



An introduction to Developmental Coordination Disorder



School resources

For most people, getting dressed, walking up a staircase, or using cutlery to eat are all actions that are performed so automatically and easily that they require very little thought. People with Developmental Coordination Disorder (DCD), however, have difficulties in movement and coordination (also known as motor skills) that begin in early childhood and persist through life. It takes them longer to acquire the motor skills needed for actions involving movement or coordination of the body, and their ability to perform these actions required for daily living is significantly impaired. DCD is sometimes known as dyspraxia, but DCD is the official diagnostic term for the condition.

What is Developmental Coordination Disorder?

People with DCD usually have difficulties with both gross and fine motor skills, impacting their daily lives in a wide range of ways. Motor skills describe the set of abilities we use when we perform or coordinate any physical movement. Whole-body motor actions (gross motor skills) include engaging the larger muscles in the body, allowing us to complete actions such as walking and running, throwing a ball, or riding a bike. This often involves balance and coordination between different parts of the body. Fine motor skills describe control of smaller movements, such as writing, buttoning clothes, or eating with a knife and fork.

DCD is usually diagnosed in childhood by a paediatrician and/or an occupational therapist, who make their assessment against a set of diagnostic criteria. The main symptom of DCD is significantly below average motor skills performance compared to people of the same age. A diagnosis of DCD will be given if these symptoms began in early childhood, represent a significant obstacle to the completion of daily living activities, and cannot be explained by an alternative diagnosis such as a neurological condition or intellectual disability¹.

The prevalence of DCD among school-age children is estimated to be between 2% and 6%², which means that there is likely to be at least one student in every classroom with DCD. It is also common for students with DCD to go undiagnosed due to the overlap with other developmental conditions, such as ADHD or autism, which are often identified first.

Potential causes of DCD

There has not yet been enough research to determine what causes DCD, but there are likely to be many contributing factors rather than one identifiable cause. Some studies have shown that there may be genetic links³ and children born prematurely or with a very low birth weight are more likely to have DCD compared with those born full term or within the normal weight range⁴. There is also evidence that there are differences in the brains of people with DCD compared to those without DCD, particularly in the areas of the brain associated with movement and sensory perception⁵.

Strengths and challenges

As people with DCD are prone to lower self-esteem⁶, it is important to focus on where the individual's strengths lie and use these to minimise their difficulties. For example, someone with DCD might have much stronger verbal communication skills compared to their written skills. These students may benefit

from opportunities to demonstrate their strengths in different contexts at school, such as engaging in learning activities using oral communication. Supporting a student with DCD to identify and harness their own strengths and interests is a good way to provide them with the tools to thrive in school and beyond.

Due to their motor difficulties, there are physical aspects of school that might be challenging for students with DCD, such as sitting on a chair or a mat for prolonged periods of time. Activities that involve a sequence of movements, such as packing away their books and stationery at the end of a lesson, can also be challenging. Other examples might include getting changed for PE, which requires multiple motor steps (such as doing buttons, tying or untying shoelaces, and removing items of clothing).

Although not a part of the diagnostic criteria, [sensory processing differences](#) are common in DCD. Research suggests that more than 80% of people with DCD experience differences in the way they detect and manage sensory information. How this presents in the classroom will vary depending on the student's specific sensory processing differences, but some examples include finding noise uncomfortable, or the reverse, not responding to sound and missing verbal instructions. Read more about understanding the impact of sensory processing differences in the classroom [here](#).

People with DCD can struggle to understand where their body is in space and in relation to other objects. This is also known as spatial thinking, which refers to understanding the location, dimension, and properties of objects, and is strongly linked to motor skills. For this reason, activities such as puzzles or construction activities might be more challenging. People with DCD also have difficulty remembering and manipulating spatial information, also known as visuospatial working memory⁷. Visuospatial working memory involves the ability to remember shapes and colours, as well as their locations and movements, and is important in letter and number recognition. These difficulties are known to impact academic learning broadly, but particularly mathematics because it involves a lot of spatial thinking⁸.

Supporting students with DCD at school

Students with DCD can find school challenging. Research has shown that students with DCD achieve significantly poorer educational outcomes compared to their peers⁹. Below are a few examples of specific challenges that students with DCD might face. There are currently very few evidence-based supports and interventions for students with DCD, but some ideas from practice that may be beneficial for some students with DCD are included. It is important to discuss the use of supports and interventions with the student and their caregivers prior to implementation. Often the student and their family will have valuable information about their strengths, needs, and approaches that have been successful in the past.

