

Another Source of Individual Differences: Strategy Adaptivity to Changing Rates of Success

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This article explores an alternative approach to the study of individual differences of cognitive function—that people may have the same strategies but differential ability to adaptively select among them in response to success and failure feedback from the environment. Three studies involving the complex and dynamic Kanfer–Ackerman Air Traffic Control Task (P. L. Ackerman & R. Kanfer, 1994) demonstrate (a) that individuals do differ systematically along this strategy adaptivity dimension, (b) that those differences have important consequences for overall task performance, and (c) that the differences are primarily associated with reasoning ability and working-memory capacity.

From an information-processing perspective, there are two popular approaches to the study of individual differences of cognitive function construed broadly (i.e., including studies of child development, giftedness, aging, intelligence, brain damage, schizophrenia, expertise, and adult individual differences). The first is the parameter approach. This approach assumes that individuals vary in performance because of differences in some fundamental aptitude or parameter of the cognitive architecture. Although many different parameters have been proposed, there are two especially popular parameters: processing speed and working-memory capacity. For example, in terms of processing speed differences, researchers have argued that older children think faster than younger children (Fry & Hale, 1996; Kail, 1988), that older adults think slower than younger adults (Salthouse, 1994), that gifted children think faster than average children (Saccuzzo, Johnson, & Guertin, 1994), and that people with schizophrenia think slower than people without schizophrenia (Schooler, Neumann, Caplan, & Roberts, 1997). In terms of working-memory capacity, researchers have argued that people with aphasia have reduced working memory capacity (Miyake, Carpenter, & Just, 1995), that children have higher working memory capacity (Case, 1985; Fry & Hale, 1996),

and that general intelligence differences depend heavily on working-memory capacity differences (Just & Carpenter, 1992). Although this parameter approach most naturally describes the analyses of information-processing psychologists (e.g., Daily, Lovett, & Reder, in press; Hunt, Joslyn, & Sanquist, 1996; Just & Carpenter, 1992; Lovett, Reder, & Lebiere, 1996, 1999; Sternberg, 1977), it can also be viewed as the information-processing take on the psychometric approach to individual differences (e.g., Ackerman, 1989; Snow, Kyllonen, & Marshalek, 1984; Spearman, 1904).

The second general approach is the strategies approach. A strategy is a method used for solving a problem. This approach assumes that there are many different strategies that can be used to solve any given problem and that individuals vary in the strategies they use. For example, researchers have argued that older children use different strategies than younger children in a wide variety of domains (Siegler, 1983), that older adults use different strategies than younger adults (Reder, Wible, & Martin, 1986; Shapira & Kushnir, 1985), that good students self-explain and poor students do not (Chi, Bassok, Lewis, Reimann, & Glaser, 1989), that experts use different strategies than novices (Chi, Feltovich, & Glaser, 1981; Ericsson & Polson, 1988; Larkin, McDermott, Simon, & Simon, 1980), that optimists use different strategies than pessimists (Carver & Scheier, 1992), and that individuals from different cultures use different strategies (Greenfield & Lave, 1982; Wagner, 1978). A variant of the strategies approach is the styles approach, in which individuals are thought to vary in terms of their general cognitive styles or their typical modes of processing information (see Sternberg & Grigorenko, 1997, for a review).

Although many researchers tend to emphasize one approach over the other—in fact, they frequently design their experiments to minimize the influence of the other factor—the strategies approach and the parameters approach need not be mutually exclusive. It has been argued, moreover, that groups select different strategies to compensate for parameter differences. For example, it has been argued that older adults rely more heavily on plausible-reasoning strategies because their exact memory retrievals are more effortful than those of younger adults (e.g., Reder, Wible, & Martin, 1986).

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