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Editorial

CHC theory and the human cognitive abilities project: Standing on the shoulders of the giants of psychometric intelligence research

Kevin S. McGrew *

Woodcock-Muñoz Foundation, University of Minnesota, United States

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ABSTRACT

During the past decade the Cattell–Horn Gf–Gc and Carroll Three-Stratum models have emerged as the consensus psychometric-based models for understanding the structure of human intelligence. Although the two models differ in a number of ways, the strong correspondence between the two models has resulted in the increased use of a broad umbrella term for a synthesis of the two models (Cattell–Horn–Carroll theory of cognitive abilities—CHC theory).

The purpose of this editorial is three-fold. First, I will describe the CHC framework and recommend that intelligence researchers begin using the CHC taxonomy as a common nomenclature for describing research findings and a theoretical framework from which to test hypotheses regarding various aspects of human cognitive abilities. Second, I argue that the emergence of the CHC framework should not be viewed as the capstone to the psychometric era of factor analytic research. Rather, I recommend the CHC framework serve as the stepping stone to reinvigorate the investigation of the structure of human intelligence.

Finally, the Woodcock-Muñoz Foundation Human Cognitive Abilities (HCA) project, which is an evolving, free, on-line electronic archive of the majority of datasets analyzed in Carroll's (1993) seminal treatise on factor analysis of human cognitive abilities, is introduced and described. Intelligence scholars are urged to access the Carroll HCA datasets to test and evaluate structural models of human intelligence with contemporary methods (confirmatory factor analysis). In addition, suggestions are offered for linking the analysis of contemporary data sets with the seminal work of Carroll. The emergence of a consensus CHC taxonomy and access to the original datasets analyzed by Carroll provides an unprecedented opportunity to extend and refine our understanding of human intelligence.

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Intelligence and educational achievement

Volume 35, Issue 1, January 2007, Pages 13-21
Deary, I.J. | Strand, S. | Smith, P. | Fernandes, C.

This 5-year prospective longitudinal study of 70,000 + English children examined the association between psychometric intelligence at age 11 years and educational achievement in national examinations in 25 academic subjects at age 16. The correlation between a latent intelligence trait (Spearman's g from CAT2E) and a latent trait of educational achievement (GCSE scores) was 0.81. General intelligence contributed to success on all 25 subjects. Variance accounted for ranged from 58.6% in Mathematics and 48% in English to 18.1% in Art and Design. Girls showed no advantage in g, but performed significantly better on all subjects except Physics. This was not due to their better verbal ability. At age 16, obtaining five or more GCSEs at grades A *-C is an important criterion. 61% of girls and 50% of boys achieved this. For those at the mean level of g at age 11, 58% achieved this; a standard deviation increase or decrease in g altered the values to 91% and 16%, respectively.

Intelligence and socioeconomic success: A meta-analytic review of longitudinal research

Volume 35, Issue 5, September 2007, Pages 401-426
Strenze, T.

The relationship between intelligence and socioeconomic success has been the source of numerous controversies. The present paper conducted a meta-analysis of the longitudinal studies that have investigated intelligence as a predictor of success (as measured by education, occupation, and income). In order to better evaluate the predictive power of intelligence, the paper also includes meta-analyses of parental socioeconomic status (SES) and academic performance (school grades) as predictors of success. The results demonstrate that intelligence is a powerful predictor of success but, on the whole, not an overwhelmingly better predictor than parental SES or grades. Moderator analyses showed that the relationship between intelligence and success is dependent on the age of the sample but there is little evidence of any historical trend in the relationship.

Executive functioning in children, and its relations with reasoning, reading, and arithmetic

Volume 35, Issue 5, September 2007, Pages 427-449
van der Sluis, S. | de Jong, P.F. | van der Leij, A.

The aims of this study were to investigate whether the executive functions, inhibition, shifting, and updating, are distinguishable as latent variables (common factors) in children aged 9 to 12, and to examine the relations between these executive functions and reading, arithmetic, and (non)verbal reasoning. Confirmatory factor analysis was used to decompose variance due to the executive and the non-executive processing demands of the executive tasks. A Shifting factor and an Updating factor, but not an Inhibition factor, were distinguishable after controlling for non-executive variance. Updating was related to reading, arithmetic, and (non)verbal reasoning. Shifting was mainly related to non-verbal reasoning and reading. However, in terms of variance explained, arithmetic and reading were primarily related to the non-executive processing demands of the executive measures. The results are discussed in light of the "task impurity problem".

CHC theory and the human cognitive abilities project: Standing on the shoulders of the giants of psychometric intelligence research

Volume 37, Issue 1, January 2009, Pages 1-10
McGrew, K.S.

