

Enculturation Begins Before Birth

Walburga von Raffler-Engel

*Vanderbilt University
Institute for Public Policy Studies*

Introduction

The question I want to pose to this gathering of old friends is one that has not yet been broadly raised even though it is a vital issue I have tried to tackle for many years since starting to do research in pre-natal behavior thirty years ago (von Raffler-Engel 1964). The salient point of pre-natal research for the linguist, the psychologist and the anthropologist is the interaction between the fetus and it's mother (von Raffler-Engel 1964:75). The necessary underpinning of such research is the bio-medical evidence which documents the neural development of the fetus (see handout).

Medical research shows ever more convincingly how active a fetus is even during the first trimester of gestation. Brain waves can be registered at twelve weeks after conception. A miscarriage of less than six months can be viable and a one-pound newborn can be helped to survive.

From the social science perspective, the theoretical underpinning of the data I will present is the assumption that communication is verbal and nonverbal from its inception philogenetically, as well as ontogenetically during the pre-natal stage of human development (von Raffler-Engel 1983:296308).

The assertion that enculturation begins in the womb is sustained by the documented capability of the fetus to perceive the external environment that surrounds its mother wherever she goes. The child, thus lives within its culture before it is born (von Raffler-Engel 1988a:101). After centuries of neglect, we are coming back to recognize the active life of the child in the

period before its birth. In olden times this was an accepted fact, as legends and folktales amply attest (von Raffler-Engel 1993).

Culture

Before dealing with the acquisition of culture by the child during its earliest development, I may be permitted to define culture as I see it. I started to say that I would look at culture in its relation to communication when I realized that such a statement is largely redundant. Except when we are totally alone, sleeping on a futon or high up on a mattress, culture is communication. Our behavior communicates to the in-group that we are part of it and to the out-group that we do not share identical presuppositions.

Dictionaries of the social sciences abound in definitions of "culture". The subject is complex because the many sub-cultures of each culture share sets of common features on their own. The classic example is the corporate culture which varies greatly among the capitalist countries but within the uniform purpose of producing money for the firm.

With regard to my thesis that the enculturation of the child begins during its intra-uterine stage, the relevant sub-culture is the family. But this by no means excludes the culture-at-large of the environment where the mother is living. Except when she lives in a harem, a pregnant woman goes about her daily routines of shopping, visiting friends, etc. Her fetus is thus exposed to the community-at-large beyond its immediate family.

The Auditory Faculty

It is well established in physics that sound travels through water and thus outside noises can reach the fetus through the amniotic fluid. Biomedical research has documented that "the auditory system is functional by the start of the third trimester" of pregnancy (Birnholtz and Benaceraff 1983: note 5). These authors have observed a startle effect to noise in a fetus at 25 weeks of gestation. Indeed, between 26 and 40 weeks of gestational age, the fetal reaction to acoustic stimuli demonstrates "a functional maturation of the central nervous system" (Gagon *et al.* 1987:1375). The cochlear function is "present at the fifth month of gestation" (Sadovsky *et al.* 1986). Other researchers date the fetal response to auditory stimuli even one week earlier (Westgren *et al.* 1987).

Maternal responses were tested at the Karolinska Institute at Danderyd Hospital in Sweden where the mothers of healthy fetuses felt a kick immediately after the auditory stimulation (Westgren *et al.* 1987). I tested

this myself in 1960 to be certain that the fetal reaction to outside noise is not induced through the hormonal reaction to the mother's shock or feeling of apprehension caused by a loud noise. Looking out of a window and seeing a big truck and hearing the noise such a vehicle makes does not cause a fearful reaction in a woman but will cause a startling movement in the fetus.

A young American woman who talked to her fetus remarked to me that after birth, her baby was more attuned to her voice than any other. It is indeed known that when a newborn is placed between two women who will speak at the same time and the baby can hear them but cannot see them, it will turn toward its mother (Brazelton and Tronik 1980). The newborn is familiar with its mother's voice from the time it lived in her womb and therefore, "newborns prefer their mothers voices" (De Casper and Fifer 1980). Bonding does not come about in a few tender moments after birth but is formed in the months-long contact between the mother and the child in her womb.

It is well known that a fetus will kick nervously when it senses an altercation in the environment. Folk wisdom has known this forever and all cultures advise fathers to keep their pregnant wife "happy," in quiet surroundings. That children exposed to certain musical themes during the gestational period will recognize these themes after birth is by now a well documented fact.

