**Supplemental Digital Content A**

**Evidence for Interventions with ToM Components**

To accompany: Westby, C.E. & Robinson, L. (2014). A developmental perspective for promoting theory of mind. *Topics in Language Disorders, 34*(4).

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| Interventions | Research articles | Level of evidence | Outcomes |
| Baron-Cohen, S. *Mind reading: The interactive guide to emotions.* Philadelphia: Jessica Kingsley. | Golan, O & Baron-Cohen,S. (2006). Systematizing empathy: Teaching adults with Asperger syndrome or high-functioning autism to recognize complex emotions using interactive multimedia. *Development and Psychopathology, 18*, 591-617. | An adult intervention group with ASD (19); two matched control groups -- ASD (22); neurotypical (24) | Intervention group improved in ability to recognize a variety of complex emotions and mental states on close, but not distant, generalization |
| Thomeer, M.L., Rodgers, J.D., Lopata, C., McDonald, C.A., Volker, M.A., Toomey, J.A., Smith, R.A., Gullo, G. (2011). Open-trial pilot of mind reading and in vivo rehearsal for children with HFASD. *Focus on Autism & Other Developmental Disabilities, 26*, 153-161. | 11 7-12 year olds. Pre-post assessment of treatment group on Social Responsiveness Scale and Emotion Recognition and Display Survey | Emotion recognition and ability to display emotion rated significantly higher than at pretest. Significant reductions on ratings of autism-associated symptoms on a standardized rating scale completed by parents |
| Baron-Cohen, S. Transporters Computer program available at: www.thetransporters.com | Baron-Cohen, S., Golan, O., & Ashwin, E. (2009). Can emotion recognition be taught to children with autism spectrum conditions? *Philos Trans R Soc Lond B Biol Sci. 364*, 3567–3574. | 3 groups, children aged 4-7 years: ASD intervention (n=20), ASD control (n=19), typically developing control group (n=18). ASD children randomized to intervention/control groups  | Intervention group significantly better on emotional vocabulary task and on situation–expression matching tasks. Control groups showed no significant improvement on any of the tasks between test sessions. |
| Golan, O., Ashwin, E., Granader, Y., McClintock, S., Day, K., Leggett, V. & Baron-Cohen, S. (2010). Enhancing emotion recognition in children with autism spectrum conditions: An intervention using animated vehicles with real emotional faces. *Journal of Autism and Developmental Disorders, 40*, 269–279. | Children with ASD (n=20), ages 4-7 years and 2 matched control groups: ASD (n= 18) and typically developing (n=18) | Children in treatment group significantly in their emotion comprehension and recognitionskills for 15 key emotions |
| Williams, B., Gray, K.M., Tonge, B.J. (2012). Teaching emotion recognition skills to young children with autism: A randomised controlled trial of an emotion training programme. *Journal of Child Psychology & Psychiatry, 53,* 1268-1276. | 55 children with ASD, aged 4–7 years randomly assigned to an intervention (n = 28) or control group (n = 27); mean IQ 1 ½ SD or more below mean. | Improved performance in the recognition of anger compared with the control group, with few improvements maintained at 3-month follow-up. There was no generalization of skills to TOM or social skills. Limited support for the efficacy of the Transporters program for children with ASD in lower cognitive range |
| Cognitive Behavior Therapy (CBT)\*Principles of CBT are foundational for STAMP and Social Thinking programsSee also Social Skills | Koning, C, Magill-Evans, J., Volden, J., Dick, B. (2013) Efficacy of cognitive behavior therapy-based social skills intervention for school-aged boys with autism spectrum disorders. *Research in Autism Spectrum Disorders, 7* (10), pp. 1282-1290. | 15 boys, aged 10-12, randomly assigned to treatment of control group | Better on measures of social perception, peer interaction, and social knowledge; no differences on general measures of socialization |
