Evidence-base

The National Clearinghouse on Autism Evidence and Practice has adopted the following criteria to determine if a practice is evidence-based. The 2020 EBP report (Steinbrenner et al., 2020) provides more information about the systematic review process.

Efficacy must be established through high-quality, peer-reviewed research in scientific journals using:

- At least 2 randomized or quasi-experimental group design studies, or
- At least 5 single subject/case design studies, or a
- Combination of evidence of 1 randomized or quasi-experimental group design study and 3 single subject/case design studies

OVERVIEW:

Based upon the 2020 systematic review conducted by the National Clearinghouse on Autism Evidence and Practice (NCAEP), Discrete Trial Training is a focused intervention that meets the evidence-based practice criteria with 58 single case design. Discrete Trial Training has been effective for early intervention (0-2 years), preschoolers (3-5 years), elementary school learners (6-11 years), middle school learners (12-14 years), high schoolers (15-18 years), and young adults (19-22 years) on the spectrum. Studies included the 2020 EBP report (Steinbrenner et al., 2020) detail how Discrete Trial Training can be used to effectively address the following outcomes for a target skill/behavior/goal: academic/pre-academic, adaptive/self-help, behavior, cognitive, communication, joint attention, play, school readiness, social, and vocational.

In the table below, the instructional outcomes identified by the evidence base are shown by age of participants.

Age	Academic	Adaptive	Behavior	Cognitive	Communication	Joint Attention	Play	School Readiness	Social	Vocational
0-2						Yes			Yes	
3-5	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	
6-11	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
12-14					Yes				Yes	
15-18	Yes				Yes				Yes	
19-22					Yes				Yes	

EARLY INTERVENTION (0-2 YEARS):

*** Krstovska-Guerrero, I., & Jones, E. A. (2013). Joint attention in autism: Teaching smiling coordinated with gaze to respond to joint attention bids. *Research in Autism Spectrum Disorders, 7*(1), 93-108. https://doi.org/10.1016/j.rasd.2012.07.007**

PRESCHOOL (3-5 YEARS):

Benedek-Wood, E., McNaughton, D., & Light, J. (2016). Instruction in letter-sound correspondences for children with autism and limited speech. *Topics in Early Childhood Special Education, 36*(1), 43-54. https://doi.org/10.1177/0271121415593497

*** Carroll, R. A., Joachim, B. T., St Peter, C. C., & Robinson, N. (2015). A comparison of error-correction procedures on skill acquisition during discrete-trial instruction. *Journal of Applied Behavior Analysis, 48*(2), 257-273. https://doi.org/10.1002/jaba.205**

*** Carroll, R. A., Kodak, T., & Fisher, W. W. (2013). An evaluation of programmed treatment-integrity errors during discrete-trial instruction. *Journal of Applied Behavior Analysis, 46*(2), 379-394. https://doi.org/10.1002/jaba.49**

Davis, B. J., Kahng, S., & Coryat, K. (2012). Manipulating motivating operations to facilitate the emergence of mands for a child with autism. *Analysis of Verbal Behavior, 28*, 145-150. https://doi.org/10.1007/bf03393116

*** Delfs, C. H., Conine, D. E., Frampton, S. E., Shillingsburg, M. A., & Robinson, H. C. (2014). Evaluation of the efficiency of listener and tact instruction for children with autism. *Journal of Applied Behavior Analysis, 47*(4), 793-809. https://doi.org/10.1002/jaba.166**

* Goldsmith, T. R., LeBlanc, L. A., & Sautter, R. A. (2007). Teaching intraverbal behavior to children with autism. *Research in Autism Spectrum Disorders*, *1*(1), 1-13. https://doi.org/10.1016/j.rasd.2006.07.001

* Gould, E., Tarbox, J., O'Hora, D., Noone, S., & Bergstrom, R. (2011). Teaching children with autism a basic component skill of perspective-taking. *Behavioral Interventions*, *26*(1), 50-66. https://doi.org/10.1002/bin.320

