

Mirror Test of Infant Self-Awareness

Jenna Bekkala, MS

University of Detroit Mercy

Naomi J. Aldrich, PhD

Grand Valley State University

Our understanding of *self*, or belief in one's being as distinct from others, has been a subject of inquiry throughout human history. Discussions of self-concept would not appear in the empirical literature, however, until the mid-19th century. After likening an orangutan's response to teasing as that of a "naughty child", Charles Darwin began to question orangutans' self-concept by observing reactions to their own mirror images. Darwin's use of the mirror to gauge self-awareness, a method eventually applied to his own infant son (Darwin, 1877), would remain the most frequently used assessment of self-concept for the next century.

To substantiate previous findings, Dr. Gordon Gallup Jr. created a modified version of Darwin's assessment, the mirror self-recognition test (1970). After marking a primate's brow ridge and ear with red dye, the animal was considered self-aware if they inspected the mark once placed in front of a mirror. Prior to these experiments with juvenile chimpanzees and monkeys during the summer of 1969, a doctoral student at the University of North Carolina was investigating self-awareness in human children as part of her dissertation (1963-1966). Although her findings would not be published until two years after Gallup's, Beulah Amsterdam's mirror assessment bears strikingly similar modifications to Darwin's original measure.

In her ground-breaking study (1972), Amsterdam assessed the development of self-recognition in 88 typically-developing 3- to 24-month-olds, with two females and two males at each month-of-age. Every child and their mother visited a room containing a playpen with an 11 x 47-inch mirror fastened to one side. The session began with a 5-minute warm-up period allowing the child to become comfortable with the setting, after which a spot of rouge was placed on the side of the child's nose to help focus the child's attention to their face. Each child participated in three, consecutive 2 ½ minute trials, during which the child was placed in front of the mirror while their mother said "see, see, see", "Who's that?" while pointing to the child's reflection. Based on detailed notes taken during each trial, Amsterdam then completed a checklist of observed behaviors upon the dyad's departure. Amsterdam's mirror behavior checklist included 11 categories of mirror behaviors evaluated by 34 items, organized by the expected order of emergence from earliest (i.e., not looking at mirror) to latest (i.e., saying their own name, pointing to self).

According to Amsterdam, mirror behaviors vary greatly during the first two years, with self-recognition developing in three phases. Between 6- and 12-months-of-age, children act as if their reflection is that of a desired playmate, reacting joyfully and enthusiastically towards the "other child". In the second phase (13 to 24 months), children display early signs of self-consciousness, through behaviors associated with locating the red spot on their face (e.g., avoiding/retreating from the mirror, showing signs of bravado or embarrassment). Finally, between 20 and 24 months, most children display self-recognition by stating their name and/or pointing to themselves in the mirror.

Now commonly referred to as the "rouge" test, Amsterdam's study documented an innovative paradigm for testing humans' burgeoning self-awareness. Employing a critical

variation to earlier mirror-reaction assessments; the unexpected change brought to children's reflections through a smudge of red cream appears to have made all the difference. Regardless whether researchers vary the types of mirrors used (e.g., distorted versus flat mirrors with clear or partial occlusion, Schulman & Kaplowitz, 1977), sample typical or developmentally at-risk populations (i.e., Mans, Cicchetti, & Sroufe, 1978), or establish a cognitive-developmental stage model regarding self-recognition (i.e., Bertenthal & Fischer, 1978), subsequent studies have arrived at the same conclusion that Amsterdam reached in 1972: human self-recognition emerges in a sequence of behaviors, culminating in full by 24-months-of-age.

Once believed to be a uniquely human ability, we now acknowledge that having a sense of *self* is shared with many other species. In tandem, the seminal work of Drs. Gallup Jr. and Amsterdam determined not only which primates have a self-concept, but also the age at which humans' initial understanding of *self* emerges. In doing so, both researchers advanced developmental science by increasing our understanding of who we are— both at the individual- and species-level. Seemingly, great minds think alike, especially when it comes to reflections.

Further readings:

Amsterdam, B. (1972). Mirror self-image reactions before age two. *Developmental Psychobiology*, 5(4), 297-305.

Bertenthal, B. I., & Fischer, K. W. (1978). Development of self-recognition in the infant. *Developmental Psychology*, 14(1), 44-50.

Darwin, C.R. (1877). A biographical sketch of an infant. *Mind: A Quarterly Review of Psychology and Philosophy*, 2(7), 285-294.

Gallup, Jr., G.G. (1970). Chimpanzees: Self-recognition. *Science*, 167(3914), 86-87.

Mans, L., Cicchetti, D., & Sroufe, L. A. (1978). Mirror reactions of Down's Syndrome infants and toddlers: Cognitive underpinnings of self-recognition. *Child Development, 49*(4), 1247-1250.

Schulman, A. H., Kaplowitz, C. (1977). Mirror-image response during the first two years of life. *Developmental Psychobiology, 10*(3), 133-142.