62)}$ = 4.26, p = .04, Tx group showing a significant decrease in family chaos over time in comparison to control group. No significant difference in parental stress btw. Tx and Control group. Paired samples t-test (t (32) = 2.18, p = .04) significant increase in parenting self-efficacy in tx group from pre-post. Control group: increase in family chaos, main effect not statistically significant (p =.08). Mean self-efficacy remained unchanged.	Small effect sizes for primary outcome variables, control group not restricted from participating in other interventions, and homogeneous sampling
Laugeson et al., 2008 J Autism Dev Disord	To determine the efficacy of a manualized parent-assisted social skill intervention (PEERS).	E2 RCT Level 1	N= 33 (28 males) Tx n = 17, age range: 13–17 yo, M(SD): 14.6 (1.3) Control n = 16, age range: 13 – 17 yo, M(SD): 14.6 (1.6) IC:13-17 yo, social problems as reported by parents, English, verbal IQ > 70, previous dx of HF/ASD, AD, or PDD-NOS, no history of major mental illness, absence of hearing, visual, or physical impairment.	Tx: PEERS 90-min/wk for 12 wks. Parents participated in separate concurrent session. Multiple homework assignments given. Control: 12 wks delayed PEERS after first OM. Both groups completed OM at wk1 and wk12, and control group completed post- assessments at 24wk. OM = SSRS; QPQ; TASSK; FQS	Tx group: significantly improved in knowledge of social skills on the TASSK (p<0.01), increase in hosted get-togethers (p<0.01), and in parent-rated SSRS social skill scale (p<0.01). Friendship quality was not significantly increased. Control group: no changes.	Poor response rate from teachers (13/33), parent outcome may have been biased due to involvement in the Tx, durability of outcome was not measured, diagnostic assessment was limited due to the lack of a standard measure of autistic symptomatology, SSRS-p was not designed for the ASD population.

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Laugeson et al., 2012 J Autism Dev Disord	To examine the efficacy of PEERS for high functioning adol. w ASD and the durability of Tx gains after a 14-week follow-up period.	E3 Controlled Clinical Trial Level II	N= 28, age range: 12-17 yo, M(SD) = 14.6 (0.71) Tx n = 14 Control group n = 14	UCLA PEERS Program of 90-min sessions weekly for 14 weeks w/ additional Tx modules on making and keeping friends. Parent & adol attended separate concurrent sessions. Participants required to attend 11/14 sessions for inclusion. OM: SSRS-P; SRS-P; QPQ; TASSK-R; KBIT-2; Vineland II	Tx group reported significant improvement in social skills on SSRS-P as compared to Control group, $p < 0.01$. Overall cooperation, assertion, & social communication increased, $p < 0.01$; responsibility, social awareness and social cognition also increased, $p < 0.02$. Self-report indicated improvements in knowledge of social skills on TASSK-R ($p < 0.01$) and in hosted get-togethers ($p < 0.03$). Tx gains maintained at follow-up for all outcomes measures except SRS-P.	Did not verify diagnoses. Possible parent bias resulting from their active participation. Poor response rate of teacher report resulted in < half the sample obtaining complete teacher data.
Schohl et al., 2013 J Autism Dev Disord	To evaluate the effectiveness of a replicated and extended SSI program (PEERS) on adol w/dx of ASD.	E3 Controlled Clinical Trial Level II	N = 58 (47-male, 11-female), age range: 11-16 yo, M = 13.65 w/dx of ASD. 56-EA, 3-AA, 1-AsA, 2-no answer. 29-tx & 29-control group. IC: 11-16 yo, social problems (parent report, English fluency, family member English fluent & willing to participate), no hx major mental illness, no hx hearing, visual, physical impairments, dx of HFA, ASA, PDD, IQ of 70+, verbal interest in how to make & keep friends.	Tx: PEERS sessions: 90-min wkly sessions over 14 wks, with the goal of learning how to make & keep friends by implementing learned social skills. OM: Demographic, health & Rx questionnaire (for parents), KBIT-2, ADOS-G, Vineland II, TASSK, QSQ-A-PR, QSQ-A-AR, FQS, SIAS, SRS, & SSRS	Significance of main effect of Group for combined adol/parents and for Time ($p < .001$). Group by Time interaction were sig. for four adol outcome measures: TASSK ($p < .001$), QSA-A-AR ($p < .01$), SIAS ($p < .01$) and two parent outcome measures: SRS ($p < .01$) & SSRS ($p < .05$).	The sample lacked diversity. Parent ratings may be biased due to involvement in the intervention. The outcome measures lacked an observation of social skills behavior. The teacher-return response for post-tx report was lower than hoped for, resulting in decreased statistical power.

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Van Hecke et al., 2015 J Autism Dev Disord	To determine whether remediation of friendship skills and social isolation, via the PEERS intervention, affected neural activity in adol with ASD.	E2 RCT Level 1	N = 87 Tx n = 28, Control group n = 29, TYP = 30 IC: 11-16 yo, verbal and full IQ > 70, caregiver spoke fluent English, enrolled in middle or high school, met autism criteria on Module 3 or 4 of the ADOS-G, indicted interest, and attended at least 12/14 sessions. EC: no neural physical, hearing, or visual impairments, no comorbid bipolar or schizophrenia	Tx: PEERS intervention 1wk/14wks OM: EEG, SRS, QSQ-R, and TASSK	Adol w/ASD who completed PEERS showed a shift from R hemispheric dominance to L hemispheric dominance, Control group did not. Tx group decrease in parent-rated symptoms of ASD, increase in social contacts, increase in social skills knowledge targeted by PEERS.	Results related to gamma asymmetry are new to the literature and need to be replicated for consistency. Tx group was older than Control group.

Key to Abbreviations

AA- African American
AC- Adolescent confederates
AD- Autism Disorder
Adol - adolescent
ADOS-G - Autism Diagnostic Observation Scale-Generic
AS – Asperger syndrome
ASD – Autism Spectrum Disorder
AsA- Asian American
CASS-the contextual assessment of social skills
CHAOS: Confusion, Hubbub, and Order Scale
Dx- Diagnosis
EA-European American
EEG-Electroencephalogram
FQS - Friendship Qualities Scale

HF-High functioning
HFA-High functioning Autism
HX- History
IC- Inclusion criteria
IQ – Intelligence quotient
KBIT-2 - Kaufman Brief Intelligence Test-Second Edition
M - mean
OM - outcome measure
PDD-NOS - Pervasive Developmental Disorder not otherwise specified
PEERS- program for the education and enrichment of relational skills
Piers-Harris-2 - Piers-Harris Self-Concept Scale, Second Edition
PSOC-Parenting Sense of Competence Scale
QPQ - Quality of Play Questionnaire
QSQ (-A-PR & -A-AR) – Quality of Socialization Questionnaire admin. to parents & adolescents
SIAS – Social Interaction Anxiety Scale
SIPA-Stress Index for Parents of Adolescents
SRS - Social Responsiveness Scale, or SRS-2 (2nd edition)
SRS-P Social Responsiveness Scale, Social Cognition Subscale
SSI- Social Skills Intervention
SSRS - Social Skill Rating System
TASSK- Test of Adolescent Social Skills Knowledge
TASSK-R - Test of Adolescent Social Skills Knowledge-Revised
Tx- treatment
UCLA - University of California, Los Angeles
Vineland-II - Vineland Adaptive Behavior Scales-Second Edition, Survey Form
W/- with
wk/wks/wkly-week/weeks/weekly
Yo- years old

