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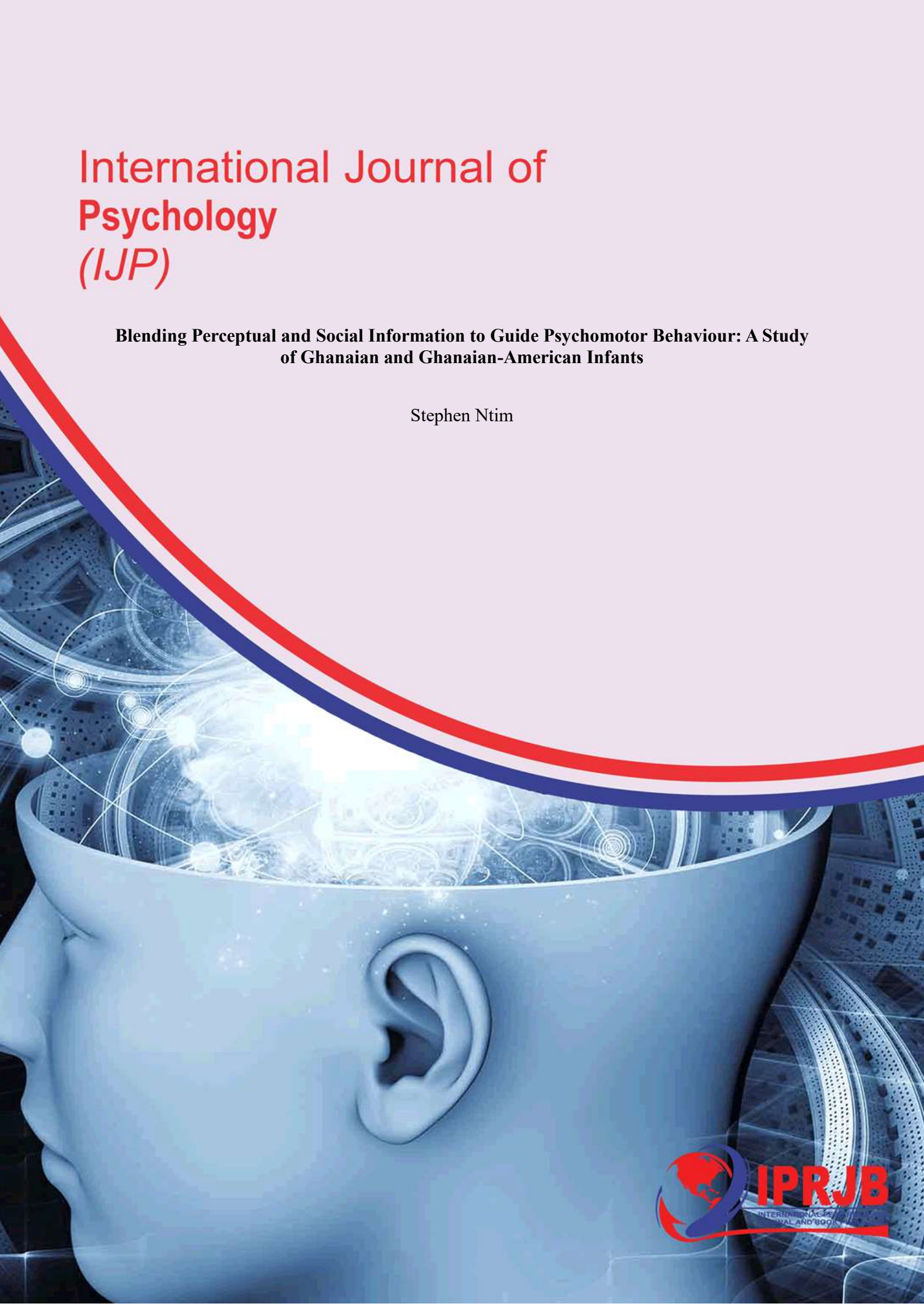

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Blending Perceptual and Social Information to Guide Psychomotor Behaviour: A Study of Ghanaian and Ghanaian-American Infants

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Abstract

Purpose: This study examined how mothers from two different geopolitical areas having the same cultural roots blended perceptual and social information to coax infants' psychomotor behaviour to learn how to walk. It emphasizes how culture and acculturation (migration) shape maternal social information and their behavioral outcomes to entice infants to learn how to walk.

Methodology: This research is observational quantitative. It collected and analyzed data, such as maternal coaxing of infants to walk, infants' psychomotor decisions, infants' perceptual exploration such as crawling or sitting down, infants facial and vocal expressions.

