At past Gatherings for Gardner I have noticed that I am not the only person who finds it easier to concentrate if I have a pen in my hand. I had assumed that I was holding the pen to make notes, but I made few. I wondered if I were holding the pen for the same reason that I always carry a book with me when I travel - to ward off the dreaded boredom, but I was never bored at G4G; intrigued, amazed and sometimes perplexed, but never bored. Then I became aware that at the end of each session the sheets of paper in front of me were covered in doodles – and looking around the room I saw that I was not the only one. Did this mean that I had been bored after all and so had needed to entertain myself? Had my doodling prevented me from concentrating on the talks? Had the speakers felt chagrined when they thought I was not paying attention – or had they been pleased when they mistook my doodling for assiduous note taking?

Jackie Andrade, a cognitive psychologist at the University of Plymouth UK, designed a clever psychological study of doodling. She compared how well people remembered details of a monologue when doodling compared to those who did not doodle. Forty volunteers were asked to listen to a monotonous two-and-a-half minute telephone message and jot down the names of people who had been invited to a party. Half of the participants were asked to shade in shapes on a piece of paper while they listened to “relieve the boredom”. The shading task was chosen instead of more creative doodling because it was less likely to make people feel self-conscious.

After hearing the recorded message, the volunteers were given a surprise memory test to see how much of it they could remember. The script of the message mentioned eight names of people who could make the party, three who could not and eight place names.

Doodlers scored better on writing down the names of people attending the party, and were also able to recall the names more accurately afterwards. On average, the doodlers recalled 7.5 names and places – 29% more than the average of 5.8 remembered by the control group.

Why? Well it seems likely that when sitting and listening, not only to a monotonous monologue but even to an interesting talk, there is a tendency for the mind to wander, to daydream. In fact when a speaker is throwing out interesting ideas, I sometimes follow an idea off at a tangent and then, when I return to the talk, I have missed an important bit.

Andrade suggests that a simple task like doodling may be sufficient to stop the mind wandering without affecting performance on the main task. So doodling may be something we do because it helps to keep us on track, rather than being a distracting activity that we should try to resist. It is not so much that doodling is good for your concentration, but that daydreaming is bad. Letting your mind follow a tangential idea away from the talk is probably going to be more cognitively demanding than a doodle. So at G4GX I shall doodle unashamedly.

However, doodling has other benefits. The Ulam spiral is a simple method of visualizing the prime numbers that reveals the apparent tendency of certain quadratic polynomials to generate unusually large numbers of primes. It was discovered by the mathematician, Stanislaw Ulam, in 1963 while he was doodling during a scientific meeting. Shortly afterwards, in an early application of computer graphics, Ulam with collaborators
Myron Stein and Mark Wells produced pictures of the spiral for numbers up to 65,000. In March of the following year, Martin Gardner wrote about the Ulam spiral in his Mathematical Games column in Scientific American with the Ulam spiral featuring on the front cover.

Vi Hart (http://vihart.com/doodling/) uses doodles to great effect and with a lot of fun to teach about Fibonacci and Lucas series, Pascal’s triangles, graph theory and knot theory – and the biology of plant growth. Her videos are inspirational and I strongly recommend them to math teachers.

Some have suggested that the nature of your doodle, even where on the page you doodle, can tell something of your personality. Sometimes the content of the doodle comes as no surprise, for example Ronald Regan’s doodles below and left. The doodle, below and right, by J. F. Kennedy with angular and square shapes is said to indicate a determined person who needs an outlet for their mental and physical energy and who likes to be in control.
Rounded doodles with circles and spirals are said to indicate emotionality and a desire for love and are more common in women doodlers – though it is one of my favourite doodles. Often these abstract shapes transform into hearts, faces, flowers, hills or waves.

On the other hand doodles with square shapes suggest a determined, controlling, down-to-earth and practical personality and are more common in men doodlers – I do these too. Often these abstract doodles transform into houses, ladders, chessboards and books.

Just as a palmist can distinguish the hands of a manual labourer from a desk worker and graphologist can often tell something about the education and sex of the writer, so “doodle interpreters” may use these weak but significant associations of hearts and curly shapes with romantic female empathisers and the mechanical, more angular shapes with a male systematising and engineering personality.

When at the 2005 Davos Economic Summit a page of doodles was found on Tony Blair’s desk, psychologist and graphologists were quick to claim insights into his subconscious with phrases such as “struggling to concentrate”, “not a natural leader”, 'struggling to keep control of a confusing world' and 'an unstable man who is feeling under enormous pressure'. However, the UK Prime Minister’s office then announced, with some glee, that the doodles were not in fact the work of Tony Blair at all, but were done by one of his guests, Bill Gates.

My own doodles are a mixture of stacked cubes with odd perspectives and tear drops and circles that link to form a road network.

*The puzzle presented overleaf for your fun started out as my doodling on a map of Georgia.*
Start at Atlanta (A) with an anticlockwise turn and then make your way to Savannah (S) following the curved lines. Never turn down an acute angle. No reverse gear. Enjoy.

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