Effective Intervention for Students with Specific Learning Disability:
The Nature of Special Education

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Abstract

The nature of effective instruction for students with specific learning disability is explored. Process training has long been a prominent intervention but is shown to possess limited efficacy. Better outcomes are attained when effective general education instructional techniques are adapted for the purposes of special education. Related services are also shown to be useful adjuncts to the instructional program. Special education for students with specific learning disability appears to be more efficacious when “education” is emphasized over “special” interventions not routinely found in general education.
Introduction

Because of the failure to profit from general education students with specific learning disability (SLD) present significant challenges for special education. What are the best means for enhancing academic performance? Answers have been difficult because, according to Sarason and Doris (1979), special education often fails to learn from its past meaning that there is change but not necessarily progress. Consequently, special education has demonstrated a cyclical nature that swings between optimism and pessimism in about ten-year periods (Zigler and Hodapp, 1986). Under such circumstances, it has been difficult to provide an unequivocal answer to the question: Is special education for student with SLD special?

The Nature of Special Education

The definition of special education as “specifically designed instruction…to meet the unique needs of a child with a disability (U.S. Department of Education, 1999, p. 12425) emphasizes individualized instruction but does not stipulate the nature of the instruction to be provided. For students with SLD who “failed” in general education, special education has historically opted for developing unique and exclusive methods that would differentiate it from general education. Such “special” methods provided a distinct identity for special education but also a separateness from general education that produced a skepticism about their benefits on the part of general education. Because of its increased costs, special education became increasingly accountable. Could special education for students with SLD substantiate its benefits?

As part of its distinct identity, special education viewed its primary goal to be one of correcting or reversing the altered learning functions of students with SLD. Beginning with the word of Jean-Marc-Gaspard Itard with Victor, the “wild boy of Areyron” (Itard, 1806/1962), special education has focused in enhancing cognitive processes. Thus, process training has a long
history as a primary form of special education (see Mann, 1979). For students with SLD, process training seeks to improve information-processing abilities so they may then be able to acquire and assimilate information in the same manner as students in general education. Although intuitively appealing, there has always been questions about whether or not training processes can improve learning ability. Such questions date back to Itard whose innovative education program produced limited improvement in Victor’s performance, and the enduring perception that Itard had “failed” (e.g., Kirk & Johnson, 1951). In reality, the modest gains were substantial and became more meaningful with a shift in emphasis from results to methods: “Few current education interests fail to be illuminated by [Itard’s] single slender volume (Gaynor, 1973, p. 445).

Process training continued to be a prominent form of special education and reached its greatest prominence with the emergence of SLD as a category of special education. Nevertheless, questions about the efficacy of process training also continued to be raised. These questions were typically answered by a rendering of “what the research says”. The vagaries of interpreting research findings are illustrated in the case of psycholinguistic training a prominent form of process training during the 1960s and 1970s. Psycholinguistic training was developed by Samuel A. Kirk and embodied the Illinois Test of Psycholinguistic Abilities (ITPA). The model was based on the assumption that psycholinguistic ability is comprised of discrete components and that these components can be improved with training. By the mid 1970s research summaries were available but they revealed very different interpretations.

A review of 39 studies offered by Hammill and Larsen (1974) concluded that, “the idea that psycholinguistic constructs, as measured by the ITPA, can be trained by existing techniques remains nonvalidated” (p. 11). In response, Minskoff (1975) offered a more positive evaluation
and concluded that psycholinguistic deficits can be remediated. The Minskoff review was
immediately challenged by Newcomer, Larsen, and Hammill (1975) who again concluded that,
“the reported literature raises doubts regarding the efficacy of presently available Kirk-Osgood
psycholinguistic training programs” (p. 147). The divergent interpretations along with
increasingly harsh rhetoric made it increasingly difficult to determine what the research says
about the efficacy of psycholinguistic training.

Several years later, Lund, Foster, and McCall-Perez (1978) re-evaluated the original 39
studies, and concluded that, “It is, therefore, not logical to conclude either that all studies in
psycholinguistic training are effective or that all studies in psycholinguistic training are not
effective” (p. 319). Hammill and Larsen (1978) contested the Lund et al. analysis and concluded
that, “the cumulative results…failed to demonstrate that psycholinguistic training has value” (p.
413). Although polemics abounded, a primary question remained unanswered: What is really
known about the efficacy of psycholinguistic training?

