Olfaction, Memory, and Maternal Bonding

How food aromas in the postpartum home shape the neurological bond between mother and child

By Monika Sudakov

Introduction

Of all the senses, smell is the most deeply wired to memory and emotion. It is the oldest sense, evolutionarily speaking, and its neural architecture reflects this primacy: olfactory signals bypass the thalamic relay station that filters other sensory inputs and project directly into the limbic system—the amygdala, the hippocampus, the piriform cortex—where they are processed alongside emotion, memory, and social information.[1]

This paper examines the implications of this unique neural architecture for the postpartum period. Specifically, we explore how food aromas in the postpartum home become encoded into both the mother's and the infant's long-term memory, how these olfactory memories contribute to maternal bonding, and why the deliberate creation of positive olfactory environments during the early postpartum weeks may have lasting effects on the mother-infant relationship.

The Olfactory Superhighway: Why Smell Is Different

Every other sense takes the scenic route through the brain. Visual information passes from the retina through the lateral geniculate nucleus of the thalamus to the visual cortex. Auditory signals travel from the cochlea through the medial geniculate nucleus to the auditory cortex. Even taste,

the sense most closely related to smell, is routed through the thalamus before reaching cortical processing areas.

Smell does not follow these rules. Odorant molecules bind to receptors in the nasal epithelium, triggering signals that travel through the olfactory bulb and directly into the piriform cortex, amygdala, and entorhinal cortex—the gateway to the hippocampus. This means that olfactory information reaches the brain's emotional and memory centers before it reaches conscious awareness. You *feel* a smell before you *identify* it.[2]

Harvard neuroscientist Venkatesh Murthy has noted that this direct pathway makes smell "the sense most closely connected to emotion and memory in the human brain." Research using functional neuroimaging confirms that odor-evoked memories are accompanied by significantly greater amygdala and hippocampal activation compared to memories evoked through verbal or visual cues.[3]

> *"Smell and memory are so closely linked because of the brain's anatomy. Odors take a direct route to the limbic system, including the amygdala and the hippocampus, the regions related to emotion and memory."*
>
> — Harvard Gazette, citing research by Venkatesh Murthy

The Infant Nose: Olfactory Learning from Day One

Neonates are olfactory learners. In the first hours and days of life, when vision is blurry and hearing is still calibrating, the sense of smell serves as the infant's primary tool for navigating the social world. Research has demonstrated that newborns can identify their own mother's breast odor within hours of birth, preferentially orienting toward pads bearing her scent over those of unfamiliar women.[4]

This olfactory recognition is not passive. It involves active learning that reshapes the infant's neural circuits. Mammalian studies reveal that the changes to the olfactory bulb following birth are "extremely important and influential for maternal behavior"—and this influence runs in both directions. The mother's olfactory system undergoes pregnancy- and birth-related plasticity that enhances her ability to detect infant cues, while the infant's olfactory system rapidly calibrates to the mother's unique scent signature.[5]

In rodent models, this early olfactory conditioning is mediated by norepinephrine release in the olfactory bulb during nursing, creating an associative link between the mother's odor and the reward of feeding. Sullivan and colleagues demonstrated that odor stimuli paired with warmth and tactile comfort during the neonatal period produce persistent preferences that influence social behavior into adulthood.[6]

The Kitchen as Olfactory Environment

Now consider the postpartum home. The infant, in its first weeks of life, is building an olfactory map of its world. Every scent in the home—the laundry detergent, the skin of the people who hold it, the soap, and yes, the food cooking in the kitchen—is being catalogued, associated, and stored in the developing limbic system.

When nourishing meals are being prepared or warmed in the home—bone broth simmering with ginger, stews fragrant with turmeric and garlic, warming grains releasing their earthy steam—these aromas become part of the infant's earliest olfactory landscape. They are being encoded alongside the infant's most fundamental associations: warmth, satiation, maternal proximity, safety.

This is not metaphor. Research on food-related olfactory stimuli has demonstrated that these odors activate "evolutionarily conserved neural networks associated with survival and emotional responses," with the most significant activation observed in the hippocampus and limbic cortex.[7] The aromas of nourishing food literally activate the infant's survival circuitry, reinforcing the association between the home environment and biological safety.

Key Insight: The olfactory environment of the first postpartum weeks is not background noise. It is the sensory scaffolding upon which the infant's earliest emotional memories are constructed.

Maternal Olfactory Memory: The Mother's Side

The olfactory encoding is bidirectional. While the infant is learning the smells of home, the mother is forming her own olfactory memories of this period—memories that will be among the most vivid and emotionally charged she will ever create.

