THE LITTLE DEVELOPMENTAL COORDINATION DISORDER QUESTIONNAIRE - CANADIAN© (LITTLE DCDQ-CA ©)

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University of Jerusalem, with permission of B.N. Wilson (Rihtman, Wilson, & Parush, 2011)

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Administration and Interpretation of the Little DCDQ

Overview

The *Little Developmental Coordination Questionnaire (Little DCDQ)* is a parent report measure that screens for motor coordination difficulties in 3- and 4- year old children. Using a 5 point Likert scale, parents are asked to compare their child's motor skills with those of other children of the same age and gender. The *Little DCDQ* consists of 15 items, which group into two distinct factors: 1) gross motor skills and 2) fine motor skills. The *Little DCDQ* measures functional skills in several contextual areas across home and preschool environments and during play activities.

Developmental Coordination Disorder (DCD) is a DSM-V diagnosis (APA, 2013). An indication of "suspect for DCD" based on the score of the *Little DCDQ* fulfills the requirements for the first two Criteria of this diagnosis:

- Acquisition and execution of coordinated motor skills are below what would be expected at a given chronologic age and opportunity for skill learning and use; difficulties are manifested as clumsiness (e.g., dropping or bumping into objects) and as slowness and inaccuracy of performance of motor skills (e.g., catching an object, using scissors, handwriting, riding a bike, or participating in sports)
- The motor skills deficit significantly or persistently interferes with activities of daily living appropriate to the chronologic age (e.g., self-care and self-maintenance) and impacts academic/school productivity, prevocational and vocational activities, leisure, and play

It is important to note, however, that this questionnaire is a *screening tool* and cannot be used alone for this purpose. Diagnosis must be made based on the results of several reports and tests.

Since diagnosis of DCD is generally not recommended before the age of 5 years (Blank et al., 2012), the *Little DCDQ* was developed for early identification of preschool children who are at risk of being labeled DCD at school age. Children identified as being at risk for motor difficulties on the *Little DCDQ* would benefit from further, formal testing of their motor skills, enriched motor opportunities and careful surveillance. Even if parents or professionals are reluctant to diagnose before 5 or 6 years, it is important to *watch* the motor skill development carefully -- the 'Watch and See' approach.

The reliability of the *Little DCDQ* was initially investigated using a sample size of 108 typically developing children, as well as 245 children at risk for motor problems. Test-retest reliability and internal consistency were high (Wilson et al., 2014).

Following this, validity was established with 119 children, who were assessed with Movement Assessment Battery for Children-2 (MABC-2) and the Beery–Buktenica Developmental Test of Visual-Motor Integration (VMI) to confirm possible motor impairment. The *Little DCDQ* correlated well with the MABC-2 and VMI, supporting the questionnaire's concurrent validity. Construct validity was supported by a factor analysis and a significant difference in scores between children who were typically developing and children at risk for motor difficulties.

Discriminant function analysis showed that all items were able to distinguish these two groups of children. Finally, validity as a screening tool was assessed using logistic regression modelling and

receiver operating curves, establishing optimal cut-off values with adequate sensitivity. Psychometric properties of the *Little DCDQ* are fully described in Wilson et al. (2014).

In summary, the *Little DCDQ* is a reliable and valid instrument with a potential to aid in the early identification of preschool children who demonstrate or who are at risk for motor coordination difficulties. Early identification of children at risk of DCD has important clinical implications for provision of adequate services and prevention of secondary consequences for preschool children (Wilson et al., 2014).

Prior to Administration

Before copying the *Little DCDQ* for clinical or research use, it is recommended that a name and phone number be written into the space on the parent page so that parents can call if they have questions about the meaning of an item. This contact person should be knowledgeable about the condition of DCD, or know who to refer the question to if questions of this nature arise. The validity of the results will be increased if parents have the opportunity to clarify the intent of an item.

The Score Sheet on the next page (the last page of this document) should be kept separate from the questionnaire itself. It is not recommended that parents be given the Score Sheet.

Respondents

This questionnaire was developed for parents, as parents know their children the best and can reliably report developmental problems. In addition, only the data from parent report was used to develop the scoring system. The *Little DCDQ* is therefore intended to be used with parents.

With the original DCDQ (Wilson et al., 2007), some clinicians and researchers are experimenting with having both parents (or one parent and the child's primary teacher) complete it. Sometimes two or more respondents have completed the questionnaire separately, but in other situations they have conversed while completing one form. Subjectively, the results appear to be satisfactory but no one has yet studied this approach.