Findings: On maternal coaxing messages to induce infants to walk, with agreed baseline of 99.5% of trials, indigenous Ghanaian mothers, scored 95%, while the Ghanaian mothers living in New York scored 89.55%. Infants' psychomotor decisions to reciprocate maternal coaxing to walk were 180 seconds individually for four of the Ghanaian infants, while three of the infants from New York-based mothers scored 180, 178 and 174 seconds respectively. Infants' facial expression, such as laughing and babbling, the two groups diverged significantly on a benchmark of 91.3 %. Crying and facial frowning were found to be high among Ghanaian-American infants': Ghanaian infants scored 40 percent (37.24), while Ghanaian-Americans infants scored 60 percent (55.86). These data were interpreted to mean that even though, the two groups of mothers were both Ghanaians culturally, yet the contexts of maternal expressions to coax infants to walk varied significantly. This suggests that infants' executive function, as well as effortful psychomotor control, do not only depend on mothers deliberate coaxing methods, they also vary both across cultures, and more significantly within cultures as a result of the impact of migration.

Unique Contribution to Theory, Practice and Policy: This study underscores how critical it is to understand the process of acculturation as key to migrants' psychological adaptation to the new culture. At both group and individual levels, acculturation often influences changes to migrants' home culture and their indigenous social practices as they become introduced to the overarching culture of destination, highlighting the need for a culture-sensitive, Childhood Education for immigrant children as they migrate from L1 to L2.

Keywords: *Culture, Cognition, Maternal Coaxing, Infants Psychomotor Decisions, Perceptual Exploration*

JEL Code of Classification: *Z00, D1, Z1, 120, 129*

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INTRODUCTION

One could make the submission that most 20th and 21st century psychologists generally support the subsequent four assumptions about human cognition: a) the universality of cognitive processes: that is, all humans are endowed with the same mental processes (perception, attention, memory, learning and the ability to make inferences); b) regardless of content being operated on, these processes of cognition work pretty the same way; c) every growing child has cognition for general learning and the ability to make inference to learn about the environment. While processes of cognition provide the content, the basis for these operations are provided by the environment; d) the environmental contexts forming the basis of mental operations (social, political, economic) differ for cultures and peoples. Therefore, in terms of theories, belief systems, values, etc., human minds also do vary (Asch, 1952; D'Andrade, 1987; Leslie, 1994; Wellman, 1990; Sperber, 1996; Atran & Sperber, 1991). Copious evidence supports the view that cognition shapes cultural phenomenon, just as culture also shapes cognitive processes (Nisbett & Norenzayan, 2002)). There are varied ways people label and at the same time organize perpetual and conceptual worlds. Typical patterns are evident at a tender age. One convincing evidence involves how infants develop ideas of the physical world as well as of cognitive life, notwithstanding the convincing cultural evidence of social folk theories and religion being limited by universality postulate of cognitive structures (Nisbett & Norenzayan, 2002). Evidence in the last two decades suggest, in respect of folk theories of the nature of the world, human infants come to the world already equipped with some understanding of the basic framework of the natural and psychological worlds (Baillargeon, 1995; Carey & Spelke, 1994, Wellman, 1990). They appear to develop so early as to suggest they are innate components. For example, the relationship between environmental cues and internal cues which infants are able to distinguish suggest that these are already highly 'prepared' (Seligman, 1970). A three-month human infant becomes surprised with violations in their expectancies about the physical world (Garcia, McGowan, Ervin, & Koelling, 1968).

In the same way as cognition is shaped by culture, so also culture influences our thought through shared knowledge structures. Many psychological concepts have been used to describe knowledge structures, such as schema and scripts. Roy D'Andrade (1984; 1995) a cognitive anthropologist, drawing from psychology introduces the concept of cultural schemas. These constitute patterns of models, that constitute a cultural group's symbolic meaning. These schemas are intersubjectively shared. They also govern how people in a given culture interpret their experiences (D'Andrade, 1995; Holland & Quinn, 1987; Shore, 1996). Another variety of cultural model is what Schank and Abelson (1977) describe as 'script'. A script is seen as an event schema. It prescribes for people in a given culture what social roles they participate in, objects they are likely to use as well as and the chronology of actions they normally engage in. It is in this context that Nelson (1981) makes the submission: "Without shared scripts, every social act would need negotiating afresh" (1981, p. 109). Studies have established that socialization practices, such as how caregivers interact with children, shape children's manner of learning, their velocity of learning, as well as the developmental cut-off point of their learning (Bornstein, 2010). Therefore, what must be learnt vary across cultures (Clegg et al., 2017). One area contributing to understanding the connection between culture and learning has been efforts establishing children's development benchmarks in motor development- what children were capable of doing physically, in what order, as well as at what age across cultures (Gesell, 1934)