| Developmental, Individual Difference, Relationship-based (DIR®/Floortime™) Model Greenspan, S., & Wieder, S. (2009). *Engaging autism: Using the floortime approach to help children relate, communicate, and think.* Philadelphia: Da Capo Press.<http://www.icdl.com>www.profectum.org | Pajareya, K., & Nopmaneejumruslers, K. (2011). A one-year prospective follow-up study of a DIR/Floortime parent training intervention for pre-school children with autistic spectrum disorders. *Autism, 15,* 563-577. | 32 children, 24-72 months, assigned to either the typical treatment or DIR/Floortime–supplemented treatment groups using stratified random assignment based on age and symptom severity.  | Intervention group made significantly greater gains in all three measures employedin the study: Functional Emotional Assessment Scale; Childhood Autism Rating Scale, and theFunctional Emotional Questionnaires  |
| Solomon, R., Necheles, J., Ferch, C., & Bruckman, D. (2007). Pilot study of a parent training program for young children with autism: The PLAY Project Home Consultation program. *Autism, 11*, 205–224. | 68 children with ASD, 18 month – 6 years | Pre-post intervention ratings on Functional Emotional Assessment Scale. 45.5% of the children participating made good to very good functional developmental gains. |
| Early Start Denver ModelRogers, S.J., Dawson, G., & Vismara, L. (2012). *An Early Start for your Child with autism*. New York: Guilford Press. | Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenson, J. Et al. (2010). Randomized, controlled trial of an intervention for toddlers with autism: The early start Denver model. *Pediatrics, 25,* 17-23. | 48 children with ASD between 18 and 30 months of age randomly assigned to the Denver Model intervention or were referred to community providers for intervention  | Two years after entering intervention, Denver group on average improved 17.6 standard score points (1 SD: 15 points) compared with 7.0 points in the comparison group relative to baseline scores. Denver group maintained its rate of growth in adaptive behavior compared with a normative sample of typically developing children.  |
| Emotional regulation(e.g., STAMP Program --Scarpa, A., Wells, A., & Attwell, T. (2012). *Exploring feelings for young children with high-functioning autism or Asperger’s disorder.* Philadelphia, PA: Jessica Kingsley. | Scarpa, A., & Reyes, N.M. (2011). Improving regulation with CBT in young children with high functioning autism spectrum disorders: A pilot study. *Behavioral and Cognitive Psychotherapy, 29,* 495-500.Sofronoff, K., Attwood, T. and Hinton, S. (2005). A randomized controlled trial of a cognitive behavioural intervention for anxiety in children with Asperger Syndrome. *Journal of Child Psychology and Psychiatry, 46,* 1152–1160. Sofronoff, K., Attwood, T., Hinton, S. and Levin, I. (2007). A randomized controlled trial of a cognitive behavioural intervention for anger management in children diagnosed with Asperger Syndrome. *Journal of Autism and Developmental Disorders, 37*, 1203–1214.  | 11 children with ASD, ages 5-7 years, randomly assigned to experimental (n=5) or delayed treatment group (n=6)45 children with ASD, ages 9-13 years, randomly assigned to experimental child only, child and parent, and wait list groupChildren with ASD randomly assigned to experimental or delayed treatment group | Less parent-reported negativity/ lability, better parent reported emotion regulation and shorter outbursts; generated more coping strategies in response to vignettesSignificant decreases in parent-reported anxiety symptoms; significant increase in children’s ability to generate positive strategies in anxiety-provoking situationsSignificant decrease in episodes of anger; qualitative information – parent & teacher reported some generalization of strategies |
| Hanen Sussman, F. (2012). More than words, 2nd Ed. Toronoto: Hanen Centre.http://www.hanen.org | Carter, A.S., Messinger, D.S., Stone, W.L, Celimli, S.,Nahmias, A.S., Yoder, P. (2011). A randomized controlled trial of Hanen's 'More Than Words' in toddlers with early autism symptoms. *Journal of Child Psychology & Psychiatry. 52*, 741-752. | 62 children with ASD, ages 15-25 months, randomized into treatment and intent-to-treat groups | Differential effects depending on baseline performance. Facilitated communication in children with lower object interest at baseline |