Due to difficulties with fine motor skills, **handwriting** can be challenging and uncomfortable for students with DCD. This might mean that they are slower to complete learning activities that involve writing compared to their peers. As verbal skills tend to be a strength of students with DCD, providing them with opportunities to share the outcomes of their learning activities verbally may demonstrate their capabilities better than presenting them in written form. When writing is unavoidable, offering wide-stemmed pencils or pens, or applying a grip to the writing tool, may make writing easier. Lined paper will also likely be easier to write on than blank paper. They will likely also benefit from having additional time to complete written assignments.

Organisation and planning can be challenging for students with DCD, particularly when it involves movement. They may need support with planning a sequence of movements or activities, due to difficulties with visuospatial working memory. They may also find it difficult to follow complex or multi-component instructions. Offering instructions in smaller chunks, or in a step-by-step format, reduces

the demands on [executive functions](#) such as working memory. Students with DCD may also need more processing time compared to other students in the class.

Engaging in physical education or sports activities can be more challenging for students with DCD.

Encouraging the student to verbalise their plans for movement may help them to process what their body needs to do next to achieve the goals of the activity. This will help to build the neural pathways in their brain that govern movement. For example, do they need to move more to the left or the right, or kick a bit harder next time? Younger children may need more physical support, such as an adult helping them to place their hands, feet, or arms in the positions needed. Because of their difficulties with spatial thinking, students with DCD may also find it difficult to navigate the space they are in, so adjustments such as using cones or lines on the floor, or a marked spot on the floor for them to return to, may support their spatial thinking difficulties. Students with DCD may benefit from physical activities that are more independent and repetitive, before taking part in team sports or activities.

Students with DCD are more likely to experience social exclusion than **their peers**¹⁰. This can impact their confidence and self-esteem, which is also known to negatively affect academic performance. It is therefore important to ensure they have sufficient opportunities to engage in group activities, and that even if they do need to be taken out of class for certain learning activities, ensure that they can still spend a good proportion of their time in class with their peers.

Endnotes

- 1 APA (2013). *Diagnostic and Statistical Manual of Mental Disorders*, 5th edn. Washington, DC: American Psychiatric Publishing.
- 2 APA, 2013.
- 3 Mosca, S. J., Langevin, L. M., Dewey, D., Innes, A. M., Lionel, A. C., Marshall, C. C., Scherer, S. W., Parboosingh, J. S., & Bernier, F. P. (2016). Copy-number variations are enriched for neurodevelopmental genes in children with developmental coordination disorder. *Journal of Medical Genetics*, 53(12), 812. <https://doi.org/10.1136/jmedgenet-2016-103818>
- 4 Lingam, R., Hunt, L., Golding, J., Jongmans, M., & Emond, A. (2009). Prevalence of Developmental Coordination Disorder using the DSM-IV at 7 Years of Age: A UK Population-Based Study. *Pediatrics*, 123, e693–e700. [10.1542/peds.2008-1770](https://doi.org/10.1542/peds.2008-1770)
- 5 Subara-Zukic, E., Cole, M. H., McGuckian, T. B., Steenbergen, B., Green, D., Smits-Engelsman, B. C., Lust, J. M., Abdollahipour, R., Domellöf, E., Deconinck, F. J. A., Blank, R., & Wilson, P. H. (2022). Behavioral and neuroimaging research on Developmental Coordination Disorder (DCD): A combined systematic review and meta-analysis of recent findings. *Frontiers in Psychology*, 13, 809455. <https://doi.org/10.3389/fpsyg.2022.809455>
- 6 Lingam, R., Jongmans, M. J., Ellis, M., Hunt, L. P., Golding, J., & Emond, A. (2012). Mental health difficulties in children With Developmental Coordination Disorder. *Pediatrics*, 129, e882–e891. [10.1542/peds.2011-1556](https://doi.org/10.1542/peds.2011-1556)
- 7 Alloway, T. P. (2007). Working memory, reading, and mathematical skills in children with developmental coordination disorder. *Journal of Experimental Child Psychology*, 96(1), 20–36. <https://doi.org/10.1016/j.jecp.2006.07.002>

- 8 Gilligan, K. A., Flouri, E., & Farran, E. K. (2017). The contribution of spatial ability to mathematics achievement in middle childhood. *Journal of Experimental Child Psychology*, 163, 107–125. <https://doi.org/10.1016/j.jecp.2017.04.016>
- 9 Harrowell, I., Hollén, L., Lingam, R., & Emond, A. (2018). The impact of Developmental Coordination Disorder on educational achievement in secondary school. *Research in Developmental Disabilities*, 72, 13–22. <https://doi.org/10.1016/j.ridd.2017.10.014>
- 10 Zwicker, J. G., Harris, S. R., & Klassen, A. F. (2013). Quality of life domains affected in children with developmental coordination disorder: A systematic review: Quality of life in DCD. *Child: Care, Health and Development*, 39(4), 562–580. <https://doi.org/10.1111/j.1365-2214.2012.01379.x>

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