*** Henrickson, M. L., Rapp, J. T., & Ashbeck, H. A. (2015). Teaching with massed versus interspersed trials: Effects on acquisition, maintenance, and problem behavior. *Behavioral Interventions, 30*(1), 36-50. https://doi.org/10.1002/bin.1396**

* Jahr, E. (2001). Teaching children with autism to answer novel wh-questions by utilizing a multiple exemplar strategy. *Research in Developmental Disabilities*, *22*(5), 407-423. https://doi.org/10.1016/S0891-4222(01)00081-6

* Joachim, B. T., & Carroll, R. A. (2017). A comparison of consequences for correct responses during discrete-trial instruction. *Learning and Motivation, 62*, 15-28. https://doi.org/10.1016/j.lmot.2017.01.002

Jones, E. A., Feeley, K. M., & Takacs, J. (2007). Teaching spontaneous responses to young children with autism. *Journal of Applied Behavior Analysis*, *40*(3), 565-570. https://doi.org/10.1901/jaba.2007.40-565

*** Kodak, T., Campbell, V., Bergmann, S., LeBlanc, B., Kurtz-Nelson, E., Cariveau, T., Haq, S., Zemantic, P., & Mahon, J. (2016). Examination of efficacious, efficient, and socially valid error-correction procedures to teach sight words and prepositions to children with autism spectrum disorder. *Journal of Applied Behavior Analysis, 49*(3), 532-547. https://doi.org/10.1002/jaba.310**

Kodak, T., & Clements, A. (2009). Acquisition of mands and tacts with concurrent echoic training. *Journal of Applied Behavior Analysis*, *42*(4), 839-843. https://doi.org/10.1901/jaba.2009.42-839

*** Kodak, T., Clements, A., & Leblanc, B. (2013). A rapid assessment of instructional strategies to teach auditory-visual conditional discriminations to children with autism. *Research in Autism Spectrum Disorders, 7*(6), 801-807. https://doi.org/10.1016/j.rasd.2013.02.007**

*** Krstovska-Guerrero, I., & Jones, E. A. (2013). Joint attention in autism: Teaching smiling coordinated with gaze to respond to joint attention bids. *Research in Autism Spectrum Disorders, 7*(1), 93-108. https://doi.org/10.1016/j.rasd.2012.07.007**

Lang, R., Rispoli, M., Sigafoos, J., Lancioni, G., Andrews, A., & Ortega, L. (2011). Effects of language of instruction on response accuracy and challenging behavior in a child with autism. *Journal of Behavioral Education*, *20*(4), 252-259. https://doi.org/10.1007/s10864-011-9130-0

Leaf, J. B., Alcalay, A., Leaf, J. A., Tsuji, K., Kassardjian, A., Dale, S., McEachin, J., Taubman, M., & Leaf, R. (2016). Comparison of most-to-least to error correction for teaching receptive labelling for two children diagnosed with autism. *Journal of Research in Special Educational Needs, 16*(4), 217-225. https://doi.org/10.1111/1471-3802.12067

*** Leaf, J. B., Leaf, R., Taubman, M., McEachin, J., & Delmolino, L. (2014). Comparison of flexible prompt fading to error correction for children with autism spectrum disorder. *Journal of Developmental and Physical Disabilities, 26*(2), 203-224. https://doi.org/10.1007/s10882-013-9354-0**

* Leaf, J. B., Oppenheim-Leaf, M. L., Dotson, W. H., Johnson, V. A., Courtemanche, A. B., Sheldon, J. B., & Sherman, J. A. (2011). Effects of no-no prompting on teaching expressive labeling of facial expressions to children with and without a pervasive developmental disorder. *Education and Training in Autism and Developmental Disabilities*, *46*(2), 186-203.

