

How to tell and what to do if working memory isn't working

By Dr Jennie Guise



In my job, I carry out assessments for learning difficulties, across a wide age range, from children at primary school, through to secondary level, College and University students and adults in the workplace. I have seen, over many years, that difficulty in working memory is a common factor in people who learn differently. The difficulty can be relative – maybe working memory is in the average range, but ability scores are considerably higher. Sometimes, working memory scores are low in themselves.

It's also worth mentioning here that if a person has a processing speed difficulty, this can have an impact on working memory. If the task is mainly done in your head, and your processing speed is low, then you have to hold information in your head for a longer time – so, extra burden is put on working memory. That means that in some cases, processing speed problems can look quite similar to working memory problems.

Something else that I have observed is that often the working memory difficulty has not been spotted by teachers, parents or work colleagues. Sometimes, difficulties are mentioned, but they are more likely to be described in terms such as 'is easily distracted' or 'tends to find it hard to stay focused'. The trouble with these terms is that there seems to be some implication in there that if the person tried harder, he or she would manage to resist distractions, or to maintain focus. If the root cause – quite likely a difficulty in working memory – is not identified, then that person might not get the appropriate support.

So, I became interested in how we might identify working memory difficulties a bit sooner. How might a teacher, parent or line manager spot the signs, so that the person gets properly targeted support, or maybe a fuller assessment to pinpoint his or her areas of strength and weakness, with a view to more specialist intervention?

In this article, I will start by explaining why working memory is so important in learning, at work and in everyday life. I will then discuss some signs of potential working memory problems, and some simple tests that could be used to further explore any concerns. I'll finish by describing some ways that we can support and improve a person's working memory skills. For more information on the content of a full assessment, please see Reid and Guise (2017) in the reference list below.

Why is working memory important?

In order to appreciate why working memory is important, we need to distinguish it from other types of memory. A key fact about working memory is that loss is 'catastrophic' – once gone, that information cannot be retrieved. It is a temporary storage of information – for example, what we can hold in our heads before we have had a chance to write it down, or commit it to long-term memory. So, it is different from long-term memory, and I will often see people who have very good long-term memory skills, and who have therefore not considered that there might be any type of memory problems. Working memory is very important because it can affect the processes of getting information into long-term memory, and later of retrieving that information. This means that it is crucial in learning. Taking notes from the board can be hard – how many words can you trust yourself to remember before you have to look up again, relocate where you were, look at the next section, etc? Some pupils/students have to go through this process more frequently, and they will often run out of time before the board is wiped, or changed. Taking notes when someone is talking can be even more challenging. Working from spoken instructions can be very problematic.

Often, a student will start off doing what is required, but at some stage gets lost and is not sure what to do next. Sometimes the person will miss out a step but not realise it, and then can be very disappointed, and frustrated, when (s)he realises the task has not been done properly.

Working memory is also vital in multi-tasking, and difficulties in working memory are likely to increase if the work takes a long time and/or if it is unstructured. An extended piece of writing would therefore often be quite challenging.

How can we spot possible working memory difficulties?

One way to spot potential working memory difficulties is to put yourself in the position of someone who has a shorter working memory span. Take a few moments to consider what strategies might you use to compensate for this, or to avoid your weakness being discovered.

Pupils, especially at a younger age, might not be aware of what they are doing, or why, but often they will gravitate towards certain types of behaviour, or ways of working. I used to wonder why some students did not take notes, because I could not imagine how they could remember the content of a lecture without doing this. Then I realised that the people who most need notes are often the ones who find this the hardest thing to do – for reasons already described. There might be a handwriting difficulty, and that is worth considering, but if a pupil/student seems to avoid note-taking, I would be interested to know why. I might also see over-use of a highlighter – having suggested that key words could be highlighted to help with recall, I have found that some pupils actually highlight every word. This might be another way of staying focused on task, and it could reflect the fact that it is hard to read and decide which are key words at the same time. I will also often see the time of the assessment appointment written on the student's hand – a fairly sure sign that (s)he is using some strategies to avoid forgetting!

When it comes to carrying out work, pupils with a working memory difficulty will often find it hard to get started, particularly if the task is unstructured and has a lot of elements that need to be considered at the same time. To answer a comprehension or exam question, we need to keep in mind what the question is asking, what we know about the topic, what, out of that, is relevant to the question, how we are going to organise the information, how to structure it into a coherent argument, etc.

Many students will get completely stuck at the initial stages because they cannot focus on one part of this without potentially forgetting other important information. They are the ones who will be staring at a blank page or screen, although you know that they have plenty they could say about the topic. Linked to this, often people with a working memory difficulty will favour practical subjects over those that involve extended reading or writing, and they will often prefer to learn by doing than by reading.

Pupils with working memory difficulties will often want to vocalise their strategies, or to chat while working. This is a good way of keeping information to the fore, and of staying focused and on-task – but it is not always seen that way by parents and teachers. Similarly, the pupil who fidgets, or likes to move around a lot, might find this is what helps him or her to avoid other distractions. The effort involved in staying focused can be very tiring. I have often seen people work well on hands-on tasks in the assessment, but as soon as we come to tasks that involve working memory they will begin to yawn and show signs of fatigue. More generally, pupils can become anxious when they know that they are going to find something hard to remember, despite their best efforts. Some students will easily lose their train of thought, and they can appear distracted or inattentive, and sometimes seem to 'zone out'.



