

# Early Childhood Measurement and Evaluation Tool Review

Early Childhood Measurement and Evaluation (ECME), a portfolio within CUP, produces *Early Childhood Measurement Tool Reviews* as a resource for those who conduct screening, assessment, and evaluation. To learn more about ECME and CUP, provide feedback, or to access additional reviews, visit our website at [www.cup.ualberta.ca](http://www.cup.ualberta.ca) or email us at [cup@ualberta.ca](mailto:cup@ualberta.ca)

## Miller Function & Participation Scales (M-FUN)

### Measurement Areas:

The Miller Function & Participation Scales (M-FUN) tool is designed to assess children who may have mild to moderate developmental delays in functional motor abilities in the following areas:

1. Visual Motor Skills
2. Fine Motor Skills
3. Gross Motor Skills

The M-FUN can be used to assess individual children from **2 years 6 months to 7 years 11 months** of age.

### Purpose:

The M-FUN is a norm-referenced functional motor skills assessment tool that can be used to:

- determine if a child possesses the basic motor skills necessary for schooling in the early years;
- identify delays in visual motor, fine motor, and gross motor skills;
- determine a child's eligibility for services to address motor delays;
- identify underlying neuromotor issues;
- assist in the development of intervention programming;
- track a child's progress in intervention programs.

### Length and Structure:

The M-FUN should take approximately 40-60 minutes to administer depending upon the age and responsiveness of the child being tested. The participation checklists (completed by care givers, teachers, and/or the examiner) each take an additional 5-10 minutes to complete.

The tool is split into two parts. The **Performance Assessment** section consists of 17 motor activities that directly measure three skill areas: visual motor (7 activities), fine motor (5 activities), and gross motor (5 activities). All activities are administered to children aged **4 years to 7 years 11 months**, whereas 15 activities are administered to children aged **2 years 6 months to 3 years 11 months**. Each activity is given a total score based on performance on several

items/tasks. Individual items/tasks are scored on a 0-3 scale; 0 points indicates that the child is unable to perform the task, 1 point indicates partial mastery, 2 points indicates moderate mastery, and 3 points indicates perfect mastery. Some items/tasks are scored on a 0-2 scale. The activities that fall within each score area (i.e., visual motor has 7 activities) are totaled to produce an overall score for visual motor, fine motor, and gross motor skills.

The **Participation Assessment** section consists of 3 different observation checklists: the *Home Observations Checklist*, the *Classroom Observations Checklist*, and the *Test Observations Checklist*. Each checklist is used to gain information about a child's motor abilities in different situations and by different raters. Individual behaviours on the checklist are rated as *almost always successful*, *frequently successful*, *occasionally successful*, *seldom successful*, and *not observed*. When the form scores are totaled, the child is given a **criterion-referenced** score that can be used to compare the child's score with other children in her/his age group (i.e., average, below average, and far below average).

### **Materials:**

The publisher classifies the M-FUN as a "B level" qualification, targeted to institutions consisting of psychologists, speech-language pathologists, early childhood teachers, and special education teachers with experience and training in standardized testing. The publisher requires the purchaser to be one of the following categories: (a) trained and certified by a recognized institution in a relevant area of assessment (with or without a Master's degree), (b) a member of a Speech-Language-Hearing Association, Physical Therapist Association, or an Occupational Therapy Association, or (c) possess a Master's (or Doctorate) degree in psychology, education, or relevant field with training in assessment.

The complete M-FUN kit can be purchased through the publisher for CDN \$555. The complete kit includes the examiner and administration manuals, manipulatives, record forms, workbooks, and observation checklists. It should be noted that administration requires a timer with a second-hand, a water bottle and 8 pennies; these are not included with the kit. Additional record form packages are available through the publisher.

### **Accessibility:**

The M-FUN is available in the English language only.

### **Administration, Scoring, and Interpretation:**

The M-FUN suggests a person with "previous training or experience" in the administration, scoring, and interpretation of standardized tests.

### **Subscales:**

Total raw scores for each of the three Performance subscales (Visual Motor, Fine Motor, and Gross Motor) are calculated; confidence intervals, scaled scores, percentile ranks, performance plots, progress scores, age equivalents, and a neurological foundation profile can be determined for each of the subscales based on the total raw scores.

Participation scores yield criterion-referenced scores that are useful for comparing the child's behaviour with other children of his/her same chronological age.

### **Documentation:**

The examiner's manual, which is included in the M-FUN, contains specific procedures for administration and scoring, and a comprehensive section on interpretation including case studies and examples. The manual also includes sections on test standardization, the normative sample, validity, and reliability.