META-ANALYSIS AND THE EFFICACY OF SPECIAL EDUCATION

Quantitative Research Synthesis

The case of psycholinguistic training demonstrates the difficulties in providing
unequivocal answers to questions about efficacy. The research investigating psycholinguistic
training typically used the “scientific method” to provide empirical evidence about efficacy
(Kauffman, 1987). As the case of psycholinguistic training demonstrates, difficulties arise when
individual study findings do not agree. Since none of the individual empirical investigations are
“perfect” (i.e. provides unequivocal evidence), individual studies need to be combined to
produce “usable knowledge” (Lindlom & Cohen, 1979) that provides the basis for decisions
about efficacy.
The method used to combine findings about the efficacy of psycholinguistic training encountered difficulties because they failed to accumulate knowledge in an objective and systematic manner. To eliminate the subjectivity associated with traditional review methods (see Cooper & Rosenthal, 1980), quantitative methods, usually termed “meta-analysis” (Glass, 1976), have become a preferred means of synthesizing empirical findings. The “effect size” (ES) metric used in meta-analysis imparts a clarity and explicitness to empirical evidence that makes combined findings more objective and verifiable (Glass, McGaw, & Smith, 1981). Cohen (1988), based on notions of statistical power, provided “rules of thumb” where ES may be interpreted as small (.20), medium (.50), or large (.80).

**Psycholinguistic Training**

In an effort to bring closure to the psycholinguistic training debate, Kavale (1981) conducted a meta-analysis on 34 studies that yielded an average ES of .39. In a statistical sense, an ES shows outcomes in standard deviation (SD) units that can be interpreted in terms of overlapping distributions (treatment vs control). The ES of .29 indicates that the average subject receiving psycholinguistic training would gain 15-percentile ranks on the ITPA, and would be better off than 65% of comparison (no treatment) subjects. At a “medium” level, an ES of .39 does not represent an unequivocal endorsement of psycholinguistic training.

To gain additional insight, ES data were aggregated by ITPA subtest and 5 of 9 ITPA subtests revealed “small,” albeit positive, effects. Such a modest level of response suggests that training is not warranted in these 5 cases. For 4 subtests (Auditory and Visual Association, Verbal and Manual Expression), training improves performance from 15 to 24 percentile ranks and makes the average trained subject better off than approximately 63% to 74% of entrained subjects.
The findings regarding the Associative and Expressive constructs appear to belie the conclusion of Hammill and Larsen (1974) that, “neither the ITPA subtests nor their theoretical constructs are particularly ameliorative” (p. 12). Although encouraging, the meta-analytic findings should not be interpreted as an unequivocal endorsement of psycholinguistic training. For example, in the case of Auditory Association, there are difficulties in defining the skill: What is Auditory Association? Additionally, it is important to determine whether improvement in Auditory Association provides enhanced functioning in other than that discrete ability. In contrast, the case for Expressive constructs, particularly Verbal Expression, presents a different scenario, however, because it represents the tangible process of productive language behavior whose improvement is critical for school success. In fact, the Verbal Expression ES (p. 63) exceeds what would be expected from 6 months of classroom language instruction (ES=.50). Thus, the Kavale (1981) meta-analysis showed where psycholinguistic training might be effective and might be initiated when deemed an appropriate part of an intervention program.

Process Training

Mann (1979) suggested that, “process training is, in fact, one of the oldest forms of education and that, despite periodic discontinuities in its practice, it has continued unabated into our own day” (p. 537). Table 1 shows that all forms of process training reveal limited efficacy (see Appendix A for sources). For example, perceptual-motor training, the embodiment of 1960s special education had practically no effect on improving education performance; famous programs such as those developed by Kephart (ES=.06) and Frostig (ES=.10) revealed modest effectiveness.

Although attacks on process training have been vigorous (e.g., Mann, 1971), its historical, clinical, and philosophical foundation provides a resistance to accept negative
evidence (e.g., Hallahan & Cruickshank, 1973) because, “the tension between belief and reality provides a continuing sense of justification for process training” (Kavale & Forness, 1999, p. 35). The failure to alter beliefs with evidence was found for modality-matched instruction (ES=.14) which received a number of negative evaluations (e.g., Arter & Jenkins, 1979; Larrivee, 1981; Tarver & Dawson, 1978) but also finds teachers maintaining a belief that students learn best when instruction is modified to match individual modality patterns (Kavale & Reese, 1991). The empirical evidence demonstrating that interventions developed to define the uniqueness of special education are not effective needs to be accepted by teachers because, “schools must view the time, money, and other resources devoted to [process training] as wasteful [and] as an obstruction to provision of appropriate services (Council for Learning Disabilities, 1986, p. 247).