| Girolametto, L., Sussman, F., & Weitzman, E. (2007). Using case study methods to investigate the effects of interactive intervention for children with Autism Spectrum Disorders. *Journal of Communication Disorders, 40*, 470-492. | 3 parents and children Outcome measures included estimates of parents’ responsive language input, and measures of children’s rate of communication, number of engagements in social interaction, and initiations. | Mothers increased their responsive comments during play interactions and were rated as being more responsive on a rating scale. All three children evidenced positive outcomes in vocabulary and the number of engagements in social interaction. Improvement observed in social initiation skills for all three children. |
| McConachie, H., Randle, V., Hammal, D., & LeCouteur, A. (2005). A controlled trial of a training course for parents of children with suspected autism spectrum disorder. *The Journal of Pediatrics, 33*, 5–340. | 51 children/parents, ages 24-48 months randomized to treatment and delayed access to treatment | Children in treatment group had significantly larger vocabularies |
| Joint Attention Symbolic Play and Engagement Regulation JASPERhttp://www.interactingwithautism.com/section/treating/jasper | Lawton, K., & Kasari, C. (2012). Teacher-implemented joint attention intervention: Pilot randomized controlled study for preschoolers with autism. Journal of *Consulting and Clinical Psychology, 80,* 687-693. | 16 dyads (preschoolers with ASD and the public school teachers who worked inthe child’s classroom) randomly assigned to the JASPER intervention or a control group. | JASPER preschoolers used more joint attention than control children in the classroom and spent more time in supported engagement and less time in object engagement than control preschoolers on a taped play interaction |
| Goods, K.S, Ishijima, E., Chang, Y.-C., & Kasari, C. (2013). Preschool based JASPER intervention in minimally verbal child with autism: Pilot RCT. *Journal of Autism and Developmental Disorders, 43*, 1050-1056. | 15 children, aged 3-5 years, randomly assigned to a treatment as usual group or a substituted JASPER intervention  | treatment group demonstrated greater play diversity on a standardized assessment. Effects generalized to the classroom,where participants in the treatment group initiated moregestures and spent less time unengaged. |
| Let’s Face It Computer Program to Teach Facial Processinghttp://web.uvic.ca/~letsface/letsfaceit/ (games and manual with ideas for teaching emotions can be downloaded free) | Tanaka, J.W., Wolf, J. M., Klaiman, C., Koenig, K., Cockburn, J., Herlihy, L., Brown, C., Stahl, S., Kaiser, M.D., and Schultz, R.T. (2010). Using computerized games to teach face recognition skills to children with autism spectrum disorder: The Let's Face It! program. *Journal of Child Psychology & Psychiatry, 51*, 944-952. | Randomized clinical trial; 42 children with ASD in experimental group; 37 children with ASD in control group | Significant improvements in face recognition (recognize mouths in isolation and process eyes holistically) |
| Pretend play/creative dramatics | Allen, J.R., & Kinsey, K. (2013). Teaching theory of mind. *Early Education and Development, 24*, 865-876. | 38 children, 36-52 months; children split into experimental (pretense play) and control groups | Children receiving specific pretense play training performed significantly better compared to the control group on measures of appearance-reality and emotion recognition.  |
| Goldstein, T. R., & Winner, E. (2012). Enhancing empathy and theory of mind. *Journal of Cognition and Development, 13,* 19–37. | 35 elementary school children (ages 7;6–10;11) enrolled in acting classes and 40 children (ages 8;0–10;5) enrolled in after-school visual arts classes; 28 high school students (ages 13;0–16;0) majoring in acting; 25 high school students (ages 13;0–16;0) majoring in the visual arts or music.  | In both studies, those receiving acting (but not other arts) training showed significant gains in empathy scores; adolescentsreceiving acting training also showed significant gains on a naturalistic measure of theory of mind |
| Questioning the AuthorBeck, I.L., & McKeown, M.G. (2006). *Improving comprehension with questioning the author.* New York: Scholastic. | Beck, I.L, & McKeown, M.G. (1996). Questioning the author: A yearlong classroom implementation to engage students with text. *Elementary School Journal, 96*, 385-414. | 23 4th grade students, Pre-post analyses of transcripts of videotaped lessons and classroom observations  | Teacher talk decreasedin quantity and increased in quality with more emphasis on questions focused on constructing and extending meaning and more skillin refining and using students' comments in discussion.Changes in the content of student talk included an increasein the number and complexity of student initiated questions |
