



# Movement Behaviour Questionnaire

## Child Closed Version

### (MBQ-C)

#### OVERVIEW

- The MBQ is a validated rapid assessment tool for measuring movement behaviours in children aged 0 – 5 years.
- The MBQ-C measures active play, screen time and sleep.

#### TARGET POPULATION

- For children aged up to 5 years *who can walk*.

#### HOW IT IS MEASURED

- 9 items
- Closed questions
- Self-report
- Hard-copy or electronic completion (REDCap data dictionary available upon request)
- Supplemented by the User guide for administration and scoring (hard copy or REDCap versions available)

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Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

## Movement Behaviour Questionnaire (MBQ-C)

### DIRECTIONS

This survey will ask you questions about your child's movement behaviours (activity, screen time, and sleep) on a typical day.

A typical day is a day when your child does things they normally do.

Please respond to all the questions as best as you can.

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How old is your child?

- 1 year old [1]
- 2 years old [2]
- 3 years old [3]
- 4 years old [4]
- 5 years old [5]

This section is about your child's physical activity

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**Q1A.** Thinking about the past week, on a TYPICAL **WEEKDAY**, how much time did your child spend in active play? *Active play includes activities such as walking, running, dancing, climbing, playing with balls, riding bikes or scooters, or swimming.*

- 0 min per day [0] → **Skip to question 2A**
- Between 1 and 30 min per day [1]
- Between 30 and 60 min per day [2]
- Between 1 and 2 hrs per day [3]
- Between 2 and 3 hrs per day [4]
- Between 3 and 4 hrs per day [5]
- More than 4 hrs per day [6]

**Q1B.** Of this time, how much was spent doing vigorous activities such as running, jumping, dancing, riding bikes or scooters? Please note, the time provided must be less than your previous answer.

- 0 min per day [0]
  - Between 1 and 15 min per day [1]
  - Between 15 and 30 min per day [2]
  - Between 30 and 60 min per day [3]
  - Between 1 and 1½ hrs per day [4]
  - Between 1½ and 2 hrs per day [5]
  - More than 2 hrs per day [6]
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**Q2A.** Thinking about the past week, on a TYPICAL **WEEKEND DAY**, how much time did your child spend in active play? *Active play includes activities such as walking, running, dancing, climbing, playing with balls, riding bikes or scooters, or swimming.*

- 0 min per day [0] → **Skip to question 3A**
- Between 1 and 30 min per day [1]
- Between 30 and 60 min per day [2]
- Between 1 and 2 hrs per day [3]
- Between 2 and 3 hrs per day [4]
- Between 3 and 4 hrs per day [5]
- More than 4 hrs per day [6]

**Q2B.** Of this time, how much was spent doing vigorous activities such as running, jumping, dancing, riding bikes or scooters? Please note, the time provided must be less than your previous answer.

- 0 min per day [0]
- Between 1 and 15 min per day [1]
- Between 15 and 30 min per day [2]
- Between 30 and 60 min per day [3]
- Between 1 and 1½ hrs per day [4]
- Between 1½ and 2 hrs per day [5]
- More than 2 hrs per day [6]

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This section is about your child's screen time

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**Q3A.** Thinking about the past week, on a TYPICAL **WEEKDAY**, how much time did your child spend watching television programs, videos/internet clips or movies on a television, computer, or portable/mobile device such as iPad, tablet or smartphone?

- 0 min per day [0] → **Skip to question 4A**
- Between 1 and 15 min per day [1]
- Between 15 and 30 min per day [2]
- Between 30 and 60 min per day [3]
- Between 1 and 1½ hrs per day [4]
- Between 1½ and 2 hrs per day [5]
- Between 2 and 3 hrs per day [6]
- More than 3 hrs per day [7]

**Q3B.** Of this time, how much time did they spend watching television programs, videos/internet clips, or movies while standing? Please note, the time provided must be less than your previous answer.