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Statement of the Problem

Psychological literature since Gibson's (1979) theory of affordances, Bronfenbrenner and Ceci's (1993) and other recent studies such as Zorlular, Allaya and Elbasan (2024); Miquelote, Santos, Cacola Montebelo and Gabbard (2012), Brugnaro et al (2025) have been consistent that there is a relationship between children's environment and psychomotor skills. Early research on psychomotor development focused primarily on establishing universals in perception, memory and learning. Initiated by Gesel (1928), testing items and procedures were deliberately designed to focus on children's behaviors of Western, Educated, Industrialized, Rich and Democratic (WEIRD) along the traditions of Bayley (2006) originally developed in 1969 and Denver scales (Frakenburg & Dodds, 1967). These templates described developmental timelines and infants motor skill sequencing. This has gained acceptance in the literature, considered as the normative prescriptions of what is desired, and not what could be acquired (Karasik et al., 2010). Therefore, researchers in cross-cultural studies typically compare developmental onset stages, rather than the cultural divergencies in child rearing practices (Adolp et al, 2010). Studies conducted in Africa and its Diaspora, such as the Caribbean, and in India (Bril 1988; Super 1976) on how variational approach to child rearing differences in some cultures deliberately foster accelerated psychomotor learning rather than simply the normative developmental template.

This current study aims to bridge this gap that focuses only of the normative developmental template of WEIRD by examining other cultural affordances such as cultural practices for child rearing that facilitates psychomotor learning. Additionally, while there is enough empirical literature on cognition and culture from other geopolitical areas (Bril 1988; Super 1976), few has been conducted using sample from same cultural backgrounds, but differ sharply by geographical migration. Thus, the cross-cultural studies typically have concentrated on between-cultures, either on different cultures, or different race/tribe, or home environmental affordances (Audrei et al, 2012; Zorlular et al, 2024). Little has been conducted from within same cultural groups living across different geographical boundaries in order to tease out whether or not geographical migration is also implicated, hence this study. In terms of culture, the home affordances between Ghanaian and Ghanaian-Americans child rearing practices, such as, deliberately teaching infants psychomotor skills of learning how to walk are assumed to be the same for infants' caregivers in this study- Ghanaian and Ghanaian American mothers. Nevertheless, the geographical environment differs. Thus, this study assumed cultural similarity between caregivers and different geographical environment. What impact (if any) does geographical migration have on infant psychomotor learning. Thus, against the background of Gibson's (1979) theory of affordances that environments as well as objects within them do have unique values and meanings specific to the person within the environments perceiving them, this current study assumes that infants' psychomotor perception is equally unique to their specific processes of socialization between them and the caregivers. Similarly, Bronfenbrenner and Ceci's (1993) ecological system explains that individuals' development is contingent upon different interconnected environmental systems, that vary from the immediate (microsystems) to broader social influences macrosystems. This current study is anchored on these two theories to examine whether or not international migration has significant effect on maternal social information to guide infants on how to walk.

Research Questions

The subsequent questions guided this study:

a) What variational approaches to child rearing practices accelerate/retard children's readiness to walk between Ghanaian and Ghanaian American parents?

b) How does maternal coaxing significantly promote infants perceptual and social information to guide psychomotor behavior?

c) How do Ghanaian and Ghanaian-American parents handle initial toddling practices of infants to foster walking ability?

Significance of Study

The outcome of this study will contribute significantly to cultural psychology theories on the critical role that cultural plays in enriching research in psychological science. The findings could offer critical insights not only into psychological processes, but would also equip researchers with additional information to better understand and situate the interconnection between culture, cognition and human behaviour. The study of perceptual processes in social cognition, for example, self as emotion knowledge, future thinking, etc. are generally ignored by psychologists studying fundamental perceptual process. This is because the underlying assumption especially by cross-cultural psychologists heavily influenced by the universality of biology perceive perceptual processes as universal and so do not differ across cultures and human groups. The findings from this study might offer some support showing cultural differences in the very perceptual phenomenon assumed to be biologically invariant, even within the same cultural group with environmental/geographical differences due to migration. Additionally, the findings of this study will be beneficial to neuroscience in explaining how culture/environment wires our brains more than our behaviours, especially in the area of psychomotor learning. As a system of meaning and shared beliefs, culture/environment provides a framework for our behavioral and affective norms. Besides, the outcome of this paper will be significant for early childhood care givers both in the home and in school such as parents, preschool teachers to provide much needed enabling environment to enhance the cultural/environmental scripts learnt during childhood as well as thecultural/environmental practices which influence our brains and psychomotor learning.

LITERATURE REVIEW

Environment and Motor Skill: The African Infant Precocity

One of the earliest studies on culture and cognition, specifically on how culture implicates motor development is that of Super (1976). It was titled 'Environmental effects on motor development: The case of African Infant precocity', published in Developmental Medicine and Child Neurology 18 (5) 561-567 The author establishes the case for doing research within the context of 'natural experiment' devoid of experimental manipulation. This is because in natural settings, study variables rarely occur in isolation. Multiplicity of factors are likely to confound clear interpretation, and this is especially so in psychomotor skill development in African children. Both genetic and environmental factors are blended in early development. The finding that in psychomotor learning African children appear to have precocity substantially earlier than western children, has been in the literature since the last seven decades. It goes back to Geber (1956); Wey and Possony (1963); Brackbill and Thompson (1967); Zigler and Child, (1969); LeVine ,(1970) and Eysenck (1971).Sampling differences, for example between African (Ugandan children) and American, on such variables as the altitude in which infants

