INTELLIGENCE **21,** 13–29 (1995)

Impulsivity and Speed-Accuracy Strategies in Intelligence Test Performance

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A number of authors have expressed concern about our lack of knowledge of speed-accuracy strategies in intelligence tests. This study examines whether relations between intelligence-test performance and information-processing measures depend on individual differences in speed-accuracy preferences rather than on capacity limitations and whether the impact of strategic variables changes with increasing age or extraversion. Eighty-three volunteers from 50 to 79 years old were compared on 4 tests of intelligence and 3 tests of information-processing rate. Impulsivity indices were computed from intelligence-test performance parameters in order to quantify speed-accuracy preferences. Impulsivity measures from different tests correlated positively, showing that stable strategic preferences exist independently of test ability. There was no evidence that impulsivity was related to extraversion or increasing age. Strategic preferences did not underpin relations between intelligence-test total scores and measures of processing rate. More complete predictions of cognitive task performance could be obtained in future work if both total scores and impulsivity indices are taken from intelligence tests.

It is well established that total scores obtained on intelligence tests relate negatively to latency of performance on simpler reaction-time (RT) tasks (e.g., Vernon, 1987). These findings have led to the well-documented theory that individual differences in intelligence are caused by variations in the rate at which people can process simple information (e.g., Eysenck, 1982). Despite considerable interest in such findings, little is known about speed of performance on more complex tasks such as intelligence tests themselves. Traditionally, only one measure is taken from intelligence-test performance: the total number of questions that an individual answers correctly, henceforth *total score*. Dissatisfaction has been expressed with this single index (e.g., Detterman, 1985; Eysenck, 1986; Goward, 1987; White, 1973). Frearson, Eysenck, and Barrett (1990) suggested that other parameters of intelligence-test performance such as speed, percentage accuracy, and persistence may be salient.

In this article, two separable influences on intelligence-test performance are

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examined: test ability and strategic preference for speed or accuracy. Total scores obtained from intelligence tests are generally accepted to be a plausible index of test ability, but no suitable way of measuring strategic preference has thus far been forthcoming. In this article, a method of measuring such speed-accuracy preferences is suggested in the form of an impulsivity index. A number of issues about strategic influences on intelligence-test performance are examined:

- Are strategic preferences for speed or accuracy consistent across a range of intelligence tests?
- Do such strategic factors influence the relations between intelligence-test scores and rate of performance on simple processing tasks?
- Are strategy changes apparent with increased adult age?
- Do personality measures relate to differences in speed-accuracy emphasis?

IMPULSIVITY: STRATEGIC PREFERENCE FOR SPEED OR ACCURACY

Those who perform better on intelligence tests in terms of the total score that they achieve are likely to be both faster and more accurate on the tests (Rabbitt, 1990). This suggests that those who differ in test ability also fundamentally differ in terms of their latency-accuracy trade-off functions on individual items (see Figure 1). In intelligence-test items, there must be a minimum time that an individual can spend before responding correctly and the minimum solution time will be shorter for those who are better at the test.

However, individuals also have a choice as to how fast they wish to carry out a test item depending on how much they emphasise speed or accuracy of performance, as shown in Figure 2. Two people of roughly the same ability will have similar latency-accuracy curves but they may choose to adopt different strategies of emphasis on speed or accuracy and thus occupy different positions on the curve. In Figure 2, Individual A operates at maximum accuracy but has a concomitant increase in latency. Individual B chooses to favor speed and thus has less accurate performance. On time-limited intelligence tests, in which both speed and accuracy of performance are likely to influence the total score achieved, Individuals A and B may well obtain comparable total scores through different speed-accuracy emphases.

Therefore, for any individual there will be two influences on their speed and accuracy of performance on cognitive test items: Their test ability will determine the characteristics of their latency-accuracy trade-off function and their preference for speed or accuracy will determine the position on that curve they choose to occupy. The opposing influences of strategic preference and test ability on cognitive speed have often been recognized, but so far little progress has been

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