II. Table Summarizing the Evidence for *Group-based Social Skills Interventions (non-PEERS)*

A. *Autism Spectrum Disorder*

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Barnhill et al., 2002 Focus on Autism & Other Dev Disabil	To enhance the non-verbal skills of adol w/ AS through direct instruction, targeted paralanguage and by identifying and responding to facial expressions.	O4 Pre- and post Level III	N = 8 (7 male); age range: 12.9–17.9 yo, M = 15.5; 6 had dx of AS, 1 of PDD-NOS, 1 was awaiting definitive dx of PDD.	Tx: SSTP adapted from "Teaching Your Child the Language of Social Success." 1 hr/wk for 8 weeks and subsequent community activity for 2-3 hrs. OM: DANVA2	No statistically significant differences between pre and post. Slight differences on DANVA2 subtest scores: pre-test: 3% above mean; 56% within mean; 28.5% between 1 and 2 SDs below mean 12.5% below 2 SDs. Post-test scores: 6.7%; 60%; 26.6%; 6.7%, respectively. 87% of participants reported they developed friendships in the group.	Inclusion of adol w other autism spectrum disabilities in addition to AS may have affected results.
Freitag et al., 2016 J Child Psychol Psychiatr	To assess the long-term effects and moderating factors of manualized, cognitive behavioral group-based social skills training for adol with HFA-ASD.	E2 RCT Level I	N = 209 Multi-center trial at 6 univ-affiliated outpatient clinics in Germany. IC: Dx of ASD; 8-20 yo; no or stable psycho-pharmacotherapy; child & parent fluent in German. EC: IQ < 70; psychiatric disorders, aggressive behavior, group-based SST during last 6 mo.	Tx: 12 90-min weekly SST group sessions using SOSTA-FRA led by behavior therapist. Parent training 3x over 12 weeks. OM: SRS total raw score: pSRS and tSRS subscale raw scores and SDQ.	Post Tx pSRS scores decreased by 12.9 (95% CI) in Tx and by 6.4 (95% CI) in CG, p = 0.01, ES = 0.35. At 3 mo. follow-up, pSRS scores remained lower in IG (14.6, 95% CI) than CG 9.2 (95% CI), p = 0.02, ES = 0.34. ASD-specific, group-based Tx SOSTA-FRA has direct and long-term effects on parent-reported social responsivity as add-on to TAU.	Primary OM (pSRS) was unblinded. Possible performance bias as it was not possible to blind therapists or patients.

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Herbrecht et al., 2009 Eur Child Adolesc Psychiatry	To evaluate the effectiveness of Frankfurt Social Skills Training (KONTAKT) to improve social and communication skills in children and adol w/ ASD; to identify participant variables associated w/ program effectiveness.	O4 Pre- and post Level III	N = 17 (15 male); age range: 9.3–20.3, M(SD) = 14.7 (3.4). IC: Dx ASD. EC: IQ< 70; lack of functional language; severe comorbid health problems.	Tx: weekly SST (1 hr for 8-13 yo; 1.5 hrs for 13-19 yo.) Tx conducted over 11 mo period. 3 Tx groups: naive children; experienced adol; naive adol. OM: 3 expert ratings (DCL, CGB, GAS), 1 blind expert rating, 3 parent ratings (PIA-CV-mini, SKS, FaBel), 1 teacher rating (FEG).	ANCOVAs showed significant or trend effects on GAS, SKS, all subscales of DCL and 2/6 PIA-CV-mini subscales. Largest effect sizes: FEG = 0.69, GAS = 0.42, DCL subscales = 0.30 - 0.50. No significant difference in program benefit between naive and experienced adol. Non-verbal IQ (p=0.02) and language abilities (p=0.03) had significant positive influence on social skills improvement.	No CG and authors attempt to use blind expert rating pre- and post to compensate not sufficient to overcome Hawthorne effects. Small sample size. Missing data: full data for FEG (teacher rating) available for only 5 participants.
McMahon et al., 2013 J Autism Dev Disord	To examine changes in social behavior during group time of a SSTP; to examine predictors of change in social behavior over course of SSTP.	O4, Pre- and post Level III	N = 14; 9 male; age range: 10–16 yo, M(SD) = 13 (2.9) IC: Dx of ASD; > 60 on SRS; > 15 on ASSQ; verbal IQ > 65.	Tx: 1.5 hrs/week for 22 weeks; structured introduction, didactic lessons, unstructured play, structured joke telling, game time, and homework. Parent attended concurrent psychoeducational group. OM = ASSQ; SCQ; SRS; WASI. Behavior coding and hierarchical linear modeling were used in data analysis.	Responding vocalizations increased (p < 0.04); initiating vocalizations and other vocalizations decreased (p < 0.01) indicating participants more frequently responded to others and less frequently in non- directed speech. Participants who attended more sessions had steeper increase in time spent w/ a peer (p < 0.01). Predictors of change over course of Tx: age and intervention.	Positive changes in social behavior may be due to repeated interactions w/ peers in safe environment and not Tx. Game time not standardized across Tx groups. Some participants received other types of therapy, including OT, w/ 3 receiving other SST. Behavioral coders not blind to intervention status and received limited training.

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Mitchel et al., 2010 J Dev Disabil	To evaluate efficacy of SSTP for adol w/ AS or HFA and to assess skill acquisition and generalization using behavior probes.	O4 Single subject, multiple baseline Level III	N = 2; 16 yo male w/ AS, 15 yo, female w/ AS. IC = ages 12-19; dx of AS or HFA.	Tx: 2-hr. sessions 1x/wk for 12 wks for adol. Parents 2-hr separate concurrent sessions every 3 wks. OM: SSRS and QoL administered pre, post and at 3 mo. follow-up; Training and generalization probes. (target skills & SSRS priority rankings confirmed at baseline.	Increased generalized targeted social skills at home and in community. SSRS 59.5% increase pre-post for 16 yo female; and 69% increase for 15 yo male. Ranking of parents was: 0% increase for 16 yo female and 40.6% increase for 15 yo male. QoL: Small improvement post training & in follow-up (means at pre, post, 3 mo follow-up were: 2.18 to 2.37 to 2.48 for 16 yo female and 1.88 to 1.93 to 2.19 for 15 yo male.	Multiple baseline design weakened due to delay of training effect and absence of overlap between baselines. Procedural fidelity not measured. Training constraints prevented authors from ensuring previously trained skills had consistently increased before starting training on the next skills. Authors also question the efficacy of skill-focused training to address performance- related deficits.
Tse et al., 2007 J Autism Dev Disord	To evaluate the effectiveness of a 12-week SST group on social competence for adol w/ AS/HFA.	O4 Pre- and post Level III	N = 46; 61% male, age range: 13–18 yo, M = 14.6. IC: Adol 13–18 yo; dx of ASD, adequate language skills, willingness to attend. EC: Inability of talk about interests and verbalize goals.	Tx: Training combined psychoeducational & experiential methods w/ emphasis on role play & skill development. Weekly 90-min group sessions led by social worker and psychiatrist. OM: SRS, ABC, N-CBRF; adol feedback survey.	Of 12 pre- to post-tx scores on measures of social competence (SRS and N-CBRF): 6/12 subscales were statistically significant w/ effect sizes of 0.34 - 0.46; 4/12 subscales near significant. Statistically significant improvements on all subscales of ABC and N-CBRF except hyperactivity w/ effect sizes of 0.34 - 0.72. Largest effect on irritability and overly sensitive subscales. Greater improvements found for indiv. < 14 yo.	No control group, no formal recruitment. Relies largely on parent report measures to assess improvement. Lacks detailed data on participants including IQ and language ability.

