

## Developmental Co-ordination Disorder Dyspraxia

Presented by  
**Professor Amanda Kirby**

Kirby 2015

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## Aims of the talk

- Background to my interests
- What do we know about DCD/Dyspraxia?
- How is this important in school/HE and the Workplace if you are assessing and supporting someone.

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## My foci

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### DCD:

- Is a common **movement disorder** affecting children and adults in more than one setting-i.e. pervasive
- Is enduring
- Is a developmental disorder
- Has multiple causes



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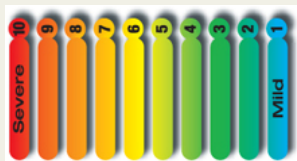
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### Heterogenous in nature



Individuals may vary in how their difficulties present and in severity

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### Prevalence

UK based large population study:  
a prevalence of **1.7%** with severe difficulties  
and a further **3.2%** of children considered as  
having "probable developmental coordination  
disorder" (Lingham et al,2009).

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**A common language**

through the UK DCD consensus in  
2012

[www.movementmattersuk.org](http://www.movementmattersuk.org)



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**Developmental Co-ordination Disorder (DCD), also known as **Dyspraxia** in the UK is a common disorder affecting **motor co-ordination** in children and for many continues into adulthood**

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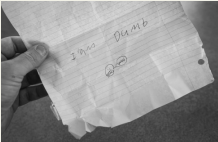

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**Children may present with difficulties with:**

- writing
- typing
- riding a bike
- self care tasks
- recreational activities



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In adulthood many of these difficulties will continue, as well as **learning new skills** at home and work e.g.driving a car and DIY.

In addition individuals **often have** difficulties with:

**Organisation and planning skills**

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This condition is formally recognised by international organisations including the *World Health Organisation, and American Psychiatric Association.*

DCD is **distinct from** other motor disorders such as Cerebral Palsy and stroke.

The range of intellectual ability *is in line with the general population.*

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## Gender differences

- ? **3:1 boys to girls**
- External and internal pressures
- More obvious behaviours



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The co-ordination difficulties may affect  
**participation and functioning**  
 of  
*everyday*  
**life skills**  
 in education, work and employment

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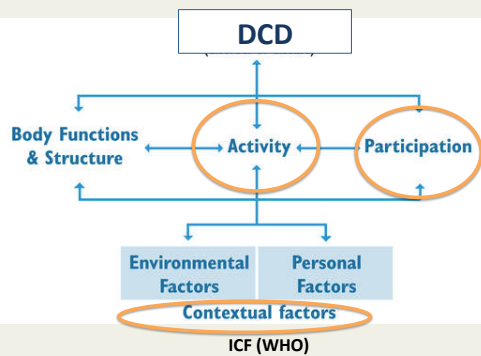
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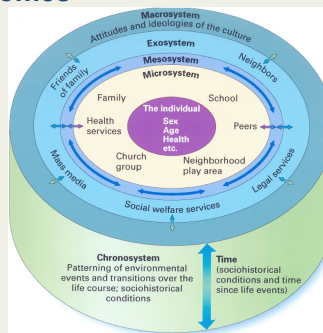
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## Different environments create different outcomes



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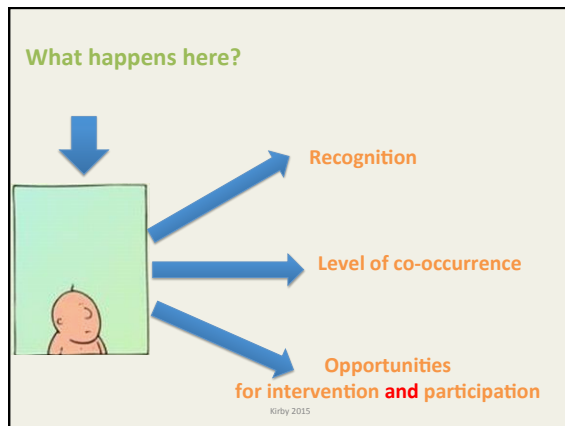
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**Impact of poor motor functioning**

**Cardiovascular fitness worse** esp. boys (Wu, Cairney, 2010, Green et al, 2011;Chirico et al, 2011)

**Weight gain (higher BMI)** -50% of children with DCD are overweight

**Leading to greater risk of Metabolic Syndrome e.g.**  
Diabetes

- Higher body fat percentage (Cairney, Hay, Faght, & Hawes, 2005)

