

# Research Knowledge and Skill Builder: **Validating Tools**

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nch

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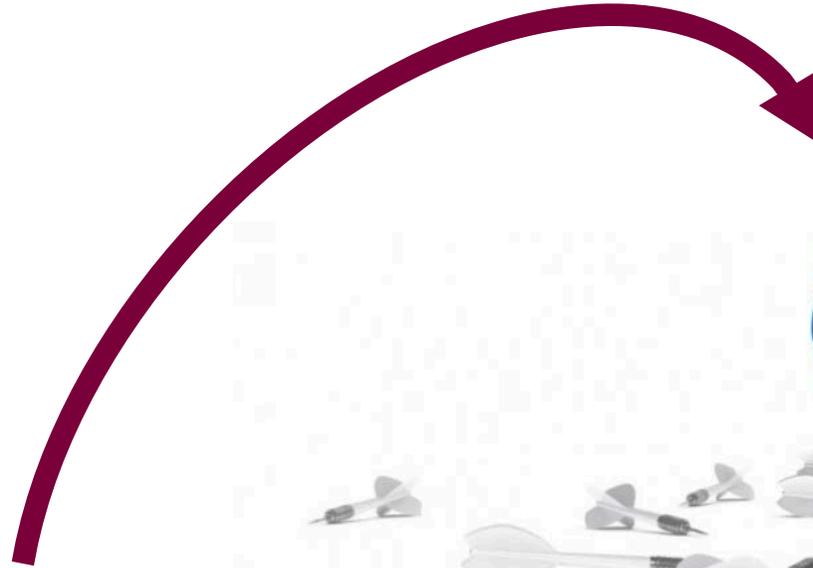
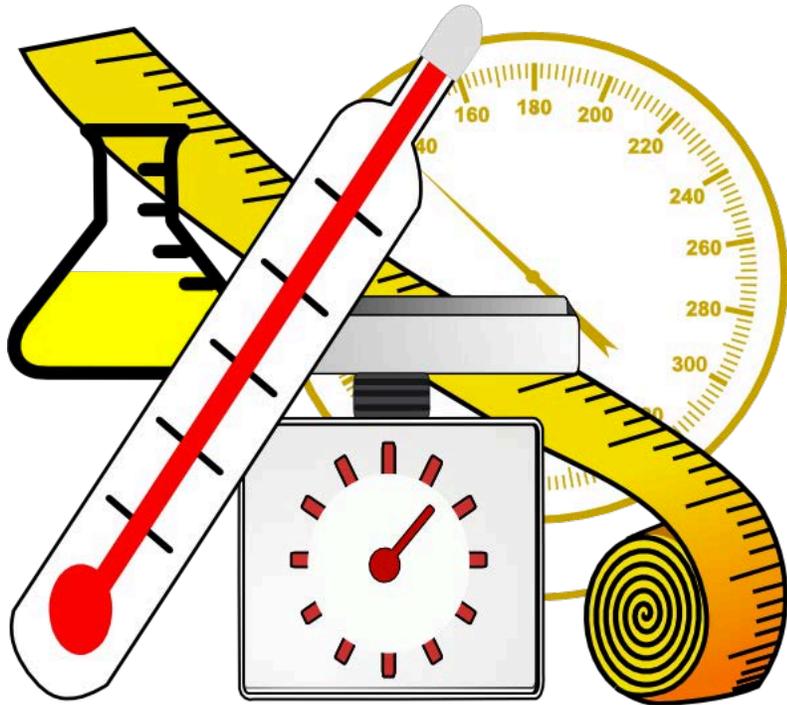
Michael G. DeGroot  
SCHOOL OF MEDICINE

# Objectives of this Session:



- (1) Provide an overview of validity and reliability;
- (2) Highlight the importance of validating research tools;
- (3) Provide examples within INCH of how we have validated tools and test for reliability;
- (4) Facilitate discussion or answer questions.

# Validating Tools



# What are tools?



# What are tools?



 Child's Name: \_\_\_\_\_  
 nipissing district developmental screen Birthdate: \_\_\_\_\_ Today's Date: \_\_\_\_\_

The Nipissing District Developmental Screen is a checklist designed to help monitor your child's development.

