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The **Autism Research** Group

An Evidence Based Guide to

Supporting Learning in Autism

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The Autism Research Group

We are a group of scientists based in the Psychology Department at City, University of London, who share an interest in neurocognitive processes in autism spectrum conditions. In particular we are interested in:

Learning and memory, focussing on:

The role of memory in language development

Mental state understanding ('theory of mind') and its relation to memory

Episodic memory and episodic future thinking

Metacognition ('thinking about thinking')

Anxiety and mental health in ASCs

Later life and older age in people with ASCs

Further details of our work can be found at:

www.city.ac.uk/about/schools/arts-social-sciences/psychology/research/autism-research-group

Your opinion matters!

We would be delighted if you wanted to give us your feedback on this booklet. Just scan this QR code to link you to an online, anonymous questionnaire. You can also contact us on **argtasksupport@city.ac.uk**

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Introduction

Our research into learning and memory regularly brings us into contact with professionals and parents, as well as with autistic people themselves. What has frequently struck us is that people don't often know about the latest research findings on learning and memory in autism and so are not in a position to incorporate these findings into their work and practice.

As scientists, we feel a certain responsibility for this state of affairs and so have decided to produce this short booklet with the aim of enhancing parents' and practitioners' understanding as well as that of autistic people themselves around issues of learning and memory. We hope that this increased understanding will help anyone involved with autism to think differently about learning and memory in autism and that this will help them to tailor the way they structure interventions. This should help to achieve greater understanding of why interventions might and might not work. It should also make for more effective interventions.

Many parents' and professionals' experience of autism tells them that autistic people learn and remember in a different way from everybody else. This difference sometimes leads to autistic people taking a long time to 'get to the right answer', sometimes give a 'stock answer' when asked a question or sometimes behave in what seems a strange way in particular situations.

Part 1

Part 1 of this guide outlines a series of five scenarios designed to illustrate common situations that arise for autistic people. Each scenario is followed by a brief explanation of the events together with some pointers to strategies that could be used to help the person with autism.

Part 2

In Part 2, we give some of the scientific background and an evidence base for the suggested strategies. You can read Part 1 and Part 2 together or simply use the strategies outlined in Part 1 on their own.

We hope this guide will provide the following:

☑ An overview of the broad framework used by scientists to understand and investigate learning and memory.

☑ An overview of the methods used to test out this framework.

☑ A summary of the main findings of research into memory into Autism Spectrum Conditions.

☑ A discussion of how all this can inform your practice in promoting better learning and memory in the people you work with.

Who is this guide aimed at?

Our goal is to provide a general framework of understanding the specific differences in learning and memory for autistic people. We hope that the information set out in this guide will be helpful for autistic people themselves as well as for everyone who works with autistic individuals – teachers, tutors, learning support workers, specialist mentors, as well as clinicians and practitioners, parents and advocates.

We have worked with education providers and autistic individuals in the creation of this guide. In this way, we hope that it will be useful for all developmental stages, across the lifespan, and across different support settings.

A note about language and terminology

We consulted a wide range of autistic people and professionals about the content, style and language used in this guide. We acknowledge that there are many individual differences in preferred use of language as either identity-first ('autistic person') or person-first ('person with autism') – a topic which has led to much debate in the wider autism community (e.g. Kenny et al., 2016). In appreciation of these differences, and out of respect for everyone who has shaped our work over the years, we have used both identity-first and person-first language throughout.

Terms and definitions

You may notice that some words or terms e.g. **episodic memory**, may be written in bold font. In those cases, the term is listed at the back of the booklet together with a short explanation of its meaning and relevance (see **New Terms You Have Learned**, on page 25). These terms are also discussed in more detail in Part 2.

Kenny, L., Hattersley, C., Molins, B. et al. (2016). Which terms should be used to describe autism? Perspectives from the UK autism community. *Autism, 20(4)*, 422-462.