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Vernon et al., 2016 J Autism Dev Disord	To evaluate a hybrid socialization intervention approach combining experiential and didactic components into a single multi-component treatment model.	D3 Clinical case series/multiple baseline Level IV	N = 6, age range: 12-17 yo w/ ASD IC: use full sentences, verbal IQ > 70, and ASD diagnosis confirmed by ADOS, ADI, and SRS.	I: Two intake sessions, 5 wks apart. Two pre-tx meetings. Tx: START program for 2hrs/wk/20wks. OM: SSIS-RS, SRS-2, and SMCS	Pre-post findings: SSIS-RS: mean score ☐ of 5.3. SRS-2: 5 participants mean ☐ of 4.3 in endorsement of autism-related symptoms. SMCS: mean ☐ of 9.1 in social behavior.	Repeated measure case series component is non-experimental and therefore does not allow for a control, small sample size limits generalizability, no follow-up data.
Webb et al., 2004 Focus Autism Other Dev Disabil	To examine the efficacy of using the SCORE Skills Strategy program to teach high-functioning adol with ASD five skills needed to work in cooperative groups.	O4 Pre-post Level III	N = 10 male (9 white), age range: 12.3-17.2 yo, M = 14.8. IC: educational eligibility for ASD program,12 - 18 yo, receptive and expressive language >70, attending general education classroom, deficit in social skills, transportation to and from tx by parents.	I: 60 mins SCORE skills program twice/wk for 10 wks OM: videotaped role-play sessions, SCORE-RPS, sks, SDT, SOS, SCORE-SSQ, SSRS, PSQ	Difference in group M score pre tx (M = 5.7) and post tx (M = 6.8) All skills, except share ideas, statistically significant; compliments others (p = .003), offer help or encouragement (p = .000), recommend changes nicely (p = .001), exercise self-control (p = .000). Many parents and 60% of participants indicated high satisfaction on the SCORE program. Opinions about working w/peers increased 25%.	Small sample size drawn from one regional area, less generalizable.

II. Table Summarizing the Evidence for *Group-based Social Skills Interventions (non-PEERS)*

*B. **Attention Deficit Hyperactive Disorder***

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Evans et al., 2010 Behav Ther	To determine the efficacy of providing CHP and optional service to evaluate social functioning outcomes	E2 RCT Level I	N = 31 (22 males) age range: 10-13 yo Tx n = 15 (year 1); n = 16 (year 2). Control n = 9 (year 1); control n = 9 (year 2). All participants were recruited from two Virginia middle schools over 2 academic years. IC: diagnostic criteria for at least one subtype of ADHD, academic or social impairment, IQ ≥ 80, no diagnoses for PDD or any following: BD, psychosis, substance dependence other than tobacco, or OCD.	Tx: CHP 2 hrs 15 min per session twice/a wk for 5 month, 3 families participated in optional three 90 min sessions of FCU prior to tx. Control groups: family selected services OM: BASC-2, IRS	No significant tx benefit was found on parent and teacher rating of social impairment on the IRS although tx groups improved more than control group.	Inability to specifically analyze moderators and mediators (type of medication, dosage, and adherence to prescribed schedules). People who provided outcome data were not blind.

II. Table Summarizing the Evidence for *Group-based Social Skills Interventions (non-PEERS)*

C. Comorbid Disorders

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Glass et al., 2000 J Psych in Ind Prac	To determine the effects of a drama-based social skills program (SCIP) on self-awareness of feelings & behaviors and impact on social interaction.	Q3a Group Qualitative Study	N = 7; (2 girls), age range: 11-14 yo. 1-ASD, 3-NVLD, 3-ADHD IC: Referral by School District, clinical interviews of parent & child, BASC-1, SSRS, CASP used to determine IC/EC.	Tx = SCIP. Once per wk, 2-hr. sessions for 8 wks drama-based role-plays to enhance social competence. An important component was video feedback. OM = Information gathering through comments made by children and parents throughout the program and post-intervention feedback.	Children able to identify emotional expression & tone of voice, they may have "caught up" to their emotional age. They expressed that video feedback was particularly helpful in learning. One parent expressed that his child has become more aware of his own and other's emotions.	Reflective limitations were stated as: limited number and frequency of sessions, no pre- and post-intervention parental feedback and participation, lack of communication system to parents for inter-session help, co-mingling of children with NVLD and ADHD in the intervention group caused difficulty in focused tx techniques.
Guli et al., 2012 The Arts in Psycho-therapy	To explore the effects of SCIP on social competence levels of children w/ASD, NLD, and/or ADHD	E3, Q3 CCT/ Group Qualitative Study Level II	N = 34 (post-attrition); M age =10.97 yo. 18-dx of ASD (10 comorbid w/ADHD), 8-NLD (7 comorbid w/ ADHD), & 8-ADHD only. 20 participants using Rx in the pre-attrition group, n = 39, but no quantity listed post-attrition. 36-EA, 2-HA, 1-AA. All middle-upper class SES. IC: IQ of 80 on KBIT-3 or WISC-III, social deficits as pt. of dx for ASD or NLD, ADHD only w/deficits from SSRS. EC: Head injury, psychosis, ODD, CD, non-native English speaker.	Tx = SCIP for a total of 24 hrs. 12, 2 hr. wkly sessions or 16, 1.5 hr. sessions over 8 wks. creative-drama based group to improve social competence. OM = (Quantitative) SSRS, BASC, DANVA2. Naturalist observation utilizing the partial interval audiotaped recording method. Behaviors recorded were: positive social interaction, solitary behavior and neutral behavior. Post-tx interviews w/children & parents.	Quantitative: Non-significance for BASC & DANVA2 measures. Medium effects in "observed" positive interactions (p = .028) & decreases in solitary play (p = .026). Qualitative: 75% parents & 82% of children reports improvement in social competence.	Not blinded to dx of participant, possible bias. During the observation period, lack of personnel yielded only 50% of the control and 38% of the tx group leading to limited observation ability for the larger sample. Rolling enrollment procedure may have affected outcomes. Finding that more children in the tx group were on Rx may present a confounding element.

