

Academic Self-Concepts of Adolescents with Learning Disabilities:

A Large-Scale Database Study

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Abstract

Using the ELS: 2002 national database, we compared the self-concepts in reading, math, and general academic areas for students with and without identified learning disabilities. Unlike most similar research, students' measured achievement in reading and math was controlled, thereby effectively comparing students at similar levels of achievement. When controlling for achievement, academic self-concepts were *not* lower for the students with LD. Similar to other studies, students with LD tended to statistically over-predict their achievement compared to the non-LD group.

Introduction

School psychologists and others in education have long been concerned about the self-concepts of students with learning disabilities. However, the research literature is mixed. Chapman's (1988) influential meta-analysis concluded that children with LD had lower general and academic self-concepts than did non-LD students. In addition, Chapman concluded that LD students in self-contained classes or resource rooms had *better* self-concepts than did similar students who were completely mainstreamed, leading some to support the value of special education placements. Similarly, Gans, Kenny and Ghany (2003), in a study of mostly Hispanic middle-school students, found that LD students had lower self-concepts in academic and behavior areas than did non-LD students, but did not differ on global self-concept. By contrast to the Chapman review, a more recent and more extensive meta-analysis of the relevant literature (Bear, Minke, & Manning, 2002) concluded that differences between LD and non-LD students in global self-concept and in domain-specific self-perceptions in regard to behavioral and social competence were so small as to be of no practical importance. Substantially higher academic self-concepts were found for non-LD students, as in the Gans et al. study and Chapman meta-analysis. However, Bear et al. concluded that educational setting (e.g., resource room, general education class with support) had limited, although statistically significant, effects.

While one might assume that lower academic self-concepts of LD students simply reflect realistic self-appraisals of academic achievement, some literature suggests exactly the reverse. Stone and May (2002) compared LD and non-LD students on a measure of academic self-concept, but also on students' predictions of their ability to perform a given academic task. While the LD students in this study did, in fact, post lower academic self-concept scores they *over-predicted* their actual performance compared to their non-LD peers, suggesting that LD students' academic self-concepts may actually be less accurate than those of non-LD students.

The original research cited above and most of the studies included in the Chapman (1988) and Bear et al. (2002) meta-analyses suffer from two shortcomings: (a) inadequate sample sizes that do not allow for exploration of important moderator variables such as gender or ethnicity, and (b) comparisons have typically been made between LD and "normal" non-LD students., i.e., students with average achievement levels. When studies included more than one non-LD contrast group, the Bear et al. meta-analysis calculated an effect size using the contrast group that was "most representative of the normal population" (p. 409), e.g., random-sample vs. matched samples, or normal-achieving vs. low-achieving. Having an identified learning disability, versus having low achievement, but not being so-identified, results typically in an educational program that is differentiated in varying degrees of intensity from general education and also likely results in having some different aspects of self-identity

(i.e., having a disability). So, to investigate the effects of “LD status” on students’ self-concepts the more informative comparison would be between LD and similarly-low-achieving non-LD students.

This study used data from a large-scale national dataset (Education Longitudinal Study of 2002) to investigate the levels and accuracy of academic self-concept for 10th grade students with learning disabilities compared to a sample of students without identified learning disabilities, controlling for levels of achievement in reading and math. The main research questions for this study were:

1. When controlling for measured achievement do LD 10th graders possess differing levels of reading, math, and general academic self-concept when compared to a group of NON-LD sophomores?
2. Does the degree of congruence between academic self-concepts in reading and math and actual achievement in these respective subjects, as measured by correlations between academic self-concept and tested achievement and grades, vary for the LD versus NON-LD students.

Methodology

Data Samples

The ELS: 2002 dataset is comprised of data collected from 15,525 students who were enrolled as sophomores in 750 public or private high schools in the spring term of 2002. All data were collected during that term. ELS: 2002 used a cluster sampling method in which schools were first selected, then students were randomly selected from within schools. Some smaller populations were intentionally over-sampled so as to allow for subsample analyses with adequate power. Data were collected from students, students’ teachers, students’ parents, and school administrators, and from school records. Verified IEP status is included in just over half of the students (N = 8149) Of these, 7,114 (87.3%) did not have an identified disability requiring an IEP, 700 (8.6%) were classified as having a learning disability, and 335 (4.1%) were classified as having another disability. The no-disability group and the LD group constituted the samples for this study. However, self-concept data were missing for nearly half of the LD group and a quarter of the non-LD group, thus substantially reducing the actual sample size for various analyses. Demographics displayed in Table 1 correspond to largest samples available for the actual analyses reported below.