Part 1: Scenarios and support strategies

Consider the following scenarios illustrating differences in memory function in autism and possible ways of supporting learning in similar situations (we have provided blank boxes for you to record your thoughts for future reference).

Scenario 1

John's mother knew that he was going to start a new reading programme at school today. When he came home from school, his mother asked him 'what did you do today at school?'. He replied 'we went to the park and fed the ducks'. This was what he always said. So, she asked him 'was there anything else you did?' Answer: 'No.' So, she showed him the new book based on the reading programme. 'Did you use this book today?' Answer: 'Yes', and he took the book, opened it on the first page and started to read a passage from it.

> **What do you think is happening here and why?**
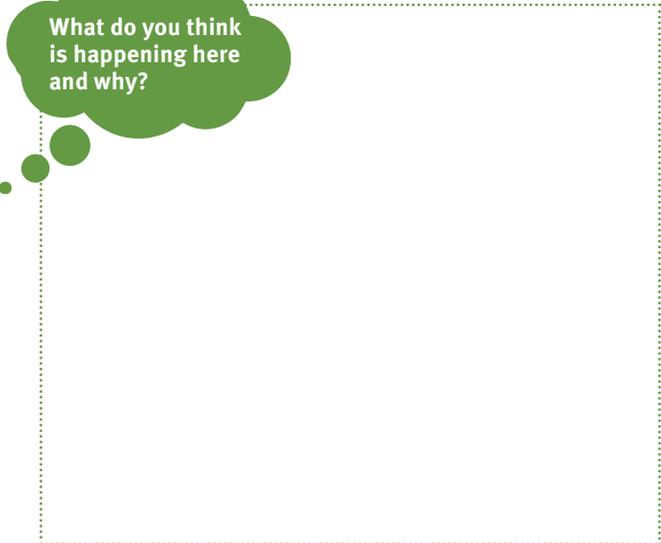
Most of us, when we are asked a question, try to work out the meaning of the question and what the person asking it wanted to find out by asking it. People with autism can also do this. But the way their brain processes and orders information when they are asked a question can sometimes mean that there are lots of other possibilities available to them than there are to us. For someone who is autistic, the sounds of the words can be just as important as their meaning. And, sometimes, so many things come flooding into their mind that it's easier to give a stock answer that has worked in the past rather than working out what they actually did at school that morning.

The key point here is that you shouldn't assume that what is an obvious answer to you is also obvious to a person on the autism spectrum. They may be completely bewildered by the choice of answers available to them.

How might you deal with this situation?

A lot of research (see Part2) now tells us that autistic people perform better on tests that give them some clues to the 'right answer' than on open-ended tests like the 'what did you do in school today' question in the scenario presented above (we call this the **Task Support Hypothesis**). So, it might be better to ask John 'Did you do reading or number work?'. Or perhaps show him the book and ask 'Did you use this in class today?'. It's also worth bearing in mind that because John might prefer to listen to the sounds rather than the meaning of the words, it might take him a little longer to come to the answer that you want. By giving him a little more time, as well as supportive nudges in the right direction you will help him get to the answer you want.

Take a moment to reflect on similar learning challenges in your work and ways that you could adapt communication and support with autistic students.

Scenario 2

A parent is trying to teach their child to sort items into categories and shows them the set of objects in the three pictures. The parent hopes that the child will see that there are fruit and items of clothing, but the child goes ahead and sorts the objects by colour.

Why do you think the child is 'missing the point'

Like we saw in Scenario 1, people on the autism spectrum often experience situations rather differently than neurotypical people. What looks to us like 'a group of fruit and a group of items of clothing' might look like that to an autistic person too, but it might also look like a group of red things and blue things, or one group of things whose names have one syllable and another whose names have more than one syllable.
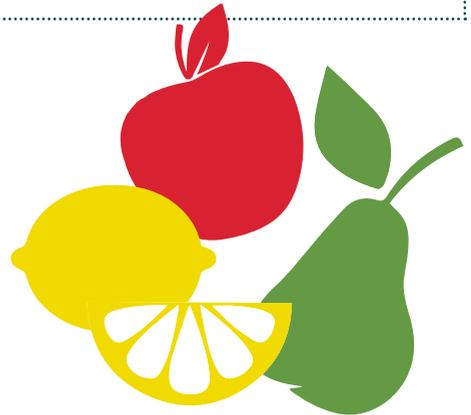
How might you deal with this situation?