live, availability of sunshine, cultural practices, diet and health etc. used as evidence has been less useful to establish the underlying cause of differences in psychomotor development, which makes African infants have advantage. Varied plausible explanations abound in the literature. For example, innate racial differences (Geber & Dean, 1957; Jensen, 1973); traditional infant rearing practices/methods (Walters & Parke, 1965). Others also see maternal attitudes and anxieties at the prenatal period when the infant is in the womb as a factor (Geber & Dean 1958). Warren (1972) investigated methodical flaws and reviewed some 30 articles on African infant precocity. His conclusion was that there was lack of certainty regarding such thing as African infant precocity The term 'natural experiment' as used in the methodology this study of this study involves the examination of the effects of independent variable (IV) that occurs naturally without any active manipulation by the researcher as in the case of true experimental research where researchers directly control both the IV.

Motor Competence from Cross-Cultural Perspectives: The Last 5-10 Years

Monika et al (2018) also studied motor competence among 7-to 8-year-old in three selected countries in Europe, namely, Greece, Italy and Norway. Their thesis was that development of motor skills is not only dependent om maturation and growth. It is also largely influenced by both specific cultural and environmental contexts. Factors such as lifestyles, as well as physical activity contexts modulate how motor competence is developed. Based on this premise, their studied focused on evaluating selected aspects of motor competence of children from these three European nations. Using the instrument of Test of Motor Competence with two fine motor tasks as well as two gross motor tasks Placing Bricks and Building Bricks and Heel to Toe Walking and Walking/Running in Slopes, respectively, they report that Norwegians children out performed the other children in all test. Greek children performed significantly better in the task of Walking/Running in Slopes. Their conclusion was that the observed differences were likely to be the outcome of differences countries placed on physical activity contexts as well as policies in culture and habits regarding movements. Thus, the findings here support the earlier study of Super (1979) of the African infant precocity, namely that motor competence development cannot be environmentally /culturally neutral.

Motor Development and Culture

Developmental Psychology has typically examined children in isolation. While caregivers and experimenters tend to be present, they generally sit to observe children complete a task. The social and cultural determinants of skill acquisition are ignored, while many studies are replete with solitary infants coping with physical forces. The irony is that outside of the laboratory, infants motor development cannot be a stand-alone variable. Social influences remain invariant. They are shaped by both cultural and social factors. For instance, the first steps of the infant are more likely to be typically intertwined with caregivers' interaction. It is caregivers who design the kind of physical environment through which motor skills develop. This is generally in line with the cultural norms which enable social interactions, child rearing practices as well as the parental home environments likely to predict acquisition of motor skill (Adolph & Hoch, 2019).

Social Influences

The literature also abounds with sources indicating infants within the few months begin to control movements, especially the eyes, face and head (Adolph & Berger 2015). These motor skills are developed with caregivers (Beebe et al. 2016). Infants smile, pouts, make lips smacks, tongue protrusions, brow furrows and make eye widening (Oster 2005) as well as making

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babblings and cries (Wilson et al. 2008). In all these motor behaviors, both caregivers and infants are quick to detect gestures of the face as well as each other's voices (Beebe et al. 2016). Infants equally vocalize, make smiles and focus their gaze towards the face of their caregivers. They cease vocalizing and smiling when caregivers are unresponsive (Tronick et al. 1978). Social messages from caregivers are taken into account when infants are navigating obstructions and perceptual information on risk is uncertain. For example, empirical evidence suggests that experienced crawlers only crawl in risky drop-off, if facial expression of caregivers give positive facial as well as vocal expressions. Similarly, they avoid doing so when facial language of caregivers looks fearful (Moller et al. 2014, Sorce et al. 1985, Vaish & Striano 2004). They might wait to receive caregivers' advice when there is uncertainty of navigations. At safe increments, they disregard discouraging messages and similarly ignore at risky increments encouraging messages(Karasik et al. 2016, Tamis-LeMonda et al. 2008). Children's interaction with the external world is equally socially supported by caregivers. For example, before infants could walk properly on their own, it is the caregiver who has to provide any missing link regrading control of postures by the infant. They gain control gradually from caregivers (Saavedra et al. 2012). It is also the case that caregivers typically are extremely sensitive and spontaneous to their infants' postural skills at appropriate levels (Duncan et al. 2018). Whether or not infants are able to arrive at manual actions such as initiating their first steps in walking, holding their hands, and improving postural stability, etc. are all contingent upon support from caregivers (Ivanenko et al. 2005). Thus, literature focusing on social cognition puts premium on the initial infants understanding of caregivers as knowledge repositors. Based on the understanding of caregivers' useful information, infants typically adopt emotional attitudes to different objects and events.

