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It's time to rebrand 'Mommy Brain'

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For decades, the concept of 'mommy brain'^a has permeated what it is to be a mother. Mommy brain is almost a rite of passage, giving a name to the memory loss and brain fog that so many pregnant and postpartum women report. In fact, studies show that up to 80% of pregnant women report a degree of subjective memory loss; subjective reports among postpartum women are similar. However, the idea that motherhood is wrought with memory deficits and is characterized by a brain that no longer functions well is scientifically just not so¹. While complaints of mental foggy should be taken seriously, it is likely the inescapable narrative of 'mommy brain' contributes to these subjective reports, focusing women's (and researchers') attention on what may be a small decrease in particular aspects of cognitive function, while at the same time ignoring the faculties that are gained during this period of life.

At odds with the subjective reports of memory loss during motherhood, objective differences in memory function in mothers have rarely been observed in empirical studies. Studies in pregnant women report subtle memory decrements compared with non-pregnant controls, however reported differences tend to be small and concentrated to specific tasks that tax prefrontal cognitive reserves (e.g., verbal paired associates, prospective memory). Among the few studies conducted in the postpartum period, non-significant differences in memory between mothers and non-mothers are frequently reported.

Why doesn't performance on objective memory tests map on to what mothers are experiencing? First, objective memory tests are performed in a laboratory setting which minimizes distractions, likely not accounting for the 'mental load' of motherhood that is part of daily life. Indeed, the only studies where objective memory testing was carried out in a home setting showed that

pregnant women had poorer prospective memory performance than non-pregnant counterparts². Second, many mothers live in a society geared towards strong expectations of ‘mommy brain’, where many small and commonplace behaviors (e.g., forgetting a word, misplacing the keys) become highlighted as something more. Decades of psychological research has demonstrated that such attributional biases are exceedingly common in our everyday lives and ‘mommy brain’ may be a prime example of this. Third, as scientists, the questions we ask and the filters through which we interpret data are colored by dominant narratives in our respective fields. For research on motherhood and the brain, this narrative is ‘mommy brain’ – an idea that there are deficits in brain function with the transition to motherhood.

Our long-held negative narrative of ‘mommy brain’ does not tell the full story of how the brain functions with motherhood. Indeed, the study of the parental brain in nonhuman animals has long focused on positive adaptations with the goal of uncovering how the essential repertoire of parental behaviors emerges in new parents - a profoundly important developmental event, facilitated by well-documented heightened neuroplasticity. Thus, a promising alternative approach to understanding memory and motherhood is to reframe cognitive change during the transition to motherhood as an adaptation rather than a deficit. Such reframing spurred us to test memory in pregnant women using ecologically relevant stimuli (i.e., baby related items). Surprisingly, and in direct opposition to oft cited ‘mommy brain’, we found that pregnant women show a boost in learning about baby-related items, while also having generally better long-term memory than never pregnant women³.

In human mothers, and parents, we are seeing a number of enhanced cognitive and emotional abilities which are linked to remarkable changes in the brain^{1,4}. For example, functional brain adaptations are reported in birthing and non-birthing parents as they learn the suite of behaviors necessary to keep their offspring alive. The emerging pattern of brain structural plasticity in birthing parents is one of reductions in gray matter volumes in many brain areas, including the prefrontal regions and hippocampus – brain areas important for memory – that last up to 6 years postpartum (with transient volume increases during the early postpartum months). Perhaps counterintuitively, these maternal brain structural changes are not linked to performance on objective memory tests; they are associated with enhanced caregiving sensitivity⁵. In turn, this caregiving ‘expertise’ is proposed to be reflected at the neural level with a fine-tuning of pathways necessary to enable effective responses to infant needs while also regulating one’s own emotions, and coping in the face of new demands⁶. This takes coordination of a number of complex neural mechanisms.

Motherhood also entails a similar degree of morphological brain modifications to those seen during adolescence, contributing to the idea of the developmental stage called matrescence⁷. Both adolescence and matrescence are sensitive neuroplastic windows characterized by hormonally-mediated shifts in attention, motivation, cognition, and behavior necessary for adaptation to the new demands of life. Conceptualizing the transition to motherhood as a developmental period prompts us to take a broader, holistic view of the brain during this critical period and consider the adaptive importance of these changes in brain function. Given the strong interrelationship between maternal health and infant development, it is imperative to understand what effective adaptation to motherhood looks like in terms of maternal brain function as a whole, and not just with regards to child care. Addressing the gaps in our knowledge of the

maternal brain will provide basic understanding of the brain in the majority of females, and provide new targets for treating perinatal psychiatric disorders; illnesses that affect 1 in 5 mothers.

Why then is ‘mommy brain’, this narrative denoting brain dysfunction with maternity, so pervasive in the discourse of motherhood? Is it possible this phenomenon reflects a long history of caregiving work and women’s capabilities being under-valued? For centuries, western culture has seen women as the lesser sex; a sex that is not as smart, not capable of intellect, but capable of reproducing and caregiving. A quote from an Obstetrics textbook in 1848 states: “She (woman) has a head almost too small for intellect but just big enough for love.” And probably just big enough for mother love. Not only does this quote reflect the devaluing of a woman's intellect, it devalues the role of a caregiver as someone that doesn’t require a whole brain.

Simultaneously, we live in a society where the impossible ideal of a ‘natural’ and perfect mother prevails, often without accompanying resources devoted to supporting parents. Perhaps complaints of ‘mommy brain’ have, thus, become a cry for help; a way of naming the impossibilities of the mental load of motherhood and laughing them off as a personal ‘failure’ of the brain’s capabilities. The troubling consequence of normalizing mental struggles at this critical life phase is that it diminishes the capacities of the maternal brain and the essential role of parents in society. This, then, results in a devaluing of the need to support mothers in their adaptation to parenthood; something that is essential to maintain and improve the wellbeing of mothers and, in turn, subsequent generations.

It’s time we rebrand ‘mommy brain’ as a narrative reflecting the adaptation of a mother’s (and parent’s) brain to take on the remarkable feat of parenting. To do this, we need to continue to focus our research on understanding the suite of neural adaptations that accompany matrescence and start giving the maternal brain the credit it deserves.

^a Also referred to as Baby Brain, Mom Brain, Momnesia and Pregnancy Brain

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