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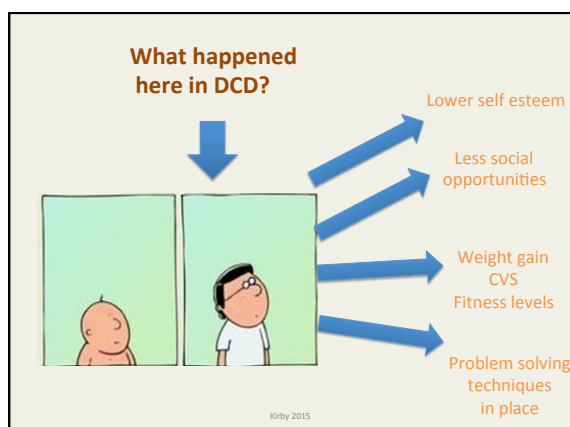
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### The social consequences

- **Socially more isolated** (Poulsen, Ziviani, Johnson, & Cuskelly, 2008)
- **Reduced social acceptance by peers** (Garnett, Mowson, Jansen, & Slater, 2005; Poulton & Ziviani, 2004)
- **Fewer social contacts and friendships** (Cairney, Hay, Wade, Faght, & Flouris, 2006; Causgrove Dunn & Dunn, 2006; Dewey et al., 2002; Pellegrini, 1995; Poulsen et al., 2008; Watkinson et al., 2003; Wrotniak, Epstein, Dorn, Jones, & Kondilis, 2006)
- **Poorer social skills** (Tseng, Howe, Chuang, & Hsieh, 2007)
- **Increased social exclusion and risk of being bullied** (Campbell et al., 2012; Chen & Cohn, 2003; Piek, Barrett, Allen, Jones, & Louise, 2005; Poulsen, Ziviani, Cuskelly, et al., 2007; Poulsen & Ziviani, 2004; Schoemaker & Kalverboer, 1994; Smyth & Anderson, 2000)
- **Decreased self-esteem and perception of competence** (Cairney et al., 2006; Cantell et al., 2003; Miskuna et al., 2007; Piek et al., 2005; Piek, Baynam, & Barrett, 2006; Schoemaker & Kalverboer, 1994)

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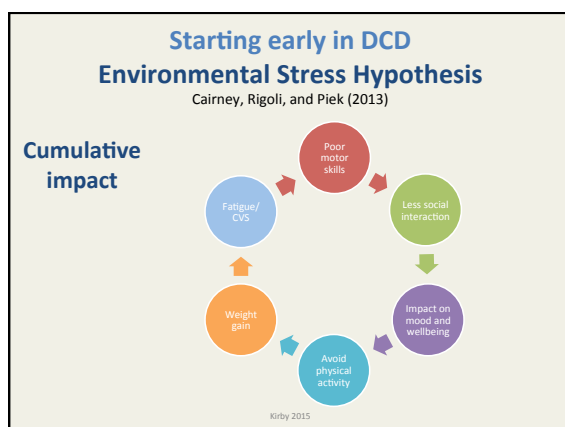
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## Mood and wellbeing

- **Depression in childhood** (Campbell, Missuna, & Vaillancourt, 2012; Gillberg & Gillberg, 1989; Pearsall-Jones, Piek, Rigoli, Martin, & Levy, 2012; Piek, Rigoli, et al., 2007)
- **Anxiety in childhood** (Heiligen, Gillberg, & Gillberg, 1994; Kristensen & Torgersen, 2008; Rasmussen & Gillberg, 2000)
- **Self worth related to perceptions of physical competence** (Cairney et al., 2006; Schoemaker & Kalverboer, 1994; Sigurdsson, Van Os, & Fombonne, 2002)
- **Symptoms of anxiety** reported adults with DCD and parents of children with DCD describe school anxiety, social anxiety, and physical symptoms of anxiety such as heart palpitations. (Fitzpatrick & Watkinson, 2003; Missuna et al., 2007).



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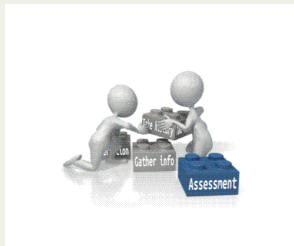
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## Stages to a diagnosis



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## The history is 90% of the diagnosis



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### Some rules

- A test does not diagnose
- You need to be able to rule out before you rule in
- Consider the age of the child/adult- what should they be able to do at this stage?
- Multiple sources of information are better than a single source
  - Child/adult
  - Parent/partner
  - Teacher/lecturer/employer
- Consider if the challenges being presented are :
  - New e.g. brain injury, MS
  - Changing e.g. brain tumour
  - Worsening
  - Related to other factors e.g. depression

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### Start with the history

Past antenatal and childhood development

- Premature babies ( increased risk of DCD)
- Stages of development e.g. delays in walking/talking



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### Think if there could be other..

**Medical conditions** that would preclude a diagnosis of DCD e.g.

- Cerebral Palsy
- Changing or deterioration in symptoms over the past 2 years or a history of head injury
- Genetic conditions e.g. NF1, Klinefelters Syndrome
- Fetal Alcohol Syndrome



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### Past medical history

- During pregnancy/childbirth difficulties?
- Any other diagnoses been given
  - e.g. Cerebral Palsy, epilepsy?
- Seen by any other professionals?
  - If so for what and what were there conclusions
- Has vision and hearing been checked in last year?