- Y N BY EIGHTEEN MONTHS OF AGE, DOES YOUR CHILD:**
- 1 Identify pictures in a book? (*"show me the baby"*)\*
  - 2 Use a variety of familiar gestures? (*waving, pushing, giving, reaching up*)\*
  - 3 Follow directions using "on" and "under"? (*"put the cup on the table"*)\*
  - 4 Make at least four different consonant sounds? (*b, n, d, h, g, w*)\*
  - 5 Point to at least three different body parts when asked? (*"where is your nose?"*)\*
  - 6 Say 20 or more words? (*words do not have to be clear*)
  - 7 Hold a cup to drink? \*\*
  - 8 Pick up and eat finger food?
  - 9 Help with dressing by putting out arms and legs? \*\*
  - 10 Walk up a few stairs holding your hand?
  - 11 Walk alone?
  - 12 Squat to pick up a toy and stand back up without falling?
  - 13 Push and pull toys or other objects while walking forward? A
  - 14 Stack three or more blocks?
  - 15 Show affection towards people, pets, or toys?
  - 16 Point to show you something?
  - 17 Look at you when you are talking or playing together?



**18**  
MONTHS  
English

\* Examples provided are only suggestions. You may use similar examples from your family experience.

\*\* Items may not be common to all cultures.

Helpful link: your health care professional will ask you how you feel about your child's development or well-being. See www.nipissing.ca for more information. Information on this page is for informational purposes only. It is not intended to be used as a substitute for professional medical advice. © 2011 Nipissing District Developmental Screen. Intellectual Property Association. All rights reserved.








The following activities for your child will help you play your part in your child's development.

 I feel safe and secure when I know what is expected of me. You can help me with this by following routines and setting limits. Praise my good behaviour.

 I want to do things just like you. Let me have toys so I can pretend to have tea parties, dress up, and play mommy or daddy. I like new toys, so find the local toy lending library or play groups in our community.

 I like toys that I can pull apart and put back together—large building blocks, containers with lids, or plastic links. Talk to me about what I am doing using words like "push" and "pull".

I'm not too little to play with large crayons. Let's scribble and talk about our art work.

 I am learning new words every day. Put pictures of people or objects in a bag and say "1, 2, 3, what do we see?" and pull a picture from the bag.

Pretend to talk to me on the phone or encourage me to call someone.

 Don't be afraid to let me see what I can do with my body. I need to practise climbing, swinging, jumping, running, going up and down stairs, and going down slides. Stay close to me so I don't get hurt.

Play some of my favourite music. Encourage me to move to the music by swaying my arms, moving slowly, marching to the music, hopping, clapping my hands, tapping my legs. Let's have fun doing actions while listening to the music.

Let me play with balls of different sizes. Take some of the air out of a beach ball. Watch me kick, throw, and try to catch it.

 Help me to notice familiar sounds such as birds chirping, car or truck motors, airplanes, dogs barking, sirens, or splashing water. Imitate the noise you hear and see if I will imitate you. Encourage me by smiling and clapping.

I like simple puzzles with two to four pieces and shape-sorters with simple shapes. Encourage me to match the pieces by taking turns with me.

*I enjoy exploring the world, but I need to know that you are close by. I may cry when you leave me with others, so give me a hug and tell me you will be back.*

*I may get ear infections. Talk to my doctor about signs and symptoms.*

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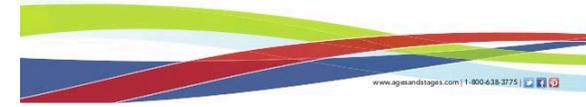
Screening with a valid, reliable tool helps you check that children's development is on track, identify strengths and needs, and plan learning activities that help the kids in your program reach key milestones.

Trusted for nearly 20 years, ASQ-3™ is a quick, family-friendly screener that makes it easy to check child development. This practical toolkit will help you get started with ASQ-3! Use these handouts, checklists, charts, and other resources to learn about ASQ-3, involve families in the screening process, and track child development. You'll also learn from the success stories of programs like yours and see how they used ASQ-3 to enhance their current practices.

Whether you're new to screening or looking to improve your existing program, these resources will help you take full advantage of everything ASQ-3 has to offer.

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- All About ASQ-3 ..... PAGE 23
- Order ASQ-3 ..... BACK COVER



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# What are tools?



## PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Over the last 2 weeks, how often have you been bothered by any of the following problems?  
(use "✓" to indicate your answer)

|   | Not at all | Several days | More than half the days | Nearly every day |
|---|------------|--------------|-------------------------|------------------|
| 1. Little interest or pleasure in doing things  | 0          | 1            | 2                       | 3                |
| 2. Feeling down, depressed, or hopeless   | 0          | 1            | 2                       | 3                |
| 3. Trouble falling or staying asleep, or sleeping too much  | 0          | 1            | 2                       | 3                |
| 4. Feeling tired or having little energy  | 0          | 1            | 2                       | 3                |
| 5. Poor appetite or overeating  | 0          | 1            | 2                       | 3                |
| 6. Feeling bad about yourself...or that you are a failure or have let yourself or your family down  | 0          | 1            | 2                       | 3                |
| 7. Trouble concentrating on things, such as reading the newspaper or watching television  | 0          | 1            | 2                       | 3                |
| 8. Moving or speaking so slowly that other people could have noticed. Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual | 0          | 1            | 2                       | 3                |
| 9. Thoughts that you would be better off dead, or of hurting yourself   | 0          | 1            | 2                       | 3                |

add columns     +  +

(Healthcare professional: For interpretation of TOTAL, please refer to accompanying scoring card). TOTAL:

|  |                      |       |
|--|----------------------|-------|
| 10. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people? | Not difficult at all | _____ |
|  | Somewhat difficult   | _____ |
|  | Very difficult       | _____ |
|  | Extremely difficult  | _____ |

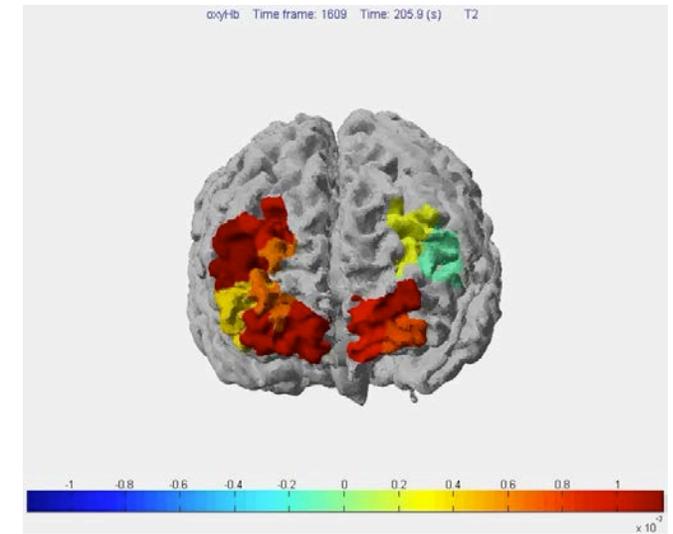
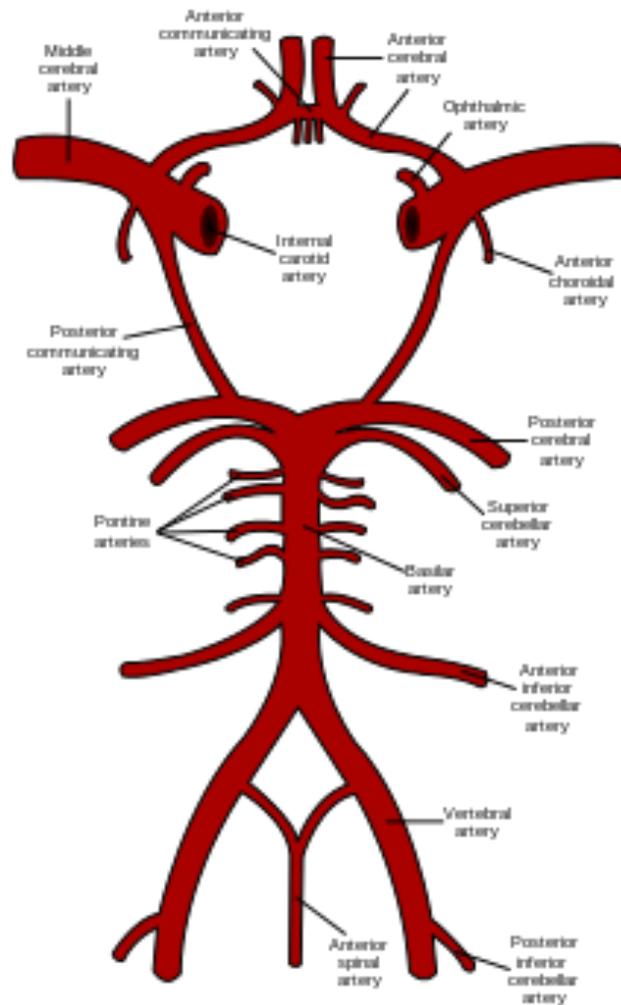
Copyright © 1999 Pfizer Inc. All rights reserved. Reproduced with permission. PRIME-MD is a trademark of Pfizer Inc. A2663B 10-04-2005