Key to Abbreviations

AA- African American
ABC - Aberrant Behavior Checklist
ADHD- Attention Deficit Hyperactivity Disorder
ADI-Autism Diagnostic Interview Revised
Adol - adolescent
ADOS-Autism Diagnostic Observation Scale
ANCOVAs - Analysis of Covariance
AS – Asperger syndrome
ASD – Autism Spectrum Disorder
AS/HFA - Asperger syndrome w/ high functioning autism
ASSQ - Autism Spectrum Screening Questionnaire
BASC-1 - Behavior Assessment scale for children, 1st ed.
BASC-2 - Behavior Assessment scale for children, 2nd ed.
BD- Bipolar Disorder
CASI-anx- Child and Adolescent Symptom Inventory-4 ASD Anxiety Scale
CASP- Child and Adolescent Social Perception Test
CD-Conduct Disorder
CGB - Checklist for Group Behavior
CGI-I - Clinical Global Impressions Improvement Scale
CG - control group
CHP- Challenging Horizons Program
DANVA2 - Diagnostic Analysis of Nonverbal Accuracy 2
DCL - Diagnostic checklist for Pervasive Development Disorder
DD-CGAS- Developmentally Disabled Children's Global Assessment Scale
EA-European American
EC- Exclusion criteria
FaBel - Family Burden Questionnaire
FEG - Questionnaire for assessment of group behavior
GAD-Generalized Anxiety Disorder
GAS - Global Assessment of Functioning Scale
HA- Hispanic American
HFA-High functioning Autism
HFA-ASD – High functioning Autism-Autism Spectrum Disorder
IC- Inclusion criteria
IQ – Intelligence quotient

IRS- Impairment Rating Scale
KBIT-3 - Kaufman Brief Intelligence Test-Third Edition
KONTAKT – Frankfurt Social Skills Training
M – mean
MASSI-Multimodal Anxiety and Social Skill Intervention
N-CBRF - Nisonger Child Behavior Rating Form
NLD/NVLD- Nonverbal Learning Disabilities
OCD- Obsessive Compulsive Disorder
ODD- Oppositional Defiance Disorder
OM - outcome measure
PARS- Pediatric Anxiety Rating Scale
PIA-CV-mini - Parent Interview for Autism
PDD-Pervasive Developmental Disorder
PDD-NOS - Pervasive Developmental Disorder not otherwise specified
PSQ-Parent Satisfaction Questionnaire
pSRS - parent-rated Social Responsiveness Scale
QoL - Quality of Life Questionnaire
RPS- role play situation
SAD-Separation Anxiety Disorder
SCIP - Social Competence Intervention Program
SCQ - Social Communication Questionnaire
SDQ - Strength & Difficulties Questionnaire
SDT - Situation Discrimination Test
SKS - skill knowledge survey
SMCS-Social Motivation & Competencies Scale
SOS – The Subject Opinion Survey
SOSTA-FRA – (German) structured, manualized, cognitive behavioral group-based SST
SRS - Social Responsiveness Scale, or SRS-2 (2nd edition)
SSIS-RS-Social Skills Improvement System Rating Scale
SSTP - Social Skills Training Program
SSQ-Subject Satisfaction Questionnaire
SSRS - Social Skill Rating System
SST – Social Skills Training
SSTP - Social Skills Training Program
START-Social Tools and Rules for Teens
TAU - treatment as usual
tSRS - teacher-rated Social Responsiveness Scale
Tx- treatment

WASI - Wechsler Abbreviated Scale of Intelligence
WISC-III- Wechsler Intelligence Test for Children, 3rd edition.
wk/wks/wkly-week/weeks/weekly
Yo- years old

III. Table Summarizing the Evidence for *Non-group, non-PEERS Interventions*

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Gutman et al., 2010 Occupational Therapy International	To describe an intervention designed to promote social skills based on mirror neuron theory.	E4 Level IV	N = 2, 15 yo Caucasian males w/HFA or PDD	Tx: 1hr/wk/7wks. Each session included warm-up sensory modulation activities, activities linking motor behavior w/ cognitive intention and emotional understanding, role-play activities, and cool-down sensory modulation OM: Frequency of verbal and nonverbal behaviors.	Pt. 1 t-test btw. baseline and intervention t = -7.31, p = 0.00 Pt. 2 t-test btw. baseline and intervention t = -4.415, p = 0.001. Participants increased social behaviors when motor behaviors were connected with cognitive and emotional meaning. An increase in patient's ability to use non-verbal social behaviors was also documented.	Recording measure was not standardized and therefore may have poor generalizability.
Sibley et al., 2012 J of Attn Disorders	To evaluate the effectiveness of video-feedback on the social behavior of a 16 yo male w/ADHD	E4 Single Case Study Level IV	N = 1, 16 yo male with ADHD and marked social impairments.	I: Video feedback added to existing STP-A program - 7 sessions meeting at the same time as the business meeting. The subject participated in video review and guided self-analysis. O: Frequency counts in 10-30 sec. interval clips of inappropriate behavior, adol-counselor agreement and Negative Tracking System Behaviors as a comparison factor.	Intervals of coded behavior: During baseline (A), the participant's inappropriate behavior steadily increased over time, for the intervention period (B), the behavior decreased to zero. Intervention withdrawn (A), increased again. Adol-Counselor Agreement: 60%-100% over the course of the intervention. Negative tracking system behaviors: the inappropriate behaviors ceased in the business meeting except for one interval.	Did not collect baseline or post-intervention self-ratings; measures were only taken off intervals of the meeting, missing any positive effects present outside of these intervals; and limited number of days for intervention delivery due to working within the STP-A time constraints.

Author, Year, Journal	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Stevenson, et al., 2000 Behavioral Interventions	To demonstrate effectiveness of audiotaped scripts and script fading for non-reading children with ASD.	E4 AABA Design Level IV	N = 4; all boys; M (12 yo), B (13 yo), J (15 yo) and one more participant (excluded for age exclusion criteria). Dx w/ASD & attended the Princeton Child Development Institute's day school & intervention program (5.5 hrs/day, 5 days/wk).	Tx: Audiotape script-fading method to teach social interaction statements. OM: Observed interactions measured in 1-min intervals. Four categories: Scripted 1, scripted 2, unscripted or non-interaction.	Baseline I & II: Measures for social interactions of all boys with the subject were zero except who scored three unscripted interactions. Teaching phase: Mean number of unscripted interactions with the subject taking place over 5-9 sessions: M-17, B-16 and J-13. Maintenance phase: Means increased: M-23, B-27 and J-23.	The scripting procedure only measured textual component; adding a graded tonal component to the tx. could be a potential add on to further enhance success in social engagement.
White et al., 2012 J Autism Dev Disord	To evaluate whether future study of the Multimodal Anxiety and Social Skill Intervention (MASSI) is warranted by assessing the feasibility of the program.	E2 RCT Level I	N = 30, Tx=15 (11 male), age range: 12-17 yo, M = 14 yo, control Group = 15 (12 male), M = 15 yo. IC: ages 12 -17 with ASD 1 of 4 anxiety dx: SoP, GAD, SP or SAD; current verbal IQ of 70 or above; no previous dx of intellectual disability; multiple anxiety disorders EC: primary OCD	Tx = Admin of MASSI: Individual therapy (up to 13, 60-75 min. topically focused sessions), group therapy topically focused (7, 75 min. sessions) topically focused, and parent education w/ coaching post-session. OM = SRS, CASI-anx, PARS first as present or absent in previous week. Second: severity of symptoms. CGI-I; DD-CGAS.	SRS within-group effect size change for the tx group showed significant increase between pre- to post-test results (p < .01); between-group comparison also showed statistical significance. DD-CGAS pre- to post-test results showed significant improvement for the tx group and between-group results (p =.029).	Limited sample size, small selection of assessment measurements, non-normal distribution of effect size outcome data (likely due to lack of statistical power), and lastly non-generalizability due to logistical or resource factors, i.e. session-length, staffing.