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### Differential diagnosis

- What other neurodevelopmental disorders/SpLDs' could be present?
  - Dyslexia/ADHD/ASD/SLI/dyscalculia
- Why else could the individual have co-ordination difficulties?
- Or what else could be present with the co-ordination difficulties?
  - Vision
  - Hearing
  - Behavioural issues at home/school
  - Depression
  - Attention

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### Past social /family history

- Family history of developmental disorders/ SPLDs or other conditions
- Who's at home in the family
- **Activity** – types of interests
- **Participation**- how often and how limited
- Distinct dislikes
- Distinct behaviours/interests

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### What is the impact of difficulties on day to day functioning?

- Including self care, tool usage, and the extent to the difficulties having a limit on activity and participation for the child (and the family) (Magalhães et al., 2011)
- The impact of DCD on quality of life of children (Zwicker et al., 2012)
- Child or adult fitness levels (Rivalis et al., 2011).

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### Past educational history

- Early years
  - Colouring, cutting, dressing, feeding
- Primary school
  - Writing, scissors, cutting, ball skills, dressing, feeding, team games, riding a bike
  - Any additional support- if so what
- Secondary school
  - Writing at speed and legibly, ball sports and team games, organisational difficulties, secondary impact on self esteem
  - Examinations – any additional help, extra time, use of computer

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### In school/college

- Did anyone recognise these difficulties?
- Was help sought, and if so..
  - Who helped in and out of school etc?
  - What helped? E.g. additional time, alternative sports, ICT
- Why was help needed?

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### Screening tools can help to gather information for you

- Screening tools are brief measures that differentiate children/adults who are at risk for atypical development from those who are not.
- Screening by itself does not provide a diagnosis, but is the first key step in the diagnostic process.
- False positives
- False negatives

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### Considerations when using screening and assessment tools

- Why
- Who for
- What will you do with results
- Was this test/assessment developed for the group being used e.g. Morrisby
- Does the test relate to the function you are seeing e.g. EF tests and function (Tannock), TVPS and educational impact
- How are they interpreted and by whom
- How was the test created and validated
- Cultural/gender/country variables

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### DCD/Dyspraxia screening and assessment tools

[Review of checklists \(2009\)](http://www.jssm.org/vol8/n2/1/v8n2-1.pdf)  
<http://www.jssm.org/vol8/n2/1/v8n2-1.pdf>

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# Movement ABC Checklist

## MABC-2 Battery

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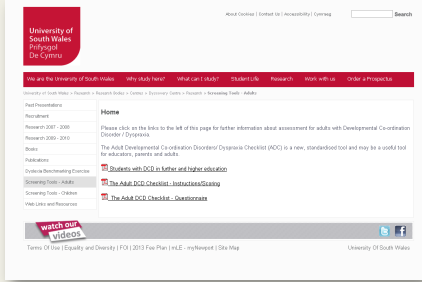
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# Adult DCD checklist



<http://www.newport.ac.uk/research/researchcentres/Centres/Dyscovery%20Centre/Research/Screening%20Tools%20-%20Adults/Pages/default.aspx>

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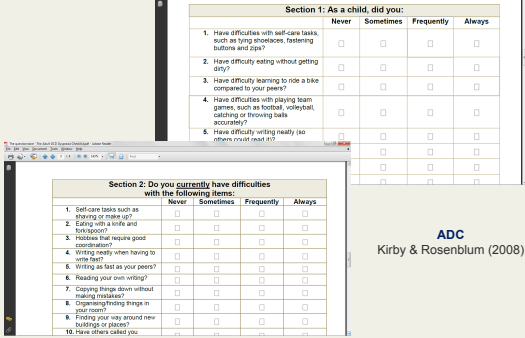
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**Section 1: As a child, did you:**

	Never	Sometimes	Frequently	Always
1. Have difficulties with self-care tasks, such as tying shoelaces, fastening buttons and zips?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Have difficulty eating without getting dirty?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Have difficulty learning to ride a bike compared to your peers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Have difficulties with playing team games, such as football, volleyball, basketball or throwing balls accurately?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Have difficulty writing neatly (so others could read it)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Section 2: Do you currently have difficulties with the following items:**

	Never	Sometimes	Frequently	Always
1. Self-care tasks such as washing or make up?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Eating with a knife and fork/spoon?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Tasks that require good coordination?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Writing neatly when having to write right?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Writing as fast as your peers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Reading your own writing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Copying things down without making mistakes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Copying/reading things in your mouth?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Finding your way around new building or places?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Have others called you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**ADC**  
Kirby & Rosenblum (2008)

