

ABILITIES

Systematic exploration of the domain of intellectual development began in the 1930s with the study of children and young adults and eventually produced several taxonomies of abilities intended to identify the "building blocks of the mind." The most prominent taxonomies of abilities are those associated with Thurstone, Guilford, and Cattell.

Thurstone empirically identified 10 major dimensions by factoring a battery of 60 mental ability tests. Of these the first five factors that have been most frequently explored in work with adults. The most important abilities include Verbal Meaning, Spatial Orientation, Inductive Reasoning, Number and Word Fluency. Adult age changes occur at different rates for these abilities. For example, only late life decline is found for Verbal Meaning, while decline on Number skill begins in late midlife (Schaie, 1996). Abilities also display differential cohort patterns. There has been a substantial increase in level over successive generations for Reasoning, and a smaller increase for Spatial Orientation and Verbal ability, while there has been a decline for Number ability (Willis, 1989).

Guilford (1967) in a more theoretical analysis, proposed a structure-of-intellect model that include the three major dimensions of (1) operations (evaluation, convergent production, divergent production, memory and cognition), (2) products (units, classes, relations, systems, transformations and implications), and (3) content (figural, symbolic,

semantic and behavioral). This system yields a total of 120 possible ability components, only a limited number of which were fully operationalized.

Cattell, whose early work in the ability realm was concerned with the development of culture-fair measures, identified two major higher-order dimensions that resulted from the factor analysis of primary mental ability measures. These are the construct of *fluid ability* involved in the solution of novel problems and of *crystallized ability* involving knowledge acquired in the course of the socialization process of a given culture. Observable ability measures may be more or less pure measures of these higher order abilities or may involve both components as well as the additional higher order components of short-term acquisition retrieval, long-term storage-retrieval and speed or fluency (cf. Horn, 1982). The Cattell-Horn ability model has been of particular interest to researchers on aging because cross-sectional data suggest early adult decline for the fluid abilities but maintenance or modest increments for the crystallized abilities into advanced age. Tests suitable for ability measurement in adults are described in Schaie (1985) and in Ekstrom et al, (1976).

References

- Ekstrom, R. B., French, J. W., Harman, H., & Derman, D. (1976). *Kit of factor-referenced cognitive tests* (rev. ed.). Princeton, NJ: Educational Testing Service.
- Guilford, J. P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.
- Horn, J. L. (1982). The theory of fluid and crystallized intelligence in relation to concepts of cognitive psychology and aging in adulthood. In F. I. M. Craik & S. Trehub (Eds.), *Aging and cognitive processes* (pp. 237-278). New York: Plenum.
- Schaie, K. W. (1985). *Manual for the Schaie-Thurstone Test of Adult Mental Abilities (STAMAT)*. Palo Alto, CA: Consulting Psychologists Press.
- Schaie, K. W. (1996). *Intellectual Development in Adulthood: The Seattle Longitudinal Study*. New York: Cambridge University Press.
- Willis, S. L. (1989). Cohort differences in cognitive aging: A sample case. In K. W. Schaie & C. Schooler (Eds.), *Social structure and aging: Psychological processes* (pp. 94-112). Hillsdale, NJ: Erlbaum.