In the event of uncertainty, they resort to caregivers' guidance and thereby extending their learning (Tamis-LeMonda & Adolph, 2005; Moses et al., 2001). Relating these social influences in the context of the differences between Ghanaian and American parenting style, whereas the former tends to be more authoritative, prioritizing to obedience, respect or the elderly, familial values right from the onset of infancy, the latter generally tends to focus more on autonomy, independence and decision-making. Thus, both geopolitical areas differ significantly in child rearing practices. For example, the Ghanaian child care giver will deliberately start teaching and coax the infant how to walk through perceptual and social information, which the American parent will normally take for granted. Most Ghanaian cultures have songs to coax a child how to walk.

Perception–Action Research

While social cognition research paradigm uses infant's social information, the perception-action model examines how infants make use of perceptual decisions about actions (Adolph & Berger, 2005, 2006; Bertenthal & Clifton, 1998). In this paradigm, perceptual explorations and their accompanying motor decisions are assessed by infants under varied environmental restrictions which include object distance variations, size, shape and orientations, such as reaching and grasping objects, cliff, slopes and slippery surfaces balancing, etc. Variations in infants balance of locomotive experiences abilities to gauge affordances for balance and locomotion in such situations are contingent upon the daily frequency of locomotor experience. Thus, infants with more locomotive experience become not only more selective and efficient in their motor decisions, but also, more tuned to biochemical constraints on actions (Adolph, 2002, 2005; Adolph & Berger, 2006).

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Cultural Influences

Decades of cross-cultural research from the West using samples outside of WEIRD have reported remarkable instances of how other cultures outside of Europe and America differ from the accounts in Western Journals, textbooks and caregivers/parenting guides (Adolph & Robinson 2015, Adolph et al. 2010b, Bril 2018, Super 1976). This notwithstanding, in too many instances, empirical studies on psychomotor development and learning as well as motor behaviour typically ignore cultural influences. This creates the rather false impression in the literature that processes and outcomes of motor behaviour is universal (Bril 2018). Precisely because child-rearing practices tend to be generally pervasive and apparently less important, the cultural influence such as, for example, the way certain cultures position infants for sleep, have them dressed and choosing particular ways of toiletry, carry and hold them, etc. are normally taken for granted. Yet, the embedded variations both in history, and culture have a tremendous impact on which motor behaviour children acquire with ease, at which sequence and at what ages it is acquired, as well as the development outcomes (Adolph & Robinson 2015, Adolph et al. 2010b). A case in point was the 1992 American Academy of Pediatrics recommendation to caregivers to ensure infants are placed on their backs to sleep (and not on their bellies) as a way to limit death-syndrome of infants (Kattwinkel et al. 1992). The irony in this flip in child rearing was the late development in prone skills vis-à-vis back sleepers relative to belly sleepers (Davis et al. 1998).

In cultures in which caregivers consciously encourage and teach their infants movements in upright stepping in walking training, the cultural affordances make it easier for such infants to be able to sit and walk much younger than non or less-exercised infants. Some are able to jump crawling (Hopkins & Westra 1988, 1990; Super 1976). Climate-related changes in clothing also influence children's motor development. While temperate climates caregivers dress infants in heavier clothing relative to tropical, the additional load could delay for example the timing for rolling and crawling compared to tropical infants relative to less heavy clothing (Benson 1993, Hayashi 1992). In Ghana, most cultures such as the Akans (especially the Asantes) have songs such as taa-taa-tuu-tuu, taa-taa-tuu-tuu, deliberately composed and designed as structured stepping exercises aimed to coax children by child givers.

Cultural Species and Cognitive Phenotypes

Copious evidence suggests that it is culture that shapes cognition- issues people attend to, perceive, encode, and recall, in addition to how people think, feel and reason. Therefore, it is human ecology (environment) and the mode of socialization processes that to a large extent determine people's perception, their spatial navigation, mentalizing, thinking styles, their epistemic norms, such as their mode of reasoning as well as their language (Henrich et al. 2023) While there are significant variations in these areas, the fundamental point is that samples involved in such studies are psychologically peculiar in a given historical context which is a reflection of cultural evolution (Henrich et al, 2023).Therefore, cognitive abilities, how information is processed, our thinking styles, emotions, our psychomotor leanring, etc. are ontologically adapted to the diversity of the culturally-constructed worlds that we confront. Given that over 90% of empirical studies in the social science are undertaken with samples from Western, Educated, Industrialized, Rich and Democratic (WEIRD), it is critical to question the pervasiveness and the implicit assumptions underlying such findings (Henrich et al., 2010). The document titled "A Cultural Species and its Cognitive Phenotypes" by Joseph Henrich and colleagues (2023) explores how culture profoundly shapes human cognition and physiology. The authors argue that humans have evolved to rely heavily on cultural learning,

which influences various cognitive domains such as perception, spatial navigation, mentalizing, reasoning, and language. They emphasize that most psychological research has been conducted on WEIRD (Western, Educated, Industrialized, Rich, and Democratic) populations, which are not representative of humanity as a whole. This reliance on WEIRD samples has led to misconceptions about human nature and cognitive processes.