There are some more general signs that might alert you to a working memory difficulty. The pupil who seems impulsive, in terms of interrupting or being desperate to give an answer before you have finished a question, might have to say something before (s)he forgets it. Some pupils are very chatty one-to-one, but they find it harder to socialise in a group setting because it can be difficult to keep up with what is being said, and to follow the normal conversational rules of turn-taking.

So far, I have mentioned things that can be seen in the person's behaviour. We can also spot potential working memory difficulties in his or her output. Given the role that working memory has in getting things into long-term memory, mentioned above, we might expect to see some difficulties in learning facts, particularly when the facts need to be learnt in a specific sequence.

The most obvious example here would be retaining times tables; some pupils find this extremely hard. Younger pupils might have trouble learning the alphabet. Very often, there is some inconsistency in performance. For example, I would often see the same word spelt in more than one way in the same piece of text. It seems that at times the pupil is attending to the spelling, but at other times (s)he might be more focused on other aspects of the writing (eg content or structure), and the detail of spelling seems to be forgotten.

Sometimes, information is in long-term memory but there appears to be some delay in accessing it. You might see 'word-finding difficulties' – most of us have experienced this to some degree or another, when we know that we know something, but cannot immediately recall it. When this happens, we can lose our train of thought, and the work appears disjointed. On a more general level, it can be hard to structure extended writing because the student feels the need to put things down before they are forgotten, so there can be sudden topic shifts that are confusing for the reader.

A very good way to explore possible working memory difficulties is to ask the pupil or student what (s)he finds easier to remember or learn, and if there are things that are more tricky. We can also use some simple rapid naming tests to get an idea of how quickly the student is able to access information that is in long-term memory. These can be administered quickly and are easy to score. Examples would include the CTOPP 2 (Comprehensive Test of Phonological Processing – 2nd edition) and the TOWRE 2 (Test of Word Reading Efficiency – 2nd edition). Details are provided in the reference list below.

What can we do to help the person with working memory difficulties?



One of the best things you could do as a teacher, parent, colleague or manager is to start by thinking about how you remember things. When you are set the challenge of revising or reviewing information, how does that make you feel, and what strategies do you use? Take a few moments to reflect on this.

I often hear parents say that they had similar difficulties to their child, but had not thought about this actively for some time, because they had figured out ways of coping. Teachers often have a wealth of ideas from their own personal experience, and if they can make these explicit then they will have some tried and tested methods to offer to their students.

The key piece of advice for people with working memory difficulties is to use multi-sensory techniques, and if we consider what working memory is, we can see why this would be a powerful strategy. As noted above, working memory is a temporary storage system, and loss from working memory is 'catastrophic'. So, we need to think about how we can use different types of memory to store that information effectively. The more senses we use, the more likely it is that we will have a better memory trace. Here is an example – if you were asked just to read a recipe, and even given half an hour to do it – then two weeks later to recall that recipe in detail, you might find this task quite difficult. However, if you had spent that half hour making the recipe, or even visualising this in detail, you would have much more chance of recalling it. You might, for example, be able to visualise the colour of a red pepper, the fact that onions make your eyes water, the scent of a herb, the heat of the oven, the fact you had to stir something until it thickened. The other advantage of multi-sensory techniques is that you can create an event or an experience, so the memory becomes 'episodic' and there is a narrative to it – a beginning, a middle and an end. If you forget part of the story, you can retrace and perhaps use another part to help you in your recall. So, the loss need no longer be 'catastrophic'. Details on how these strategies can be put into action in the classroom can be found in Reid, Guise & Guise (2018).

As noted above, if a task is unstructured, or if instructions are given verbally, the pupil with working memory difficulties is likely to struggle. So, we should break large tasks into separate steps that can be done one at a time, and we should not expect the pupil to remember all of the steps at once. We could give instructions one or two at a time and/or give a checklist or flowchart to follow. We could also reduce unnecessary demands on working memory by providing outline notes instead of expecting the student to copy information down. Strategic use should be made of technologies. The pupil could take a picture of what is on the board or use an electronic pen to take notes from a book.

Most of these strategies will involve the person taking a more active approach to learning and revision, and this will also make it easier for him or her to stay focused on and interested in the task. An added advantage is that the pupil learns strategies that can be applied to other topic areas.

The ultimate aim should be to encourage that person to become an independent learner, so that (s)he can use the most effective study techniques in later work. The great thing about this is that the person has learnt not just facts, but how to learn. This can give a greater sense of control and it can improve the learner's self-esteem.

Conclusion

It should be clear from this article that working memory is a very important component in learning, and that difficulties here can be quite disruptive to the pupil, student or person in the workplace, as well as to those working with him or her. It can be a 'hidden' difficulty in the sense that those around the learner and often the learner him- or herself is not aware of what might be going on. However, there are some signs that we as parents, teachers or colleagues could look out for that might indicate the need for support, or for a full assessment. There are many strategies that can be used to help and encourage the person with working memory difficulties and to allow his or her potential to be more fully recognised.



**Liz Dunoon, Jennie Guise
and Jillian Zocher**

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