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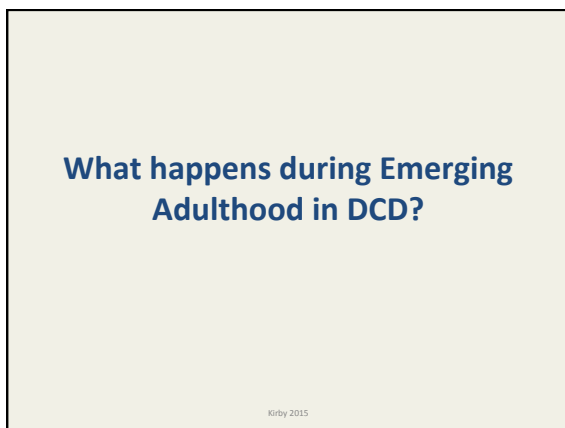
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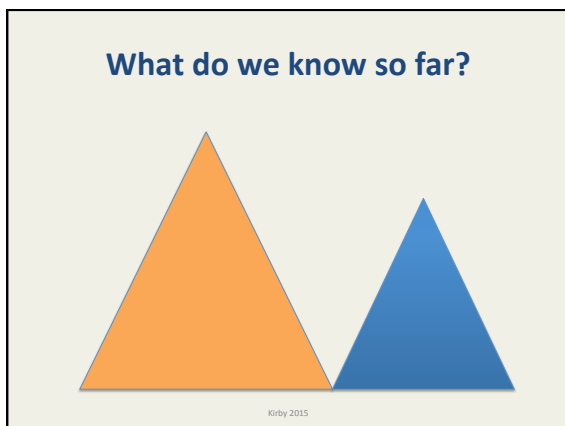
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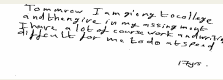
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## What continues?

**Motor**



**Team sports avoidance**

1 in 2 with DCD stated **handwriting** specifically as a continuing

**Non - Motor**

- Executive Functioning
- Less social interaction
- Less risk taking opportunities
- Weight gain
- Delay in relationship development

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What happened here?





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What happened here?

What happened here?

=

What happens here

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## The ecology is changing.....



Leaving home

Managing washing, and ironing, finances

Presenting yourself to others  
Relationships and sex

DRIVING A CAR

Managing home + work

Study life + relationships

Gaining a job

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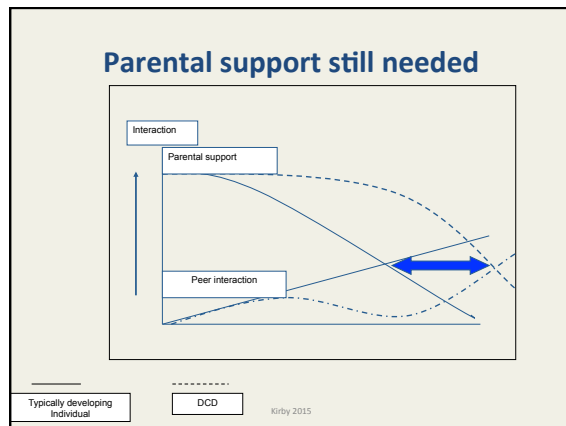
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### Executive Functioning

Follow up study- from a cohort 3-4 years before

- 25 year olds
- DCD(25), borderline DCD(30) and TD (41)
- Used BRIEF and WURS
- DCD and borderline DCD groups had significantly lower EF profiles in comparison with the control group
- No sig diff found between DCD and borderline DCD groups.

**EF profiles remained consistent even when using the attention component as a covariate.**  
(Tal Saban, Ornoy, Parush, 2014)

**In 80 adults with DCD-- Executive Functioning difficulties reported in**

- DCD (52.4%)
- "DCD + other" diagnosis group (32.4%)
- Dyslexia group (17.4%).

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### DCD and employment (Kirby et al, 2013)

All adults with DCD  
39 employed and 18 UE  
21-30 years

Beck Depression Inventory  
HADS anxiety rating scale  
The Satisfaction With Life Scale  
The General Health Questionnaire  
The Hospital Anxiety and Depression Scale