Pregnancy induces significant changes in the maternal olfactory system. Hormonal shifts, particularly in estrogen and progesterone, alter olfactory sensitivity and hedonic evaluation (how pleasant or unpleasant odors are perceived). Many women report heightened olfactory sensitivity during pregnancy, and this sensitivity persists into the early postpartum period. The maternal brain is, in effect, primed for olfactory learning.[8]

Research on olfactory memory formation demonstrates that memories encoded during periods of heightened emotional arousal are stored more durably and recalled more vividly than memories formed during neutral states. The postpartum period—with its intensity of emotion, hormonal flux, and identity reorganization—represents a state of sustained heightened arousal. Olfactory memories formed during this window are likely to be exceptionally persistent.[9]

This means that the food aromas present in the postpartum home will become part of the mother's long-term olfactory memory. Years later, encountering a similar scent—the particular warmth of a ginger-turmeric broth, the earthy comfort of slow-cooked grains—will evoke not merely a memory but a *re-experiencing* of the postpartum period. The question is: what will that memory feel like? If the postpartum period is characterized by isolation and struggle, the associated aromas will carry that valence. If it is characterized by warmth, nourishment, and care, the aromas will carry *that* instead.

Proust's Madeleine and the Postpartum Kitchen

Marcel Proust's famous passage about the madeleine—in which a single taste-smell experience triggers an involuntary cascade of vivid autobiographical memory—has become the literary touchstone for what neuroscientists now study as odor-evoked autobiographical memory (OEAM). Research confirms that Proust was observing something real: odor-evoked memories are consistently rated as more emotional, more vivid, more "transported"—the feeling of being *back there*—than memories evoked through other sensory channels.[10]

The characteristics of these memories follow the LOVER model: they are Limbic (processed in emotional brain regions), Older (typically from the first decade of life or from periods of heightened significance), Vivid (experienced as re-living), Emotional (accompanied by strong affect), and Rare (the first odor-memory association formed tends to persist over subsequent associations).

The postpartum period qualifies as a period of "heightened significance" in the most profound sense. It is a time when the brain is actively constructing new neural architectures for caregiving, bonding, and identity. The olfactory memories formed during this period will be Older (early in the parenting journey), Emotional (formed during one of life's most intense experiences), and Rare (first-time mothers are forming many of these associations for the first time). They will persist.

Shared Olfactory Memory: A Bond Across Time

Perhaps the most remarkable implication of this research is the possibility of *shared olfactory memory* between mother and child. If both the mother and the infant are encoding the same food aromas during the postpartum period—the same ginger, the same bone broth, the same warming spices—they are creating a shared sensory library that may function as a non-verbal bond.

Years later, when a child smells something that evokes their earliest infancy, they will not have conscious access to the memory—the hippocampal circuits required for explicit autobiographical memory are not yet mature in the neonatal period. But the amygdala-mediated emotional association will persist. The smell will *feel* like something—like safety, like home, like the presence of the mother—without the child being able to articulate why.[11]

For the mother, the same aroma will evoke vivid, conscious memories of the postpartum period. If those memories are of warmth and nourishment—of someone caring enough to send meals, of the kitchen filled with healing aromas, of feeling held during a vulnerable time—then the shared olfactory cue becomes a bridge between two different forms of memory, connecting the mother's conscious recollection with the child's implicit emotional association.

> *"My daughter is three now. When I make ginger broth, she comes into the kitchen and says she feels cozy. She doesn't remember those first weeks. But something in her does."*
>
> — Monika Sudakov, Founder, Mothership

Implications for Postpartum Meal Design

This research changes how we think about postpartum meal design. If the aromas of the postpartum period are going to become some of the most durable memories both mother and child will carry, then the olfactory profile of postpartum meals is not a detail—it is one of the most consequential design decisions we make.

At Mothership, we prioritize ingredients with warming, complex aromatic profiles: ginger, turmeric, bone broth, slow-cooked alliums, toasted sesame, and fermented elements that add depth without sharpness. These are not arbitrary choices. They are ingredients that traditional postpartum food cultures worldwide have converged on—not because ancient practitioners understood the olfactory-limbic pathway, but because they understood something about comfort that modern neuroscience is only now articulating.

Conclusion

Smell is the sense that remembers what the mind forgets. The aromas that fill a postpartum home during the first weeks of a child's life are not transient—they are being encoded into the deepest structures of two developing brains, forming a shared sensory foundation that will persist across decades. Every Mothership meal is designed with this understanding: that what the home smells like during the postpartum period is not a matter of culinary preference. It is a matter of neurological legacy.

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