



## Culture-fair prediction of academic achievement

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### ABSTRACT

A theoretically based, culture-fair test of new learning ability is predictive of academic achievement. A sample of 633 adults, 121 of minority status, drawn from urban private universities, colleges, and community colleges were given information as to the meanings of previously unknown words, sayings, similarities, and analogies. They were also tested for their existing knowledge of vocabulary, opposites, and analogies with a brief version of the Scholastic Assessment Test (SAT). New learning ability proved to be culture-fair, reliable, and predictive of grades and of the brief version of the SAT.

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### 1. Introduction

The present research tests the validity of a culture-fair test of the ability to process new information for the prediction of academic achievement (exam scores in college courses). The culture-fair test of new learning is based on a theory which defines intelligence as information processing ability and the intelligence quotient (IQ score) as a measure of knowledge resulting from processing ability and from the information provided by the culture for processing (Fagan, 2000).

The search for a culture-fair test predictive of academic achievement begins with a question. Are majority-minority differences in IQ due to differences in innate intellectual ability or to cultural variations in exposure to information (Jensen, 1985)? There is no agreed upon answer and there is evidence for both sides of the argument (Gottfredson, 2005; Nisbett, 2005; Rushton & Jensen, 2005a,b; Sternberg, 2005; Suzuki & Aronson, 2005). Therefore, many (Cooper, 2005; Helms, 2007; Hunt & Carlson, 2007; Newman, Hanges, & Outtz, 2007; Sternberg, Grigorenko, & Kidd, 2005) argue for the need for new theoretical approaches to the question of the

sources of racial inequality in IQ. The theoretical approach taken in the present study assumes that group differences in IQ not accompanied by group differences in information processing ability are due to group differences in access to information (Fagan, 2000). Based on these assumptions, studies by Fagan & Holland (2002, 2007) offer a theoretically guided, empirical approach to the question of the basis of racial differences in IQ.

Fagan and Holland (2002) investigated the contributions that information processing ability and access to information make to racial differences in IQ. Majority and minority group members were compared for their knowledge of the meanings of words, a task that typically results in racial group differences in IQ. Fagan and Holland (2002) insured that the people in each group were given equal opportunity to learn the meanings of novel words and tested to determine how much knowledge had been acquired. General knowledge of word meanings was also tested to control for the possibility that the particular people chosen to represent each racial group might, by chance, simply have been equal in vocabulary knowledge. The majority group members were, as expected, superior to those in the minority in general vocabulary knowledge. However, when equal opportunity for exposure to the meanings of words was experimentally assured, both racial groups were equal in knowledge. Fagan and Holland (2007) explored the generality of their original findings by testing majority and minority group members for their

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knowledge of sayings, analogies, or similarities. Material was presented in such a way that knowledge of the concepts and terms employed in each test were commonly available for individuals of either race. Participants were also tested for their understanding of sayings, similarities, and analogies typically given in assessments of IQ, assessments which vary with race (Jensen, 1980; Jensen, 1981). As in their earlier study (Fagan & Holland 2002), knowledge such as that tested on conventional IQ tests varied with race while knowledge based on information made generally available did not vary with race.

### 1.1. Summary

In brief, the data of Fagan and Holland (2002, 2007), based on some 1000 participants, support the view that differences among races in knowledge typically tapped on standard IQ tests have to do with experience. A chief implication of such findings is that it may be possible to develop culture-fair tests of intelligence. As Williams (2000, p. 17) notes “Fagan’s ideas” are “relevant to the debate on intelligence testing and affirmative action because .... a true measure of processing efficiency (if it could be devised) would be fair to members of all racial and ethnic groups”. The goal of the present investigation was to discover if a culture-fair test of information processing based on new learning ability is predictive of academic achievement. Specifically, adults drawn from private universities, colleges, and community colleges in a major urban setting were tested for their ability to acquire new information concerning the meanings of previously unknown words, sayings, similarities, and analogies. They were also tested for their knowledge of vocabulary, opposites, and analogies via a brief version of the verbal section of the Scholastic Assessment Test (SAT-V) constructed for the purposes of the present study. Associations among performance on the culture-fair tests of new learning, a more conventional estimate of academic aptitude (the brief SAT), and academic achievement (objective test scores in college courses) were analyzed. For a small number of the participants standard SAT-V scores were available which allowed an estimate of whether the brief SAT constructed for the present study was comparable to the standard SAT-V in predicting class exam scores.

## 2. Methods

### 2.1. Participants

The sample included 633 students (392 females, 241 males). Racial identity was voluntarily provided by the student who checked, on a form, one of five categories labeled “American Indian or Alaskan Native”, “Asian or Pacific Islander”, “Black or African-American, not of Hispanic origin”, “Hispanic”, or “White, not of Hispanic origin”. The categories used were based on the designations employed by the United States Public Health Service and were consistent with the use of the same categories employed in the Fagan and Holland (2002, 2007) studies. Of the 630 who provided information as to their race, those of majority status (461 Whites, 48 Asians) constituted 80% of the sample and those of minority status (100 African-Americans, 18 Hispanics, 3 American Indians)

constituted 20%. The mean age was 21.3 years (SD 6.0 years), the mean education 13.7 years (SD 1.3 years). Some 49% of the students were enrolled at two private universities, 3% attended a small, private, liberal arts college, and 48% attended a two-year, community college. Admission to the community college is not based on standard tests such as the SAT or the ACT, only proof of completion of high school is required. Including community college students as well as students in private universities and colleges allowed a representative estimate of performance across a wide range of ability. All were registered for psychology classes at the undergraduate level.

### 2.2. Apparatus and materials

A culture-fair test of the students’ ability to acquire new information concerning the meanings of previously unknown words, sayings, similarities, and analogies was given. Examples will be noted below. In addition to the culture-fair tests of new learning all participants were given a brief SAT type test based on questions available from books containing practice questions for the SAT (examples will be given below). The brief SAT was given to insure that all participants would be given the same test, since community college students are not required to take the SAT for admission. In addition, students from other countries and transfer students did not always have SAT scores on record. Measures of exam performance on all of the objective tests taken during a semester (expressed as % correct out of 100) were obtained from instructors of psychology courses, with the students’ consent.

### 2.3. Procedure

#### 2.3.1. Culture-fair tests of new knowledge

Tests of new knowledge were based on a training phase and a testing phase. All training and testing was done in a group setting. Training for the learning of the meanings of new words, consisted of a form that said: “Now you are going to see how some unusual words are used in sentences. Read each sentence carefully.” An example of such a sentence was “It cost 1500 BEZANTS to buy the rug in Byzantium.” Training would then continue for the remaining 11 words of the 12 item set. Instructions for learning the meaning of new sayings were: “On the following pages you will see how 16 sayings from various cultures are explained in English. Carefully read the explanation for each saying.” An example of such a saying was “IN THE SOUP: Stuck. Not able to escape. Can’t get away.” Training for learning the meanings of new similarities and analogies was accomplished using pairs of nonsense words. Each of 20, two-word sets was explained. Later, 10 pairings of words were used to test for knowledge of the similarity between the words and 10 pairings were used to estimate newly gained knowledge of how the words fit into an analogy. The training instructions for two examples follow: “On the following pages you will see how simple words from rare languages are explained in English. Carefully read the explanation for each set of words. BRILLIG and CIDY: A BRILLIG is easily picked from a low branch and a CIDY from off a vine. Both a BRILLIG and a CIDY are juicy and Delicious. KODT and VALD: Big drills went into the earth hoping to find solid, shiny KODT or energy-rich, flowing VALD.”

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