Key to Abbreviations

ADHD- Attention Deficit Hyperactivity Disorder
Adol - adolescent
AS – Asperger syndrome
ASD – Autism Spectrum Disorder
Dx- Diagnosis
EC- Exclusion criteria
FCU -Family Check-up
HFA-High functioning Autism
I - Intervention
IC- Inclusion criteria
IQ – Intelligence quotient
M – mean
OM - outcome measure
PDD-Pervasive Developmental Disorder
Rx- Prescription medication
SES – Socioeconomic status
SoP- Social Phobia
SP-Specific Phobia
SSRS - Social Skill Rating System
STP-A – Summer Treatment Program for Adolescents
Tx- treatment
wk/wks/wkly-week/weeks/weekly
Yo-years old

Summary of Key Findings:

Summary of the PEERS Intervention Studies

The majority of research findings in this category included randomized controlled studies. While a variety of social skills interventions were assessed, the PEERS program was the most frequently seen in the literature (Chang et al., 2014; Dolan et al., 2016; Karst et al., 2015; Laugeson et al., 2008; Laugeson et al., 2012; Schohl et al., 2013; Van Hecke et al., 2015). The PEERS program was developed at the University of California, Los Angeles. All participants were diagnosed with some form of ASD. One article by Laugeson et al. (2012) included participants with ADHD and other co-morbid mental health disorders. The PEERS protocol includes 14-weekly sessions targeted at initiating and maintaining friendships. Program topics include identifying appropriate friends, establishing common interests, hosting get-togethers, and working through negative experiences such as bullying or disagreement. Parents are highly involved in the PEERS program via didactic sessions and weekly homework assignments geared at helping families troubleshoot issues that can arise.

Overall implementation of the PEERS program has resulted in decreased reports of family chaos and increased levels of parent-reported self-efficacy of children (Karst et al., 2015). Research examining the PEERS program and neuroplasticity found that adolescents who completed the program shifted from right-hemispheric dominance to left-hemispheric dominance (Van Hecke et al., 2015). Adolescents in the control group (waitlist) did not demonstrate this change. Within the same study, the parents reported a decrease in their child's autistic symptoms, total number of social contacts increased, and overall knowledge of social skills concepts increased. Results of parental self-reported stress levels were not statistically significant.

Summary of Group-based Social Skills Interventions (non-PEERS)

This category contains three sections where the diagnoses of the participants were the delineating factor. The groups were ASD, ADHD and comorbid disorders.

ASD. Eight studies involved social skills training for children with ASD. Studies took place in small groups of 6 to 10 participants weekly for 1.5 to 2 hours with most lasting from 10 to 12 weeks (Barnhill et al., 2002; Freitag et al., 2016; Herbrecht et al., 2009; McMahon et al., 2013; Mitchell et al., 2010; Tse et al., 2007; Vernon et al., 2016; Webb et al., 2004). These studies resulted in increased peer-related social interaction and parent-rated social responsiveness. Treatment gains were noted in social competence and problem behaviors associated with AS/HFA.

The majority of the studies taught social skills through techniques including experiential learning, learning through role play, modeling and reinforcement through the use of both structured lessons and unstructured play and/or social time (Freitag et al., 2016; Herbrecht et al., 2009; McMahon et al., 2013; Mitchell et al., 2010; Tse et al., 2007). These studies used questionnaires that contained rating and responsiveness scales such as the Social Skills Rating Scale (SSRS), the Social Responsiveness Scale (SRS) completed by participants and parents, as well as a variety of other parent, teacher, and blind expert ratings. Some studies targeted specific skill areas for intervention of participants at baseline (McMahon et al., 2013; Mitchell et al., 2010; Vernon et al., 2016; Webb et al., 2004). A multiple baseline design was used in three studies and resulted in generalization and maintenance of target social skills at home and in the community (Vernon et al., 2016; Webb et al., 2004). One study targeting nonverbal communication did not produce statistically significant results in developing communication skills, however, half of the participants developed and maintained friendships outside of the group. Overall treatment interventions had the greatest impact on social responsivity, social competence, and generalization of target skills (Freitag et al., 2016; Herbrecht et al., 2009; Mitchell et al., 2010; Tse et al., 2007; Vernon et al., 2016; Webb et al., 2004).

ADHD. One study looked at social problem solving, individual goal setting and frequent feedback in the ADHD population. Although improvement was noted in the treatment group over the control group, the results were not statistically significant for increasing social behaviors. (Evans et al., 2010).

Comorbid Disorders. For the purposes of this project, comorbid refers to disorders where the participants of the studies were diagnosed with one or more of the following: ASD, ADHD or NLD/NLVD (Nonverbal Learning Disorder). Two studies implemented role play as a primary form of intervention (Glass et al., 2000; Guli et al., 2012) These intervention designs focused on the practice, assignment, and identification of facial expressions and emotion. Results indicate an increased ability to identify emotional expressions, heightened emotional awareness and social competence.

Summary of Non-group, non-PEERS Interventions

This category contains four studies that combine individual and group-based therapies. Treatment interventions include role-play (Gutman et al, 2010) video feedback (Sibley et al., 2012), script-fading (Stevenson et al., 2000) and a multi-modular program (White et al., 2013).

One study implemented the use of video feedback to enhance self-monitoring and social engagement skills (Sibley et al., 2012). Results indicated an increase in accurate interpretation of emotions and a decrease in inappropriate and aversive social behaviors. A study by Stevenson et al. (2000) focusing on a script-fading intervention showed increased frequency of unscripted social interaction responses from pre- to post-test data. In their article focusing on mirror neuron theory, Gutman et al. (2010), social behaviors could be increased when motor attempts were accompanied with cognitive and emotional meaning. Specifically that participants improved in their ability to "use facial expressions and body language to convey emotion" (Gutman et al., 2010).

A different study looked at a multimodal intervention that included individual and group therapy sessions with an added parent education component (White et al., 2012). Participants received education on different aspects of social skills training over the course of twelve weeks. Results indicated a statistically significant increase in social skills, global functioning, and decrease in anxiety.