When the perspective of two adults gives a more complete or more accurate evaluation of the child's motor performance, this practice is likely to increase the validity of the score. However, it must be remembered that the scores were developed solely on parent response, so if the respondents have divergent opinions on the child's performance, or if the two forms have very different scores, the parent's score should be the one reported. The fact that others who know the child score the items differently can be noted, but it would be inappropriate to use the score of a teacher or coach alone (for example) in interpreting the results of the *Little DCDQ.*

Time to Complete

The *Little DCDQ* usually takes parents about 10-15 minutes to complete. As much as possible, arrange for the parent completing the questionnaire to do so in a non-distracting environment.

Administration - Written or Verbal

The *Little DCDQ* was designed to be self-administered by parents but if it is completed by interview, there will be immediate opportunity to clarify a parent's answer as well as many opportunities for the clinician to probe and discover the extent or type of problem.

Missing Items

When the questionnaire is completed or returned, review it for missed items or items where more than one item is circled. Ask the parent who completed it for clarification.

> **Note:** a total score can only be calculated if all items are scored. Missing one score will prevent you from obtaining a total score and having an indication of suspected DCD or not.

If the parent does not know how to grade an item, or has not seen their child in a particular activity, ask them if there is anyone else who would know (e.g., the other parent, a caregiver, a teacher or a coach). You may inquire if the parent can make arrangements to ask that person, or if they will give you permission to do so.

Computing the Chronological Age

Enter the date that the *Little DCDQ* was completed and the child's Date of Birth (D.O.B.) on the second page of this document (the questionnaire itself). Compute the chronological age by subtracting (first) the days, then the month and finally the year of birth. For example, if the questionnaire was completed on March 21, 2015, and the child was born on February 2, 2011, the child's chronological age would be calculated as shown in the first table:

	Year	Mon	Day
DCDQ completion	2015	03	21
Child's D.O.B.	2011	02	02
Chronological age	4 yrs	1 mon	19 days

	Year	Month	Day
DCDQ completion	2014 ~~2015~~	14 ~~02~~ ~~03~~	51 ~~21~~
Child's D.O.B.	2011	06	28
Chronological age	3 years	8 months	23 days

If the day of the month in which the child was born is larger than the day of the month of questionnaire completion, add 30 days to the day of testing and subtract one month from the month of testing. Similarly, if necessary, the month of testing can be borrowed by adding 12 months to the month of testing and subtracting one year from the testing year, as shown above in the table on the right.

Computing a Total Score

Re-enter the numbers circled for all items of the questionnaire onto the Score Sheet (3rd page). Total each column to compute the two Factor Scores. Add the two Factor Scores to compute a Total Score. *It is advisable to double check your addition.*

Interpretation of Scores on the Little DCDQ
As gender was a significant predictor of the *Little DCDQ* Total Score, separate cut off scores were generated for boys and girls (ages 3 years 0 months to 4 years 11 months). Based on the child's gender, scan across the row to find the range of scores which the child's total score falls within. This range will indicate whether the child's score is an indication of "Suspect for DCD", or "Probably not DCD".

Gender	Suspect for DCD	Probably not DCD
Boys	15-67	68-75
Girls	15-68	69-75

Reporting of Little DCDQ results
As outlined above, the *Little DCDQ* is a screening tool. Its purpose is to more accurately identify children at risk of motor challenges, who would benefit from formal motor testing. Therefore, when using the questionnaire in a verbal or written report about a child, the terms "suspect for DCD" or "probably not DCD" should be used, as this test alone cannot be used to diagnose DCD.

Sensitivity and Specificity
The most accurate predictive values of the *Little DCDQ* are reported in the table below according to gender.

Gender	Sensitivity and Specificity
Boy	Sensitivity = 86% Specificity = 63%
Girl	Sensitivity = 80% Specificity = 49%

The purpose of a screening tool is to identify whether a child may have a particular condition. Rarely is a screening tool alone 100% accurate in identifying all children with a condition, while at the same time not falsely identifying any children without the condition. When evaluating a screening tool such as the *Little DCDQ*, the degree of accuracy in identifying children with motor coordination difficulties (sensitivity) must be compared to the accuracy of incorrectly identifying children who do not have motor coordination difficulties (specificity).

This "*trade off*" is common to all diagnostic tests because when one of these predictive values increases, the other decreases. For a screening tool in which early diagnosis is beneficial, and when it is more desirable to identify all those at risk of having motor difficulties, high sensitivity is preferable to higher specificity (Schoemaker and Wilson, 2015).