When I first mentioned this over thirty years ago, only old country women would believe me. Now it is considered sophisticated to expose the unborn to classical music. Women used to sing to their child in the womb, now pregnant women attach devices to their body that produce soothing noises for the fetus. We have come full circle, except that, like most of communication among adults which is now by voice mail or other mechanical devices, we use electronics for mothers to feel that they provide "quality" time. This is one more way the child is enculturated into the modern world.

There are great cultural differences in the way mothers interact with the child they are carrying. At the present time, many Oriental mothers will talk to the child in their womb, read aloud and play music for it. Western mothers do some of this, but most do it in a perfunctory manner. While Japanese women do so with dedication and take pleasure in it, most Western women I interviewed expose their child to music or talk to it "because the doctor said to do so." Most do not stop to think whether it is actually purposeful or not and some do not even believe that "it makes any difference at all." A couple of women said they "felt like talking to plants."

Instinctively, albeit unconsciously, women may be aware of the capability of the child in their womb to hear outside noises because they try

to avoid places where altercations are taking place. They likely feel the nervous movements of their fetus even though many may not acknowledge them. Most women calm the fetus with their caressing hands although few women mention this. Some Western women, however, are conscious of the fetal auditory powers. A thirty-year-old, mother of one child born in 1988 told Diane Allen, one of my researchers, that she did not talk to the child she was carrying even though the doctor had told her to do so, "because it would hear her voice when she talked to everybody else and wouldn't know the difference" between speech directed to the child or to others.

The capacity of the fetus to hear has important implications for the prenatal enculturation of the child. Of course, the fetus does not understand the propositional or illocutionary meaning of what is said. But it gets accustomed to the sounds and the sound patterns of a specific language. Later on, it is likely to feel more comfortable when surrounded by speakers of the familiar language than by foreigners. Bilingual ambiances probably accustom the child to two sound patterns. Being raised bilingual after birth certainly does not present a problem.

Most obvious is the impact of intonation because the intonational rhythm is reinforced by the rhythm of the bodily movements of the mother. This is probably the reason why the mastery of intonation is the hardest aspect of foreign language learning and why incorrect intonation causes more misunderstandings than any other feature of discourse.

Body Rhythm

Intonation is also tied to body rhythm which is among the crucial facets of the cross-cultural encounter, if not the most crucial one. This is an area which still needs considerable research. I broached it in a fairly extensive article and thus will mention it here only briefly. Each culture has its own characteristic body rhythm while "rhythmic interactional synchrony is a precondition for successful communication" (von Raffler-Engel 1988a:8890). The problem is compounded by the fact that differences in body rhythm tend to be felt as an irritant the cause of which is hard to identify.

The fetus is enculturated into its mother's body rhythm when she walks or bends and, after birth, the baby will be carried around in its mother's arms. It is known that babies keep the same sleeping rhythm as their mothers. The children of waitresses wake up late and the children of bakers wake up in the early morning hours (von Raffler-Engel 1988b:302). It is plausible that the same applies before birth.

Body rhythm also influences behavioral forms in which people vary greatly. Chinese men walk with small strides while Americans walk with large strides. An Oriental and a Westerner will cover the same distance in the same amount of time but with a different number of strides. This has nothing to do with the height of the person or the size of the feet. I have compared very tall Chinese with small size Americans and the manner of walking proved strictly cultural.

Discourse Rules

Coming back to communicative interaction, what the child learns about discourse rules before it is born is the ratio of silence to speaking during conversation. Mothers that read aloud to stimulate the child in their womb also give it an idea of the ratio of silence and speaking in a lecture. Cultures vary greatly. The Japanese intersperse what they say with frequent short pauses to give the listener time to fully absorb what they have heard. Americans do not understand the purpose of these moments of silence. When they want to give their listener a reprieve, they stray from the argument introducing a little joke or some remarks about the pleasantness of the meeting. Such extraneous disruptions leave the Japanese listener at a loss.

The child in the womb also familiarizes itself with the level of loudness of its native tongue. Southern Italians enunciate more forcefully what they have to say than do Britishers. Being familiar with all these linguistic features undoubtedly facilitates the child's language acquisition after birth. While in the womb, it already has been exposed to the suprasegmentals.