- 0 min per day [0]
  - Between 1 and 15 min per day [1]
  - Between 15 and 30 min per day [2]
  - Between 30 and 60 min per day [3]
  - Between 1 and 1½ hrs per day [4]
  - Between 1½ and 2 hrs per day [5]
  - Between 2 and 3 hrs per day [6]
  - More than 3 hrs per day [7]
-

**Q4A.** Thinking about the past week, on a TYPICAL **WEEKEND DAY**, how much time did your child spend watching television programs, videos/internet clips or movies on a television, computer, or portable/mobile device such as iPad, tablet or smartphone?

- 0 min per day [0] → Skip to question 5A
- Between 1 and 15 min per day [1]
- Between 15 and 30 min per day [2]
- Between 30 and 60 min per day [3]
- Between 1 and 1½ hrs per day [4]
- Between 1½ and 2 hrs per day [5]
- Between 2 and 3 hrs per day [6]
- More than 3 hrs per day [7]

**Q4B.** Of this time, how much time did they spend watching television programs, videos/internet clips, or movies while standing? Please note, the time provided must be less than your previous answer.

- 0 min per day [0]
- Between 1 and 15 min per day [1]
- Between 15 and 30 min per day [2]
- Between 30 and 60 min per day [3]
- Between 1 and 1½ hrs per day [4]
- Between 1½ and 2 hrs per day [5]
- Between 2 and 3 hrs per day [6]
- More than 3 hrs per day [7]

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**Q5A.** Thinking about the past week, on a TYPICAL **WEEKDAY**, how much time did your child spend playing games, looking at photos, or video chatting (e.g. FaceTime, Zoom, Skype) on a screen-based device such as a computer or laptop, video game console, iPad, tablet, or smartphone?

- 0 min per day [0] → Skip to question 6A
- Between 1 and 15 min per day [1]
- Between 15 and 30 min per day [2]
- Between 30 and 60 min per day [3]
- Between 1 and 1½ hrs per day [4]
- Between 1½ and 2 hrs per day [5]
- Between 2 and 3 hrs per day [6]
- More than 3 hrs per day [7]

**Q5B.** Of this time, how much time did they spend playing games, looking at photos, or video chatting (e.g. FaceTime, Zoom, Skype) while standing? Please note, the time provided must be less than your previous answer.

- 0 min per day [0]
  - Between 1 and 15 min per day [1]
  - Between 15 and 30 min per day [2]
  - Between 30 and 60 min per day [3]
  - Between 1 and 1½ hrs per day [4]
  - Between 1½ and 2 hrs per day [5]
  - Between 2 and 3 hrs per day [6]
  - More than 3 hrs per day [7]
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**Q6A.** Thinking about the past week, on a TYPICAL **WEEKEND DAY**, how much time did your child spend playing games, looking at photos, or video chatting (e.g. FaceTime, Zoom, Skype) on a screen-based device such as a computer or laptop, video game console, iPad, tablet, or smartphone?

- 0 min per day [0] → Skip to question 7A
- Between 1 and 15 min per day [1]
- Between 15 and 30 min per day [2]
- Between 30 and 60 min per day [3]
- Between 1 and 1½ hrs per day [4]
- Between 1½ and 2 hrs per day [5]
- Between 2 and 3 hrs per day [6]
- More than 3 hrs per day [7]

**Q6B.** Of this time, how much time did they spend playing games, looking at photos, or video chatting (e.g. FaceTime, Zoom, Skype) while standing? Please note, the time provided must be less than your previous answer.

- 0 min per day [0]
- Between 1 and 15 min per day [1]
- Between 15 and 30 min per day [2]
- Between 30 and 60 min per day [3]
- Between 1 and 1½ hrs per day [4]
- Between 1½ and 2 hrs per day [5]
- Between 2 and 3 hrs per day [6]
- More than 3 hrs per day [7]

This section is about your child's sleep

**Q7.** Thinking about the past week, on a TYPICAL NIGHT, how much time did your child sleep in total during the night?

- Less than 6 hrs per night [1]
- Between 6 and 8 hrs per night [2]
- Between 8 and 10 hrs per night [3]
- Between 10 and 12 hrs per night [4]
- Between 12 and 14 hrs per night [5]
- More than 14 hrs per night [6]

