

Opinion

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i, alerce i n [20-22], a en i n [23,24], ca, ala rib, i n [25], r ce ing eman icrela i n-
hi [26], r ce ing m, ic [27,28], men al calc, la i n [29], elf-face rec gni i n [30,31], elf-

The CBB Loop Model of Human Development

The CBB Loop Model

The CBB Loop Model, illustrated in Figure 1, illustrates how ideas are created by individuals and are diffused in a population through social interaction in a specific ecological environment become dominant shared belief and behavioral criteria that influence and consequently human behavior. The functional and/or structural organization of the brain, including its inherent plasticity, change as a consequence of absorbing cultural values and performing cultural learned behavior. The modified brain then guides individual behavior in specific cultural contexts and ultimately determines specific cultural environments. The CBB Loop Model refers to the effects of behavior. Culturally contextualized behavior (CC-behavior) refers to behavior that are mainly governed by a specific cultural context, such as when a Chinese student who is accustomed to accepting authority in China arrives in the USA and imitates American students arguing with authority. CC-behavior mainly occurs when leaving a specific cultural environment. Culturally universal behavior (CV-behavior) denotes behavior that are guided by specific cultural belief values and behavioral criteria are encouraged by a specific cultural environment and are embedded in the brain. For example, after the Chinese student has died in the USA for a long time, and has internalized Western cultural values such as independence, he may default to arguing with authority, regardless of the action of his peers. CV-behavior can occur independently of a specific cultural context if the cultural elements in the brain remain available to some degree.

The CBB Loop Model also distinguishes between effects of culture-brain interaction. Behavior-mediated culture-brain interaction refers to the interaction between culture and brain via behavioral practice. For instance, Western cultural values such as independence in the USA encourage the Chinese student to argue with authority and practicing such behavior influences his brain. Direct culture-brain interaction refers to the interaction between culture and brain that does not involve behavior. For example, reminding individuals of specific cultural values such as independence or independence in a laboratory setting can directly modulate brain activity. Thus, in the CBB Loop Model, behavior is not considered a consequence of culture-brain interaction. Instead, behavior is considered a

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belief has farming. It is a reference to the main infrastructure in the
ga hering/herring farming during the Agricultural Revolution [59]. There are many behavioral
differences in commercial and illegal fishing activities. The idea of a
he environment [60]. As an example, the illegal fishery is a belief

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Cultural and behavioral influences on the brain occur much faster (e.g., life span) [62]. Cultural priming in the immediate f

(See Figure). First, genes have human brain anatomy influencing [79,80], affecting both cortical and subcortical structure [81,82], and having the function of specific brain regions [83,84]. Second, twin and adoption studies have demonstrated heritable behavioral/cognitive characteristics [85]. Candidate gene and genome-wide association studies have linked genes to behaviors, although not all are determined (e.g., smoking and drinking) [86,87]. Third, environment and experience significantly influence genetic effects on behavioral phenotypes [88]. Moreover, the link between genes and behaviors is revealed in different regions of the brain in East Asian and Western culture [89,90], and cultural differences in social orientation (e.g., independence vs. interdependence) are in the brain and heritable for the same gene [91]. The finding indicates gene × culture interaction in behavior and psychological traits. Finally, the brain activity in regions of self-reflection and other-regarding areas are a function of cultural value (e.g., independence) among carriers of the variant for a gene but not for a different variant of the same gene [92,93] (Box 2). The cultural neuroscience finding implicates a gene-moderated effect of culture on the brain. The model in Figure 2 is different from the macro-micro model of the human mind [51] that includes genes and culture in the environment influence the brain and behavior. Rather, the model in Figure 2 considers the different time scale of which gene and culture interact in the brain. This model not only highlights the interaction between genes and each node of the CBB but also highlights genetic contributions to the dynamics in interaction between culture, behavior, and the brain, which affect the function of the CBB in the environment.

The finding facilitates a better understanding of cultural value and allelic frequencies of genes across nations [94,95] implicates a potential number 8.9663008.96635224

ake a recent example, the rapid growth in e-commerce and

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