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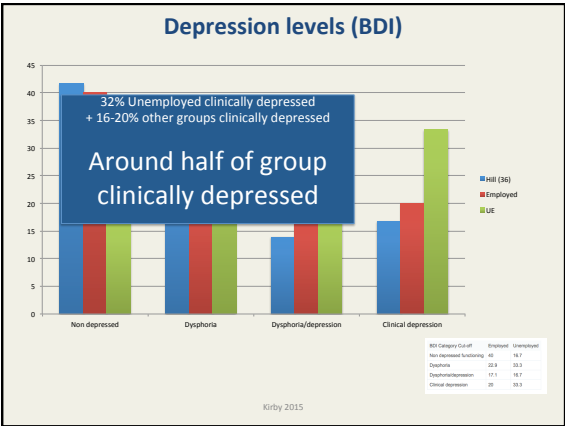
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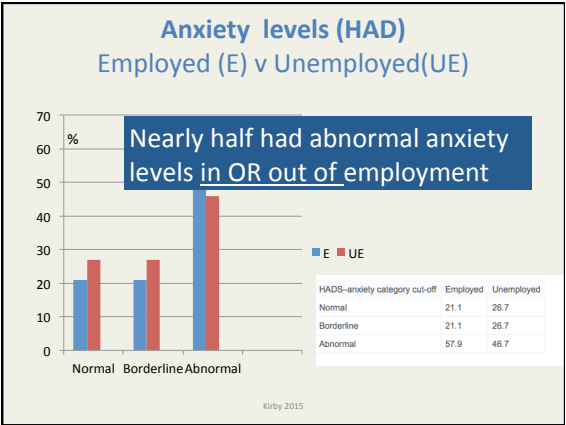
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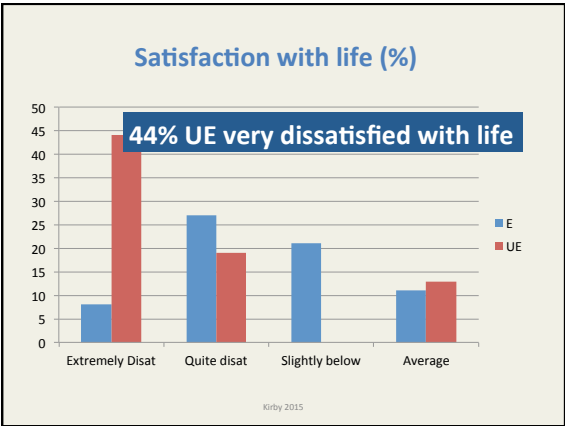
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**DCD rarely comes along as *just* motor . . .**



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© Amanda Kirby 2013

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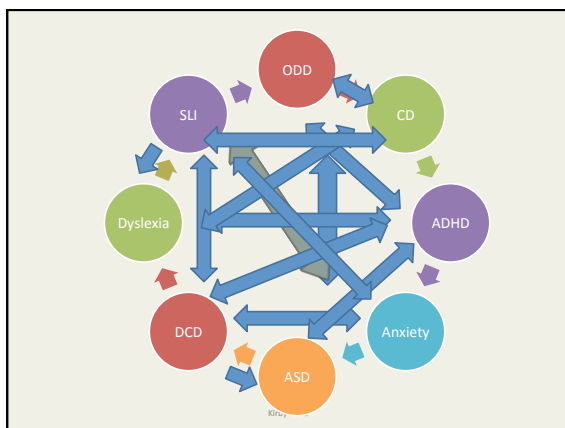
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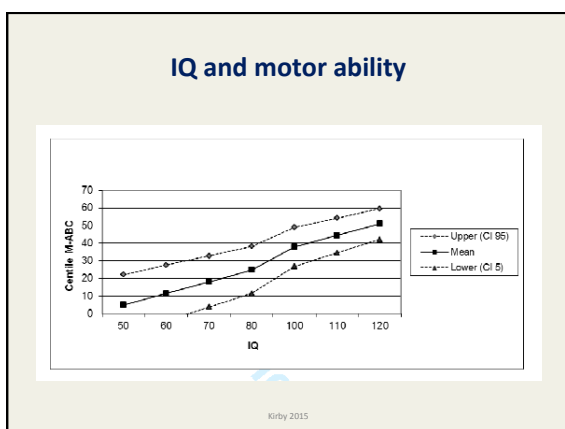
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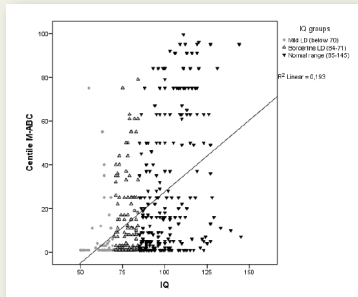
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### Variation is the rule



### Focus in childhood

- Identify early motor delay
- Find a sport that the child likes
- Introduce writing and practice but teach IT skills alongside
- Make sure enough and appropriate practice

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### Focus in adolescence

- Allow to experiment and make mistakes
- Keep fit to help with stamina
- Social opportunity essential
- Teach organisational and independent living skills
- Make sure enough and appropriate practice

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### Focus in adolescence

- Risk taking and peer interaction is part of growing up
- Encourage exercise
- Use adaptations to allow independence
- Scaffold organisational and independent living skills

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### Focus in adulthood

- Reduce the level of scaffolding but recognise there are a finite amount of balls you can juggle with and choose which are the important ones to keep juggling with