Leaf, J. B., Tsuji, K. H., Lentell, A. E., Dale, S. E., Kassardjian, A., Taubman, M., McEachin, J., Leaf, R., & Oppenheim-Leaf, M. L. (2013). A comparison of discrete trial teaching implemented in a one-to-one instructional format and in a group instructional format. *Behavioral Interventions, 28*(1), 82-106. https://doi.org/10.1002/bin.1357

*** Lee, G. T., Feng, H., Xu, S., & Jin, S. J. (2017). Increasing "object-substitution" symbolic play in young children with autism spectrum disorders. *Behavior Modification, 43*(1), 82-114. https://doi.org/10.1177/0145445517739276**

Majdalany, L. M., Wilder, D. A., Greif, A., Mathisen, D., & Saini, V. (2014). Comparing massed-trial instruction, distributed-trial instruction, and task interspersal to teach tacts to children with autism spectrum disorders. *Journal of Applied Behavior Analysis, 47*(3), 657-662. https://doi.org/10.1002/jaba.149

Majdalany, L., Wilder, D. A., Smeltz, L., & Lipschultz, J. (2016). The effect of brief delays to reinforcement on the acquisition of tacts in children with autism. *Journal of Applied Behavior Analysis, 49*(2), 411-415. https://doi.org/10.1002/jaba.282

McHugh, L., Bobarnac, A., & Reed, P. (2011). Brief report: Teaching situation-based emotions to children with autistic spectrum disorder. *Journal of Autism and Developmental Disorders*, *41*(10), 1423-1428. https://doi.org/10.1007/s10803-010-1152-2

*** McKeel, A. N., Dixon, M. R., Daar, J. H., R., Kyle E., & Szekely, S. (2015). Evaluating the efficacy of the PEAK Relational Training System using a randomized controlled trial of children with autism. *Journal of Behavioral Education*, *24*(2), 230-241. https://doi.org/10.1007/s10864-015-9219-y**

*** Plaisance, L., Lerman, D. C., Laudont, C., & Wu, W. L. (2016). Inserting mastered targets during error correction when teaching skills to children with autism. *Journal of Applied Behavior Analysis, 49*(2), 251-64. https://doi.org/10.1002/jaba.292**

* Summers, J., Tarbox, J., Findel-Pyles, R. S., Wilke, A. E., Bergstrom, R., & Williams, W. L. (2011). Teaching two household safety skills to children with autism. *Research in Autism Spectrum Disorders*, *5*(1), 629-632. https://doi.org/10.1016/j.rasd.2010.07.008

Taubman, M., Brierley, S., Wishner, J., Baker, D., McEachin, J., & Leaf, R. B. (2001). The effectiveness of a group discrete trial instructional approach for preschoolers with developmental disabilities. *Research in Developmental Disabilities*, *22*(3), 205-219. https://doi.org/10.1016/S0891-4222(01)00068-3

Whalen, C., Moss, D., Ilan, A. B., Vaupel, M., Fielding, P., Macdonald, K., Cernich, S., & Symon, J. (2010). Efficacy of TeachTown: Basics computer-assisted intervention for the intensive comprehensive autism program in Los Angeles Unified School District. *Autism*, *14*(3), 179-197. https://doi.org/10.1177/1362361310363282

* Wynn, J. W., & Smith, T. (2003). Generalization between receptive and expressive language in young children with autism. *Behavioral Interventions*, *18*(4), 245-266. https://doi.org/10.1002/bin.142

ELEMENTARY SCHOOL (6-11 YEARS):

*** Carroll, R. A., Joachim, B. T., St Peter, C. C., & Robinson, N. (2015). A comparison of error-correction procedures on skill acquisition during discrete-trial instruction. *Journal of Applied Behavior Analysis, 48*(2), 257-273. https://doi.org/10.1002/jaba.205**

*** Carroll, R. A., Kodak, T., & Fisher, W. W. (2013). An evaluation of programmed treatment-integrity errors during discrete-trial instruction. *Journal of Applied Behavior Analysis, 46*(2), 379-394. https://doi.org/10.1002/jaba.49**

Cihak, D. F. (2007). Teaching students with autism to read pictures. *Research in Autism Spectrum Disorders*, *1*(4), 318-329. https://doi.org/10.1016/j.rasd.2006.12.002

*** Delfs, C. H., Conine, D. E., Frampton, S. E., Shillingsburg, M. A., & Robinson, H. C. (2014). Evaluation of the efficiency of listener and tact instruction for children with autism. *Journal of Applied Behavior Analysis, 47*(4), 793-809. https://doi.org/10.1002/jaba.166**