Creating Effective Special Education

The long dominant tradition of process training reflected a pathology model of special education; academic problems were regarded as a disease and interventions are aimed at “curing” the disease (i.e., reviewing the pathology). By about 1975, the realization that process training was not producing desired outcomes shifted attention to an “instructional imbalance” model where school failure was viewed as the result of a mismatch between instructional methods and student developmental level. The “effective schools” research (see Bickel & Bickel, 1986) was a major influence that stressed, for example, the importance of teachers believing that all students can achieve, that basic skill instruction should be emphasized, and that clear instructional objectives should be used to monitor student performance.

At the same time, a “learning process” model emerged that viewed teaching within a “process-product” paradigm where variables that depict what occurs during teaching are
correlated with products (i.e., student outcomes). Research revealed the importance of a number of principles like, for example, encouraging student’s active engagement in learning, exploring innovative approaches to grouping and organizing classroom instruction, and making learning meaningful by keeping it enjoyable, interesting, student-centered, and goal-oriented (see Brophy & Good, 1986). These principles became “best practice” and were interpreted for special education (e.g., Christenson, Ysseldyke, & Thurlow, 1989; Reith & Evertson, 1988; Reynolds, Wang, & Walberg, 1992).

**Effective Special Educational Practice**

Research investigating the teaching-learning process has identified a number of effective instructional practices which have been summarized in a number of quantitative research syntheses (see Appendix A). Table 2 shows a sample of effective instructional practices and reveals that substantial positive influence on learning are possible by modifying the way instruction is delivered. To illustrate the power of the methods listed in Table 2, two additional ES interpretations are provided. The “common language effect size” (CLES) (McGraw & Wong, 1992) converts ES into a probability that a score sampled from one distribution will be greater than a score sampled from another. For example, in a sample of studies investigating the use of self-monitoring (CLES=.83), 83 out of 100 would show that a subject using self-monitoring would improve when compared to subjects in the control condition. The “binomial effect size display” (BESD) (Rosenthal & Rubin, 1982) addresses the question: What is the percentage increase in the number of successful responses to the use of a new instructional practice? Based on converting ES to r, the BESD for the use of self-questioning shows an increase in success rate from 25% to 75%. The 50-percentage-point spread between treatment (75%) and control (25%)
success rate shows that the use of self-questioning possesses, not only statistical significance, but also *practical* significance.

The use of effective instructional practices moves special education toward the general education teaching-learning model and away from “special” interventions. For example, mnemonic instruction (MI) is a strategy that transforms difficult-to-remember facts into a more memorable form through recoding, relating, and retrieving information (Mastropieri & Scruggs, 1991). A student with SLD receiving MI would be better off than 95% of students not receiving MI and show a 45 percentile rank gain on an outcome measure. In a sample of studies investigating MI, 87 out of 100 would show that students with SLD receiving MI would demonstrate improvement when compared to students in the control condition (CLES=.87). The BESD shows a 64% increase in success rate which indicates substantial practical significance. Compare the success rate of MI to, for example, perceptual-motor training (ES=.08) where the success rate increase is 4% indicating a “small” statistical effect and no practical significance.

*Effective Special Education Instruction*

The ultimate purpose of implementing effective instruction is to enhance academic performance. Achievement outcomes are shown in Table 3 and indicate the potential for substantial gains across subject areas. All achievement domains show “large” ES with gains ranging from 29 to 41 percentile ranks on achievement measures. On average, almost 8 out of 10 students with SLD will show improvement (CLES=.77). The success rate increases from 27% to 73% indicating an average 46% improvement in the number of students showing a positive response to instruction.

The example of reading comprehension demonstrates how meta-analysis can be useful for judging the magnitude of “real” effects. Two quantitative research syntheses contributed
almost all ES measurements and produced ESs of 1.13 and .98 with a modest 3 percentile rank difference in outcomes (87 vs. 84). When specific methods for improving reading comprehension are compared, the two meta-analyses revealed similar patterns. The largest effects (ESs=.60 and 1.33) were found for metacognitive techniques (e.g., self-questioning, self-monitoring). Text enhancement procedures (e.g., advanced organizers, mnemonics) produced ES of 1.09 and .92. The least effective (but nevertheless effective) techniques involved skill training procedures (e.g., vocabulary, repeated reading) with ESs of .79 and .62). The consistency of findings across these two meta-analyses provides confidence in concluding that it is possible to enhance reading comprehension.