Summary

In terms of cultural evolution, humans have evolved to acquire and transmit cultural knowledge, which has shaped our brains and cognitive abilities over time. Regarding cognitive variation, there is significant variation in cognitive processes across different cultures, influenced by factors such as social norms, institutions, and daily practices. However, the WEIRD bias and its over-reliance on WEIRD populations, especially in psychological research has skewed our understanding of human cognition, leading to incorrect generalizations about the species. Culture impacts on perception and physiology in such a way that Culture affects not only cognitive processes but also physiological traits, such as body temperature, foot mechanics, and hormone levels. Same applies to epistemic norms. : Different cultures have varying standards for what constitutes evidence and valid reasoning, which affects how people form and update beliefs. The authors reviewed here call for a broader, more inclusive approach to studying human cognition that takes into account the diverse cultural contexts in which people live. This would provide a more accurate understanding of the human mind and its development.

Current Study

We merged the three constructs of social cognition, perception–action and culture-specific child rearing practices among Ghanaian and Ghanaian-American child care givers. The purpose was to find some plausible answers to the following three questions: a) What variational approaches to child rearing practices accelerate/retard children's readiness to walk between Ghanaian and Ghanaian American parents? ;b) How does maternal coaxing significantly promote infants perceptual and social information to guide psychomotor behavior? and c) How do Ghanaian and Ghanaian-American parents handle initial toddling practices of infants to foster walking ability? We focused on caregivers' use of solicited social information and the typical Ghanaian/African deliberate attempt to teach their infants how to walk.

METHODOLOGY

Participants

In all, a random purposive sampling of thirty (30) respondents, comprising fifteen (15) mothers and fifteen (15) infants participated in this study online through zoom for the first phase. Seven (7) of these were Ghanaians from three communities in the Kumasi Metropolis of the Ashanti region of Ghana. The remaining eight (8) mothers were Ghanaian-American who have been living in New York city, specifically Brooklyne and Queens boroughs, a little over three decades. Out of the 15 infants, seven (7) belonged to the Ghanaian mothers and eight to the Ghanaian-Americans. Nine (9) were boys with the remaining six (6) being girls aged between 10 and 18 months old. Mothers were between the age range of 22 and 35 years, with an average age of 32.65. Mothers reported being married and staying with husbands. None reported being a single mother. All mothers were of African ancestry and black in complexion and highly educated. Sixty percent of the mothers had graduate or professional degrees. They spoke both impeccable English and the Akan language (especially Asante-Twi). While all mothers spoke

English as the primary language at home and were infants' primary caregivers, the Ghanaian mothers reported using both English and Akan simultaneously in the homes, compared to the New York mothers. Infants in this study contributed approximately 30 trials during the psychophysical part of this study to test how they respond to mothers perceptual and social information to guide the motor action of walking. Through a structured interview, which was an adapted form of (Adolph, 2002), mothers reported infants locomotor experience. 'Walking' as defined in this study was the date when infants were seen to have walked for some 10 feet outside of maternal support. All parents signed an agreement pact for and on behalf of their infants to participate freely in this study.

Procedure

Infants were tested in two phases. The first phase used an adapted version of a psychophysical procedure (e.g., Adolph, 1995, 1997). The difference between this current study and previous ones was that while the latter used Adolph, 1995, 1997 to normalize risk levels to infants' ability to walk down slope, the former used it to encourage infants to demonstrate walking ability through being applauded to by parents. In the second phase, mothers were asked to offer both encouraging and discouraging social information. The purpose was to measure the extent of mothers' social information on infants' locomotion. The information was either in the form of words, songs, rhyme and mothers' body/facial expression. To ensure the focus of maternal social information, the experimenters who were coding this online, did not speak or give any gesture. All items such as food, toys were removed to avoid having extraneous effect on the experiment, except mothers' social messages. This part of the study was in partial response to the first research question: In what ways do variational approaches to child rearing practices between Ghanaian and Ghanaian American parents accelerate/retard children's readiness to walk in addition to the structured interview. While all this was online, a camera was capturing the infants exploratory and locomotor movements. Another camera captured maternal facial and body language.

Normalization Phase: Psychophysical Procedure

Infants commenced their walking trials while in a standing position on a platform which was the starting point. Mothers standing at the end of a platform used various means to gently persuade their children to walk. The walking trials began and ended when parents released infants to walk on a starting platform and ended when they reached the end of the platform or after some 30 seconds. Mothers were asked to acclimatize their infants to the experiment with some three warm-up protocols. The purpose was to teach infants the locomotion of walking.