Name: \_\_\_\_\_ Date: \_\_\_\_\_

For all questions, please circle the answer most commonly related to you. Questions 3 and 6 automatically receive a score of one if the preceding question was 'none of the time'.

| In the past four weeks:  | None of the time | A little of the time | Some of the time | Most of the time | All of the time |
|--|------------------|----------------------|------------------|------------------|-----------------|
| 1. About how often did you feel tired out for no good reason?                | 1                | 2                    | 3                | 4                | 5               |
| 2. About how often did you feel nervous?                                     | 1                | 2                    | 3                | 4                | 5               |
| 3. About how often did you feel so nervous that nothing could calm you down? | 1                | 2                    | 3                | 4                | 5               |
| 4. About how often did you feel hopeless?                                    | 1                | 2                    | 3                | 4                | 5               |
| 5. About how often did you feel restless or fidgety?                         | 1                | 2                    | 3                | 4                | 5               |
| 6. About how often did you feel so restless you could not sit still?         | 1                | 2                    | 3                | 4                | 5               |
| 7. About how often did you feel depressed?                                   | 1                | 2                    | 3                | 4                | 5               |
| 8. About how often did you feel that everything is an effort?                | 1                | 2                    | 3                | 4                | 5               |
| 9. About how often did you feel so sad that nothing could cheer you up?      | 1                | 2                    | 3                | 4                | 5               |
| 10. About how often did you feel worthless?                                  | 1                | 2                    | 3                | 4                | 5               |
| <b>Total:</b>  |                  |                      |                  |                  |                 |

# What are tools?



# Features of a Good Outcome Measure

Understanding the basics of reliability and validity

# Features of Good Outcome Measures



- Reliability – the extent to which an instrument yields the same results in repeated administrations in a stable population
- Validity – the extent to which an instrument measures what it is intended to measure
- Sensitivity to Change – the ability to measure change
- Responsiveness – the ability to measure clinically meaningful change

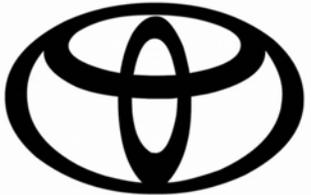
# Features of Good Outcome Measures



- **Reliability** – the extent to which an instrument yields the same results in repeated administrations in a stable population
- **Validity** – the extent to which an instrument measures what it is intended to measure
- Sensitivity to Change – the ability to measure change
- Responsiveness – the ability to measure clinically meaningful change

# What is reliability

- **Reliability** – the extent to which an instrument yields the same results in repeated administrations in a stable population



Fundamental way to reflect the amount of error both random and systematic, inherent in any measurement

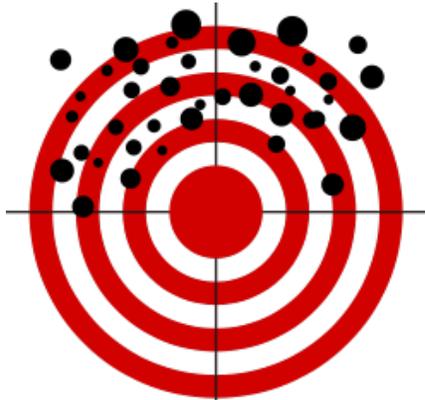
- Error occurs – in every context, but we want to ensure that we limit variability