Except for the teeth and the descent of the larynx, the vocal tract is formed in the fetus. The mobility of the tongue is operant at an early fetal age. There are numerous legends of "babies crying from the womb" (von Raffler-Engel 1993). In those legends, fetuses actually speak in clearly understandable sentences. This is, of course, impossible, but audible cries are attested by physicians during delivery when an adequate amount of air can enter the birth canal. During twin births, the second twin may be heard before it emerges after the first twin has been born (Parvianen 1949). Whether one can distinguish the nationality of a baby from hearing its cry is still debated, the experiments are inconclusive.

Nonverbal Behavior

Communication is bi-modal, but the nonverbal mode is more easily apparent in the fetus than the verbal mode. Communication is propositional

and illocutionary but mostly the later. The illocutionary act is also the one developed earliest in child language (von Raffler-Engel 1964:37). In the pre-natal stage it can be ascertained by the end of the first trimester.

Over the years, I have collected innumerable testimonials from mothers who caressed their abdomen when they felt their child's quickening. This caused the child to quiet down, but when they ceased caressing, the quickening resumed. It is apparent that the child realized that it can obtain what it wants through its kicking movements. The fetus seems aware of the stimulus/response reaction.

Nonverbal communication is the only active means at the disposal of the unborn child. But movement is not all the fetus reacts to and not all the fetus elicits. As said above, the child in the womb has the capacity to hear outside noises.

Several of the women I interviewed reported that their unborn child apparently enjoyed their singing. It would kick and then when the mother started singing, it would become quiet. When she stopped singing, the child would elicit resumption of the singing by returning to kick. The same behavior was observed for music.

What all this implies is that while still in the womb, the child is enculturated to the spoken language and the type of musical rhythm common in its culture. In the nonverbal field, the impact of maternal behavior is clear. It is not known what the differences - if any - are in regard to the manner in which mothers from diverse backgrounds caress their abdomen.

There is no doubt in my mind that the fetus manifests a personality of its own (von Raffler-Engel 1993) as "each fetus develops its own pattern of activity" (Rayborn 1987:899). I am presently engaged in a research project comparing the pre-natal and the post-natal behavior of individual children. Here I will report only on what proves relevant to my thesis that enculturation begins before birth.

Two women, one American and one Japanese, that used to sing when they were pregnant observed that one unborn child would kick when they ceased singing and would calm again when they resumed. Their other child seemed to insist on their caressing the abdomen. As infants and toddlers these children would enjoy music and sing on their own. Their other children were neither as interested in music nor as sensitive to it. The children that loved music were able to sing in tune, the others were not.

It is known that musical ability is hereditary and thus per se has nothing to do with enculturation. What is related to culture is the type of music and, even more so, the rhythmic patterning of the language to which

the child is exposed before it is born. Of course, enculturation continues after birth, but this has hardly been challenged. What I want to establish is the continuum of enculturation throughout life, beginning in the womb.

In conclusion, I propose two periods of learning, the pre-natal and the post-natal period, one following the other in a continuum. Learning in utero is distinct from inheritance (von Raffler-Engel 1988:101) and should not be confused with the psychological concept of pseudo-inheritance. Culture is not transmitted by genes but learned. Much of it is learned through osmosis.

During the pre-natal period all learning comes about in this manner. But not all that is learned is offered without purpose. Reading and playing music for an unborn child is a form of teaching.

Language Change After Birth

Children inherit the physical features of their natural parents, but if they are raised where another language from that of their parents is spoken, they will acquire the language of their environment. They will also acquire the nonverbal manners of the culture in which they grow up.

There is no data on how an adopted baby feels when it is in the arms of a loving adoptive mother but one that walks and moves and talks in a manner totally different from what the baby was accustomed to before birth. Even the children of immigrants do not show any special aptitude in learning the language of their grandparents. So far, there is no contradiction with what I said before. An unborn child, or a baby for that matter, does not understand the words that are spoken around it and has not yet acquired any rules of grammar.

It is extremely difficult for Americans to master the tones of the Chinese language. Children of American missionaries that have grown up in China can speak like natives. The only problem that needs to be researched in this connection is whether children of parents who speak a tone language and are raised by parents who speak a stress language may have less difficulties than others when learning a tone language later in life. It is also not known whether children whose natural parents practice an expansive gestural system and who are raised in a culture where gestures are close to the body will find it easier to acquire the gestural system of Southern Italy than children of British descent. I am not talking of heredity but of the habituation during the pre-natal stage.