Data Analysis

Analysis of covariance (using SPSS 11.5) was the primary analytic tool used to investigate differences in self-concept between the LD and non-LD groups, using measured achievement as the covariate, LD status as the independent variable, and self-concept as the dependent measure. Covariates used were as follows: English self-concept - reading achievement; math self-concept – math achievement; general academic self-concept – reading *and* math achievement. Because the ELS: 2002 is a complex sample (versus a simple random sample), all analyses were weighted by the student weights included in the dataset. Although the standard SPSS package will accommodate such weighting and will produce correct parameter values (means, correlations, etc.), SPSS does not adjust the standard errors, and resulting statistical tests, for the design effects of complex samples. Accordingly, the AM Software program (American Institutes for Research, 2004) was used to generate the *t*, *F* and *p* values reported below. Stratum, primary sampling unit, and student weight variables were used by the AM Software to make the necessary adjustments. However, AM Software does not include an ANCOVA program; hence, analogous regression analyses were used.

To compare congruence between self-concept and achievement for the two groups, simple Pearson correlations were generated from the weighted data.

Reported effect sizes are either Cohen’s *d* based on calculated differences between adjusted means and their pooled standard deviations or the partial Eta² effect size from the ANCOVA.

Table 1:
Sample Demographics

Characteristic	Non-LD		LD	
	N	%	N	%
<i>Gender</i>				
Male	2374	44.9	248	64.9
Female	2910	55.1	134	35.1
<i>Ethnicity</i>				
African-American	450	8.5	43	11.1
Asian-American	460	8.7	17	4.5
European-American	3489	66.0	221	57.9
Latina/o	602	11.4	69	18.1
Other	283	5.4	32	8.4
<i>Socioeconomic Status</i>				
1 st Quartile	1021	19.3	132	34.6
2 nd Quartile	1170	22.1	109	28.5
3 rd Quartile	1392	26.3	73	19.1
4 th Quartile	1701	32.2	68	17.8
<i>Total N</i>	5284	93.3	382	6.7

Results

Given the large sample sizes available from the ELS: 2002 dataset, focusing on effect sizes is much more informative than focusing on statistical significance; even trivially small effects will produce a p -value $<.001$ when statistical tests have degrees of freedom in the hundreds or thousands. Accordingly, the results will be reported primarily with an emphasis on effect size.

Differences in Self-Concept

Consistent with most previous research, students with LD posted lower mean scores on English, math, and general academic self-concept compared to their non-LD peers when achievement was *not* factored into the analyses. Effect sizes (ES) ranged from $-.23$ to $-.51$, indicating “small” to “medium” effects following Cohen’s (1988) scheme for classifying effect size (see Table 2). These ES’s were substantially smaller than for the corresponding mean ES’s for within-study contrasts reported in the Bear et al. (2002) meta-analysis; all comparisons were significant beyond the .001 level (English SC: $t_{(5664)} = -7.950$; math SC: $t_{(5660)} = -4.567$; academic SC: $t_{(5571)} = -9.002$).

By contrast to the above, controlling for achievement (English SC, covariate: reading; math SC, covariate: math; academic SC, covariates: reading, math) produced a rather different picture. Self-concepts in English and general academic areas were *not* significantly ($p > .05$) different for the two groups of students, despite the large sample sizes (English SC: $t_{(5663)} = -1.379$; academic SC: $t_{(5570)} = -.979$). Comparisons on math self-concept did produce significant differences (math SC: $t_{(5659)} = 4.401$; $p < .001$), but the adjusted means indicate a *higher* math self-concept for the LD group. Additionally, the effect size for this difference was small. Adjusted means are displayed in Table 2. Analysis of possible moderator effects follows.

Table 2:
Descriptive Statistics for Self-Concept Comparisons

	Non-LD			LD			Comparison	
	N	Mean	S.D.	N	Mean	S.D.	Effect Size	p
Unadjusted								
English Self-Concept	5284	2.75	.78	382	2.38	.74	-.48	<.001
Math Self-Concept	5284	2.53	.84	375	2.34	.70	-.23	<.001
Academic Self-Concept	5199	2.83	.72	374	2.46	.71	-.51	<.001
Adjusted for Achievement								
English Self-Concept	5284	2.73		382	2.66		-.09	.169
Math Self-Concept	5284	2.50		375	2.71		.26	<.001
Academic Self-Concept	5199	2.81		374	2.76		-.06	.328

Gender. Gender had little, if any, moderating effects on the relationship between LD status and self-concept. For English and general academic self-concepts regression coefficients for gender were not significant at the .05 level ($t_{(5661)} = -.226$; $t_{(5568)} = .759$, respectively). Gender produced a significant moderating effect for math self-concept ($t_{(5557)} = 2.66$; $p < .01$). Within the LD group, no differences in math self-concept were found when controlling for achievement, whereas in the non-LD group males had higher adjusted math self-concept scores than did females. However, the effect size of gender as a moderator was a trivial .06.

Ethnicity. Ethnicity was coded as four groups: African-American, Asian-American, European-American, and Latino. Again, effect sizes were small, even if statistically significant. No moderating effects were found in regard to English self-concept ($F_{(3, 5180)} = 1.31$; $p > .05$)¹ For math and general academic self-concepts, significant moderating effects were found ($F_{(3, 5101)} = 3.93$; $p < .01$; $F_{(3, 5105)} = 3.19$; $p < .05$, respectively), but effect sizes for the moderator were only .08 in both cases. For both cases, greater ethnic differences were found for the non-LD than the LD samples, when adjusted for achievement.