* Gena, A., Krantz, P. J., McClannahan, L. E., & Poulson, C. L. (1996). Training and generalization of affective behavior displayed by youth with autism. *Journal of Applied Behavior Analysis*, *29*(3), 291-304. https://doi.org/10.1901/jaba.1996.29-291

* Goldsmith, T. R., LeBlanc, L. A., & Sautter, R. A. (2007). Teaching intraverbal behavior to children with autism. *Research in Autism Spectrum Disorders*, *1*(1), 1-13. https://doi.org/10.1016/j.rasd.2006.07.001

* Gould, E., Tarbox, J., O'Hora, D., Noone, S., & Bergstrom, R. (2011). Teaching children with autism a basic component skill of perspective-taking. *Behavioral Interventions*, *26*(1), 50-66. https://doi.org/10.1002/bin.320

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* Jahr, E. (2001). Teaching children with autism to answer novel wh-questions by utilizing a multiple exemplar strategy. *Research in Developmental Disabilities*, *22*(5), 407-423. https://doi.org/10.1016/S0891-4222(01)00081-6

*** Joachim, B. T., & Carroll, R. A. (2017). A comparison of consequences for correct responses during discrete-trial instruction. *Learning and Motivation, 62*, 15-28. https://doi.org/10.1016/j.lmot.2017.01.002**

Kelley, M. E., Shillingsburg, M. A., Castro, M. J., Addison, L. R., & LaRue, R. H. (2007). Further evaluation of emerging speech in children with developmental disabilities: Training verbal behavior. *Journal of Applied Behavior Analysis*, *40*(3), 431-445. https://doi.org/10.1901/jaba.2007.40-431

*** Kodak, T., Campbell, V., Bergmann, S., LeBlanc, B., Kurtz-Nelson, E., Cariveau, T., Haq, S., Zemantic, P., & Mahon, J. (2016). Examination of efficacious, efficient, and socially valid error-correction procedures to teach sight words and prepositions to children with autism spectrum disorder. *Journal of Applied Behavior Analysis, 49*(3), 532-547. https://doi.org/10.1002/jaba.310**

*** Kodak, T., Clements, A., & Leblanc, B. (2013). A rapid assessment of instructional strategies to teach auditory-visual conditional discriminations to children with autism. *Research in Autism Spectrum Disorders, 7*(6), 801-807. https://doi.org/10.1016/j.rasd.2013.02.007**

*** Leaf, J. B., Leaf, R., Taubman, M., McEachin, J., & Delmolino, L. (2014). Comparison of flexible prompt fading to error correction for children with autism spectrum disorder. *Journal of Developmental and Physical Disabilities, 26*(2), 203-224. https://doi.org/10.1007/s10882-013-9354-0**

* Leaf, J. B., Oppenheim-Leaf, M. L., Dotson, W. H., Johnson, V. A., Courtemanche, A. B., Sheldon, J. B., & Sherman, J. A. (2011). Effects of no-no prompting on teaching expressive labeling of facial expressions to children with and without a pervasive developmental disorder. *Education and Training in Autism and Developmental Disabilities*, *46*(2), 186-203.

*** Lee, G. T., Feng, H., Xu, S., & Jin, S. J. (2017). Increasing "object-substitution" symbolic play in young children with autism spectrum disorders. *Behavior Modification, 43*(1), 82-114. https://doi.org/10.1177/0145445517739276**

*** McKeel, A. N., Dixon, M. R., Daar, J. H., R., Kyle E., & Szekely, S. (2015). Evaluating the efficacy of the PEAK Relational Training System using a randomized controlled trial of children with autism. *Journal of Behavioral Education*, *24*(2), 230-241. https://doi.org/10.1007/s10864-015-9219-y**

*** Plaisance, L., Lerman, D. C., Laudont, C., & Wu, W. L. (2016). Inserting mastered targets during error correction when teaching skills to children with autism. *Journal of Applied Behavior Analysis, 49*(2), 251-64. https://doi.org/10.1002/jaba.292**