### **Normative Sample:**

The M-FUN was standardized using 414 children representative of the continental USA population, ages 2 years and 6 months to 7 years and 11 months; each age group contained between 45-60 children. The examiner's manual discusses other demographic information in more detail.

It should be noted that since the M-FUN is new, no outside academic reviews or analyses of this scale are available. The preceding summary was based on information in the examiner's manual.

### **Reliability:**

The M-FUN manual discusses several kinds of reliability measures:

**Test-retest Reliability:** 27 children belonging to the standardization sample were re-tested by the same examiner within 0-21 days after the first test. Correlations between the test scores ranged from .77 to .82 depending upon the scale.

**Internal Consistency:** According to the scale's manual, a split-half test for consistency using Cronbach's alpha was conducted using data from the entire normative sample, yielding correlation coefficients of .85 to .92 for the subscales and .96 for the observations checklists. Tests of internal consistency were also conducted using the normative sample, based on a clinical group of 66 children who were already diagnosed as having motor skills-related delays; suggesting that the test is also internally reliable for clinical groups.

**Inter-Rater Agreement:** Since the M-FUN relies upon the judgment of the examiner to determine whether the child has experienced success on an activity, an analysis of inter-rater agreement is necessary. According to a study conducted by the authors who included 5 raters and 29 children, inter-rater agreements were very consistent, yielding correlations of .91 to .93 for the skill areas.

### **Validity:**

**Content Validity:** According to the manual, the M-FUN's measurement areas (Visual, Fine, and Gross Motor) were developed based on several sources. Such sources included the International Classification of Function, Disability and Health (ICF), current academic research in the neurological foundations of motor skills, and the OT Practice Framework. The authors suggest that the M-FUN was developed from a broad range of motor skill related sources, and should demonstrate strong content validity.

**Internal Structure:** The authors of the tool analyzed data from the standardization sample to determine the degree to which the subscales (Visual, Fine, Gross) were related to each other. The scores between each scale correlated between .47 and .55, suggesting that each scale measure different motor abilities. The observation checklists also yielded intercorrelations (.41 to .58).

**Concurrent Validity:** In terms of concurrency with other measures of motor skills, the manual discusses two validation studies. The first study compared scores on the Miller Assessment of

Preschools (MAP) to scores on the M-FUN using a sample of 15 children ages 2 years 6 months to 7 years 11 months. Correlations of the MAP total score and M-FUN scale scores were .47 (Gross Motor), .83 (Fine Motor), and .62 (Visual Motor), suggesting that the MAP and M-FUN are moderately correlated in some skill domains and less so in others.

The second study compared scores on the M-FUN between 3 samples of children who were already diagnosed as having a motor delay in a specific domain (Visual, Fine, Gross) by a community physician, physical therapist, or occupational therapist, and a sample of typically developing children. On average, children who were diagnosed as having a motor delay did approximately 2 standard deviations poorer on the M-FUN than children of typical development; suggesting that scores on the M-FUN are comparable to diagnoses from motor skill professionals.

**Sensitivity and Specificity:** The authors of the M-FUN also examined the clinical utility of the tool in relation to its ability to correctly identify children with or without motor skill delays. The tool demonstrated a weak sensitivity (between .38 and .60) for children who scored 2 (or more) standard deviations below the mean. The tool showed a stronger sensitivity for children who scored 1 standard deviation below the mean (between .69 and .89).

The tool showed an overall strong specificity throughout each subscale and at all scores, ranging between .80 to 1.00, suggesting that the tool is able to correctly identify children who do *not* have a motor skill delay.

As with the previous section, it should be noted that since the M-FUN is new, no outside academic reviews or analyses of this scale are available and this review is based on information in the examiner's manual.

### **Publication Information:**

The Miller Function & Participation Scales was developed by Lucy Jane Miller. This review is based on the 1<sup>st</sup> edition, published in 2006 by PsychCorp.

### **Materials Used for Tool Review:**

Publisher's website: [www.harcourtassessment.ca](http://www.harcourtassessment.ca)

Miller, L.J. (2006). *Miller Function & Participation Scales Manual*. San Antonio, TX: Harcourt Assessment.

---

**How to cite this document:** This document was created for CUP. However to cite this document use the following:

Community-University Partnership for the study of Children, Youth, and Families (2011). *Review of the Miller Function & Participation Scales (M-FUN)*. Edmonton, Alberta, Canada.