The meta-analytic evidence suggests that, on average, the real effect of reading comprehension instruction is 1.04, a level comparable to one year’s worth of reading comprehension instruction in general education (ES=1.00). Thus, methods adapted for the purposes of special education produced the same effect as 1 year of general education instruction but did so in approximately 20 hours. Clearly, students with SLD can significantly improve their ability to better understand what they read.

*Effective Special Education Related Services*

A hallmark of special education is the provision for related services to be provided when deemed appropriate to augment the instruction program. Table 4 shows a sample of possible activities and most demonstrate, at least, “medium” ES. On average (ES=.65), related services produce a 24 percentile rank gain on an outcome assessment. In 68 out of 100 cases a positive response to the related service is achieved (CLES=.68). Thus, related services appear to be useful adjuncts to the instructional program.
Placement has often been viewed as having a positive influence on student performance (see Kavale & Forness, 2000). The ES magnitude (.12) negates such a view and indicates that the success rate associated with placement increases only 6% from 47% to 53% (BESD). The “small” ES suggests that “what” (i.e., nature of the instruction) is far more important influence on student outcomes than “where” (i.e., placement). In contrast, prereferral reveals significant positive effects. The CLES (.78) indicates that in 78 of 100 cases prereferral activities will produce positive outcomes. Prereferral “works” because it is predicated in modification of instructional activities and its 48% success rate means that almost half of students with SLD given preferential activities do not enter special education.

**Evaluating Special Education**

Special education has demonstrated increasing efficacy that may be attributable to a change in instructional emphasis. Until about 25 years ago, emphasized its special nature (SPECIAL education) by developing singular and different methods not found in general education. The goal was to enhance unobservable constructs (“processes”) that were presumable the cause of learning deficits. Basic skill instruction was a secondary consideration until processes were remediated and learning became more efficient. Evaluation of SPECIAL education (see Table I) reveals limited efficacy leading to the conclusion that process deficits are difficult to “cure.”

In an effort to elevate academic outcomes, emphasis shifted to education (special EDUCATION) with the goal of improving achievement. Instructional techniques originating in general education were adapted to assist students with SLD in acquiring and assimilating new knowledge. The efforts demonstrated significant success (see Table 2) and better academic outcomes (see Table 3).
The difference between the two forms of special education are seen in the mega ES (mean of means) for special (.15) versus education (.89) techniques. The comparison reveals special EDUCATION to be 6 times more affective than SPECIAL education which produces academic outcomes (mega ES=1.04) that exceed 1 years worth of general education instruction (ES=1.00). On average, SPECIAL education offers about a 6% advantage meaning that the upper 50% of the group receiving special interventions exceeds only about 56% of the group not receiving such interventions; this modest level of improvement is only slightly above chance (50%). Additionally, across meta-analysis investigating SPECIAL education, about 25% of the calculated ES were negative indicating that in one out of four cases student’s not receiving the special intervention performed better. Clearly, there is little reason to include SPECIAL education in intervention programs.

The methods associated with special EDUCATION, in contrast, should be the basis for designing an intervention program. The use of education practices is likely to move the average student with SLD from the 50th to the 81st percentile. The 31-percentile-rank gain is better than 5 times the gain found for special interventions and indicates students are better off than 81% of those not receiving special EDUCATION. For example, Direct Instruction (DI), a behaviorally oriented teaching procedure based on an explicit step-by-step strategy (ES=.93) is 6 ½ times more effective than the intuitively appealing modality-matched instruction (ES=.14) that attempts to capitalize on learning style differences. Students with SLD who are instructed with DI would be better off than 87% of students not receiving DI and would gain over 11 months credit on an achievement measure compared to about 1 month for modality-matched instruction. When grounded in effective instructional methodology, special EDUCATION can sometimes be up to 20 times more effective than SPECIAL education.
Effective Special Education

The meta-analyses summarized provides insight into the indications and contraindications of special education interventions (Lipsey & Wilson, 2001). The interventions associated with special EDUCATION may be considered a form of “evidenced-based practice” (EBP) (Odom, Brantlinger, Gersten, Horner, Thompson, & Harris, 2005) where interventions are grounded in empirical findings demonstrating that the actions produce efficacious and beneficial outcomes. The use of EBP promotes instructional validity where changes can be attributed to the specific activities and can be used to produce similar results with other students (generalization).