Radley, K. C., Dart, E. H., Furlow, C. M., & Ness, E. J. (2015). Peer-mediated discrete trial training within a school setting. *Research in Autism Spectrum Disorders, 9*, 53-67. https://doi.org/10.1016/j.rasd.2014.10.001

Simer, N., & Cuvo, A. J. (2009). Training vision screening behavior to children with developmental disabilities. *Research in Autism Spectrum Disorders*, *3*(2), 409-420. https://doi.org/10.1016/j.rasd.2008.08.007

* Summers, J., Tarbox, J., Findel-Pyles, R. S., Wilke, A. E., Bergstrom, R., & Williams, W. L. (2011). Teaching two household safety skills to children with autism. *Research in Autism Spectrum Disorders*, *5*(1), 629-632. https://doi.org/10.1016/j.rasd.2010.07.008

Townley-Cochran, D., Leaf, J. B., Leaf, R., Taubman, M., & McEachin, J. (2017). Comparing error correction procedures for children diagnosed with autism. *Education Training Autism and Developmental Disabilities, 52*(1), 91-101.

Tullis, C. A., Frampton, S. E., Delfs, C. H., & Shillingsburg, M. A. (2017). Teaching problem explanations using instructive feedback. *Analysis of Verbal Behavior, 33*(1), 64-79. https://doi.org/10.1007/s40616-016-0075-1

* Wynn, J. W., & Smith, T. (2003). Generalization between receptive and expressive language in young children with autism. *Behavioral Interventions*, *18*(4), 245-266. https://doi.org/10.1002/bin.142

MIDDLE SCHOOL (12-14 YEARS):

* Gena, A., Krantz, P. J., McClannahan, L. E., & Poulson, C. L. (1996). Training and generalization of affective behavior displayed by youth with autism. *Journal of Applied Behavior Analysis*, *29*(3), 291-304. https://doi.org/10.1901/jaba.1996.29-291

*** McKeel, A. N., Dixon, M. R., Daar, J. H., R., Kyle E., & Szekely, S. (2015). Evaluating the efficacy of the PEAK Relational Training System using a randomized controlled trial of children with autism. *Journal of Behavioral Education*, *24*(2), 230-241. https://doi.org/10.1007/s10864-015-9219-y**

HIGH SCHOOL (15-18 YEARS):

* Gena, A., Krantz, P. J., McClannahan, L. E., & Poulson, C. L. (1996). Training and generalization of affective behavior displayed by youth with autism. *Journal of Applied Behavior Analysis*, *29*(3), 291-304. https://doi.org/10.1901/jaba.1996.29-291

*** McKeel, A. N., Dixon, M. R., Daar, J. H., R., Kyle E., & Szekely, S. (2015). Evaluating the efficacy of the PEAK Relational Training System using a randomized controlled trial of children with autism. *Journal of Behavioral Education*, *24*(2), 230-241. https://doi.org/10.1007/s10864-015-9219-y**

Vedora, J., Barry, T., & Ward-Horner, J. C. (2017). An evaluation of differential observing responses during receptive label training. *Behavior Analysis in Practice, 10*(3), 290-295. https://doi.org/10.1007/s40617-017-0188-6

YOUNG ADULTS (19-22 YEARS):

* Gena, A., Krantz, P. J., McClannahan, L. E., & Poulson, C. L. (1996). Training and generalization of affective behavior displayed by youth with autism. *Journal of Applied Behavior Analysis*, *29*(3), 291-304. https://doi.org/10.1901/jaba.1996.29-291

*** McKeel, A. N., Dixon, M. R., Daar, J. H., R., Kyle E., & Szekely, S. (2015). Evaluating the efficacy of the PEAK Relational Training System using a randomized controlled trial of children with autism. *Journal of Behavioral Education*, *24*(2), 230-241. https://doi.org/10.1007/s10864-015-9219-y**

Notes: * denotes the study has participants in at least two age ranges
Bold denotes new studies since 2011 (2012 till 2017)