



## A parentally administered cognitive development assessment for children from 10 to 24 months

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### ABSTRACT

The Cognitive Development Questionnaire (CDQ) allows accurate assessment of cognitive development of children from 10 to 24 months by parents and caregivers in the home. It takes between 1 and 2 h to complete over about a week. Three phases of work are described, in which the instrument is progressively refined to improve its validity and reliability. This resulting version of the CDQ shows excellent correlation with age, and with the Mental Scale of the Bayley Scales of Infant Development (Bayley, 1993). The CDQ thus offers researchers and clinicians a useful alternative to professionally administered cognitive assessment in infancy.

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## 1. Introduction

Cognitive assessment of children in the first year or two of life is undertaken for health surveillance, diagnosis, and/or research purposes. It typically involves administration of standardized tests by trained assessors. Table 1 lists some of the most commonly used professionally administered instruments. Some measure cognitive ability only; others encompass domains such as motor, and personal-social skills, and general behavior. Yet, these assessor-administered tests do not utilize one of the richest sources of information on that infant's cognitive ability: the infant's parent or caregiver (Bricker & Squires, 1989; Bricker, Squires, Kaminski, & Mounts, 1988; Fenson et al., 1994; Saudino et al., 1998). Parental reports have been extensively used in other domains to assess, e.g., attachment, social skills and behavioral problems (Achenbach & Edelbrock, 1983; Goldsmith, 1996; Hogan, Scott, & Bauer, 1992; Waters & Deane, 1985), and communicative development (Dale, Bates, Reznick, & Morisset, 1989; Fenson et al., 1994; Nelson, 1973).

Saudino et al. (1998) give a number of reasons to prefer parental<sup>2</sup> reports to professionally administered tests. First, in a test in the home, a broader sample of infant behavior may contribute to the final assessment of cognitive ability than would be the case with a professionally administered test. Second, parent report measures are more economical than professionally administered tests, which can involve a trained assessor in several hours of testing. Third, parental report measures can provide relatively economical data for research studies using large samples (see also Bricker et al., 1988; Oliver et al., 2002).

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<sup>2</sup> The term 'parent' may at all times be read as 'parent or caregiver'.

**Table 1**  
Infant cognitive assessment instruments.

Assessment instrument	Age range	Domains of assessment
Battelle Developmental Inventory (Newborg, Stock, & Wnek, 1984)	1 month to 8 years	Cognitive, personal social, adaptive, motor and communication
Bayley Scales of Infant Development BSID-II (Bayley, 1969, 1993); Bayley Scales of Infant and Toddler Development BSID-III (Bayley, 2005)	1–42 months	Cognitive, communication, motor and behavior
Cattell Infant Intelligence Test (Cattell, 1940)	2–30 months	Cognitive
Clinical Adaptive Test/Clinical Linguistic Auditory Milestone Scale CAT/CLAMS (Accardo & Capute, 1996)	Birth to 36 months	Language, problem solving and visual-motor skills
Cognitive Abilities Scale CAS-2 Infant Form (Bradley-Johnson & Johnson, 2001)	3 months to 24 months	Exploration of objects, communication with others and initiation and imitation
Denver Developmental Screening Test-Denver II (Ffranenburg, Didds, Fandal, Kazuk, & Cohrs, 1975)	Birth to 6 years	Language, gross motor, fine motor-adaptive, personal-social and behavior
Griffiths Developmental Schedule (Griffiths, 1996)	1–60 months	Locomotor, hearing and speech, eye and hand co-ordination, performance, practical reasoning and personal-social
Gesell Developmental Schedules (Knobloch, Stevens, & Malone, 1980)	1 week to 36 months	Adaptive, gross motor, fine motor, language and personal-social
Infant Psychological Development Scale (Uzgiris & Hunt, 1975)	2 weeks to 2 years	Object permanence, use of objects as means, learning and foresight, development of schemata, development of an understanding of causality, conception of objects in space, vocal imitation and gestural imitation
Infant-Toddler Developmental Assessment IDA (Provence, Erikson, Vater, & Palmeri, 1995)	Birth to 36 months	Gross motor, fine motor, language/communication, relationship to peers, emotions and feeling states and coping behavior
The Mullen Scales of Early Learning (Mullen, 1995)	Birth to 68 months	Gross motor, visual reception, fine motor, expressive language and receptive language

Fourth, parents draw on a broader sample of infant behavior in their assessment, and are thus more likely to observe and to report more accurately on emerging skills, than are professional researchers (Saudino et al., 1998). Fifth, the unnaturalness inherent in testing by a stranger may result in underestimation of ability (Gradel, Thompson, & Sheehan, 1981; Sheehan, 1988).

Strong positive correlations are commonly reported between parental and professional assessment (Dinnebeil & Rule, 1994), including when parents and professionals assess the same child with the same assessment instrument (Beckman, 1984; Blacher-Dixon & Simeonsson, 1981; Bricker & Squires, 1989; Bricker et al., 1988). Parental and professional agreement has also been found to be high when used for the purposes of developmental screening (Glascoe, Altemeier, & MacLean, 1989). The accuracy of parental report has also been shown to be unaffected by socio-demographic factors such as level of education and experience in child rearing (Glascoe et al., 1989; Johnson, Wolke, & Marlow, 2008). Yet despite its apparent utility, little use has been made of parent report in evaluating cognitive ability below 2 years. To our knowledge, no parental report instrument focuses solely on *cognitive* development across a *range* of ages in infancy. Nonetheless, five parentally administered instruments include measures of cognitive ability and are now briefly reviewed.

The Child Development Inventory (CDI) (Ireton, 1998) is a parent report questionnaire for the screening and assessment of children at risk of development delay. It consists of 270 statements describing skills across eight developmental areas that parents are likely to observe in daily interactions: social, self-help, gross motor, fine motor, expressive language, language comprehension, letters, and numbers. The CDI provides information about the child's current development, their weaknesses and also their strengths. Parents' scores correlate well with standardized tests such as Clinical Adaptive Test/Clinical Linguistic Ability Milestone Scale (Accardo & Capute, 1996) and the Bayley Scales of Infant Development 2nd edition (Bayley, 1993; Doig, Macias, Saylor, Craver, & Ingram, 1999). However, the number of items in the CDI makes its completion a lengthy process, restricting its utility.

The Infant Development Inventory (IDI; Ireton, 1994) was developed by Ireton to cover the period from birth to 21 months of age. Parents describe their infant in terms of current behaviors using an Infant Development Chart, describing patterns of behavior expected across the five domains of fine motor, gross motor, social, self-help and language. The IDI is a descriptive tool which health professionals ask concerned caregivers to complete—at-risk infants are referred for subsequent assessment. The IDI has yet to be validated against the BSID or other standardized test.

The Parent Report of Children's Abilities (PARCA; Saudino et al., 1998) assesses non-verbal cognitive ability in 2-year-old children and takes approximately 1 h to complete. The PARCA is divided into two parts: a parent-report section and a parent-administered section. The parent-report section comprises 26 yes-or-no items assessing quantitative skills, spatial abilities, symbolic play, planning and organizing, adaptive behaviors, and memory. The parent-administered section comprises 24 items assessing design drawing, match to sample, block building and imitation. These 24 test items were drawn from

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