Implications for Consumers:

A variety of effective treatments exist primarily for adolescents (11-18 years old) with ASD or ADHD to improve social skills. For this population, poor social skills can result in social isolation or a lack of friendships, which could lead to higher rates of comorbid depression and withdrawal (Stewart et al., 2006). The PEERS program appears predominantly in the ASD literature review with statistically significant results. Non-PEERS group-based social skills programs are equally effective in improving overall social skills. While not directly targeted for adolescents with ADHD, the PEERS intervention has been shown to increase social skills in participants with a dual diagnoses. However, there are limited studies focusing on improving social skills of adolescents with ADHD.

Parents of adolescents with ASD and ADHD should approach outpatient therapy professionals with an interest in group-based interventions. The PEERS intervention program and similar intervention designs are worth discussing with occupational therapists involved in the adolescent's treatment. Parents can expect that a variety of intervention strategies may need to be employed to treat their adolescent. Parents should note that many of the interventions documented include concurrent parent/family training.

Implications for Practitioners:

There are many different strategies used by therapists to teach social skills to adolescents with ASD and ADHD, many of which have statistically significant findings of interest to practitioners. While there is some overlap among group-based social skills training programs for ASD, individual components within a program, such as role-play, the amount of structured vs. unstructured activities, and approach to skill development, can vary. Practitioners should note that some research regarding the PEERS and other group-based interventions include participants with dual diagnoses of ASD and ADHD, and therefore may be considered a potential option for clients with these conditions (Glass et al., 2000; Guli et al., 2012; Laugeson et al., 2012). Practitioners interested in interventions related to naturalistic and real-world settings can consider the piloted SCIP program which yields significant quantitative and qualitative results for individuals with ASD and ADHD (Glass et al., 2000; Guli et al., 2012).

It is important to note that many of the interventions documented, include concurrent parent training. Practitioners should consider this aspect of each intervention program on a client-by-client basis. Given the increasing prevalence of ASD, it is likely that practitioners will continue to receive referrals for therapy and that social skills training may be a core element of therapy.

Implications for Researchers:

Research regarding social skills intervention is especially important for adolescents as this population is at risk for social isolation and lack of friendship, which can lead to higher rates of depression and withdrawal (Stewart et al., 2006). Adolescents diagnosed with ASD, ADHD, and SPD are at even greater risk than the general population for these comorbidities. No articles were found in our search of the literature pertaining to interventions for SPD or sensory processing. Limited articles were found in the area of interventions specific to ADHD, and varied interventions were found to be used with children and adolescents with ASD and AS. Therefore, a significant need exists for research on more effective interventions for social skills in adolescents with SPD and ADHD.

Practitioners have a variety of social skill interventions to choose from in working with adolescents with ASD. The PEERS Program is used frequently, as are various group-based training programs that incorporate similar elements. Ongoing research is needed to further vet the PEERS program to test its generalizability across a variety of individuals with ASD. Longitudinal data is currently missing from the research concerning the lasting impact of the PEERS program. Lastly, large-scale studies will help to solidify the foundation of research related to the PEERS program.

A number of research teams have identified peer mentoring, mindfulness training and using specific behavioral coding in assessment as areas of emerging treatment. These areas should receive greater research and evidence to determine their efficacy.
Despite our efforts to organize the research presented here, more evidence is needed to clearly target the essential ingredients of effective programs.

Bottom Line for Occupational Therapy Practice/ Recommendations for Better Practice:

There is evidence in the literature that social skills interventions are successful for adolescents with ASD and ADHD. Thus far the PEERs program maintains the strongest base of evidence for improvement in social skills for individuals with ASD. Individual components of social skills training programs from the studies discussed could be used as part of a customized treatment plan. Therefore, clinicians possess a variety of choices in treating their clients.

Literature pertaining to social skills training of clients with ADHD is still limited. Thus practitioners face challenges in choosing effective treatment interventions that address diversity and allow for individualized client-centered care. Should a practitioner or clinic need to address social skills deficits for clients with ADHD, those mentioned in this report may be options to consider. The intervention, client, feasibility and logistical factors should be taken into consideration for the specific context.

Literature pertaining to SPD was not found within the scope of our search. Within the profession, clinicians should call for further research on effective treatment for populations diagnosed with ADHD and SPD.

While a number of intervention strategies have emerged in the literature, more definitive evidence is needed to determine: 1) whether a single program design can be effective for clients with different diagnoses; 2) whether a single program design can generalized among clients with similar diagnoses and even within the same diagnosis; and 3) whether there is a specific program design that is most effective for specific diagnoses.

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Involvement Plan

Introduction. Our group delivered the final critical appraisal of topic (CAT) paper to the collaborating clinician on February 14, 2017. We began by summarizing our primary findings from the literature which indicated that a number of social skills interventions were found to be effective for adolescents, ages 11 to 18, with ASD, ADHD, and other comorbidities. We mentioned that the group-based program, Program for the Education and Enrichment of Relational Skills (PEERS) program (University of California, Los Angeles) has the strongest base of evidence for improving social skills for individuals with ASD. Other group-based interventions for individuals with ASD, ADHD and other comorbidities are also supported in the literature. Within the scope of our research, literature pertaining to social skills interventions for individuals with ADHD is limited and is non-existent for individuals with SPD.

We offered several ideas for our involvement plan to the clinician. This included printed materials in the form of a toolkit, a face-to-face in-service workshop, or a web-based platform to access and build customized treatment plans. Due to the variety of effective social skills intervention programs outlined, we concluded that individual components of these programs can be used to create customized treatment plans. As we brainstormed possibilities, the clinician suggested creating a social skills program for specific clients currently receiving services from the Center for Therapeutic Intervention (CTI). As we agreed on this plan, the next step would be for the clinician to identify and provide a list of 4-5 clients who would be appropriate for the application of the involvement plan and subsequent implementation by CTI therapists.

Contextual Factors. We have identified a potential list of factors that may facilitate or hinder the implementation of our involvement plan. These facilitating factors/barriers include:

- Receptiveness of the director and therapists
- Facility space to accommodate group interventions
- Marketing for a social skills program

- Will there be enough clients to support this program?

- Insurance provisions (Limited amount of approved sessions?)

- Will private-pay clients be willing to pay for two weekly treatment sessions (individual

  and group)?

- Family support (i.e. client buy-in)

- Client adherence (participation and attendance)

Products:

    Product 1. Develop written materials detailing a customizable social skills program.

Materials will include:

- List 1: Social skills intervention components list (Cross-referencing master list to match

  intervention components with diagnoses)

- List 2: Intervention components descriptions

- List 3: Didactic lesson topics (Cross-referenced with diagnoses)

- List 4: Didactic lesson themes (Didactic lessons organized by topic)

    Product 2. Provide an in-service workshop to present and explain the research process and

findings, product 1 items listed above with explained rationale, and applied treatment

recommendations for the client list provided to us by CTI. Presentation components will be in

the form of a Prezi presentation.