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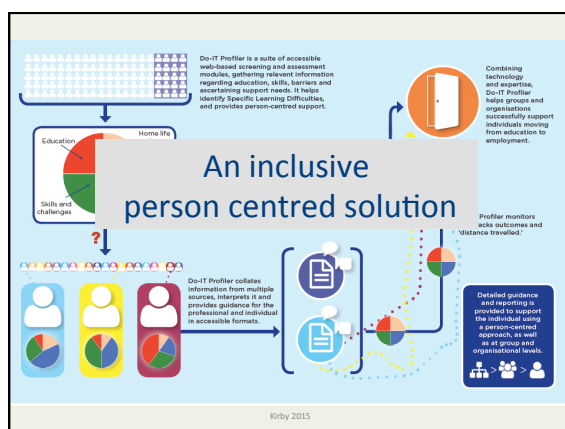
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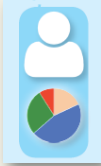


## Do-IT Profiler

A consistent modular system, providing personalised screening, assessment and guidance in different contexts

- Education- school, college, university
- Workplace
- Offending settings

Combining science and computer technology  
Contextualised for each setting



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- Modular
- Can stop and start and save as you go
- Don't need to do the whole thing!
- Individual can pause and come back in
- Can provide up front guidance at the start of academic year
- Guidance dependent on response
- Report can direct students to specific services in your college/university

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## Specific suites of tools

**Screening + Student +**

- Background in relationship to Uni and College
- Triage – Study Skills/SpLD traits
- More in depth assessments
- Advice in context of uni/college

**Workplace +**

- Background in relationship to workplace
- Triage –SpLD traits
- More in depth assessments
- Advice in context for the workplace

**Workplace+ assessors**

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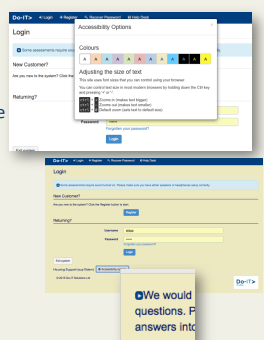
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## Accessible

- Voiced
- Alter colour background and size of text
- Reports in pdf format so can be printed and read
- Written reports and videos designed for ALL
- Usable on multiple formats (computers and mobile devices e.g. iPhone, Android ,internet)



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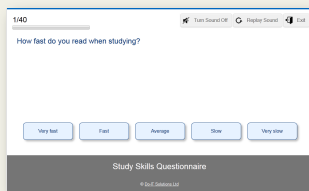
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## e.g. Study skills

- Questions cover areas including time management, reading for understanding, exam preparation, organisational skills
- Results link to a range of resources and useful links




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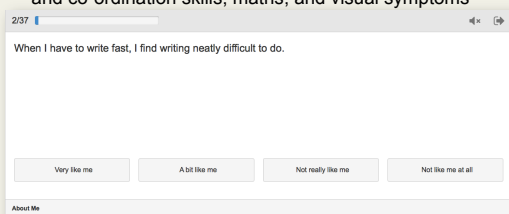
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## About me (SpLD traits)

This module gather information about the students':

- attention, concentration, social, communication, planning and co-ordination skills, maths, and visual symptoms



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Which of the following approaches do you currently use at home or university to help you day to day? \*

Write lists	<input type="checkbox"/>	Use colour coding	<input type="checkbox"/>
Keep a diary (paper or electronic)	<input type="checkbox"/>	Have a noticeboard in your room	<input type="checkbox"/>
Set alarms	<input type="checkbox"/>	Use a smart or iPhone to remind you	<input type="checkbox"/>
Use polypockets to separate notes	<input type="checkbox"/>	Have a note taker in lectures	<input type="checkbox"/>
Wear a watch	<input type="checkbox"/>	Meet with mentor or student support regularly	<input type="checkbox"/>
Work with a study partner	<input type="checkbox"/>	Use a reference manager	<input type="checkbox"/>
Get past exam papers	<input type="checkbox"/>	Use the library	<input type="checkbox"/>
Use organisational applications on the phone / computer	<input type="checkbox"/>	Use technology to assist (e.g. Speech-to-text software)	<input type="checkbox"/>
Have assistance from parents, friends or partner	<input type="checkbox"/>	Other, please specify	<input type="checkbox"/>
None of the above	<input checked="" type="radio"/>		

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Support/assessor notes

\* = Required

**Date completed**

01 Nov 2014

**Name of person completing / job title**

John Jones, Educational Psychologist

**Check Spelling**

**Additional history and relevant information**

Information gathered relating to primary school  
Examples of difficulties in class included being excluded for behaviour twice  
School report shown