| Relationship Development Intervention (RDI)Gutstein, S. & Sheely, R. (2002). *Relationship development intervention with young children*. Jessica Kingsley Publications: London.Gutstein, S. & Sheely, R. (2002). *Relationship development intervention with children, adolescents and adults.* Jessica Kingsley Publications: London.http://www.rdiconnect.com/ | Gutstein, S.E., Burgess, A.F., & Montfort, K. (2007). Evaluation of the relationship development intervention program. *Autism, 11,* 397-411. | Review of progress of 16 children over 5 years; 20-96 months at initiation of RDI intervention. | Prior to treatment, 10 children received an initial ADOS‘autism’ rating, two received an ‘autism spectrum’ rating. After amedian of 41.5 months in treatment, no child met ADOS criteria for an autism diagnosis, 6 children met criteria for autism spectrum, and 10 children were rated in the ‘non-autism’ diagnostic category. Five children initially rated in the ‘autism’ category achieved a ‘non-autism’ rating |
| Social Communication Emotional Regulation Transactional Support SCERTSPrizant, B.M., Miller, A., & Rubin, E. (2005). SCERTS Manual: A comprehensive educational approach for young children with autism spectrum disorders. Baltimore: Brookes. | See “Summary of Research Supporting the SCERTS Model” at: <http://www.scerts.com/docs/ResearchSupportingtheSCERTSModel10-7-06.pdf>Evidence organized into 3 SCERTS domains: Social Communication, Emotional Regulation, Transactional SupportThe SCERTS Model has been derived from a theoretical and empirically based foundation and addresses core challenges of children with ASD as they relate tosocial communication, emotional regulation, and transactional support. |  |  |
| Social Skills Training (may be part of CBT) | Gantman, A., Kapp, S.K., Orenski, K., & Laugeson, E.A. (2012). Social skills training for young children with autism spectrum disorders: A randomized controlled pilot study. *Journal of Autism and Developmental Disorders, 42,* 1094-1103. | 19 adults with ASD, ages 18-23 with IQs greater than 70, randomized into immediate treatment and delayed treatment groups | Less loneliness and improved social skills knowledge; caregivers reported significant improvements in overall social skills, social responsiveness, empathy, and frequency of get togethers |
| Social ThinkingWinner, M.G. (2007). *Thinking about you, thinking about me.* Thinking Social Publishing.Madrigal, S., Winner, M.G., & Knopp, K. (2008). Superflex: *A superhero social thinking curriculum*. Think Social.https://www.socialthinking.com/ | Crooke, P.J., Hendrix, R.E., Rachman, J.Y., (2007) Brief Report: Measuring the Effectiveness of Teaching Social Thinking to Children with Asperger Syndrome (AS) and High Functioning Autism (HFA). Journal of Autism and Developmental Disorders, Online publication: DOI 10.1007/s10803-007-0466-1 | Pre-post comparisons of verbal and non-verbal social behaviors of 6 students, ages 9-11 years | Increases in expected/appropriate verbal and nonverbal behaviors; decreases in unexpected/ inappropriate behaviors |
| Lee, K Y S, Lui, A.L.Y, Kan, P.P.K, Luke, K.L, Mak, Y.M, Cheung, P.M.P, Cheng, L; Wong, I (2009) A Case Series on the Social Thinking Training of Mainstreamed Secondary School Students with High-functioning Autism, Hong Kong Journal of Mental Health 35: 10-17. | 4 case studies, 14-15 years old | Pre-post scores on Social Thinking Rating Scale domains; minimal change -- percentage gains .88% to 7.54%. Students did not make gains in all areas. |
| Think-AloudWilhelm, J. (2013). *Improving comprehension with think aloud strategies: Modeling what good readers do paperback.* New York: Scholastic. | Laing, S. P.; Kamhi, A. (2002). The use of think-aloud protocols to compare inferencing abilities in average and below-average readers. *Journal of Learning Disabilities, 35*, 436-438. | 20 average and 20 below average 30 graders listened to stories in 2 conditions: listen through or listen and after each sentence explain what they understood about the story | For both average and below average readers, story retells were better in the think aloud condition |