What would research in these areas accomplish? Will it be possible to find out how long the pre-natal habituation will last when it is superceded by other forms of behavior after birth? Should American women planning to

adopt Vietnamese or Brazilian babies study the movements of women in the child's country of origin? And if they so did, what purpose would their study fulfill? I hope my studies do not lend support to those in the United States who oppose adoption across the color line.

For the time being, what I would like to stimulate is pure research. Why is it harder to gain proficiency in certain aspects of communicative behavior than in others when studying a foreign language? It seems that intonation is not only difficult to master when studying a foreign language, it also is the most frequent cause of misinterpretations. This is usually accounted for because linguistic intonation is intertwined with emotional intonation. I would venture to say that the rhythm of language is more profoundly radicated in one's first language than other features because it was acquired before birth.

A foreign speaker can gain perfect mastery over vocabulary and syntax and write with a native proficiency. It is well known that after puberty, it is rare for an individual to gain native-like pronunciation. This, I believe, is due to the consolidation of the habits of the vocal tract which at puberty reaches its full development. Like vocabulary and syntax, phonation is not acquired before birth. It is interesting to notice that having a foreign accent does not generally create severe misunderstandings.

Body Odor

That which is acquired before birth might constitute the most integral part of our sense of self, and eventually of our sense of belonging to an ingroup. In my research on involuntary clashes in cross-cultural encounters I found that odor plays an important role. Somehow we know this, but the subject seems taboo and has not been adequately researched.

In the fetus the sense of smell develops during the seventh month of conceptual age (Monie 1983:25). Neonates were believed to have a poor sense of smell until recent research proved the contrary. Babies are accustomed to their mother's balm.

As body odor varies greatly among cultures, due in part to their diverse diets, familiarity with the olfaction of the in-group is one more aspect of cultural identity and one more subtle means for the exclusion of the out-group. Tribal allegiance and prejudice are formed in the womb and are thus deeply ingrained and hard to overcome.

The question is: Should they be overcome? Can it be done? If so, how is it possible to go beyond the surface? The answer, as I see it, is that if it does

not lead to viscous prejudice (and most prejudice is quite viscous), tribal allegiance is not wrong by definition.

As I pointed out in earlier articles on cross-cultural communication, we cannot - and we may not want to - change ourselves. The key to harmonious communication across cultural barriers is the consciousness of our differences and a positive attitude toward the worth of that which is different. What we need to do is gain ever more knowledge of where we differ. As the old saying goes, the truth will make us free. Understanding that some of our cultural differences start in the womb might make us more tolerant of them.

In any case, however profound our differences may be, what unites us is far greater than what separates us. Otherwise - how could we meet here in San Antonio so harmoniously and why would we look forward to meeting again and again over the years?

Pre-natal Learning as Self-defense

As the child matures inside the womb to get ready to function in the outside world after birth, it learns not only how to satisfy its needs by eliciting singing or a caressing response through kicking. The child also gets ready to interact not only with its mother, but also with the other people that will surround it.

It's a hostile world for a helpless little human being. In the so called advanced societies, a child is lucky if it does not get killed by abortion. In the so-called underdeveloped countries, during periods of famine, newborn babies may be killed for food. In India, it may get killed before or after birth if it is of the wrong sex. All this is done to the child by its own significant others.

The precarious situation of this tiny, defenseless creature could be even more perilous if it did not bond with its mother through the early recognition of her touch and her voice. As the child grows up, it will be inconspicuous because it easily fits into its culture. This is accomplished by its adjustment to the body motions and the intonation contour of its ingroup.

In conclusion, what I wanted to say is that enculturation begins in the womb. Thus, at birth, the child is already a member of its community. Its precocious enculturation is part of the child's defense mechanism after birth. Before birth, the child's defense mechanism works on two planes. Physically, against neglect and exposure to harsh noises or being hit, the fetus is somewhat protected by being surrounded by the water of the amniotic fluid.

The psychological defense against the danger of death by abortion is the child's ability to interact with its mother through quickening. Many women I have interviewed feel that kicking is the child's way to tell them "I am here, I am alive and well." Bonding often dates from that moment. Women are more reluctant to undergo abortion after they have actually felt the movements of their child and its reaction to stroking and singing. The end of the third trimester is also the time when the brain waves of the fetus are developed to the point it is most likely that the fetus can feel pain.