Socioeconomic Status. SES, coded as a continuous variable, did not act as a moderator for either math ($t_{(5557)} = -0.61$; $p > .01$) or general academic self-concept ($t_{(5569)} = 1.28$; $p > .05$). For English self-concept, SES produced a moderating effect ($t_{(5661)} = -2.77$; $p < .01$), but the partial correlation was only .04, again a trivial effect.

Congruence of Self-Concept and Achievement

The relationships between self-concept of ability and tested achievement were very different for the LD and NON-LD groups; all differences between respective correlations were significant beyond the .001 level. As shown in Table 3 correlations between the three measures of self-concept and tests of reading and math achievement were substantially higher for the NON-LD than for the LD group. Additionally, the correlations between the self-concept measures and achievement for the LD group

¹ F values are reported from SPSS ANCOVA rather than from the AM software used elsewhere; AM software would not run the corresponding regression analysis because of problems with a matrix solution.

were trivially small and statistically significant (.05) in only one instance. Frequency analysis of standardized residuals resulting from the respective regression equations indicated that the self-concepts of students with LD tended to over-predict their actual achievement levels.

Table 3
Correlations between Self-Concept and Achievement Measures

Self-Concept	Reading Achievement				Math Achievement			
	Non-LD		LD		Non-LD		LD	
	N	r	N	r	N	r	N	r
English Self-Concept	5284	.311**	382	.071	---	---	---	---
Math Self-Concept	---	---	---	---	5187	.382**	375	.100
Academic Self-Concept	5199	.290**	374	.078	5199	.318**	374	.114*

Note. * = $p < .04$; ** = $p < .01$. All comparisons of the differences between respective correlations of the LD and NON-LD groups were significant at $p < .001$.

Discussion

The literature on self-concept of students with learning disabilities consistently finds that students with LD hold lower self-concepts in academic areas than do non-LD students (Bear et al., 2002). This simple comparison was replicated in this study using a large and reasonably representative sample of these two groups. However, such analyses typically compare LD students, almost all of whom are low-achieving by definition, with a very heterogeneous group of non-LD students. Hence, these comparisons tell us little about whether these lowered perceptions stem from “having” a learning disability (or being so-labeled or having the educational modifications that typically accompany being so-identified) or whether these perceptions are related to low-achievement and not to LD status, per se. The results of this study, which found either non-existent or small and counter-intuitive differences in self-perceptions when controlling for achievement suggest that LD status, per se, does not affect self-concept in academic areas. This conclusion strongly supports Bear et al.’s position that it is questionable to provide interventions to enhance self-concept with students with LD, “...solely on the basis of the student’s disability category” (p. 419). The counter-intuitive finding that *adjusted* mean math self-concept scores were *higher* for students with LD than for non-LD students is difficult to interpret. Given that mean reading and math achievement scores of the students with LD were nearly identical, differences in actual achievement can not account for this effect. Perhaps the special education programs for students with LD focused more strongly on reading (the most common reason for referral for LD placement), such that the student’s self-perceptions of their math competence were higher because of an internal comparison against a focus on their reading difficulties.

Similar to Stone and May (2002) this study found that students with LD tended to *over-predict* their achievement, that is, to have *higher* academic self-concepts than would be expected based on their measured skills. This finding may be interpreted in two ways. A pessimistic interpretation would focus on these sophomores as having an “inaccurate” view of themselves and, therefore, potentially making less-than-optimal decisions about educational or occupational pursuits. A more positive interpretation, favored by this study’s authors, is that students who are identified with LD have optimistic predictions of their own abilities that will allow them to strive for continued academic progress *even though* such self-predictions might be probabilistically less valid. An important consideration regarding the results on congruence between achievement and academic self-concept is that the comparisons were between

students with LD and non-LD students without any control for level of achievement. Unlike the analyses of levels of self-concept, these results may reflect differences in prediction for low-achieving versus average-achieving students rather than comparisons around LD status.

References

- American Institutes for Research & Cohen, J. (2004). *AM statistical software, version 0.06.02 beta*. Washington, DC: authors.
- Bear, G. G., Minke, K. M., & Manning, M. A. (2002). Self-concept of students with learning disabilities: A meta-analysis. *School Psychology Review, 31*, 405-427.
- Chapman, J. W. (1988). Learning disabled children's self-concepts. *Review of Educational Research, 58*, 347-371.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Gans, A. M., Kenny, M. C., & Ghany, D. L. (2003). Comparing the self-concept of students with and without learning disabilities. *Journal of Learning Disabilities, 36*, 287-295.
- National Center for Education Statistics (2004). *Education longitudinal study of 2002: base year data file user's manual*. Washington, DC: author.
- Stone, C. A., & May, A. L. (2002). The accuracy of academic self-evaluations in adolescents with learning disabilities. *Journal of Learning Disabilities, 35*, 370-383.