Try to use the child's answer to work out how the child sees the situation – what is going through their mind and praise them for having found such a clever answer. But then encourage the child to sort the objects in the way you want, maybe by starting with their way of sorting (say, picking up a yellow shirt and a banana), but then say 'there's another way', and pick up a banana and an orange, and an orange pair of socks and a yellow tie and ask 'is there anything similar about these two things (pointing to the banana and the tie) or these (pointing to the tie and the socks)?

Use the child's answers as a starting point to develop alternative ways of seeing the objects. The idea is to get the child to see that there are sometimes other ways of doing things than the first way that comes to mind.

Take a moment to reflect on similar learning challenges in your work and ways that you could adapt communication and support for autistic students.

Scenario 3

A teacher is trying to get a child to learn a new word – *discombobulation* – but the child repeatedly says something like *'bobcomuldisation'.* At first the child seems very satisfied with their efforts, but the teacher asks them again, and again, and eventually the child says *'disbobcombulation'* and when the teacher says 'no, that's still not right', the child becomes distressed.

Why do you think the child is showing signs of distress?

A great deal of research now shows (see page 20, Table 1) that when autistic people are asked to recall a list of items in exactly the order they heard them – this is known as **serial recall** – they can recall all the items but have difficulty in getting the order exactly right. This might seem a minor problem, but as the example shows, it is important in word learning. It is equally important in recalling episodes: *'John hit Mary'* is not the same as *'Mary hit John'.*

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The choice of exactly what you might do will depend on the situation and the developmental level of the child or young person. But the idea is to get them to pay more attention to the order of things they see and hear. So, for a very young child, you might get them to repeat simple pairs of syllables like 'bee-bo' or triplets, like 'be-ba-bu'. For an older child or adolescent, you would use sentences like 'John hit Mary' or 'the cat chased the mouse'. With older children, it's not so much a case of getting them to understand the consequences of the sentences (most older children understand perfectly well who got hit in the case of 'John hits Mary'). However, when

asked to describe what happened, they may have one thing in mind, but produce the words in the wrong order. We will say more about this under the **Themes and Strategies** heading at the end of this section.

Take a moment to reflect on similar learning challenges in your work and ways that you could adapt communication and support with autistic students.

Scenario 4

Mary is looking for a quiet room in a school in which to carry out some work. The first room she walks into happens to have a class going on. Most people would almost immediately register this as 'a class' and creep out quietly. However, Mary was struck by the rather off-putting yellow colour of the walls, the fluorescent lighting, the echo in the room's acoustics and was so upset by the swishy hum of air conditioning fans that she marched over to the control switch, almost knocking over the teacher in the process.

Why do you think Mary did this?
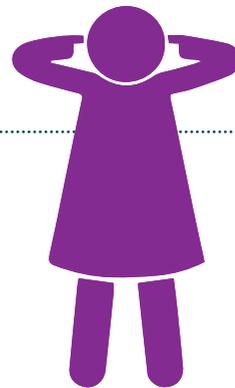
A couple of times already, we have come across the idea that everyday situations sometimes seem quite different to someone with autism. Research has shown that for us, most of the time, the meaning of a situation is more salient than its sensory features. For many autistic people, the two can be on an equal footing. Most people entering a busy classroom would almost immediately register the situation as 'a class' and creep out quietly. But for some people with autism like Mary, particular sensory features (like those described in the scenario) overwhelm everything else and have a disproportionate influence on their behaviour.

How might you deal with this situation?