**Check Spelling**

**Next**

Specialist / Assessor Notes

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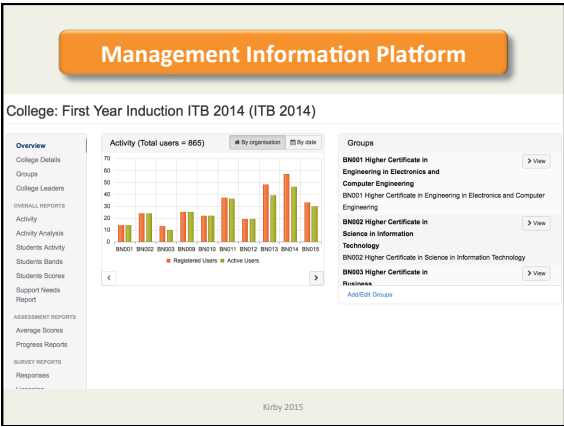
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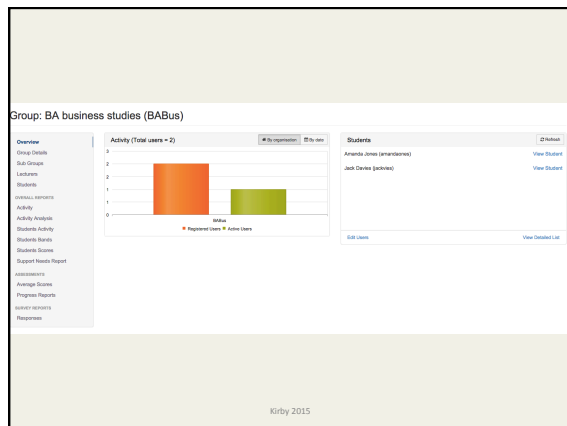
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### Assists with development and planning

- Organising group work
- Personalised reports with links, resources – set an action plan and review
- Guidance for the lecturer/student services

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### Grouping students for support

Search: [ ]

Username	Name	Reading and writing skills	Attention and concentration skills	Social and communication skills	Co-ordination and organisational skills	Reading and writing	Listening and note-taking	Examinations
		4	3	4	3	3	3	4
		1	1	1	1	1	1	1
		3	3	3	3	3	3	3
		3	3	3	3	3	3	3
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3

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Reorganising into groups

writing skills	concentration skills	communication skills	organisational skills	writing, and note-taking	Examinations
1	1		1	1	1
3	2	1	3	3	2
4	3	1	3	3	2
4	3	1	4	2	3
2	1				
2	1	1	1	1	1
3	3	1	3	3	2
1	1	2	1	1	2
2	2	2	3	1	1
3	2	2	3	3	3
2	2	2	2	2	2
2	2	2	2	2	3
2	2	2	2	2	3

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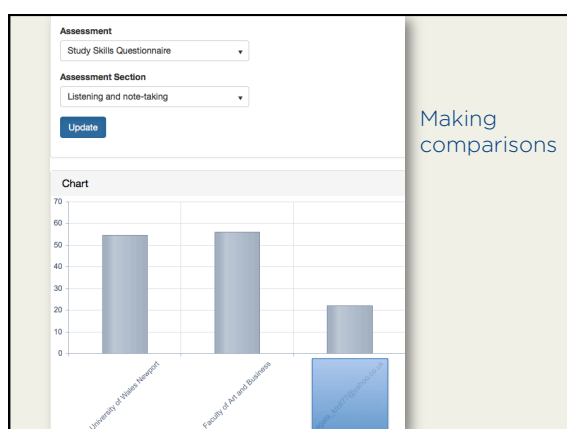
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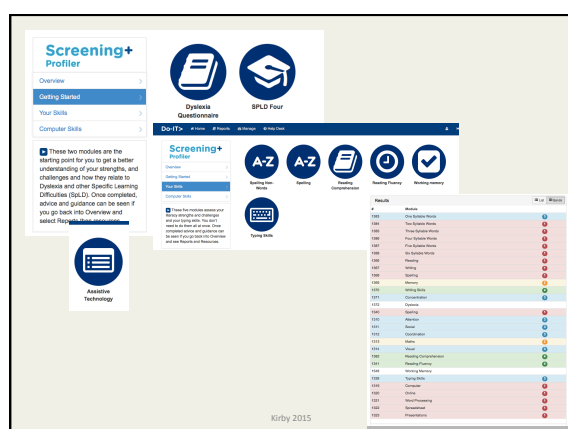
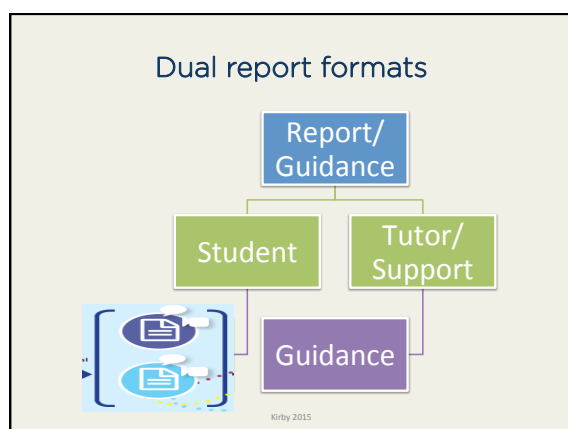
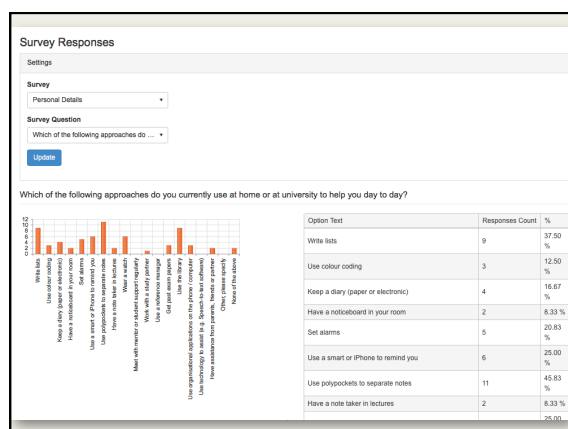
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# Quick look at student's profile





