The intellectual brain

By AfSFH Fellow and Head of IT and Social Media,
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It was a few years ago, near the start of session four or five, when a client turned to me and said: 'You know a lot about the brain …'. I wondered where this sentence was going. Obviously, we had talked about the emotional brain, including the amygdala, and other relevant parts, and we talked about the intellectual brain. He continued, 'You talk a lot about the parts of the emotional brain, but you don't talk much about what's in the intellectual brain. So, what's in it?' The truth is, I didn't know then. Obviously, I recapped on executive function and the prefrontal cortex. I also talked about the parietal lobe and receiving sensations like touch. But that was all I knew then. And, because I was making a big deal about using the intellectual brain, I felt that I should know a bit more about it.

The reason I didn't know very much was because there aren't any obvious subcomponents to the intellectual brain apart from the prefrontal cortex. It all looks very similar – the usual mixture of neurons, glial cells, and cerebrospinal fluid. There's also the glymphatic system. So, how does it work? Well, it appears that the intellectual brain is made up of small identical components – lots of them. It's what allowed humans to evolve to their current form – the ability to grow the intellectual brain by adding more of these tiny components. These tiny groupings of neurons are called cortical columns, and there are about 150,000 columns in the intellectual brain.

Each cortical column has sides under one square millimetre, and contains about one hundred thousand neurons (different types) and five hundred million synapses. Visual regions, touch regions, and language regions of the intellectual brain all look very similar. As well as receiving sensory messages and sending motor messages, they can have connections to the emotional brain. Each part of the intellectual brain is able to perform sensory and motor tasks, and some parts can perform high-level thinking and planning.

Regions of the brain

Brain regions do different tasks. Each region is composed of thousands of cortical columns, and each column is composed of hair-like mini-columns containing just over 100 neurons. All the regions of the intellectual brain are connected with bundles of nerve fibres. Each region functions internally the same way, but its ultimate job depends on what it is connected to, eg if it's connected to the eyes, its function is sight, if it's connected to the ears, its function is hearing, etc.

Our model of the brain suggests that a person's thoughts, ideas, and perceptions depend on the activity of their neurons. Everything they know is stored in synapses.

Predicting

The intellectual brain makes multiple simultaneous predictions about what it is about to see, hear, and feel. To be able to make predictions, the brain must learn what's normal in its environment, which it does based on past experience. It creates a model of the world, and it does this through movement, and by noticing how sensory inputs change as the person moves. As a consequence, with each movement, the intellectual brain can predict what the next sensation will be. If the prediction isn't correct, the model in the brain can be updated.

Researchers know that messages travel along neurons as spikes of electrical information. More recently, they have discovered mini-spikes travelling along neurons that don't get passed on to the next neuron. These are thought to be predictive spikes. The neuron is getting ready to receive an expected message. When a signal reaches the mini-columns, only those that predicted it become active, and do so more quickly than if they weren't in a ready state. Of course, if it's a different signal, then the model will be updated.

Mapping

Another interesting new idea is that the brain uses reference frames to know the shape and size of an object, eg a teacup. This gives the brain the relative position and structure of an object, and allows the model to be three-dimensional. So, the brain can manipulate the whole object at once, and plan and create movements. It knows the position of the object in relation to, for example, the position of my hand, and can easily control the movement of my hand to the object. Not only does the brain have a map of an object, it also needs to know its orientation. It's suggested that the cortical columns contain cells equivalent to grid cells (on a map), place cells, and head direction cells. In effect, each cortical column is a sensory-motor system that is capable of learning about and recognising complete objects.

This is the *Thousand Brains Theory of Intelligence (*see *References* below). It assumes cortical columns are not only learning machines, but that they are predictive. It also assumes that they do this using reference frames. Reference frames are used to model everything a person knows, and are found everywhere in the intellectual brain.

Voting

According to the theory, cortical columns vote on what they think they are perceiving, and the option with the most

Rubin's vase illusion

According to the theory, cortical columns vote on what they think they are perceiving, and the option with the most votes wins.

votes wins. Obviously, not every cortical column knows everything, so only the relevant ones will vote. This can explain visual illusions – why sometimes you see two faces and sometimes a candlestick when looking at a Rubin's vase illusion. It also explains why people can identify objects after seeing them for only the briefest period of time. And, also, why they get things wrong if what they see/hear/feel isn't what they expected.

So, now I have a much better model of the intellectual brain to share with clients, should they ask. It's simply multiple cortical columns that handle sensory-motor activities, while at the same time using a model of the world to predict what will happen next. Using reference frames allows a person to know where things are in their world and move around them or pick them up. Lastly, cortical column voting allows the brain to decide quickly what's the best way to move to achieve a goal – like picking up a cup. And it's the multiple replication of these near-identical cortical columns that has made humans so intelligent!

Reference:
Jeff Hawkins. A Thousand Brains: A New Theory of Intelligence. ISBN-10: 1541675797

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What sort of Hypnotherapist are you?

By AfSFH Fellow and Head of IT and Social Media, Trevor Eddolls

When I ask what kind of Hypnotherapist you are, I'm thinking in terms of personality rather than modality. How would you describe your personality?

Testing personality types

The trouble with personality inventories like Cattell's 16 PF test and similar is that they only allow for a small number of personality traits. The Myers-Briggs Type Indicator (MBTI) is much loved by HR departments, but generally derided by the scientific community. Even Wikipedia describes it as a pseudoscientific self-report questionnaire that claims to indicate differing personality types. The test attempts to assign a binary value to each of four categories: introversion or extraversion, sensing or intuition, thinking or feeling, and judging or perceiving. One letter from each category is taken to produce a four-letter test result representing one of sixteen possible personalities, such as 'INFP' or 'ESTJ'. Other personality descriptions often include opposites like, 'you are generally an outgoing person, but at times you like to take a back seat.' And, I guess, the truth is that people change their behaviour to suit their mood, and we can only infer another person's personality from their behaviour. However, let's assume that there is some kind of personality that each person has that simply gets expressed differently in different situations.