Testing Phase of Maternal Social Messages

All this took place online through zoom between mothers-infants and experimenters. Before commencing this phase, research assistant explained the 'encouraging' as well as 'discouraging' conditions to be measured to mothers. They were instructed to use varied communications, such as gestures, words, local/traditional rhyming, facial expressions, etc. deemed to express either 'encouragement' or 'discouragement' to get infants to walk just as they would do in everyday situation to encourage infants tackle new situations or challenges. In the 'discouraging' conditions, mothers were informed to dissuade infants from walking a slope. A bell was rung by a research assistant to signal mothers to start 'encouraging' or 'discouraging' infants to ensure infants did receive social messages at the beginning of each trial. Mother were at liberty to continue giving their social messages in ways they deemed fit.

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This gave infants opportunity to attend to perceptual information while simultaneously also attending to unsolicited maternal social information After 30 seconds the trails ended.

Measure

Data Coding and Scoring: The following six measures were scored: a) content of maternal messages; b) psychomotor decisions; c) decision time; d) perceptual explorations; e) facial and vocal expressions and f) gestures.

Maternal Messages: Content of maternal messages included occasions mothers gave encouragement, for example, through verbal coaxing of infants to walk such as 'come on', 'yes, come', 'try' taa-taa, tuu-tuu, taa-taa, tutu' (a traditional Ghanaian Akan parental rhyming to coax and encourage their children to walk). Discouraging their infants when seen to be tired included words such as: 'Stop', 'No', 'eye' (it's enough) or wagged the pointed finger back and forth to indicate to the child to stop. Two assistants coded each infant's attempt agreeing on a consensus of 99.5 % of trials.

Psychomotor decisions: Independently, the two coders scored the test trials of each infant either as successful attempt to walk, unsuccessful attempt or simply infants refusing to walk (for example, when they slid in sitting) Coders concurred on infants attempt at walking on 95 % of trials.

Decision time: Infants latency to initiate circumventing an obstruction in walking was scored ranging from 0 seconds through to 30 seconds (maximum trials) with .98 correlation between coders scores

Perceptual Exploration: Infants' hesitations generated perceptual exploration, such as trying out alternative locomotor positions such as either sitting down or crawling. Thus, frequency of positions shifts besides walking was scored on 94.6 %.

Facial and vocal expression: Facial expression was classified to be either negative or positive-neutral. Negative expression included infants' frowns, mouth curls, etc., while other expressions such as smiles, were within the positive-neutral category. Vocalizations meant any affective or language sounds produced which could be positive or negative. Whining, whimpering or crying were negative while babbling and laughing were scored as positive-neutral vocal affect.

Gestures: These included infants non-verbal communication such as head and manual movement such as fingers in the direction of an obstruction. Coders agreed on 92.5% for facial expression.

RESULTS

Maternal Coaxing: To ensure the verification of scores of the different measures, the online videos were replayed with a second coder scoring 25% of each of measure. Coders concurred 97.3% of the replay. On maternal messages with agreed baseline score of 99.5% of trials on maternal encouragement to coax children to walk, both groups scored above 70% of the baseline (69.97). Nevertheless, four (4) out of the seven (7) Ghanaian mothers scored 95% of the 99.5% trials encouraging their children to walk. Three of the American Ghanaian mothers (out of 8) with their three infants came close with a score of 89.55% of the 99.5% baseline. These mothers besides the verbal coaxing of 'come on', 'yes, come', 'try' also rhymed the traditional/indigenous mentioned above.

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Infant Psychomotor Decision

The four infants of these four mothers reciprocated with positive facial expressions of smiles and vocalizations and did walk for some 180 seconds individually. This was especially the case when these four mothers repeatedly rhymed the indigenous Ghanaian taa-taa, tuu-tuu, taa-taa, tutu' to coax children to walk. Similarly, the three infants of the three Ghanaian American infants made successful attempt to walk for 180, 178, and 174 seconds foreach infant. The remining one initially started crying but when the mother started the rhyming, she started walking for 120 seconds before sitting down.

Perceptual Exploration

In all Ghanaian-American infants were three times likely to generate other perceptual exploration, trying out other locomotive postures such as crawling or sitting down more than the Ghanaian infants. On the baseline score of 94.6%, in 31 percent cases, that is 8 out of every 15 trials, Ghanaian American infants were found were found to frequently shifts positions. The Ghanaian infants generally continued to respond to maternal coaxing and the indigenous rhyming.