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Maths

Your responses indicate that you have reported having many difficulties with maths. These may be consistent with traits of dyscalculia (specific maths difficulties). Below are some suggestions for you to try. Please note that this is NOT a diagnosis. Further assessment would be required to ascertain the specific nature of the difficulties. If you are concerned, please contact Student Support Services to discuss whether you require a more in depth assessment.

### Advice and Recommendations

- 1) Use a calculator on your phone or computer when having to work out bills etc.
- 2) Reduce the need for calculation for bills etc. when possible by setting up Direct Debits.
- 3) Learn to use a calculator effectively, as this can help you reinforce your maths skills.
- 4) Remembering passwords and pin codes is often difficult for someone with maths difficulties. This link has some tips on how to turn numbers into words to remind you: [www.dotr.im/jmc](#)
- 5) Use a talking scientific calculator if you need to use one. There are links to a talking scientific calculator app and an online talking calculator: [www.dotr.im/tac](#) and [www.dotr.im/tac01](#)
- 6) Set up speed dialling on your phone for numbers you use regularly.
- 7) Practice Sudoku as a way of improving your confidence with numbers. There are some free apps: [www.dotr.im/tud](#) and [www.dotr.im/tud01](#)
- 8) Use online tools to help you with time and money management, such as: [www.mint.com](#)
- 9) Use online banking to keep track of your expenditures.
- 10) Try and store information in one place, such as using Evernote and OneNote, and use tools such as Workflow [www.dotr.im/wfapp](#) to manage what you need to do in an essay.

### Useful apps and software

You may find the following apps and software helpful:

There are a number of apps that can help you to store passwords and pin codes e.g. The Safe, e-Wallet and Save it Safe. Algebra Touch can go through the rules with you, here is the link to the app: [www.dotr.im/algo](#)

For those who have maths difficulties or suspect they may have dyscalculia, the British Dyslexia Association (BDA) has a website of information and provides a telephone help desk.

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Reading for Understanding/Critical Reflection

Resources (3)

Do-IT>  
Using technology to help introduction

Do-IT>  
Planning an assignment

Do-IT>  
Critical thinking - Developing an argument

- If you tend to re-read paragraphs, try skimming the content first so that you have a broad idea of what you are reading. Look for key words and then read more slowly for meaning. If you are unfamiliar with the topic area try to create a glossary of terms so that you know what words to seek out.
- If you do not normally take notes while reading, try to develop this as a routine. This way you do not have to rely on your memory as much. Use a highlighter to note the most important words and phrases. Also, try to decide what you want to learn from the text before starting to read. Do you need to read and understand everything, or can you just 'skim' the text to see if it may be important and then read more thoroughly the second time?
- If you find summarizing your work hard to do then it can be useful to read the abstract first, if there is one. Also, try reading the introduction and the conclusions. The author of the paper may well have concluded the outcomes of their work. This can often be a good starting point. Have you had a lecture on the topic? If so, read through this first as your lecturer may have summed up key areas to consider.
- Think of an assignment as a story with a beginning, middle and end. The reader needs to be able to follow your thoughts and then understand your conclusions. Create an essay plan so you can ensure you have the stages set out. This can save a lot of time for you.
- Read through the conclusions in an article or paper carefully first. Highlight the key elements and list these. You can then go through the text to seek these out. Creating a process for this helps you to do this logically.

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## Conclusions

- What is DCD
- How to consider how to make an assessment
- Why do we need person centred approaches to providing support
- Why has the Profiler suite been developed?

## Questions?

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