This kind of scenario needs to be tackled in a number of ways. We could think of designing 'autism-friendly' environments. But this is a long-term solution, and not always possible, so we also need to pay attention to how autistic people can manage the distress they feel. Understanding that there is a problem is a good start. Teaching anxiety management is another. You can find out more about strategies to support anxiety in autism, in a companion guide prepared by Sebastian Gaigg and colleagues (see the **Further Reading** section at the end for more information).

Take a moment to reflect on similar learning challenges in your work and ways that you could adapt communication and support with autistic students.

Scenario 5

John has a football match at school tomorrow, so he needs to have his sports kit ready for the morning. The evening before, his mother talks this over with him and reminds him to have his kit ready. The next morning nothing is ready and there is a commotion while his mother tries to get John's football kit together.

Why do you think John is having difficulty remembering to get his sports kit ready?

We often think of 'memory' as being 'about the past'. But it's often as much about the future as about the past. For example, in the scenario above John needs to remember to get his sports kit together for the next day. Memory is therefore important in planning for the future and this can often be a problem for individuals on the autism spectrum. Scientists call memory for the future **prospective memory.**

PAST

FUTURE

One way that we all cope with situations like this in our daily lives is to post reminders to ourselves, so we might prop a letter to be posted on the door latch, so that we see it when we are going out in the morning and remember to put it in the post. In this scenario, when John's mother talked over the issue the night before, she could ask him to prepare his kit there and then, prompting him to put it somewhere he will see it when going out. Teachers and instructors could set up scenarios where the child has to do something at some time in the future. "The future" could be a few seconds, minutes, hours or days away, depending on the child's developmental level. Physical reminders could be placed at the location of the future action. The person could then be taken through the steps of thinking about the future and guided on how to prompt themselves with cues (e.g., 'What could you do to make sure you won't forget to do this later').

Take a moment to reflect on similar learning challenges in your work and ways that you could adapt communication and support with autistic students.

Themes and strategies that emerge from these scenarios

These five scenarios illustrate some of the kinds of events where a better awareness of how memory works might help us to understand why autistic individuals perform tasks differently from the way we ourselves might perform them. Several themes emerge:

1. The need for Task Support when testing learning and memory.

A great deal of research now shows that autistic people perform better on tasks that give them alternatives to choose from rather than open-ended test strategies.

2. Don't automatically assume that because something is 'obvious' to you that it is similarly obvious to a person with autism.

The next themes illustrate this in more detail.

3. Meaning is not always the first thing an autistic person sees in a situation.

People with autism don't always 'make sense of a situation' in the same way as you do. Try to think of different ways that they might be seeing (or hearing) the situation. Maybe use this insight to help design suitable support strategies to encourage less reliance on immediate sensory input and promote higher-level (conceptual or categorical) thinking about a situation.

4. Time, and order of events (even the syllables of a word) is not as salient.

Try to use task support to help people with this, for instance by adapting your prompts to help the person with autism construct a timeline or sequence of things.

5. Organising behaviour in time and remembering to do things in the future.

These are related to the previous theme and can be problematic for the individual with autism. An understanding of this difficulty can make it easier to help autistic people to better organise their day-to-day activities.

6. Certain sensory aspects of the environment can hinder learning and memory.

Where possible, try to reduce levels of sensory stimuli in the environment that upset the individual. You could also try to support the autistic person to reduce anxiety and stress around aspects they find overwhelming.

We recommend **Anxiety in Autism** by Sebastian Gaigg and colleagues for further reading (see **Further reading**).

Part 2: Theoretical background and evidence base

The aim of this section is to go into more detail about the ideas introduced in **PART 1** in a little more depth and to give a flavour of the scientific evidence that underpins them. You can use the scenarios quite effectively on their own, without having to read this section.