The implementation of EBP may be limited by extraneous factors. For example, tradition (“We have always used it”) and history (“It has worked before”) are powerful barriers. Additionally, the bandwagon effect, where an intervention suddenly becomes popular and gains momentum rapidly, may have a significant influence. As pointed out by Mostert (1999-2000), “Bandwagons are used to champion a cause, engage in sweeping yet attractive rhetoric, and generally to promise far more than they ever have hope of delivering” (p. 124). Finally, belief, a strong connection about the truth, although a legitimate consideration in intervention of decisions, is only appropriate when the beliefs are grounded in empirical evidence.

The negative influence of these extraneous factors is the reasons why research findings in special education “are embraced by some, ignored by others, and modified to suit the routines and preferences of still others” (Gersten, Vaughn, Deshler, & Schiller, 1997, p. 466). Regardless of how exciting teachers may find new EBP, they tend to resist implementing EBP in favor of more comfortable existing practices (Swanson, 1984). Heward (2003) identified 10 faulty notions that hinder the effective delivery of special education. The many obstacles in making instructional decisions primarily in evidence is the reason for the continuing research to practice
gap (Greenwood & Abbott, 2001) and the resulting problem of sustainability, the maintained use of an instructional practice supported by evidence of improved outcomes for students with SLD (Gersten, Vaughn, & Kim, 2004).

Because students with SLD, by definition, possess learning needs, instructional decisions are critical in the design of individualized programs. The complexities surrounding the instructional decision process introduces a degree of “uncertainty” (i.e., the program may not work) (Glass, 1979). Besides uncertainty, there is also the possibility of “risk” (i.e., negative outcomes) that can be described by the SD, a measure of dispersion around the mean ES that represents an index of variability. Taken together, the two statistics provide a theoretical expectation about intervention efficacy (ES ± SD). For example, psycholinguistic training (.39 ± .54) spans a wide range (-.15 to .93) from negative ES to “large” ES; the difficulty is found in the inability to predict the outcome for a particular student. The mega mean ES for SPECIAL education (.15) is associated with a larger mega mean SD (.48) making “special” interventions more variable than effective (.15 ± .48). In contrast, special EDUCATION (.89 ± .87) is more effective than variable and, although it may not “work” (ES = .02), there is also the theoretical possibility of being almost twice as effective (ES = 1.76).

Although the use of special EDUCATION reduces risk (i.e., no negative ES), the special education teaching-learning process remains variable, unpredictable, and indeterminate. To minimize the influence of these confounding factors, special education instructional decisions cannot be prescriptive (i.e., do A in circumstance X or Y, and do B in circumstance Z) but rather must blend elements of science (theoretical and empirical knowledge) and art (interpretation necessary to initiate action) to create “best” practice (see Gage, 1978). The actions of
“special education practitioners” will need to go beyond the scientific basis of their work
… [that] must be mediated through the teacher’s own creative rendering of best practice
… because quality education for special education students will always be biased on the
artful application of science” (Kavale & Forness, 1999, p. 93).

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### Table 1

Effectiveness of Process Training

<table>
<thead>
<tr>
<th>Method</th>
<th>Mean Effect Size</th>
<th>Percentile Rank Equivalent</th>
<th>Power Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irlen Lenses</td>
<td>-.02</td>
<td>49</td>
<td>Negative</td>
</tr>
<tr>
<td>Perceptual-Motor Training</td>
<td>.08</td>
<td>53</td>
<td>Negligible</td>
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<tr>
<td>Diet Modification (Feingold)</td>
<td>.12</td>
<td>55</td>
<td>Small</td>
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<tr>
<td>Modality-Matched Instruction</td>
<td>.14</td>
<td>56</td>
<td>Small</td>
</tr>
<tr>
<td>Social Skills Training</td>
<td>.21</td>
<td>58</td>
<td>Small</td>
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<tr>
<td>Psycholinguistic Training</td>
<td>.39</td>
<td>65</td>
<td>Small-Medium</td>
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Table 2