During the past decade the Cattell-Horn Gf-Gc and Carroll Three-Stratum models have emerged as the consensus psychometric-based models for understanding the structure of human intelligence. Although the two models differ in a number of ways, the strong correspondence between the two models has resulted in the increased use of a broad umbrella term for a synthesis of the two models (Cattell-Horn-Carroll theory of cognitive abilities-CHC theory). The purpose of this editorial is three-fold. First, I will describe the CHC framework and recommend that intelligence researchers begin using the CHC taxonomy as a common nomenclature for describing research findings and a theoretical framework from which to test hypotheses regarding various aspects of human cognitive abilities. Second, I argue that the emergence of the CHC framework should not be viewed as the capstone to the psychometric era of factor analytic research. Rather, I recommend the CHC framework serve as the stepping stone to reinvigorate the investigation of the structure of human intelligence. Finally, the Woodcock-Muñoz Foundation Human Cognitive Abilities (HCA) project, which is an evolving, free, on-line electronic archive of the majority of datasets analyzed in Carroll's (1993) seminal

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1. Emotional intelligence meets traditional standards for an intelligence

December 1999
John D Mayer | David R Caruso | Peter Salovey

Abstract: An intelligence must meet several standard criteria before it can be considered scientifically legitimate. First, it should be capable of being operationalized as a set of abilities. Second, it should meet certain correlational criteria: the abilities defined by the intelligence should form a related set (i.e., be intercorrelated), and be related to pre-existing intelligences, while also showing some unique variance. Third, the abilities of the intelligence should develop with age and experience. In two studies, adults (N=503) and adolescents (N=229) took a new, 12-subscale ability test of emotional intelligence: the Multifactor Emotional Intelligence Scale (MEIS). The present studies show that emotional intelligence, as measured by the MEIS, meets the above three classical criteria of a standard intelligence.

2. Mozart effect–Shmozart effect: A meta-analysis

May–June 2010
Jakob Pietschnig | Martin Voracek | Anton K. Formann

Abstract: The transient enhancement of performance on spatial tasks in standardized tests after exposure to the first movement "allegro con spirito" of the Mozart sonata for two pianos in D major (KV 448) is referred to as the Mozart effect since its first observation by Rauscher, Shaw, and Ky (1993). These findings turned out to be amazingly hard to replicate, thus leading to an abundance of conflicting results. Sixteen years after initial publication we conduct the so far largest, most comprehensive, and up-to-date meta-analysis (nearly 40 studies, over 3000 subjects), including a diversity of unpublished research papers to finally clarify the scientific record about whether or not a specific Mozart effect exists. We could show that the overall estimated effect is small in size (d=0.37, 95% CI [0.23, 0.52]) for samples exposed to the Mozart sonata KV 448 and samples that had been exposed to a non-musical stimulus or no stimulus at all preceding spatial task performance. Additionally, calculation of effect sizes for samples exposed to any other musical stimulus and samples exposed to a non-musical stimulus or no stimulus at all yielded effects similar in strength (d=0.38, 95% CI [0.13, 0.63]), whereas there was a negligible effect between the two music conditions (d=0.15, 95% CI [0.02, 0.28]). Furthermore, formal tests yielded evidence for confounding publication bias, requiring downward correction of effects. The central finding of the present paper however, is certainly the noticeably higher overall effect in studies performed by Rauscher and colleagues than in studies performed by other researchers, indicating systematically moderating effects of lab affiliation. On the whole, there is little evidence left for a specific, performance-enhancing Mozart effect.

12. CHC theory and the human cognitive abilities project: Standing on the shoulders of the giants of psychometric intelligence research

January–February 2009
Kevin S. McGrew

Abstract: During the past decade the Cattell–Horn Gf–Gc and Carroll Three-Stratum models have emerged as the consensus psychometric-based models for understanding the structure of human intelligence. Although the two models differ in a number of ways, the strong correspondence between the two models has resulted in the increased use of a broad umbrella term for a synthesis of the two models (Cattell–Horn–Carroll theory of cognitive abilities—CHC theory).The purpose of this editorial is three-fold. First, I will describe the CHC framework and recommend that intelligence researchers begin using the CHC taxonomy as a common nomenclature for describing research findings and a theoretical framework from which to test hypotheses regarding various aspects of human cognitive abilities. Second, I argue that the emergence of the CHC framework should not be viewed as the capstone to the psychometric era of factor analytic research. Rather, I recommend the CHC framework serve as the stepping stone to reinvigorate the investigation of the structure of human intelligence.Finally, the Woodcock-Muñoz Foundation Human Cognitive Abilities (HCA) project, which is an evolving, free, on-line electronic archive of the majority of datasets analyzed in Carroll's (1993) seminal treatise on factor analysis of human cognitive abilities, is introduced and described. Intelligence scholars are urged to access the Carroll HCA datasets to test and evaluate structural models of human intelligence with contemporary methods (confirmatory factor analysis). In addition, suggestions are offered for linking the analysis of contemporary data sets with the seminal work of Carroll. The emergence of a consensus CHC taxonomy and access to the original datasets analyzed by Carroll provides an unprecedented opportunity to extend and refine our understanding of human intelligence.