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# The differential effect of conation on intelligence test scores among brain-damaged and control subjects<sup>☆</sup>

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## Abstract

Conation, or the ability to apply effective effort in completing a task over time, has been shown to be impaired in brain-damaged subjects. Various intelligence tests differ in the apparent extent to which they require conative ability. In this study we compared results earned by brain-damaged and control groups on three measures of intelligence: Wechsler Verbal IQ (VIQ), Wechsler Performance IQ (PIQ), and the Henmon–Nelson Test (HNT) of Mental Ability. Test scores were converted to *T*-score distributions for the combined groups in order to delete possible effects of differences in standardization procedures and the normative samples on which IQ scores were generated. The degree of impairment shown by the brain-damaged subjects was in direct relationship to the extent to which the three intelligence measures appear to require conation. The results support a generalization that intelligence tests that require a greater conative ability tend to produce lower scores for brain-damaged persons, as compared to controls, than do intelligence tests that are less demanding of conation.

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*Keywords:* Conation; Intelligence test scores; Brain-damaged subjects

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## 1. Introduction

Conation refers to purposeful striving toward and willing of task completion, and in terms of its relationship to performances on neuropsychological tests, would be represented by the ability to focus intellectual energy on the task and apply persistent effort in order to achieve the best possible performance.

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In one sense, this ability may be thought of as the individual's intellectual power or energy (Halstead, 1947; Reitan & Wolfson, 2000). Although conation, together with cognition and emotion, have been considered in the history of psychology to be the three primary elements of mental functioning (Anderson, 1934; Boring, 1929; Burt, 1960; Warren, 1931), conation has diminished in significance to the point that the term is not even included in Goodwin's (1989) dictionary of neuropsychology and is rarely referenced to in the current literature. Nevertheless, if conation is significantly impaired in persons with brain damage, it could be a critically important aspect of the adequacy of their performances in practical situations and of direct significance in understanding and explaining instances in which there are disparities between a subject's relatively adequate level-of-performance scores on neuropsychological tests and inadequate performances in everyday life.

We have previously reviewed definitions of conation and its role in the history of psychology (Reitan & Wolfson, 2000), but it may be of value to consider the concept with regard to cognition, emotion, motivation, and vigilance. Cognition refers to the processes involved in gaining knowledge. Conation has been reported to be relevant to the efficiency of cognition (Richardson, 1929; Wild, 1927, 1928). Emotion appears to be relatively distinct from conation, except that it is the area frequently implicated when relatively competent brain-damaged people perform poorly in practical situations. Motivation would seem to be closely related to conation, but differs insofar as motivation is concerned with need fulfillment and specific incentives which direct and drive behavior toward goal achievement. Vigilance, or maintenance of alertness over time as required by the task, shares with conation the temporal aspect of maintaining efficiency, but differs from conation insofar as vigilance is essentially a receptive (input) process whereas conation relates to an expressive (output) ability to persistently apply intellectual energy to the task as needed to achieve an optimal result.

In our previous study of conation (Reitan & Wolfson, 2000) we compared the performances of a non-brain-damaged control group and a heterogeneous brain-damaged group on four measures selected to vary with regard to their dependence on conation.

Two of the tests that were used, the Information and Vocabulary subtests from the Wechsler Adult Intelligence Scale (Wechsler, 1955), are given an item at a time, and thus do not require persistent application of intellectual energy over time to solve the task presented. Another verbal test that was used (Speech-sounds Perception Test; Reitan & Wolfson, 1993) requires a degree of conation inasmuch as the subject must focus attention and make discriminative, though simple, judgments across a total of 60 items that are administered consecutively. Finally, a group intelligence test was used (the Henmon–Nelson Test of Mental Ability; Lamke & Nelson, 1957), even though it has never been proposed or evaluated as a measure that is sensitive to brain damage. The Henmon–Nelson Test (HNT) consists of 90 items that require a multiple-choice response and the subject is given 30 min to complete as many of the items as possible. Our hypothesis was that among these four measures, the HNT was most heavily dependent on conation since it required the subject to focus intellectual energy on the task and maintain productive effort over a fairly extended period of time.

Briefly recapitulated, Reitan and Wolfson (2000) found that the degree of impairment shown by the brain-damaged group, as compared to scores achieved by non-brain-damaged controls, corresponded closely with the test's dependence on conation. The Vocabulary and Information

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