Effective Instructional Practices

<table>
<thead>
<tr>
<th>Practice</th>
<th>Mean Effect Size</th>
<th>Common Language Effect Size</th>
<th>Binomial Effect Size Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mnemonic Instruction</td>
<td>1.62</td>
<td>.87</td>
<td>18  82</td>
</tr>
<tr>
<td>Self-Monitoring</td>
<td>1.36</td>
<td>.83</td>
<td>22  78</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>1.17</td>
<td>.80</td>
<td>25  75</td>
</tr>
<tr>
<td>Self-Questioning</td>
<td>1.16</td>
<td>.79</td>
<td>25  75</td>
</tr>
<tr>
<td>Drill &amp; Practice</td>
<td>.99</td>
<td>.76</td>
<td>28  72</td>
</tr>
<tr>
<td>Strategy Instruction</td>
<td>.98</td>
<td>.75</td>
<td>28  72</td>
</tr>
<tr>
<td>Feedback</td>
<td>.97</td>
<td>.75</td>
<td>28  72</td>
</tr>
<tr>
<td>Direct Instruction</td>
<td>.93</td>
<td>.75</td>
<td>29  71</td>
</tr>
<tr>
<td>Applied Behavior Analysis</td>
<td>.93</td>
<td>.75</td>
<td>29  71</td>
</tr>
<tr>
<td>Visual Displays</td>
<td>.90</td>
<td>.74</td>
<td>29  71</td>
</tr>
<tr>
<td>Computer-Assisted Instruction</td>
<td>.87</td>
<td>.73</td>
<td>30  70</td>
</tr>
<tr>
<td>Repeated Reading</td>
<td>.76</td>
<td>.71</td>
<td>32  68</td>
</tr>
<tr>
<td>Error Correction</td>
<td>.72</td>
<td>.70</td>
<td>33  67</td>
</tr>
<tr>
<td>Formative Evaluation</td>
<td>.70</td>
<td>.69</td>
<td>33  67</td>
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<tr>
<td>Peer Mediation</td>
<td>.64</td>
<td>.67</td>
<td>35  65</td>
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<tr>
<td>Diagnostic-Prescriptive Teaching</td>
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<td>35  65</td>
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<td>Peer Tutoring</td>
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<td>35  65</td>
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<tr>
<td>Positive Class Morale</td>
<td>.60</td>
<td>.66</td>
<td>36  64</td>
</tr>
<tr>
<td>Grouping</td>
<td>.43</td>
<td>.62</td>
<td>40  60</td>
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<tr>
<td>Increased Time</td>
<td>.38</td>
<td>.61</td>
<td>41  59</td>
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Table 3

Effective Special Education Instruction

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Mean Effect Size</th>
<th>Percentile Rank Equivalent</th>
<th>Common Language Effect Size</th>
<th>Binomial Effect Size Display</th>
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<tbody>
<tr>
<td>Handwriting</td>
<td>1.32</td>
<td>91</td>
<td>.82</td>
<td>22 78</td>
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<td>Oral Reading</td>
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<td>90</td>
<td>.82</td>
<td>22 78</td>
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<tr>
<td>Language</td>
<td>1.27</td>
<td>90</td>
<td>.82</td>
<td>23 77</td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>1.04</td>
<td>85</td>
<td>.77</td>
<td>27 73</td>
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<tr>
<td>Word Recognition</td>
<td>.98</td>
<td>84</td>
<td>.75</td>
<td>28 72</td>
</tr>
<tr>
<td>Narrative Writing</td>
<td>.97</td>
<td>83</td>
<td>.75</td>
<td>28 72</td>
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<tr>
<td>Math</td>
<td>.96</td>
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<td>.75</td>
<td>28 72</td>
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<tr>
<td>Spelling</td>
<td>.87</td>
<td>81</td>
<td>.73</td>
<td>30 70</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>.85</td>
<td>80</td>
<td>.73</td>
<td>30 70</td>
</tr>
<tr>
<td>Problem-Solving</td>
<td>.82</td>
<td>79</td>
<td>.72</td>
<td>31 69</td>
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Table 4

Effective Special Education Related Services and Activities

<table>
<thead>
<tr>
<th>Service</th>
<th>Mean Effect Size</th>
<th>Common Language Effect Size</th>
<th>Binomial Effect Size Display</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Success Rate Increase From %</td>
</tr>
<tr>
<td>Memory Training</td>
<td>1.12</td>
<td>.79</td>
<td>25</td>
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<tr>
<td>Prereferral</td>
<td>1.10</td>
<td>.78</td>
<td>26</td>
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<tr>
<td>Cognitive Behavior</td>
<td>.74</td>
<td>.70</td>
<td>32</td>
</tr>
<tr>
<td>Modification</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Psychotherapy</td>
<td>.71</td>
<td>.69</td>
<td>33</td>
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<tr>
<td>Stimulant Medication</td>
<td>.62</td>
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<td>Counseling</td>
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<td>Consultation</td>
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<td>36</td>
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<td>Rational-Emotive Therapy</td>
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<tr>
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References


Appendix A

Reported Effect Size were obtained from the following sources:


