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Use Your Head: Mathematics As Therapy

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Both of my parents lived into their mid-nineties.

My father suffered a mild stroke at the age of ninety-one. "She is a mathematics professor" were the first words he uttered to the nurse, proudly pointing in my direction upon regaining his speech. I took it upon myself to give him biweekly speech and arithmetic lessons to counteract his aphasia. I would ask him to add, subtract and multiply orally. His answers came rapidly when produced automatically but with much greater mental effort when he slowed down to think them through. Yet he valued these lessons and stayed with them to exhaustion. He was in touch with skills embedded in his head since early childhood. His mind had been reactivated. Some nine years later when my once brilliant mother's strength was fading, I too would sit by her and show her the wooden numbers of a child's puzzle. "What number is this?" "Six," she would whisper. "And how much is six plus six?" The right answer came from her struggling lips as I squeezed her blotched and gnarled hand to express my pride. Her eyes lit up knowing that she still could think correctly.

My parents enrolled me as a child in one of the Netherlands' first Montessori schools. We frequently started the day gathered around the teacher, who fired arithmetic problems at us and made us solve them mentally. With our minds revved up after one half hour of this activity, we would get to our work tables to engage in our individual projects. I often entertained myself in bed, unable to sleep during the long summer dusks, with proposing arithmetic problems to myself in my head and enjoying the patterns I would discover in their answers.

These mental gymnastics stood me in good stead when, upon arriving in the U.S. at the war's outbreak, I applied for a scholarship at the Lyceé Français in New York so as to maintain my educational headstart

over American high schools. The mathematics teacher who tested me in an oral examination asked me to consider some algebra problem and to explain my thinking aloud. "Always think things through mentally first," he said, "then you will see the problem as a whole." I have taken his suggestion to heart ever since. I have seen the outlines of a solution to a research question emerge as I let it wander in my head before falling asleep. "Think of your math problem when scrubbing a floor, or when the kids are screaming, or when in bed without your spouse." I used to say to my adult evening students, "It will take your mind off your other problems as well."

I developed a special course for these students entitled *Mathematics for Life and Society*. As a retired professor I presently am teaching this course to residents of the assisted care unit at the Windrows in Princeton, N.J. My students of all ages past 70 are rediscovering the basic math they thought they never were good at as I illustrate its relevance to our present world and life environment. I encourage them to think the questions through and to seek the answers in their heads. I have been greatly gratified to recognize the alertness and self-confidence (as well as the pleasure) among my audience due to this mental reawakening.

My grandchildren, unfortunately, were taught to use their fingers when adding and subtracting. They graduated from counting fingers to calculators and hence, I presume, they will move on to computers. They never developed a sense of the combinations of magnitudes which are revealed when seeing the abstract number patterns in the head.. Where will they repair to when the years lie heavy upon them and the clutter of too many stored details and similitudes of past events confuses the mind? For they will be lacking this restorative haven of precision, economy and logical thought bestowed on us with our first fundamental knowing of numbers.