

# Reinforcement Fact Sheet

## Brief Description

Reinforcement (R+) is used to teach new skills and to increase behavior. Reinforcement establishes the relationship between the learner's behavior/use of skill and the consequence of that behavior/skill. This relationship is only reinforcing if the consequence increases the likelihood that the learner performs that behavior/skill. Reinforcement can be positive or negative. Positive reinforcement is the delivery of a reinforcer (i.e., something that the learner desires which may be tangible, edible, activity-based, interest-based, and so on) after the learner does the target skill or behavior. Positive reinforcement can also be implemented in the format of a token economy program. Token economy programs systematically give learners access to tokens when targeted behaviors/skills are used. These tokens are exchanged for desired objects or activities that reinforce the learners' use of that behavior/skill. Negative reinforcement is the removal of an object or activity that the learner does not want (e.g., taking a break after finishing a set of math problems) when the learner does the identified behavior or skill. Reinforcement is a foundational evidence-based practice in that it is almost always used in conjunction with other evidence-based practices (e.g., prompting, pivotal response training, discrete trial teaching, functional communication training).

## Qualifying Evidence

R+ meets evidence-based criteria with 43 single case design studies.

## Ages

According to the evidence-based studies, this intervention has been effective for toddlers (0-2 years) to young adults (19-22 years) with ASD.

## Outcomes

R+ can be used effectively to address social, communication, behavior, joint attention, play, cognitive, school-readiness, academic, motor, adaptive, and vocational skills.

## Research Studies Providing Evidence

Athens, E. S., Vollmer, T. R., Sloman, K. N., & Pipkin, C. S. P. (2008). An analysis of vocal stereotypy and therapist fading. *Journal of Applied Behavior Analysis, 41*(2), 291-297. doi: 10.1901/jaba.2008.41-291

Baltruschat, L., Hasselhorn, M., Tarbox, J., Dixon, D. R., Najdowski, A. C., Mullins, R. D., & Gould, E. R. (2011). Addressing working memory in children with autism through behavioral intervention. *Research in Autism Spectrum Disorders, 5*(1), 267-276. doi: 10.1016/j.rasd.2010.04.008

