Published in final edited form as:
Behav Brain Sci. 2010 June ; 33(2-3): 95–96. doi:10.1017/S0140525X10000117.

WEIRD Walking: Cross-Cultural Research on Motor Development

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Abstract

Motor development—traditionally studied in WEIRD populations—falls victim to assumptions of universality similar to other domains described by Henrich et al. (current issue). However, cross-cultural research illustrates the extraordinary diversity that is normal in motor skill acquisition. Indeed, motor development provides an important domain for evaluating cultural challenges to a general behavioral science.

HHN remind us, like others before (e.g., Bornstein, 1980; Kennedy, Scheirer, & Rogers, 1984; Moghaddam, 1987; Russell, 1984; Sexton & Misiak, 1984; Triandis, 1980), about the formative role of culture in all human behavior. Even basic psychological processes such as perception are subject to cultural variation (Segall, Campbell, & Herskovits, 1966). Nonetheless, psychological research remains largely ethnocentric.

Consider basic processes in motor development. Cross-cultural comparisons serve as natural experiments revealing the effects of experience on motor development and highlighting diversity in developmental pathways and the range in human potential (Adolph, Karasik, & Tamis-LeMonda, 2009; Bornstein, 1995). Yet, the field suffers from long-standing assumptions of universality based on norms established with WEIRD populations.

Historically, research on motor development focused on establishing universals. Led by Gesell, early pioneers established the practice of cataloging the ages and stages of motor development. In particular, Gesell's (1928) testing procedures, test items, and developmental norms—explicitly and deliberately based on behaviors of WEIRD children—inspired the widely used Bayley (1969) and Denver Scales (Frankenburg & Dodds, 1967), which describe the developmental timing and sequence of infants' motor skills. Such normative templates are the current, accepted gold standard of motor development, and regarded as prescriptions of what is desired rather than relatively narrow descriptions of what may be acquired.

Due to the prevailing emphasis on motor milestones, cross-cultural research has been dominated by normative comparisons of onset ages. Recent evidence shows that cultural differences in daily childrearing practices can explain accelerated and delayed onset ages relative to WEIRD norms (Adolph, Karasik, & Tamis-LeMonda, 2009, for review). For example, in some regions of Africa, the Caribbean, and India, caregivers vigorously massage and exercise infants as part of daily bathing routines, stretching infants' limbs,

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tossing them into the air, and propping them into sitting and walking positions (Bril, 1988; Super, 1976). Infants who receive massage and exercise begin sitting and walking at earlier ages than infants who do not (Hopkins & Westra, 1988). Laboratory experiments with random assignment to exercise and control groups confirm these results: A few minutes of daily exercise accelerates walking onset (Zelazo, 1983).

Reciprocally, restricted practice can delay the age at which children reach motor milestones. In Northern China, the practice of toileting infants by laying them on their backs in sandbags for most of the day delays the onset of sitting, crawling, and walking by several months (Mei, 1994). Among WEIRD families, the recent practice of putting infants to sleep on their backs rather than their stomachs has resulted in delayed onset of crawling and other prone skills (Davis, Moon, Sachs, & Ottolini, 1998). In cultures that do not encourage crawling (including WEIRD infants circa 1900), large proportions of infants skip crawling altogether (Hopkins & Westra, 1988), either bum-shuffling or proceeding straight to walking (Fox, Palmer, & Davies, 2002; Robson, 1984; Trettien, 1900).

Other aspects of motor development are also influenced by culture and context. For example, childrearing practices can affect the shape of developmental trajectories. In WEIRD cultures, upright leg movements show a well-known U-shaped trajectory: Newborn stepping disappears after about 2 months of age and upright stepping does not return until the end of the first year. But in cultures where caregivers exercise infants' leg movements (and confirmed in laboratory experiments), stepping shows monotonic increase throughout the first year (Super, 1976; Zelazo, 1983).

Foot-binding in China provides an extreme example of how cultural practices affect the form of movements. For 1000 years, mothers deformed their daughters' feet to give them the walking gait of a "tender young willow shoot in a spring breeze" (Chew, 2005). Feet 3 inches in length were achieved through years of training and excruciating pain. The routine (typically beginning between 5 and 8 years of age) involved breaking four toes on each foot and bending and tightening them in place with bandages. Girls then relearned how to walk with altered balance constraints of their shortened feet. This custom was eradicated in the 1920s.

Cultural practices also affect the endpoint of development. Daily tasks require peoples of Africa, Asia, and North America to develop walking and running skills that exceed the abilities of WEIRD adults. African women and Nepalese porters of both genders carry immense loads by modifying their walking gait to conserve mechanical energy (Heglund, Willems, Penta, & Cavagna, 1995). They routinely carry more than their body weight for many kilometers (Bastien, Schepens, Willems, & Heglund, 2005). Tarahumaran Indian children, women, and men of Mexico run 150-300 km round-the-clock for fun and for persistence hunting (Bennett & Zingg, 1935). Endpoints can also stop short of what is expected. Crawling on hands and feet before walking is typical in WEIRD infants, but some families of adults in rural Turkey crawl on hands and feet instead of walking (Humphrey, Skoyles, & Keynes, 2005). In contrast to most cultures, the parents of these adult children never encouraged walking, and the primary models for locomotion were siblings who also crawled instead of walked.

HHN raise an important point about commonalities across cultures with different childrearing practices. Basic motor functions—manual, postural, and locomotor skills—that are universally useful and adaptive are present in every society studied. We are comparing the postural and manual capacities of 5-month-olds in disparate cultures on maternal handling practices (Karasik, Bornstein, Suwalsky, et al., 2009). Despite different support contexts, infants practice various postures with accompanying opportunities for object

exploration. These data highlight developmental equifinality (Bornstein, 1995): Although the routes to object exploration vary, the outcome is the same.

Cross-cultural research on motor development is important for establishing general principles in developmental science and for revealing possibilities in human development hitherto unimagined. WEIRD infants sit at 6 months, but African infants sit at 4 months. WEIRD mothers would never dream of leaving their young infants unattended, but mothers in Cameroon leave their 5-month-olds (for 20+ minutes!) sitting alone on high stools. These sorts of phenomena can only be revealed with cross-cultural work, and provide the impetus for laboratory investigations to consider and test hypotheses previously not envisioned.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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