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ABSTRACT

This paper explores the development of the "ecological human brain" in children, children's intellectual culture of "naturalist intelligence," and developmentally and culturally congruent curricula for young children. In early cognitive development, nature-given perception conducts thought. In contrast, for adults, intellectual culture as a way of knowing is mostly based on perception obeying thought. Primary perceptions of children as "bonding" to the earth may tend to disappear if there is no social emotionally-responsive or intellectually-congruent input during the early childhood period. Naturalist intelligence is an example of an intelligence with a critical period in early childhood. Neglecting young children's interests in nature or hindering their curiosity and limiting their exploration throughout childhood can impair cognitive abilities as well as social-emotional development. The biophobic attitudes of adults may teach children to feel fear or to keep their distance from nature. Children's way of knowing nature and constructing knowledge about it should be recognized, validated, and matched with a congruent approach to teaching based on children's curiosity-centered intellectual culture. (Contains 44 references.) (SLD)

How Is Young Children's Intellectual Culture Of Understanding Nature Different From Adults?

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Modes of Inquiry and Objective: According to the discussion on human brain development (e.g., Diamond & Hopson, 1998; Shore1997),"naturalist intelligence"(Gardner 1999) and the notion of children's nature given wondrous mind (Wilson,1984; Wilson,1997), there is *a different intellectual culture* in young children's way of knowing, understanding nature, constructing knowledge and using of it that are different from adults. *How is young children's intellectual culture of understanding nature different from adults?* This paper is to explore the "ecological human brain" development, children's intellectual culture of "naturalist intelligence," and developmentally and culturally congruent curriculum consideration for young children.

Theoretical Perspective with Naturalistic Data: Based on human brain researches, Gardner articulates that *naturalist intelligence* is a nature given intellectual culture and ability we all have in order to survive as human beings as other animals. Naturalist intelligence is an intelligence all human beings born with and young children tend to exhibit this particular intelligence more than adults. The reason "why" children exhibit more higher level of naturalist intelligence than adults is, according to Sebba (1991) and Wilson (1997), children experience natural environment in *a deep and direct manner* not as a background for events. (e.g., Table 1.)

Table 1. A Deep and Direct Manner vs. A Background For Events

Interviewer: What do you see in this playground garden? *A 4-year-old girl: I see small rocks--many, many rocks. I see flowers (touching rocks and flowers). They have different colors. I see a butterfly. It has lines and dots--same in the both sides (pointing to the two wings). Later drew a picture of flower and butterfly.* *A 4-year-old boy: I see a big bumblebee buzzing like this (pretends to be a bumblebee and flapping both arms and saying buzzzzzzzz...)!* Later draw a picture of butterfly. Children[1]: They see pebbles; they play with pebbles; ... they see patterns of the butterfly; they drew the butterfly; they act out bumblebees' buzzing ... The children interact with nature by touching, playing, and pretending as direct manners.
Interviewer: What do you see in the playground garden? *A preschool teacher: I see trees, soils, benches, some bees, butterflies, flowers, and other* insects. Adults: They see trees, the ground, and benches...they see bees and butterflies on flowers—they don't interact with nature as the 4-year-olds above.

Source: Field notes; data collected 1994, State College, PA, at a local preschool playground.
Note) [1]. This is an another critical issue relate to young children's gender differences in their development of the naturalist intelligence, which is not discussed in this particular paper. [Hyun, E. (research-in-progress)].

For young children, natural environment is everlasting and dynamic stimulator because they perceive the natural world through their primary perceptions, which are based on

their sensory-directed experiences. These primary perceptions are "bondings-to-the earth," thus interaction with the physical substance of the living earth and the environment is natural, inseparable, and critical to the child's developing brain and intelligence (Pearce, 1977). Across all ethnic cultures it is clear that children have a special close relationship--affinity-- for the natural environment that is different from adults (Carson, 1956; Nabhan & Trimble, 1994; Pearce, 1977; Sebba, 1991; Wilson, 1997). As Table 1 illustrated earlier, young children's culture of intellectual activity is different from adults. It may not congruent to adults' intellectual culture.

Early childhood learning experience depends upon concrete perceptual experience and information constructed from the direct experience (e.g., Piaget). In that regard R. Wilson (1995) and R. Sebba (1991) present that during the early stage of cognitive development, nature-given *perception conducts thought.* In contrast, human adults' intellectual culture in their way of knowing is mostly based on *perception obeys thought* (see Table2).

Table 2. Culture of Discourse That is Intellectually Mismatch.