The use of the original DCDQ'07 was studied with 4 to 6 year old children, but was found not to be an appropriate screening tool (Parmar, et al., 2014). Sensitivity was low (21%) and specificity was high (92%) – the opposite of what you would want to see in a developmental screen tool for young children.

By design, the *Little DCDQ* is most accurate in identifying children who may have motor coordination difficulties. It may also identify children who do not have the condition, but further motor testing should reveal whether motor difficulties are indeed present. Application of all DSM-V diagnostic criteria is required to make a proper diagnosis of DCD. Although the *Little DCDQ* has a role in fulfilling some of these diagnostic criteria, it should not be used alone to diagnose.

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The ***Little Movements ~ Lots to Learn Project*** Team sincerely thanks the children and families who commit their time to research that support helping children grow. ***Thank You!***

Alberta Children's Hospital Research Institute for Child and Maternal Health

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LITTLE DCDQ - CA

Name of Child: _____

Child's gender: Male ☐ Female ☐

Person completing Questionnaire: _____

Relationship to child: _____

	Year	Mon	Day
Today's Date:			
Birth Date:			
Child's Age:			

This questionnaire asks about activities that children do when moving their body and using their hands. A child's coordination skills may change as they grow and develop. That is why it will be easier for you to answer the questions if you think about other children that you know who ***are the same age and sex as your child***.

Please compare your child's coordination with that of other children the same age and sex. For each item, circle the number which best describes your child.

If you are unclear about the meaning of a question, or about how you would answer a question to best describe your child please call_____ at _____ for assistance.

Think about other children the same age and sex as your child. Compared to them, *your child…*	**Not at all like your child 1**	**A bit like your child 2**	**Moderately like your child 3**	**Quite a bit like your child 4**	**Extremely like your child 5**
1…is able to throw a large (soccer size) ball to another child or adult	1	2	3	4	5
2…catches a large ball with both hands when it is thrown towards the center of his or her body from a distance of 1.5m (ages 3-4 years) or 2m (ages 4-5 years)	1	2	3	4	5
3…kicks a ball rolled towards him or her	1	2	3	4	5
4…runs fast and in a manner similar to other children	1	2	3	4	5
5…is able to move from place to place and from one body position to another (for example, climbs up and down stairs, climbs onto and off the bed, gets into the bath independently and with ease, on and off chairs, can play musical chairs)	1	2	3	4	5
6…drinks from an open cup or glass without spilling	1	2	3	4	5
7…uses cutlery independently (spoon, fork) to bring food towards his or her mouth	1	2	3	4	5
8...holds a pencil or crayon the same way as other children, and scribbles or draws with it (age 3) or copies simple lines and shapes (age 4) with it	1	2	3	4	5
9…is able to thread large beads (3 years old) or small beads (4 years old) onto a string	1	2	3	4	5
10…is able to peel stickers from a sheet of stickers, and stick them onto a defined place or space on a sheet of paper	1	2	3	4	5
11…succeeds at building activities (puzzles, Lego™, building a block tower)	1	2	3	4	5
12…is able to imitate the body positions of others during movement or sports activities (Simon Says, Follow the Leader, dance, gymnastics)	1	2	3	4	5
13...uses playground equipment (climbs ladders, slides down the slide)	1	2	3	4	5
14…seems to be coordinated (does not fall often during the day and does not often bump into people or objects)	1	2	3	4	5
15…remains sitting upright when required to sit for a period of time (does not tire easily, does not slouch as if falling out of the chair).	1	2	3	4	5

LITTLE DCDQ-CA: SCORE SHEET

Name: _____ **Date:** _____

Birth Date: _____ **Age:** _____

Item	Gross Motor	Fine Motor
1. Throw		
2. Catch		
3. Kick		
4. Run		
5. Move place		
6. Drinks		
7. Cutlery		
8. Pencil		
9. Thread		
10. Stickers		
11. Building		
12. Imitate		
13. Playground equipment		
14. Coordination		
15. Sits upright		
Section Total	/ 45	/ 30

SCORE SUMMARY

Section	Section Total
Gross Motor	/ 45
Fine Motor	/ 30
Total	/ 75

SCORE INTERPRETATION

For Boys, Ages 3 years 0 months to 4 years 11 months

15-67 suspect for DCD
68-75 probably not DCD

For Girls, Ages 3 years 0 months to 4 years 11 months

15-68 suspect for DCD
69-75 probably not DCD