Infants Facial and Vocal Expression

Sounds that appeared to be negative expressions such as crying, whining and whimpering were found to be less among Ghanaian infants. While laughing and babbling were recorded among the two groups of infants (60-50 %,) they diverged more on crying and facial frowning which were found to be high among Ghanaian American infants. On the benchmark of 93.1%, while Ghanaian infants scored, 40 percent (37.24), Ghanaian Americans scored 60 percent (55.86)

Discussion

On maternal coaxing, the findings of this study point to the impact of socioecological factors in addressing variances. The two groups of infants studied in this paper were essentially Ghanaians. The only variance was in the environments in which they were reared up. The consistent higher scores in maternal coaxing in which four out of the seven Ghanaian mothers scored 95% of the 99.5% is suggestive. It appears to underscore the relationship between psychomotor learning and social/natural habitats. As infants begin to navigate obstructions in learning how to walk, the perceptual and social messages from caregivers are crucial. These could either inhibit or reinforce motor behaviors, as they begin to control movement. The reciprocal sensitivity of the Ghanaian infants and parents, regarding maternal intensity of vocalization, facial expression and the indigenous rhyme, might have contributed significantly, to the agility of the Ghanaian infants relative to the Ghanaian-American care givers and their infants. If this finding reported here, is anything to go by, it corroborates that of Beebe et al (2016) and Wilsson et al (2008) as well as Super (1976). Thus, infants' proclivity to motor skills are largely shaped and fostered by the embedded environment.

In Ghanaian environment, it is required that maternal caregivers consciously teach and coax their children how to walk. While, the Ghanaian-American caregivers (de facto also Ghanaians) equally coaxed their children to walk, they did so with less velocity and vim. The ease, with which infants acquire motor behvaiour, such as, at what ages and at what sequence is environment-determined, thus, also confirming Adoph and Robison (2015) and Adolf et al, (2010b). Thus, since environment shapes the thinking and by extension, the cultural rearing practices of caregivers and their mode of socialization processes, the result indicated here, seems to indicate a shift in the epistemic norms of the Ghanaian-American caregivers from the

typical indigenous Ghanaian coaxing approach, confirming Henrich et al (2023).Infants psychomotor motor decision to walk was not unrelated to maternal coaxing: the more infants were coaxed by caregivers, the more they made efforts. Four of the Ghanaian infants reciprocated their mothers' facial expressions of smiles and individually walked for some 180 seconds, while the Ghanaian-American infants walked 180, 187 and 174 with the fourth crying and siting down. This strengthens, Bernstein, 1996; Gibson, 1994; Adolf et al, 2010 and Joussemet et al 2023 (accessed 24 Feb. 2025.) submissions, that even though, infants' movements are essentially dependent on generating and controlling physical forces, they were also more than muscles and biomechanics. They also relied extensively on psychological as well as parental, social and cultural factors. Ghanaian American infants, relative to Ghanaian infants were three times more likely to try out other locomotive postures, either, crawling or sitting down, while the Ghanaians infants continued to respond to maternal coaxing without trying any other locomotive postures. This seems to suggest the inevitable role of parental, social and cultural factors as either spurring and/or constraining infant motor behaviour.

Infants facial and vocal expressions: Laughing and babbling in responding to maternal coaxing were found in both infants. But they diverged more on crying and facial frowning. Ghanaian American infants cried and frowned most of the time, relative to their Ghanaian peers. Basic human emotions and therefore infant emotions such as crying are universal across culture. Nevertheless, their expressions can differ, depending on cultural parenting (Bakaraki, P., Dourbois, T., & Kosiva, A 2024 https://www.researchgate.net/publication/382151793_Attachment_theory_across_cultures_An_examination_of_cross-cultural_perspectives_and_alloparenting_practices_Mini-Review [accessed Feb 24 2025), revealing the wide range of different kinds of relationships formed as attachments by humans. This confirms Gottlieb (2004), Bakaraki et al (2024) that West African infants are generally socialized to be comfortable not only with a wide range of caregivers but different circumstances. Consequently, executive function, and effortful control—vary across cultures as a result of migration (cf. Sanvicytores & Mendez, 2022).

CONCLUSION AND RECOMMENDATIONS

Summary: This study established that migration is likely to influence infants and caregivers' social information to guide psychomotor behaviour supporting what has been established that cognition and the plasticity of our brains are largely wired by the cultural contexts of which migration is critical.

The data reported here support the view that regardless of the universality of the biological process of encoding information, it is also culture that shapes the kind of cognitive process that people pay attention to. Ways of labeling as well as organizing perceptual and conceptual worlds vary not only because of cultural variances, but also the different kinds of relationships formed as attachments by humans. The findings in this study seem to confirm that the ways infants develop the physical world and especially their psychomotor behaviour of learning how to walk is quintessentially contingent upon the intensity of cultural maternal coaxing which in turn shapes infants motor responds. Infants' caregivers in this study were both Ghanaians. Nevertheless, the contexts of maternal expressions of coaxing infants to walk varied between those mothers living in Ghana and those living in the United States of America. This seems to highlight the fact that executive function, as well as effortful control do vary not only across cultures, but also as a result of migration. Since this study focused only on indigenous Ghanaian and Ghanaian migrants in New York city, the findings reported here might be limiting. Further research from two or more cultural backgrounds is being recommended. Based on the empirical

evidence of this research, the study recommends that policy makers, in both two geopolitical study in which this study was conducted as well as other stakeholders in Early Childhood Education design policies that support inclusive cultural diversity for infants of migrant parents.

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