**Q8.** Thinking about the past week, on a TYPICAL DAY, how much time did your child sleep in total during the day?

- 0 hrs per day [0]
- Less than 1 hr per day [1]
- Between 1 and 2 hrs per day [2]
- Between 2 and 3 hrs per day [3]
- Between 3 and 4 hrs per day [4]
- More than 4 hrs per day [5]

**Q9.** In a TYPICAL WEEK, how often does your child have a regular bedtime routine (e.g., bath, story)?

- Never [0]
- 1 – 2 nights per week [1]
- 3 – 4 nights per week [2]
- 5 – 6 nights per week [3]
- Every night [4]

--- Thank you for completing the MBQ ---

## Calculation of outcome variables

Outcome variable	Calculation
<b>PHYSICAL ACTIVITY</b>	
Weekday total active play (minutes/day)	Q1A: [0] = 0; [1] = 15; [2] = 45; [3] = 90; [4] = 150; [5] = 210; [6] = 240
Weekday energetic play (minutes/day)	Q1B: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 120
Weekend day total active play (minutes/day)	Q2A: [0] = 0; [1] = 15; [2] = 45; [3] = 90; [4] = 150; [5] = 210; [6] = 240
Weekend day energetic play (minutes/day)	Q2B: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 120
Weighted average of energetic play (minutes/day)	$((\text{Weekday energetic play} \times 5) + (\text{Weekend day energetic play} \times 2)) / 7$
Weighted average of total active play (minutes/day)	$((\text{Weekday total active play} \times 5) + (\text{Weekend day total active play} \times 2)) / 7$
<b>SCREEN TIME</b>	
Weekday passive screen time (minutes/ weekday)	Q3A: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 150; [7] = 240
Weekday passive screen time <u>while standing</u> (minutes/ weekday)	Q3B: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 150; [7] = 240
Weekend day passive screen time (minutes/ weekend day)	Q4A: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 150; [7] = 240
Weekend day passive screen time <u>while standing</u> (minutes/ weekend day)	Q4B: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 150; [7] = 240

Weekday SEDENTARY passive screen time (minutes/day)	Weekday passive screen time - Weekday passive screen time <u>while standing</u>  <u>NOTE.</u> If weekday passive screen time <u>while standing</u> exceeds total passive screen time, 'Weekday passive screen time' should be used to calculate the weighted average for Weekday SEDENTARY passive screen time.
Weekend day SEDENTARY passive screen time (minutes/day)	Weekend day passive screen time - Weekend day passive screen time <u>while standing</u>  <u>NOTE.</u> If weekend day passive screen time <u>while standing</u> exceeds total passive screen time, 'Weekend day passive screen time' should be used to calculate the weighted average for Weekend day SEDENTARY passive screen time.
Weekday interactive screen time (minutes/ weekday)	Q5A: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 150; [7] = 240
Weekday interactive screen time <u>while standing</u> (minutes/ weekday)	Q5B: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 150; [7] = 240
Weekend day interactive screen time (minutes/ weekend day)	Q6A: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 150; [7] = 240
Weekend day interactive screen time <u>while standing</u> (minutes/ weekend day)	Q6B: [0] = 0; [1] = 7.5; [2] = 22.5; [3] = 45; [4] = 75; [5] = 105; [6] = 150; [7] = 240
Weekday SEDENTARY interactive screen time (minutes/day)	Weekday interactive screen time - Weekday interactive screen time <u>while standing</u>  <u>NOTE.</u> If weekday interactive screen time <u>while standing</u> exceeds total interactive screen time, 'Weekday interactive screen time' should be used to calculate the weighted average for Weekday SEDENTARY interactive screen time.
Weekend day SEDENTARY interactive screen time (minutes/day)	Weekend day interactive screen time - Weekend day interactive screen time <u>while standing</u>  <u>NOTE.</u> If weekend day interactive screen time <u>while standing</u> exceeds total interactive screen time, 'Weekend day interactive screen time' should be used to calculate the weighted average for Weekend day SEDENTARY interactive screen time.