Learning, and its close associate **Memory** are two processes that are central to just about everything we do as human beings. It is hard to imagine even the simplest response to an object or event that doesn't involve re-activating some memory of similar objects or events that will guide our reaction in some way. And if we have to respond in a new way, we add that new response to our existing repertoire (i.e. store it in memory) in a way that makes it available for future guidance. The way in which information is processed, organised and stored also draws on other processes, such as executive functions. These are a set of processes that allow us to edit and marshal our thoughts, tailoring them to the current situation. The ways in which **executive functions** operate can have important effects on learning and memory. Those of us who work with special populations may have noticed how differently some individuals sometimes seem to learn and remember.

Many different groups of individuals often experience great difficulty both in learning new things and in recalling material learned earlier on. Some of us who are a bit older are increasingly aware that our memory is not as good as it once was and people with intellectual disabilities have similar difficulties.

Other groups – including people on the autism spectrum – may show remarkable learning and memory capacities, or perhaps perform these functions in different ways (look back at the scenarios in PART 1 for examples).

You may already have learned that people on the autism spectrum have sensory difficulties and sometimes experience high levels of anxiety. These problems can sometimes cause memory difficulties but at other times be caused by them. For example, autistic people often find even choosing a can of beans from the supermarket shelf difficult because of the overwhelming complexity of the visual display. And even if they know their way around one branch of Tesco, they often become anxious when a different branch of the store is not laid out in exactly the same way as the one they regularly use.

Because we all have the capacity to learn and remember, we are inclined to think we know quite a bit about the processes of learning and memory. This is true up to a point. But the work of scientists – psychologists and neuroscientists for the most part – has increased our understanding of how learning and memory works. This is true of non-autistic individuals as well.

A Framework for learning and memory

A common framework used by memory researchers involves the notions of Encoding and Retrieval borrowed from information processing theory and which is set out in Figure 1 below.
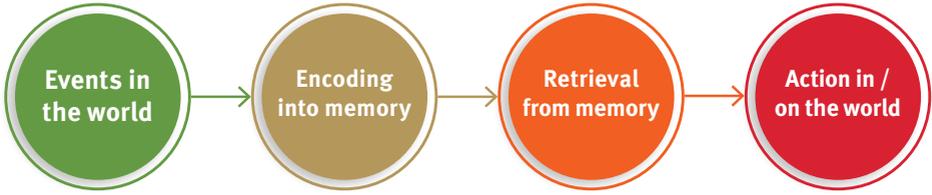

Figure 1: Stages of information processing involved in memory.

How we investigate memory in the lab

Scientists who study memory in the lab use experimental methods that ask participants to learn material that they will later be tested on. Learned material can include words, nonsense syllables (to minimise the influence of meaning), pictures or nonsense shapes, melodies, stories, sequences of beeps, time intervals etc. After a delay filled with other activity, participants are tested using one or more of these methods:

Table 1. Laboratory methods used to study memory and learning

Laboratory Method	Laboratory Task	Real-life example
(a) Serial Recall	Studied items (e.g. words, digits, dot locations in a grid) must be recalled in the exact order in which they were studied.	Refer to Scenario 3 (teaching a child to learn a new word).
(b) Free Recall	Studied items can be recalled in any order the participant pleases.	First part of Scenario 1 (remembering what happened earlier in the day).
(c) Cued Recall	Participants are given a cue, such as an initial letter, or the category of a studied item.	Second part of Scenario 1 (responding to hints or leading questions).
(d) Recognition	At test, participants are shown studied words and unstudied words and asked to identify which are which.	Any assessment procedure where the person tested can choose between studied and unstudied material that is presented.
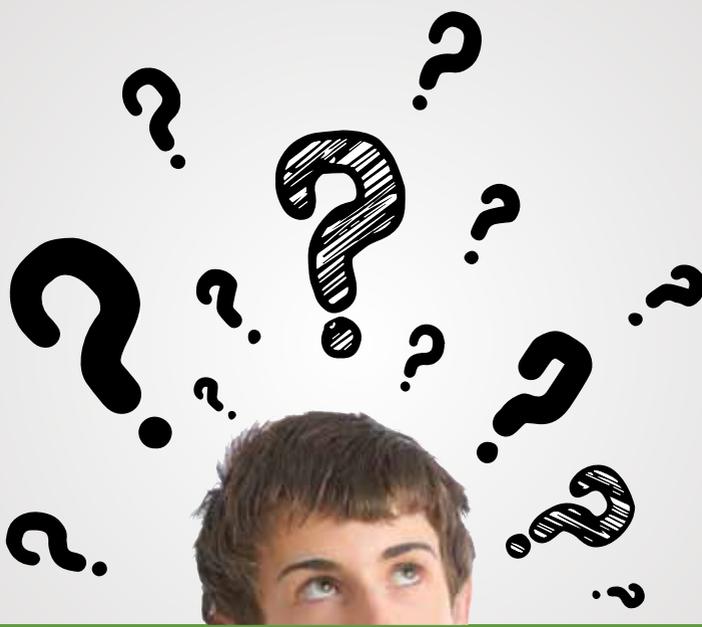
Straight away, it can be seen that *serial recall* ('what items did you see or hear just now?; What was the menu for dinner?') and *free recall* ('What were the words on the list you just studied?'; 'What did you have for breakfast this morning?') would be quite bit harder for us than *cued recall* (Were there words beginning with the letter 't' on the list you studied?; 'Did you have something rhyming with 'roast' for breakfast?') or **recognition** ('Which of these words on the screen did you study earlier on?'; 'Did you have eggs or trifle for breakfast?').

Scientists use the term *unsupported retrieval* for the kinds of tasks exemplified in a) and b) Table 1 above and *supported retrieval* for those exemplified in c) and d) in Table 1. This distinction has proved useful in helping us understand the difficulties faced by various atypical populations when confronted by situations involving learning and memory.

Remember!

Main findings of research into memory in autism

Broadly speaking, experimental studies of autistic people's memory have yielded four main findings:

1. Difficulty with unsupported retrieval.

This is illustrated in Scenario 1 where John's mother asked him what he did at school. This kind of difficulty has been borne out by a recent meta-analysis of a large number of studies. (See Scenario 1, 'What did you do at school today?' page 8).

2. Difficulty in spontaneously using relations among learned items to help their recall.

If neurotypical people are asked to learn one list of words that contains names of fruit and animals, and another list where every word comes from a different category, they invariably recall more of the first list than the second. This is because they use the meaningful relations among the words to help their recall. Autistic people are much less likely to do this. Look back at Scenario 2, where a child is asked to group objects into categories (see page 10) for an illustration of this.

3. Difficulty with recalling the order of events.

The order can be at first sight quite trivial, such as when asked to recall the digits 3,5,2,6,9,1 an individual might recall 3,5,6,2,9,1. But serial memory can be very important (see Scenario 3 above). Or think about the implications of someone who recalls that 'John hit Mary' when, in fact, Mary hit John.

4. Difficulties recollecting the personally-experienced past and envisaging the possible personally experienced future.

Scientists often distinguish between a person's store of general knowledge or 'timeless facts' (**semantic memory** system which is driven by the process of **familiarity**) and one's recollection of personally-experienced past episodes from one's life (**episodic memory** system, which is driven by the process of recollection). Just as autistic people have difficulties with episodic recollection, they also have problems envisaging highly probable events that they will experience in the future (**episodic future thinking**). As Scenario 5 (the 'football kit' scenario, page 16) illustrates, the most common consequence of this is a difficulty in organising behaviour and planning for the future.

Implications for people on the Autism spectrum and those who work with them

In the 1980's, a group of Canadian scientists led by Fergus Craik noted that older people had greater difficulty with **unsupported memory** tasks. Two decades later, we at City, University of London observed a similar pattern in autistic adults without any intellectual disabilities. We refer to this as the **Ageing Analogy** of autism. This led us to develop an idea that has the potential to help us better understand the difficulties sometimes experienced by people on the autism spectrum. We have called this idea the **Task Support Hypothesis** of memory in autism, which simply states that any memory test procedure that contains within it clues to correct performance should be easier for autistic individuals. We felt that professionals and parents keen to promote optimal learning in autistic people would benefit from a deeper understanding of the possibilities offered by the **Ageing Analogy** and the **Task Support Hypothesis** to inform their activities.

