



# Behavior Skills Training: A Single-Case Meta-Analysis

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## Introduction

Behavioral Skills Training (behavioral skills training; BST) is a method that has been used to teach new skills to individuals, and has data to support its effectiveness (Rosales, Stone, & Rehfeldt, 2009). The goal of BST is for the learner to ultimately acquire skills and use them appropriately in situations that occur outside of these training sessions (Miltenberger, 2008). BST has been used to teach lockdown drill procedures (Dickson & Vargo, 2017), correct installation of child passenger safety restraints (Himle & Wright, 2014), fire safety skills (Houvouras & Harvey, 2014), computer skills (Sump, Mottau, & LeBlanc, 2019), and safe tackling skills to football players (Tai & Miltenberger, 2017). BST has been shown effective when training both children and adults. BST has four steps: instruction, modeling, rehearsal and feedback (Miles & Wilder, 2009). As BST has been shown effective in multiple studies looking at training others to teach skills, as well as directly teaching a skill to an individual, the current study sought to examine the literature. A meta-analysis looking at the overall effectiveness of BST in recent years would help solidify BST as the gold standard for training in ABA. This would also allow us to identify with which ages and skills BST is most effective.

## Method

To conduct this meta-analysis, a search for articles was conducted using the authors' university library database, key words used in the search were "behavioral skill training," and "BST." The inclusion criteria yielded 20 articles dating from 2010-2019.

### Inclusion Criteria

Inclusion in this meta-analysis was based on three criteria. First, the author(s) had to state that the intervention used was BST or described BST procedures. Second, the articles must have used a single-case design. Third, the articles that were collected must have been in the English language. Fourth, the study sources that were considered for review were only peer reviewed journal articles. Fifth, the timeframe for the articles must have been from 2010 to the present (Cooper, Hedges & Valentine, 2009). Last, the study must have included a clear time-series graph of the results so that percentage of non-overlapping data (PND) could be used in the meta-analysis.

## Results

PND (Scruggs & Mastropieri, 1998) was used to estimate effect sizes. PND involves calculating the percentage of treatment data above or below baseline data, depending on the desired direction of the behavior. According to Scruggs and Mastropieri (1998), a PND of 80% and above indicates an effective intervention. A PND of 79-60 percent is indicative of a moderately effective intervention. PNDs below 59% indicate ineffective treatments.

### Median Effect Size Results

The individual median PND data were combined into an overall median, which resulted in the following outcomes: 20 studies evidenced an overall median PND of 100%. According to these data, the nonoverlapping technique, specifically PND, indicates that BST is an effective intervention for both adults and children, overall.

To evaluate the effectiveness of BST on different age groups, the median nonoverlapping effect size for each subject was calculated and then disaggregated into age groups. For children ages six and under (N = 29), the median PND was 100%, indicating an effective outcome. For children ages seven to eight (N = 6), the median PND was 100%. For children ages 10 to 17 (N = 39), the median PND was 100%. For adults ages 18 and above (N = 36), the median PND was 100%.

### Mean Effect Size Results

To compare statistical methods, means were calculated on the same studies, age groups, peer versus staff and parent initiating, and target behaviors. Twenty studies resulted in a mean PND of 89.46%. These results indicate that using BST for intervention produces effective outcomes.

The same age groups were disaggregated: For ages six and under (N = 29) the results were a mean PND of 96.92%. These results demonstrated to be effective. For the ages of seven to eight (N = 6), the mean PND was 100%. For ages nine through 17 (N = 39), the mean PND was 93.53%. Finally, for ages 18 and above (N = 36), the mean PND was 83.45%, indicating an effectiveness outcome.

## Results

Table 1

*Behavioral Skills Training Meta-Analysis Results*

Name	Sample & Design	Target Behavior	Subject Learning New Skill	Intervention	Treatment Integrity	PND
Aherne and Beaulieu (2018)	Multiple baseline across participants  N = 3 Males, 29 Females, 22, 26	Implementing DTT	Behavior Therapists	Therapists initiated DTT	Procedural integrity 100%  IOA: 91-97%	Person 1: 100% Person 2: 100% Person 3: 100%  Median: 100% Mean: 100%
Beaulieu, Hanley, Santiago	Multiple baseline  N = 1 Male, 21	Conversational skill improvement for students diagnosed with a learning disability	Undergraduate student with NOS learning disability	Peer-mediated BST	IOA: 91%	Person 1: 100% Person 2: 77%  Median: 88.5% Mean: 88.5%

## Discussion

The purpose of this meta-analysis was to determine the effectiveness of BST using PND effect sizes and extrapolate any variables that may change the effectiveness of BST. Overall, this meta-analysis found BST to be effective. The median and mean effect size results indicate that the optimal age to intervene with BST may be under age 18, and that BST may be less effective with older participants. The median effect size results indicate that initiating BST with peers or parents and staff for BST has the same effectiveness, whereas the mean effect size results indicate that initiating BST with peers may be more effective than intervening with parents and staff. Finally, the median and mean effect size results indicated that BST was effective for improving social interactions.