



Discussion

What Sternberg should have concluded

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Abstract

This article responds to issues raised by Professor Sternberg in response to my article analyzing the Sternberg Triarchic Abilities Test (STAT). First, I respond to specific issues he considers in his article dealing with corrections of obtained correlations and interpretations of method variance in STAT. Second, I present a synopsis of what I take to be the appropriate conclusions that should have been derived from the data obtained by Professor Sternberg and his colleagues assessing the construct validity of STAT. Third, I provide a brief conclusion for the article.

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1. Introduction

Sternberg correctly notes that the results I analyzed were obtained with a version of Sternberg Triarchic Abilities Test (STAT) that is 10 years old. The articles that I analyzed were recent and included one that was in press at the time my article was written. There are no published studies dealing with the new version of STAT. Thus, my article is relevant to current attempts to evaluate the triarchic theory of intelligence.

2. Response to specific issues

2.1. Corrected values for correlations

Corrections for attenuation and restrictions in range of talent are based on assumptions that may be incorrect. It is also the case that obtained correlations that

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are attenuated by errors of measurement and restrictions in range of talent provide a distorted index of the theoretically relevant relationship between measures. Sternberg indicates that correlations among diverse indices of ability are lower for high ability than for low ability subjects. This assumption implies that a correction for restrictions in range of talent based on a high ability sample will underestimate the appropriate value that would have been obtained in the absence of a restriction of range of talent. Thus, the corrections I reported may actually underestimate the true value of the correction. Professor Sternberg indicates that schools were asked to nominate individuals who were gifted in any manner. This could include being gifted in nonacademic ways. But, it is certainly plausible to think that high schools will nominate intellectually talented students to attend a special program at Yale in which they will be asked to master the contents of a sophisticated college-level psychology textbook.

While I agree that the exact values of the true relationships between triarchic abilities and other measures of intelligence cannot be ascertained, the reported correlations for tests with some degree of unreliability are moderately high. The disattenuated correlations between triarchic abilities and the Cattell test corrected solely for internal consistency indices of reliability are .69, .73, and .44 for analytical, creative, and practical abilities, respectively. Thus, the abilities assessed by STAT are related to scores on a standard test of fluid intelligence.

Professor Sternberg's article contains an *ex post facto* ordering of the contents of the conventional test he used to argue that the results he obtained are congruent with his theoretical assumptions. The Cattell test is usually interpreted as a test of fluid intelligence and thus might be construed as a good measure of *g*. Professor Sternberg argued that conventional measures of *g* assessed analytical ability and did not measure creative and practical ability. In his response, Professor Sternberg has apparently adopted a new theory—standard measures of fluid ability are better measures of creative ability than of analytical ability. The results he obtained indicated that a measure of fluid intelligence correlated more highly with creative ability than with analytical ability as assessed by STAT. I believe that this contradicts the earlier version of the theory.

2.2. *Method variance in STAT*

Professor Sternberg indicates that we differ with respect to the interpretation of his analysis of method variance in STAT. I interpret his analysis as one that removes the *g* variance in the multiple-choice components of STAT; he interprets his procedure as one that removes the method variance in STAT. Professor Sternberg did not demonstrate that the method-reduced indices of triarchic abilities have predictive validity. His analysis indicated that the method reduced multiple-choice measures of two of the triarchic abilities have near zero relationships with corresponding method-reduced indices of essay measures of the abilities. Thus, an analysis of STAT that removes method variance indicates that the method-reduced measures lack construct validity.

3. Reprise: What Professor Sternberg should have concluded

Here is my version of the discussion that Professor Sternberg should have presented as a result of the data he obtained.

3.1. *Does STAT measure abilities not measured by conventional tests?*

Each of the triarchic abilities is related to conventional measures of intelligence. The obtained correlations underestimate the true relationship between conventional measures of intelligence and triarchic abilities as assessed by STAT. The relationships are attenuated by imperfect internal consistency sources of error, scoring unreliability for the essay portion of STAT, and restrictions in range of talent. Also, the data do not support the assumption that conventional measures of intelligence are primarily measures of analytical ability. The correlations between conventional measures and creative ability are at least as high (and may even be marginally higher) than the correlations between conventional measures and analytical ability as assessed by STAT.

3.2. *STAT and academic achievement*

Our analyses indicated that abilities and achievements with the same name were not more substantially related to each other than abilities and achievements with different names. We designed a course and used a text that emphasized distinctions among analytical, creative, and practical intellectual achievements. Our measures were not able to provide sufficient differentiation of these achievements to allow us to obtain evidence of the construct validity of our measures of triarchic ability using a multitrait–multimethod analysis.

We did not compare predictions of academic achievement using conventional tests of Intelligence to those obtained using STAT. Thus, we are not able to decide whether STAT may be used to predict academic achievement more accurately than conventional measures.

3.3. *Are triarchic abilities unrelated?*

Triarchic abilities are related to each other. We attempted to test the hypothesis that the relationships among triarchic abilities might be attributable to method variance. The analysis failed to provide evidence for the construct validity of the method-reduced indices. The analysis indicated that for two of the triarchic abilities, the relationships between method-reduced multiple choice and essay measures of the same ability were near zero.

In an additional analysis of the relationship among triarchic abilities, we were able to fit a formal model that was congruent with the structure of the test indicating that the triarchic abilities were defined by items that were selected to measure them. The model fitting procedure left relationships among the triarchic abilities unconstrained. The resultant model indicated that triarchic abilities were substantially related to each other and indicated that covariances among triarchic abilities were a far more substantial source of variance in the test than sources of variance that were independent of each other.

3.4. *Aptitude × Instructional interaction*

We attempted to test an Aptitude × Instructional interaction demonstrating that individuals assigned to a discussion group emphasizing a triarchic ability that was congruent with their strongest triarchic ability would have higher achievement than individuals assigned to a discussion group that was not congruent with their strongest triarchic ability. We obtained a significant *F* value for the predicted interaction effect. The result was obtained after a reexamination of the obtained data that resulted in the somewhat unorthodox (and statistically impermissible) procedure of removing over one third of the subjects whose data were available for analysis.

Viewed collectively, the evidence indicates that our initial effort to develop a test of construct valid indices of triarchic abilities was unsuccessful.

4. Concluding comments

Sternberg reports in his article that he has developed a new test that appears to yield promising results in his preliminary analyses. Since I value his goals, I hope that the data analyses he reports will support the conclusions he has tentatively presented in his article.

It is possible that some scholars in the field of intelligence have an overly rigid attachment to traditional concepts and *g* theory that prevents them from objectively evaluating new theories. I believe it is also the case that some negative views of Sternberg's theory derive from a belief that the evidence offered for the theory is not based on rigorous analyses of data. Professor Sternberg's conclusions would be more acceptable to scholars in the field of intelligence if the rigor of his data analyses matched the originality of his theoretical insights.