Dates to achieve the final outcome:

- March 29 - Draft of product 1 to mentoring professor

- April 10 - Implementation of product 1 revisions and recommendations based on mentor

  feedback

- April 14 - Complete Prezi presentation for in-service

- April 21 - CTI in-service

Outcomes Monitoring. Immediately following the in-service, therapists and staff will be

provided with a feedback survey to gauge:

- The applicability of our involvement plan/product to their caseload

- The likelihood of using our involvement plan/product with their clients

- How helpful the information was

After the in-service, therapists and staff will also be provided with a second survey to be administered half-way through and/or at the end of a group intervention period (6 months from the in-service). This survey will be self-reflective in nature and encourage therapists to share results.

Knowledge Translation

The knowledge translation process comprised two parts. The first part included materials designed to be used by occupational therapists to create social skills programs for future groups of adolescents with ASD, ADHD and/or the comorbidity of both diagnoses. The second part involved using the written materials to create a social skills program for five pre-selected adolescent clients at CTI identified for future group-based instruction.

Product 1 – Written Materials. The research group wanted to create materials useful to the staff at CTI for the purposes of developing group social skills programs for their adolescent clientele. The goal was to create materials with many different points of entry to serve various goals. For example, if a therapist wanted to know which social skills programs in the literature use a particular intervention component, she/he could access that information easily. If another therapist wanted to know which intervention components were effective in the literature for adolescents with ASD, she/he could have that information readily available. And if a third therapist wanted to know the specific didactic topics taught within a particular social skills program in the literature, she/he could access that information easily.

To that end, the research group created the following four handouts. The first spreadsheet cross-references 19 intervention components and the diagnoses with which they have shown to

be effective in the literature. This spreadsheet also cross-references each social skills program that uses the intervention component. The second handout includes paragraph descriptions of the 19 intervention components to provide therapists with key details on various elements involved in a particular intervention component. The third handout is a spreadsheet detailing specific didactic lesson topics organized by social skills program and cross-referenced by diagnosis, age, and research author. The fourth and final component of the written materials categorizes specific lesson topics by theme. This document, called Didactic Themes, allows therapists to look at all lesson topics addressed within and across 12 didactic theme areas such as conflict resolution, understanding nonverbal cues, and handling electronic communication. Authors of the 22 studies cited in the literature review are referenced for each topic area to allow therapists to easily access specific research studies for more details on how didactic topics were taught.

Product 2 - In-Service Presentation. The second product created as part of the knowledge translation included a proposed social skills program for five adolescent clients CTI had identified for future group-based instruction. Using the written materials described above, the research group selected intervention components appropriate for the group based on their diagnoses (1 ASD, 2 ADHD, 2 with comorbidity of ASD and ADHD). This yielded seven components: role play, structured and unstructured group activities, game time, homework for skill generalization, video feedback, group discussion and reflection, and drama-based activities for integrated perception of verbal and nonverbal cues. Upon further investigation and discussion, the group added three more components, feedback, didactic lessons, and parent feedback/parent training, because they appeared frequently in the literature as effective for adolescents with ASD. While the literature does not indicate that these intervention components are effective for adolescents with ADHD, they may be similarly helpful. Because our literature review yielded few studies on effective social skills interventions for this diagnosis, we chose to add them to the proposed program for the therapists to include.

The research group then used the problem areas and deficits of each of the clients to choose didactic lessons for the group. These included self-regulation/impulse control, coping with anger, choosing appropriate friends, and awareness and expression of feelings. This proposed social skills program, along with the written materials, were presented at an in-service with occupational therapists, staff and the rehabilitation director at CTI on April 21, 2017.

Outcomes. The feedback received during and following the in-service was overwhelmingly positive regarding products' future usefulness and applicability to CTI's practice. The written materials were described as "an excellent reference tool" and "validating" regarding interventions currently used by therapists at CTI. For specific results of the survey conducted immediately following the in-service, see Evaluation of the Effectiveness of Tasks and Products.

Challenges. Creating a list of intervention components that accurately represented the interventions used across the 22 research studies in the literature review presented a challenge. This process involved careful review of each study's intervention procedures, identification of areas of overlap and areas of difference between studies, compilation of all interventions used, and a distillation into a final list of 19 distinct intervention components. Cross-referencing each intervention component with diagnoses, followed up by a reverse cross-referencing process to determine all social skills programs that utilized the intervention component. This also involved a detailed and careful review of each article with a new perspective. A third challenge came with having to synthesize descriptions of the 19 intervention components so that each was representative of the research studies that implemented the component. This required careful, collaborative and cohesive group work.

Lastly, in progressing towards our knowledge translation plan, we recognized that the separation of specific components and topics from a specified program naturally results in a lack of research fidelity. This topic was addressed with our mentoring professor and collaborating clinician and all recognized the limitations of maintaining fidelity during the knowledge

translation process. With this limitation acknowledged, the research team proceeded with

creating our products for CTI.

Interim Dates of completion (2017)

- March 29 - Draft of Product 1 handouts submitted to mentoring professor

- April 10 - Recommendations for revisions and feedback given by the mentoring professor

- April 14 - Completed Prezi presentation for the in-service (Product 2)

- April 18 - Completed revisions for Product 1 handouts

- April 20 - Final print of Product 1 handouts

- April 21 - CTI in-service presentation

Monitoring of Outcomes

Study outcomes were measured by the use of an exit survey given to the clinicians present at

our in-service. Clinicians completed a two-page survey asking them about their experience

during the in-service and their perceptions of the information presented. Survey questions

included: whether the information was useful, whether the information aided professional

growth, whether the information was new, and what information was most useful, to list a few.

Question types included both a four-item Likert scale and a short answer portion. The results of

the exit survey can be found in more detail within the next section.

Included within our Involvement Plan was a second follow-up survey to be distributed six

months after our in-service. The purpose of this survey is to examine the use of both the

information and products presented during the in-service. Specifically, we want to know if the

handouts were useful during regular treatment planning, if the program components were used to

create a social skills group at CTI, and if so what are/were the results of that program or camp.

Having follow-up data on the products of our research could be helpful in developing a

secondary topic for study in the next Evidence Based Practice course and may even be useful for

presentation at the next applicable conference.

Evaluation of the Effectiveness of the Tasks and Products

In reflecting on the effectiveness of our presentation, a number of successes stand out. Having never traveled to CTI our group planned to arrive at least 30 minutes prior to the start of our in-service. Meeting at CTI early set our group up for success, despite road construction and technology glitches, we were still ready to present at the scheduled time. Being ready allowed our group time to collect our thoughts and begin the presentation in a collected manner. Throughout the presentation, group members delivered their information and discussed slides clearly and concisely. Good time management allowed for plenty of discussion at the end of the presentation which enhanced the knowledge translation process. Overall, the clinicians and staff at CTI maintained engagement throughout by asking questions and responding to questions posed by the group members. At the end of the in-service, the staff at CTI expressed their thanks and gratitude for the presentation and copy of the clinic binder containing project handouts.