- Baltruschat, L., Hasselhorn, M., Tarbox, J., Dixon, D. R., Najdowski, A. C., Mullins, R. D., & Gould, E. R. (2011). Further analysis of the effects of positive reinforcement on working memory in children with autism. *Research in Autism Spectrum Disorders, 5*(2), 855-863. doi: 10.1016/j.rasd.2010.09.015
- Bartlett, S. M., Rapp, J. T., Krueger, T. K., & Henrickson, M. L. (2011). The use of response cost to treat spitting by a child with autism. *Behavioral Interventions, 26*(1), 76-83. doi: 10.1002/bin.322
- Buckley, S. D., & Newchok, D. K. (2006). Analysis and treatment of problem behavior evoked by music. *Journal of Applied Behavior Analysis, 39*(1), 141-144. doi: 10.1901/jaba.2006.120-04
- Charlop, M. H., Kurtz, P. F., & Casey, F. G. (1990). Using aberrant behaviors as reinforcers for autistic children. *Journal of Applied Behavior Analysis, 23*(2), 163-181. doi: 10.1901/jaba.1990.23-163
- Charlop-Christy, M. H., & Haymes, L. K. (1998). Using objects of obsession as token reinforcers for children with autism. *Journal of Autism and Developmental Disorders, 28*(3), 189-198. doi: 10.1023/A:1026061220171
- DeLeon, I. G., Anders, B. M., Rodriguez-Catter, V., & Neidert, P. L. (2000). The effects of noncontingent access to single-versus multiple-stimulus sets on self-injurious behavior. *Journal of Applied Behavior Analysis, 33*(4), 623-626. doi: 10.1901/jaba.2000.33-623
- Esch, B. E., Carr, J. E., & Grow, L. L. (2009). Evaluation of an enhanced stimulus-stimulus pairing procedure to increase early vocalizations of children with autism. *Journal of Applied Behavior Analysis, 42*(2), 225-241. doi: 10.1901/jaba.2009.42-225
- Falcomata, T. S., Roane, H. S., Hovanetz, A. N., Kettering, T. L., & Keeney, K. M. (2004). An evaluation of response cost in the treatment of inappropriate vocalizations maintained by automatic reinforcement. *Journal of Applied Behavior Analysis, 37*(1), 83-87. doi: 10.1901/jaba.2004.37-83
- Graff, R. B., & Larsen, J. (2011). The relation between obtained preference value and reinforcer potency. *Behavioral Interventions, 26*(2), 125-133. doi: 10.1002/bin.325
- Graff, R. B., & Libby, M. E. (1999). A comparison of pre-session and within-session reinforcement choice. *Journal of Applied Behavior Analysis, 32*(2), 161-173. doi: 10.1901/jaba.1999.32-161
- Groskreutz, M. P., Groskreutz, N. C., & Higbee, T. S. (2011). Response competition and stimulus preference in the treatment of automatically reinforced behavior: A comparison. *Journal of Applied Behavior Analysis, 44*(1), 211-215. doi: 10.1901/jaba.2011.44-211
- Hagopian, L. P., Bruzek, J. L., Bowman, L. G., & Jennett, H. K. (2007). Assessment and treatment of problem behavior occasioned by interruption of free-operant behavior. *Journal of Applied Behavior Analysis, 40*(1), 89-103. doi: 10.1901/jaba.2007.63-05
- Hagopian, L. P., Farrell, D. A., & Amari, A. (1996). Treating total liquid refusal with backward chaining and fading. *Journal of Applied Behavior Analysis, 29*(4), 573-575. doi: 10.1901/jaba.1996.29-573
- Hagopian, L. P., Fisher, W. W., & Legacy, S. M. (1994). Schedule effects of noncontingent reinforcement on attention-maintained destructive behavior in identical quadruplets. *Journal of Applied Behavior Analysis, 27*(2), 317-325. doi: 10.1901/jaba.1994.27-317
- Harchik, A. E., Harchik, A. J., Luce, S. C., & Sherman, J. A. (1990). Teaching autistic and severely handicapped children to recruit praise: Acquisition and generalization. *Research in Developmental Disabilities, 11*(1), 77-95. doi: 10.1016/0891-4222(90)90006-T
- Higbee, T. S., Carr, J. E., & Patel, M. R. (2002). The effects of interpolated reinforcement on resistance to extinction in children diagnosed with autism: A preliminary investigation. *Research in Developmental Disabilities, 23*(1), 61-78. doi: 10.1016/S0891-4222(01)00092-0
- Hoch, H., McComas, J. J., Johnson, L., Faranda, N., & Guenther, S. L. (2002). The effects of magnitude and quality of reinforcement on choice responding during play activities. *Journal of Applied Behavior Analysis, 35*(2), 171-181. doi: 10.1901/jaba.2002.35-171