The Merrill-Reid method

That brings me to the Merrill-Reid method, which allows you to profile yourself or your client. The Merrill-Reid model identifies

four key personality types, which are: analytical, driver, amiable, and expressive. The idea is that you can change your style of Hypnotherapy to match that of your client, so they get the most out of the treatment. But what kind of person are you in the first place?

The truth is that the technique is often used in selling, so the vendor changes their style to match their client's personality style. But that doesn't matter.

David Merrill and Roger Reid were psychologists, who used factor analysis to identify two scales: assertiveness and responsiveness:

• Assertiveness is a measure of how outwardly people try to influence others. People who are high on assertiveness tend to reveal their opinions, try to persuade others, and have things their own way. People who are low on assertiveness tend to keep their views to themselves, fit in with others, and avoid conflict.

• Responsiveness is more about how outwardly emotional people appear to be. People who are high on responsiveness are more socially engaged and aware of the needs of others. How they feel about things depends on interpersonal relationships. People who are low on responsiveness tend to be more socially distant, and primarily think about work.

This can be used to create a 2x2 matrix, with four personality types – see Figure 1.

Figure 1: The Merrill-Reid matrix

What different personality types mean

If you are analytical, you will ask 'why' questions, which means you will expect people to have all the facts and be ready to answer your questions. You will like objective information and have a low tolerance for ambiguity, and you will be more concerned with work than people. You will also tend to be reserved and logical in your behaviour. You like to be right and can appear to be very critical.

If you are a driver personality type, you will display assertive and direct behaviour. Your focus will be on results and achieving your goals. You very much like to feel that you are in control.

If you are an amiable personality type, you will display friendly and cooperative behaviour. Your focus is on harmony and maintaining relationships, and you have a low need for control.

If you are an expressive personality type, you will display outgoing and enthusiastic behaviour. You are competitive, your focus is on being creative and optimistic, and you will have a need for self-expression.

The trouble with reading any kind of personality summary like this, is that you may feel you're like all four of them, or a bit like each of them. If you really want to find out what personality style you have, there are questionnaires on the internet, for example at the **bradvordvts.co.uk** link in *References* below. How accurate the questionnaires are, I can't say.

Using personality types to improve our practice

If you know what kind of personality type you are, you can also identify what kind you aren't. It sounds obvious, but stay with me for a moment. Knowing which personality traits you're missing allows you to work on those aspects and make sure you use them when working with clients. No traits are particularly good or bad, but if you never considered a particular trait, it may be worth trying it on for size, to see whether it makes a difference with some clients. Being more outgoing, or cooperative, or focused on results, or showing lots of graphs, may help your client to achieve their goals more quickly and easily than they otherwise might. Just try to modify the way you ask questions or recap on the brain, etc.

And clients?

Having identified what kind of therapist you are, you can then try to identify the personality type of your client. Obviously, you

can't get them to do a personality test, but knowing the four main categories can help to assign people to one or other. And if you're not sure, you can always practice – at first, on your friends and family, to see which of the four domains you think they are in, and then check with their assessment of their own personality.

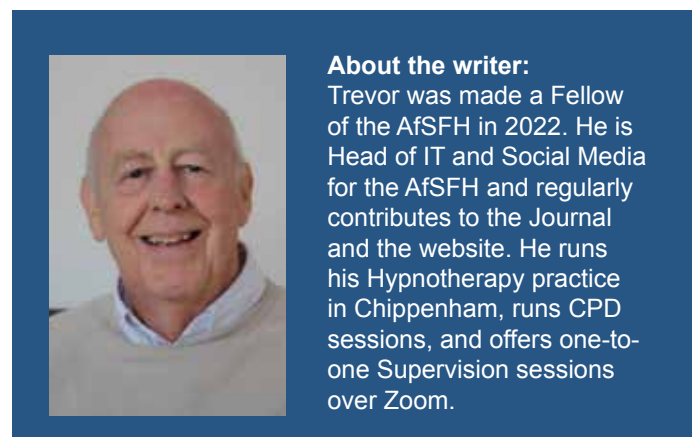Here's how the different personality types of clients like to work:

• **Analytical** – they like information to be organised and have some kind of structure. They will show little or no emotion, and make decisions slowly, because they need time to think.

• **Driver** – they like you to get straight to the point. Explain how their level of satisfaction will rise – they don't care about other people. They may appear to be arrogant and standoffish. They are action people who like results, but aren't great listeners.

• **Amiable** – ask them questions to make sure they are with you, and talk about the successes of similar clients you've seen previously. They like to go along with whatever is happening. Explain how helping them achieve their goals will have a positive impact on their friends and family. They like to feel safe and aren't good at taking action on their own, which means that they can seem obstinate or apathetic.

• **Expressive** – rather than focusing on the facts, be empathic, be their friend while they are seeing you as a client. Don't be surprised if they arrive late for a session because they have lots of commitments and a rushed lifestyle. They like to be the centre of attention. They are quite animated when they speak and don't like to be bored. They prefer spontaneity and can be impulsive, but they do like approval.

Knowing what kind of Hypnotherapist you are, and knowing what personality type your client is, can help you modify the way you work to achieve better results.

I wonder what type of therapist you thought you were?

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