Throughout the in-service at CTI, clinicians openly discussed their thoughts on the information presented. Several clinicians noted that they currently use a number of the intervention components included in our product, including role play, feedback, and homework. They cited using them individually and occasionally in small groups with their clients. Overall, the clinicians stated that the information presented, specifically the intervention components found to be effective, reaffirmed what they were already doing in their practice. They commented that they were pleased to be currently using evidence-based techniques. One concern raised by the clinicians at the end of the presentation was the feasibility of arranging a social skills group around the differing schedules of each client. Clinicians mentioned trying to arrange a group the previous year and could not find a time that worked with all families chosen. The therapists also discussed the challenges of billing for group-based therapy versus having enough therapists on hand to bill individually. The clinicians, along with the owner, discussed arranging a camp during the summer to apply the group-based design seen

in the research. Designs included a five-day intensive camp or a once-a-week style similar to those seen in the research, for a set number of weeks.

Another clinician commented about how they create treatment plans based on the client's needs rather than his or her specific diagnosis or diagnoses, indicating that our Handout A may be limiting as it cross references intervention components with diagnoses. The group discussed how two of the handouts, Topics Taught in Didactic Lessons (Handout C) and Didactic Themes (Handout D), could be used to target specific problem areas of clients. With regards to the written materials, the clinicians as a whole voiced how useful they expected each piece to be when seeking to create a social skills program with their client in mind. Each handout was mentioned at least once within this context.

Clinicians continued their comments and thoughts using a follow-up survey presented at the end of the in-service. On average staff and clinicians at CTI agreed with the statement that "the information presented was useful in increasing [their] understanding of social skills interventions." Likewise, clinicians specifically agreed with the statement that "[they] could see [themselves] implementing the presentation results into [their] practice." Within the short answer portion of the survey, clinicians were most impressed with the handouts and viewed these as being particularly useful in their practice moving forward. Overall, the clinicians at CTI were excited to have the additional resources at their disposal and looked forward to applying individual pieces of the final product to their clientele. A few clinicians mentioned that even if they do not conduct social skills therapy services in a group-based setting due to the complex nature of scheduling and insurance reimbursement, they will still use the components for individual-based therapy. We felt that this comment, and the overall feedback from the clinicians, validates the effectiveness of our products.

Overall Reflections

This evidence based project presented our group with a variety of challenges and learning opportunities throughout the year. Each individual group member experienced the processes through their own personal lenses, bringing a different perspective to the project. From the literature review process, organization of the CAT, knowledge translation process, and to the final delivery of the first and second product, each step has grown this group as both students and clinicians. In total, we are all thankful for the opportunity to explore the research and take our topic to a finalized product.

Literature Review. An initial challenge the group grappled with was the article gathering process. Finding articles related to ADHD and SPD proved difficult as noted in our overall findings and implications. Similarly, while finding articles related to our topic appeared easy at first, the process of sifting through the literature and boiling down the articles that would ultimately become part of our CAT was also a struggle. At this time, adhering to our inclusion and exclusion criteria was most helpful in wading through all the data we had found. Even so, we continued to prune our total article count throughout the different phases of the project.

Prior to and into the beginning of creating the CAT, our group came upon another difficult situation. Shortly after settling into a total article count, each group member expressed having difficulty digesting article content prior to the first CAT deadline. Working on the first CAT assignment felt uncomfortable when group members didn't have a full understanding of the depth of information contained within each article. As multiple revisions of the CAT began, the group as a whole developed a better understanding of the detail contained within the total body of research.

Organizing the Critically Appraised Topic. One of the more challenging processes of this research project centered around how best to categorize the 22 research articles into "like" groups that would be most meaningful to readers and representative of the literature review

findings. With 18 of 22 studies being group-based, with 13 different social skills programs utilized across 22 studies, and with studies most frequently focused on adolescents with ASD, organizing the Critical Appraisal of Topic (CAT) presented many challenges. We wanted to present findings that accurately reflected the current state of research, as well as present them in a format that was easily grasped by therapists in the field. Guided by our chair and mentor, and after several organizing iterations, we settled on three tiers: The Program for the education and enrichment of relational skills (PEERS) group-based intervention, group-based non-PEERS interventions with three subcategories of ASD, ADHD, and the comorbidity of ASD and ADHD, and, lastly, non-group, non-PEERS-based interventions.

The Knowledge Translation Process. Our knowledge translation process began with a brainstorming meeting with Kristin Brubaker to discuss possible ways to turn our CAT into useful information for clinicians at CTI. This was a very exciting and productive meeting as we quickly settled on using the evidence from our literature review to develop a social skills program for specific group of clients at CTI. From this seed of an idea and through discussion, our group first decided to develop a reference tool that clinicians could quickly and easily access when creating social skills interventions. We envisioned an intervention component list that represented all interventions found in our literature review. Each intervention would then be cross-referenced with diagnoses with which it was found to be effective as well as the social skills programs found in the literature review to use that intervention. From this initial reference tool, later dubbed Handout A: Intervention Components, the other three elements of the written materials naturally emerged as we found different ways to allow clinicians to access the research. For example, once we realized that didactic topics was a key component to most social skills programs and that many different topics were taught across the 13 programs, we wanted to create a master list of didactic topics cross-referenced by program, diagnosis, age, and author. And, when we saw how lengthy this list was, we thought it would be useful to group topics by theme

so clinicians could see all topics covered within each theme. This would allow therapists to develop interventions surrounding specific theme areas. In retrospect, Handouts A, C, and D reflect three different avenues to access the research evidence.

Delivery of Products. We provided an in-service workshop to present and explain the research process and findings along with our written materials detailing customizable social skills programs on April 21, 2017 at CTI. Before our in-service presentation, we practiced together as a group to ensure our delivery was cohesive and smooth. Our presentation was completed in 30 to 35 minutes, allowing 20 minutes for discussion and questions. The therapists, staff, and rehabilitation director at CTI seemed to be pleased with our products, and the comments on the survey for our in-service presentation were very positive. Therefore, we are all satisfied with our in-service presentation results and felt the product delivery was successful.

<p align="center">**Recommendations for Feasible Follow-up on Projects for the Future**</p>

The therapists, staff, and rehabilitation director at CTI recognized the effectiveness of group-based interventions to improve social skills since nature of the group setting encourages peer modeling and socialization. However, they addressed that due to logistical issues, the planning and organization of group interventions can be challenging. Most importantly, they indicated that the complication of reimbursement practices is the biggest challenge for implementing group-based interventions.

Group-based interventions can be an effective service delivery model in pediatric occupational therapy practice and can be more beneficial than one-on-one intervention for teaching social skills; such as, play, following rules, peer-modeling and communication. Therefore, further research is needed to determine whether other billing codes or options exist for group-based intervention reimbursement. Another point raised by the clinicians and staff at CTI was the cost and length of each program. A future research study could look at the programs detailed within our research and provide information related to cost, supplies, and time required

to implement each program.

    At the time of this project, we found limited research regarding social skills interventions for ADHD, and no research was found regarding SPD. Future studies should include these diagnoses to determine effectiveness for improving social skills.

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