- Hoch, H., McComas, J. J., Thompson, A. L., & Paone, D. (2002). Concurrent reinforcement schedules: Behavior change and maintenance without extinction. *Journal of Applied Behavior Analysis, 35*(2), 155-169. doi: 10.1901/jaba.2002.35-155
- Hoch, H., Taylor, B. A., & Rodriguez, A. (2009). Teaching teenagers with autism to answer cell phones and seek assistance when lost. *Behavior Analysis in Practice, 2*(1), 14-20.
- Kern, L., Carberry, N., & Haidara, C. (1997). Analysis and intervention with two topographies of challenging behavior exhibited by a young woman with autism. *Research in Developmental Disabilities, 18*(4), 275-287. doi: 10.1016/S0891-4222(97)00009-7
- Kern, L., & Marder, T. J. (1996). A comparison of simultaneous and delayed reinforcement as treatments for food selectivity. *Journal of Applied Behavior Analysis, 29*(2), 243-246. doi: 10.1901/jaba.1996.29-243
- Koegel, L. K., Camarata, S. M., Valdez-Menchaca, M., & Koegel, R. L. (1997). Setting generalization of question-asking by children with autism. *American Journal on Mental Retardation, 102*(4), 346-357. doi: 10.1352/0895-8017(1998)102<0346:SGOQBC>2.0.CO;2
- Kohler, F. W., Strain, P. S., Maresky, S., & DeCesare, L. (1990). Promoting positive and supportive interactions between preschoolers: An analysis of group-oriented contingencies. *Journal of Early Intervention, 14*(4), 327-341. doi: 10.1177/105381519001400404
- LeBlanc, L. A., Carr, J. E., Crossett, S. E., Bennett, C. M., & Detweiler, D. D. (2005). Intensive outpatient behavioral treatment of primary urinary incontinence of children with autism. *Focus on Autism and Other Developmental Disabilities, 20*(2), 98-105. doi: 10.1177/10883576050200020601
- Lee, R., & Sturmey, P. (2006). The effects of lag schedules and preferred materials on variable responding in students with autism. *Journal of Autism and Developmental Disorders, 36*(3), 421-428. doi: 10.1007/s10803-006-0080-7
- Leung, J. P., & Wu, K. I. (1997). Teaching receptive naming of Chinese characters to children with autism by incorporating echolalia. *Journal of Applied Behavior Analysis, 30*(1), 59-68. doi: 10.1901/jaba.1997.30-59
- Levin, L., & Carr, E. G. (2001). Food selectivity and problem behavior in children with developmental disabilities analysis and intervention. *Behavior Modification, 25*(3), 443-470. doi: 10.1177/0145445501253004
- Machalicek, W., O'Reilly, M., Chan, J. M., Lang, R., Rispoli, M., Davis, T., ... Didden, R. (2009). Using videoconferencing to conduct functional analysis of challenging behavior and develop classroom behavioral support plans for students with autism. *Education and Training in Developmental Disabilities, 44*(2), 207-217.
- McDonald, M. E., & Hemmes, N. S. (2003). Increases in social initiation toward an adolescent with autism: Reciprocity effects. *Research in Developmental Disabilities, 24*(6), 453-465. doi: 10.1016/j.ridd.2003.04.001
- Milo, J. S., Mace, F. C., & Nevin, J. A. (2010). The effects of constant versus varied reinforcers on preference and resistance to change. *Journal of the Experimental Analysis of Behavior, 93*(3), 385-394. doi: 10.1901/jeab.2010.93-385
- Newman, B. (2005). Self-management of initiations by students diagnosed with autism. *The Analysis of Verbal Behavior, 21*(1), 117-122.
- Normand, M. P., & Beaulieu, L. (2011). Further evaluation of response-independent delivery of preferred stimuli and child compliance. *Journal of Applied Behavior Analysis, 44*(3), 665-669. doi: 10.1901/jaba.2011.44-665
- Nuzzolo-Gomez, R., Leonard, M. A., Ortiz, E., Rivera, C. M., & Greer, R. D. (2002). Teaching children with autism to prefer books or toys over stereotypy or passivity. *Journal of Positive Behavior Interventions, 4*(2), 80-87. doi: 10.1177/109830070200400203

- Piazza, C. C., Hanley, G. P., & Fisher, W. W. (1996). Functional analysis and treatment of cigarette pica. *Journal of Applied Behavior Analysis, 29*(4), 437-450. doi: 10.1901/jaba.1996.29-437
- Reichle, J., Johnson, L., Monn, E., & Harris, M. (2010). Task engagement and escape maintained challenging behavior: Differential effects of general and explicit cues when implementing a signaled delay in the delivery of reinforcement. *Journal of Autism and Developmental Disorders, 40*(6), 709-720. doi: 10.1007/s10803-010-0946-6
- Sidener, T. M., Shabani, D. B., Carr, J. E., & Roland, J. P. (2006). An evaluation of strategies to maintain mands at practical levels. *Research in Developmental Disabilities, 27*(6), 632-644. doi: 10.1016/j.ridd.2005.08.002
- Stevens, C., Sidener, T. M., Reeve, S. A., & Sidener, D. W. (2011). Effects of behavior-specific and general praise, on acquisition of tacts in children with pervasive developmental disorders. *Research in Autism Spectrum Disorders, 5*(1), 666-669. doi: 10.1016/j.rasd.2010.08.003
- Tarbox, R. S., Ghezzi, P. M., & Wilson, G. (2006). The effects of token reinforcement on attending in a young child with autism. *Behavioral Interventions, 21*(3), 155-164. doi: 10.1002/bin.213
- Tsiouri, I., & Greer, R. D. (2007). The role of different social reinforcement contingencies in inducing echoic tacts through motor imitation responding in children with severe language delays. *Journal of Early and Intensive Behavior Intervention, 4*(4), 629-647.
- Volkert, V. M., Vaz, P., Piazza, C. C., Frese, J., & Barnett, L. (2011). Using a flipped spoon to decrease packing in children with feeding disorders. *Journal of Applied Behavior Analysis, 44*(3), 617-621. doi: 10.1901/jaba.2011.44-617
- Young, J. M., Krantz, P. J., McClannahan, L. E., & Poulson, C. L. (1994). Generalized imitation and response-class formation in children with autism. *Journal of Applied Behavior Analysis, 27*(4), 685-697. doi: 10.1901/jaba.1994.27-685

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