We would ask you to look back at the Scenarios 1-5 presented at the start (Part 1), as well as at Figure 1 and Table 1.

Take a moment to reflect on instances where you were testing a person's learning or memory and ask yourself whether the testing session went well or badly.

Also think about whether or not you used **Task Support Hypothesis**-based methods.

If you did use these or similar methods, in what ways were they helpful?

If not, how might such methods be helpful in supporting autistic people in your work?

The task Support Hypothesis

The research evidence that the **Task Support Hypothesis** works is very strong (see references in the **Further Reading**). Quite how it works is a little more speculative but is nevertheless worth mentioning.

If you look back at the information processing model set out in Figure 1, especially in light of all we have talked about above, you will see that **memory** is about a lot more than just 'recording stuff and re-playing the recording'. We have to select the 'stuff' we record and lay it down in a way that enables us to select what we later retrieve in a flexible and context-dependent manner.

Think back to Scenario 4, where Mary was looking for a quiet room and stumbled across a classroom full of people? A non-autistic person might say 'there's a class going on' – a high-level, **conceptual** memory that triggers all kinds of appropriate processing, such as not to interrupt and to withdraw quietly and apologetically. So, their prior memories of classes in progress drives the apologetic withdrawal behaviour. This influence of prior knowledge on current interpretation of a situation is what we call **top-down processing**.

Mary, however, was overwhelmed by the hum of the air conditioning fan (a much lower-level, **perceptual** aspect of the situation), and immediately headed towards the control switch ignoring the teacher, disrupting the on-going class. When our thoughts and behaviour are driven by perception rather than concepts, we refer to **bottom-up processing**.

Managing the balance of information offered by **top-down** and **bottom-up processing** requires a fair degree of mental flexibility – a type of **executive function**. We call this ability to manage our thoughts in a flexible way and this is one of the areas where people on the autism spectrum experience difficulty.

Specific **executive functions** that present difficulties for autistic individuals include planning, task switching, attention (especially in response to internally generated cues), flexibility and organisation of behaviour. That's why events such as Scenario 5 (John having problems preparing his football kit for tomorrow) above are often problematic for autistic people.

We are still unsure about whether a reliance on **Task Support** causes **executive function** difficulties or the other way around. But being aware of the fact that the way autistic people routinely and fluently process information relies more on externally provided task support and less on spontaneous internally generated ideas can at least help us to:

1. **Better understand 'atypical' learning and memory.**

2. **Understand that 'atypical' just means 'different', not 'better' or 'worse'.**

3. **Develop learning environments more tailored to an individual's strengths.**

New terms you have learned

Ageing Analogy – An observation that autistic individuals show similar cognitive difficulties to those seen in older adults in the general population.

Attention – A process that directs a person's focus towards information for later processing.

Autism Spectrum Conditions – A set of neurodevelopmental conditions defined by social communication difficulties, a need for routine and sameness and inflexible behaviours.

Bottom-Up Processing – Organising information on the basis of sensory features.

Conceptual – The classification of experiences and ideas into categories.

Declarative / Explicit Memory – A theoretical system for explaining the cognitive processes involved in long-term memory storage. Both episodic memory (past personal experiences) and semantic memory (knowledge and fact-based information, including language comprehension) are part of the declarative system.

Encoding – The process of acquiring and recording information, from experience as well as from internal thoughts, for later storage in short-term and long-term memory.

Episodic Memory – Memory for one's own past experiences, which must include detailed contextual information about the specific event (episode).

Episodic Future Thinking – The ability to imagine oneself doing or thinking something at a future point in time.

Executive Functions – a set of psychological processes including inhibition of responses and planning of strategies that enable more efficient organisation of goal-directed behaviour.

Learning – The way in which information is acquired to create new knowledge.