Weighted average of passive screen time (minutes/day)	$((\text{Weekday passive screen time} \times 5) + (\text{Weekend day passive screen time} \times 2)) / 7$
Weighted average of SEDENTARY passive screen time (minutes/day)	$((\text{Weekday SEDENTARY passive screen time} \times 5) + (\text{Weekend day SEDENTARY passive screen time} \times 2)) / 7$
Weighted average of interactive screen time (minutes/day)	$((\text{Weekday interactive screen time} \times 5) + (\text{Weekend day interactive screen time} \times 2)) / 7$
Weighted average of SEDENTARY interactive screen time (minutes/day)	$((\text{Weekday SEDENTARY interactive screen time} \times 5) + (\text{Weekend day SEDENTARY interactive screen time} \times 2)) / 7$
Weighted average of total screen time (minutes/day)	Weighted average of passive screen time + Weighted average of interactive screen time
Weighted average of total SEDENTARY screen time (minutes/day)	Weighted average of SEDENTARY passive screen time + Weighted average of SEDENTARY interactive screen time
<b>SLEEP</b>	
Night sleep (minutes)	Q7: [1] = 360; [2] = 420; [3] = 540; [4] = 660; [5] = 780; [6] = 840
Day sleep (minutes)	Q8: [0] = 0; [1] = 30; [2] = 90; [3] = 150; [4] = 210; [5] = 240
Total sleep (minutes per 24 hours)	Night Sleep + Day Sleep

## Truncation of extreme values

Implausible or extreme values for the following outcome variables are truncated (that is recoded) to the value equivalent of the 95th percentile from the validation study dataset.

Outcome variable	Truncated value
Weekday total active play	480 minutes per day
Weekend day total active play	480 minutes per day
Weekday energetic play	360 minutes per day
Weekend day energetic play	360 minutes per day

# **Adherence to Guidelines**

## **Physical Activity**

At least 3 hours of total physical activity per day, including 1 hour of energetic play.

## **Screen time**

Age = under 2 years: No screen time for babies/children.

Age = 2 – 5 years: No more than 1 hour per day of sedentary screen time.

## **Sleep**

Age = under 3 years: At least 660 minutes (11 hours) per day.

Age = 3 years or older: At least 600 minutes (10 hours) per day.

## **24-hour movement guidelines**

Meets all 3 guidelines for physical activity, screen time and sleep.

# MBQ Index

MBQ Index variable	Calculation
<b>PHYSICAL ACTIVITY</b>	
Physical activity index	= ('Weighted average of total active play' / 240) x 100
Energetic play index	IF 'Weighted average of energetic play' > 80, Energetic play index = 1.0  IF 'Weighted average of energetic play' <= 80, Energetic play index = ( 'Weighted average of energetic play' / 80) x 100
<b>SCREEN TIME</b>	
Passive screen time index	Passive screen time index = (1 - ('Weighted average of passive screen time' / 240)) x 100
SEDENTARY passive screen time index	SEDENTARY passive screen time index = (1 - ('Weighted average of SEDENTARY passive screen time' / 240)) x 100
Interactive screen time index	Interactive screen time index = (1 - ('Weighted average of interactive screen time' / 240)) x 100
SEDENTARY interactive screen time index	SEDENTARY interactive screen time index = (1 - ('Weighted average of SEDENTARY interactive screen time' / 240)) x 100
<b>SLEEP</b>	
Sleep index raw score	<b>IF child is younger than 3 years [1] or [2].</b> Sleep index raw score = (( 'Total sleep' - 300) / (780 - 300)) x 100 (Index = 100 when Total Sleep is 11 hours or more)  <b>IF child is 3 years or older [3] or [4] or [5].</b> Sleep index raw score = (( 'Total sleep' - 240) / (780 - 300)) x 100 (Index = 100 when Total Sleep is 10 hours or more)
Sleep index	IF Sleep index raw score > 100, Sleep index = 100 IF Sleep index raw score <= 100, Sleep index = Sleep index raw score
Sleep routine index	Sleep routine index = (Q9 / 4) x 100

**MBQ Index – Summary Score**

MBQ-C index summary score

MBQ Index summary score is based on the average of index scores for each behaviour.

MBQ-C index summary score = mean (Physical activity index, Energetic play index, Passive screen time index, SEDENTARY passive screen time index, Interactive screen time index, SEDENTARY interactive screen time index, Sleep index, Sleep routine index)