Last, but not least, let me also say that the early enculturation of the human offspring helps to assure the survival of the race. If children were not accepted and cared for, the human species could not continue.

References

- Birnholz, Jason C. and Beryl R. Benaceraff
 1983 "The development of human fetal hearing" *Science* 222 (4623) pp. 516-518.
- Brazelton, T.T. and E. Tronik
 1980 "Preverbal communication between mothers and infants" *The social foundation of language and thought: Essays in honor of Jerome S. Bruner*. D.R. Olsen ed., New York: Norton, pp. 299-315.
- De Casper, A.J. and W.P. Fifer
 1980 "Of human bonding: Newborns prefer their mothers' voices" *Science* vol. 208 pp. 1174-1176.
- De Vries, J.I.P., G.H.A. Visser and H.F.R. Prechtl
 1988 "The emergence of fetal behavior III. Individual differences and consistencies" *Early Human Development* 16, pp. 85-103.
- Gagnon, Robert, Cora Hunse, Lesley Carmichael, Fraser Fellows, and John Patrick
 1987 "Human fetal responses to vibratory acoustic stimulation from twenty six weeks to term" *American Journal of Obstetrics and Gynecology*, vol. 157 Nr. 6, pp. 1375-1381.
- Monie, I.W.
 1983 "Development and physiology of the fetus" chapter 5 in *Gynecology and Obstetrics*, vol. 2 (rev ed.) Albert B. Garbie and John G. Sciarra eds. (Philadelphia, PA. Harper and Row).
- Parvianen, Sakari
 1949 "Vagitus uterinus" *Annales Chirurgiae et Gynecologiae Fenniae*, vol. 38, pp. 330-336.
- Rayburn, William E.

- 1987 "Monitoring fetal body movement" *Clinical Obstetric Investigation* 21, pp. 177-181.
- Sadovsky, Eliahu, Aaron Samueloff, Yoel Sadovsky, Goren Ohel
1986 "Incidence of spontaneous and evoked fetal movement" *Gynecologic and Obstetric Investigation* 21, pp. 177-181.
- von Raffler-Engel, Walburga
1964 *Il prelinguaggio infantile* Brescia: Paideia (Studi grammaticali e linguistici 7)
- 1983 "On the synchronous development of gesticulation and vocalization in man's early communicative behavior" pp. 295-312 in *Glossogenetics: The origin and evolution of language*. E. de Grolier ed., Paris: Harwood Academic Press (Proceedings of the Transdisciplinary Symposium on Glossogenetics sponsored by the International Social Science Council, UNESCO, Paris 1980).
- 1988a "The impact of covert factors in cross-cultural communication" pp. 71-104 in *Cross cultural perspectives in non-verbal communication*. F. Poyatos, ed. Toronto: Hogrefe.
- 1988b "The synchronous development of language and kinesics: Further evidence" pp. 227-246 in the *Genesis of language: a different judgment of evidence* (selected papers from the Symposium on Language Origins, XIth International Congress of Anthropological and Ethnological Sciences, University of British Columbia, 1983) Marge E. Landsberg (ed.) Berlin: Mouton de Gruyter (Studies in Anthropological Linguistics 3).
- 1993 *The perception of the unborn child throughout the cultures of the world*. Toronto: Hogrefe. Also translated into Japanese by Nobiyuki Honna and Mikoko Cato, Tokyo: Taishukan.
- Wedenburg, E.
1965 "Pre-natal tests of hearing" *Acta Otolaryngologica*, Supplement 207, p. 27.
- Westgren, M., H. Alström, M. Nyman, and U. Ulmsten
1987 "Maternal perception of sound-provoked fetal movements as a measure of fetal well-being" *British Journal of Obstetrics and Gynecology*, vol. 94, pp. 523-527.

Appendix

Developmental stages

8 weeks after conception:
fully formed fetus

12 weeks after conception:
brain waves can be registered

12 weeks after conception:
skin is sensitive to touch

26 weeks after conception:
can hear: heartbeat accelerates with louder noise, has jerking motions
for sharp noises (like shooting)

26 weeks after conception:
has taste: distinguishes sweet from sour substances (injected into
amniotic fluid)

26 weeks after conception:
can smell

35 weeks after conception:
is sensitive to light (will turn towards source of light)