Memory – A complex theoretical system of cognitive processes involved in the acquisition, storage and retrieval of information for later use, in the short-term or longer-term.

Perceptual – The process of registering and organising information from the senses (e.g. what is seen, heard, felt). Perceptual information can be organised to give a sense of individual objects as well as of their context.

Prospective Memory – a form of memory to carry out a planned goal or action in future ('remembering to remember'), e.g. take medication, attend an appointment.

Recall / Recollection – The conscious retrieval of information that was previously encoded and stored in memory. Recollection involves contextual information that may contribute meaning or interpretation to the stored memory.

Relations – The association between two or more individual items or pieces of information.

Supported retrieval – Using external cues or prompts to establish context and to promote access to previously learned information stored in memory.

Semantic memory/ familiarity – Information that lacks specific contextual reference and tends to be more fact based is referred to as semantic. For instance, this could be knowing when your birthday is, without necessarily having the contextual memory of your actual birth.

Top-Down Processing – The process of organising information on the basis of previous experience, knowledge, expectations or goals.

Further reading

If you want to delve more into the technicalities of how scientists study memory, a good introduction would be:

Neath, I., & Surprenant, A. (2003). *Human Memory* (2nd ed.), Belmont, CA: Wadsworth/ Thompson Learning.

Three good summaries of memory research in autism spectrum disorder are:

Gaigg, S. B. & Bowler, D. M. (2012). Relational memory difficulties in autism spectrum disorder: implications for education. *British Journal of Educational Psychology, Monograph Series II, no 9 – Psychology and antisocial behaviour in school*, 34-52.

Gaigg, S. B. & Bowler, D. M. (2018). A relational processing framework of memory in Autism Spectrum Disorder. In G. S. Goodman & J. L. Johnson (Eds.), *The Wiley handbook of autobiographical memory, autism spectrum disorder and the law.* Chichester, UK: Wiley-Blackwell (pp. 11-26).

Bowler, D. M., Gardiner, J. M., & Berthollier, N. (2004). Source memory in adolescents and adults with Asperger's syndrome. *Journal of autism and developmental disorders*, 34(5), 533-542.

A very up-to date *meta-analysis* of memory in autism as well as a good overview:

Desaunay, P., Briant, A., Bowler, D. M. et al. (in press, 2020). Memory in autism spectrum disorder: a meta-analysis of experimental studies. *Psychological Bulletin*. In press.

Boucher, J., Mayes, A., Bigham, S. (2012). Memory in autistic spectrum disorder. *Psychological Bulletin*, 38(3), 458-496.

Companion booklet on how to deal with anxiety in autism:

Gaigg et al. (2018), *Anxiety in Autism*. City, University of London. www.city.ac.uk/news/2019/april/new-guide-help-manage-anxiety-autism

Who we are

Dermot M. Bowler, PhD

is Professor of Psychology and founder of The Autism Research Group at City, University of London. He first started researching memory in children with severe intellectual disabilities in 1977 and moved into autism research as a post-doctoral scientist with Dr Lorna Wing in 1986. In 1990, he moved to City, University of London where he continues to carry out work on cognition in adults and children on the autism spectrum.

Sarah Sherwood

is Director of SEN for LVS Hassocks School in West Sussex and LVS Oxford, both independent day schools for young people with a diagnosis on the autism spectrum. Sarah has worked in the field of autism education since 1994.

Amanda Roestorf, PhD

is a researcher at The Autism Research Group at City, University of London. Her work is focused on changes in functional and cognitive abilities of autistic people across the adult lifespan. Amanda's research aims to develop the skills and abilities that support good mental health and improve quality of life in older age.

Contact us

We are committed to updating the information in this guide, with current literature. If you have suggestions for improvements, please contact:

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Your opinion matters!

We would be delighted if you wanted to give us your feedback on this booklet. Just scan this QR code to link you to an online, anonymous questionnaire. You can also contact us on **argtasksupport@city.ac.uk**

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