Perception conducts thought (Child)	***Perception obeys thought (Adult)***
A 3-year old girl looking at a snake: What is this? I see it has no legs. But it moves! I wonder how it moves without legs? (Biophilia) ◄►	*Father of the girl: Oh, it's a snake! Don't touch it! It may have some poison. It may kill you or hurt you! (Biophobia)*
A 4-year old boy looking at a snake: It's a snake! I want to touch it! It has black shiny scales! (Biophilia) ◄►	*Father of the boy: Move back! It may be a poisonous one. Let me get a stick. We'd better kill it. It's dangerous to have a snake around this area, because you guys are always playing here. (Biophobia)*
A 5-year old girl looking at ants on the surface of an old concrete wall: Ants! They are carrying food (a small piece of bread)!... How do they live inside of this wall? How do they build their home inside of this hard wall? (Biophilia) ◄►	*Mother of the girl: These ants make the building get old. They make holes inside of the building or home...We need to spread a bug spray! "The ants killer." (Biophobia)*
A 5-year-old boy looking around a broken red brick which is one of the surrounding bricks of his window, and pointing at the ants carrying cookie crumbs that he had dropped the other day near by the window: How do they carry the big piece of cookie crumb? It is much bigger than its own body size. Cool! Are they like a... "Herculy" on TV? (Biophilia) ◄►	*A mother of the boy: Close the window! Do not let those ants come inside of your room. I need to call pest control. They (the ants) may chew this old home down. (Biophobia)*

Source[2]: field notes, May 1998. Fort Myers, FL (First two discourses), June, 1998, Chicago, IL (Last two discourses)

NOTE) As described in Table 2, sometimes there is a clear evidence of gender biased cognitive reasoning by the adults' social-culturally oriented mind. This is an another critical issue relate to young children's gender differences in their development of the naturalist intelligence, which is not discussed in this particular paper. There is a clear difference in parental behavior regarding how to respond to young boys and girls interests in nature. More field base social phenomenological research is needed for this particular topic. [Hyun, E. (research-in-progress)]

As illustrated in Table 2, adults open respond intellectually incongruent way to the young children's knowledge construction about nature. Children expose to the culture of discourse that is intellectually mismatched between their ways of knowing and the adults' ways of knowing regarding nature. E. O Wilson (1992) refers children's love of nature as *biophilia*. If this natural intellectual phenomenon is not encouraged or has not given opportunities to flourish during the early years of life, the opposite, *biophobia* may occur (Orr, 1994). *Biophobia* may also manifested in the tendency to regard nature "objectively" as nothing more than "resources" to be used.

Human brain changes physiologically as a result of experiences. B. Shore (1996) discuss this phenomenon as evolution has equipped human species with an "ecological brain," dependent throughout its life on social-cultural environmental input. Brain constantly changes its structure and function in response to external experiences--plasticity. Ecological human brain that may lead to either *biophilia* or *biophobia* depends on how adults respond to young children's nature given wondrous mind.

Discussion and Conclusion: As the brain develops in the early years of life, there are sensitive periods when children can meet a new developmental challenges most easily and efficiently. At the same biology, as Pearce (1977) mentions, primary perceptions as "bondings-to-the earth" are developmental in that they tend to disappear if there is no social-emotionally responsive (e.g., Gunnar, 1996) or intellectually congruent input during early childhood period. Timing is crucial. Brain development proceeds in waves, with different parts of the brain becoming active "construction sites" at different times and with different degrees of intensity. Naturalist intelligence is one example that has critical period during early childhood. Even though, we all are born with a certain degree of naturalist intelligence for a survival reason, if the human environment does not provide a social-emotionally enriched and intellectually congruent support during the early childhood period, we may anticipate a serious consequences regarding nature preservation which will negatively affect for all. Neglecting young children's interests in the nature, or hindering their curiosity and limiting their exploration to the nature throughout childhood can impair cognitive abilities as well as social-emotional development. This is similar to the result of emotional neglect that predispose an individual to respond with aggression or violence to stressful or frustrating situations (Gunner, 1996).

As Table 2 illustrates, when we accompany with adults' *biophobia* attitudes in exploring nature with children, we may teach "feeling of fear" or "keeping distance" toward the nature instead of promoting young children's curiosity and inquiry to learn and care about the nature. In that context, children may feel threatened, they downshift their thinking. Downshifted children as well as adults feel helpless; It's very hard for them to look at possibilities; they don't feel safe to take risks or challenges their ideas (Abbott,

1997; Shore, 1997). Children, learn best if they are immersed in complex experiences that are socio-emotionally and culturally supported and intellectually congruent.

Educational importance of the study: Children's way of knowing the nature and constructing knowledge of it should be re-recognized, validated and responded with a congruent mode based on young children's curiosity-centered intellectual culture and it should be reflected in daily exploratory curriculum (Cobb, 1977). Teacher and parents should be aware that; children's negative experiences or the absence of appropriate stimulation or responses toward their intellectual interests of nature are more likely to have serious and sustained effects--such as biophobia. Brain needs congruent suitable feedback system. Effective learning depends on culturally supportive emotional energy (Greenspan, 1997 & 1992). We are driven as much by emotion as by logic that are culturally oriented (Abbott, 1997). Children's effective and autonomous learning of nature occurs when they learn about things that are intellectually, social-emotionally, and social-culturally congruent to them. This article is an another attempt to emphasize the concept of DCAP (Hyun, 1998; Hyun & Marshall 1997, 1996) that hopes to have teachers and practitioners go beyond the limited understanding of "culturally appropriate practice." Understanding the differences of intellectual culture (*not intellectual level* typically described by Piagetian researchers) between adults and young children is an important area in DCAP. Critically examining the phenomenon of the intellectual "culture" mismatch and attempt to find a way to make intellectually congruent learning environment are crucial pieces for that matter.

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