# What is validity

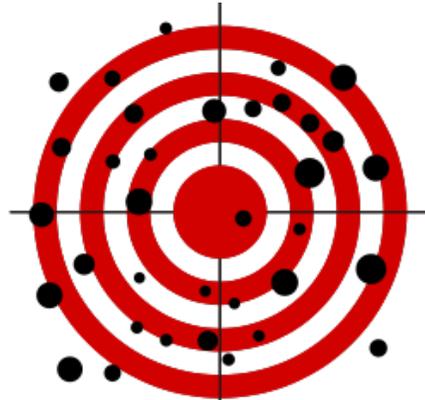
- **Validity** – the extent to which an instrument measures what it is intended to measure
- To get at what is being measured and the relationship of that variable to the purported cause
  - Quantifying something that cannot be easily observed and measured directly



# Illustration of Validity & Reliability



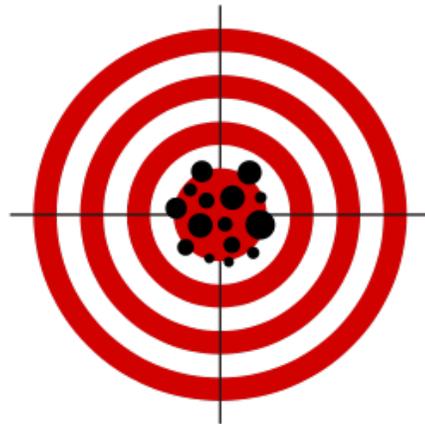
Unreliable & Invalid



Unreliable, But Valid



Reliable, Not Valid



Both Reliable & Valid

Unreliable & Not Valid  
**Not precise nor accurate**

Unreliable but Valid  
**Not precise but accurate**

Reliable but Not Valid  
**Precise but not accurate**

Reliable & Valid  
**Precise and accurate**

# Reliability

- **Intra-rater** – within-rater agreement
  - e.g. TA 1 grades same assignment (consistency between ratings)
- **Inter-rater** – between raters
  - e.g. TA 1 and TA 2 grade same assignment (consistency between raters)
- **Test-retest** – between administrations
  - e.g. Administer PLAYtool at time 1 and again 2 weeks later (stability of administration)
- **Internal Consistency** – between items (are items tapping into the same construct)
  - e.g. 10 item QoL scale  $\rightarrow 0.7 < \alpha < 0.9$

# Measuring Validity

- **Criterion** – behaves as expected compared to gold/reference standard or other like measures (**predictive/concurrent**)
  - e.g. Self-report PA measure to doubly-labeled water
  - e.g. 20m shuttle run → cycle ergometer ( $\text{VO}_2$  max)
- **Construct** – behaves as expected to accurately represent reality (**convergent/discriminant**)
  - e.g. Depression – data structure to represent the affective and behavioural domains
- **Face** – perceived as something that accurately represent reality
  - e.g. Quality of Life – interdisciplinary expert panel ratings



Family Medicine



# Canadian Campus Wellness Survey (CCWS)



Canadian Campus Wellbeing Survey | Bien-Être sur les Campus Canadiens

# CCWS: Context

**Okanagan Charter:** Engaging higher education institutions to advance the health-promoting campuses movement within Canada

- Robust data required to take a 'whole campus' approach to wellbeing.
- ***In the absence of a Canadian surveillance mechanism***, Canadian institutions have participated in the National College Health Assessment service of the American College Health Association (NCHA-ACHA).



# Vision of CCWS

- Long-term vision is building and implementing a comprehensive and coordinated Canadian Post-secondary Health Surveillance System
- To create a campus-based data collection and knowledge exchange system designed to inform and guide the

1. development,
2. evaluation, and
3. targeting

of programs, policies and resources designed to promote wellbeing among students (*staff and faculty*).



# Rowing in the same direction

- NSSE/Undergraduate Experience Survey
- Campus Climate Survey
- CPADS (Canadian Postsecondary Education Alcohol and Drug use Survey (CPADS))
- Bell Let's Talk and The Rossy Family Foundation commit \$1 million to develop a national standard for post-secondary student mental health with the Mental Health Commission
  - **With plans to develop an institutional audit tool**



# Measures of Student Wellness

## 1. Campus-level

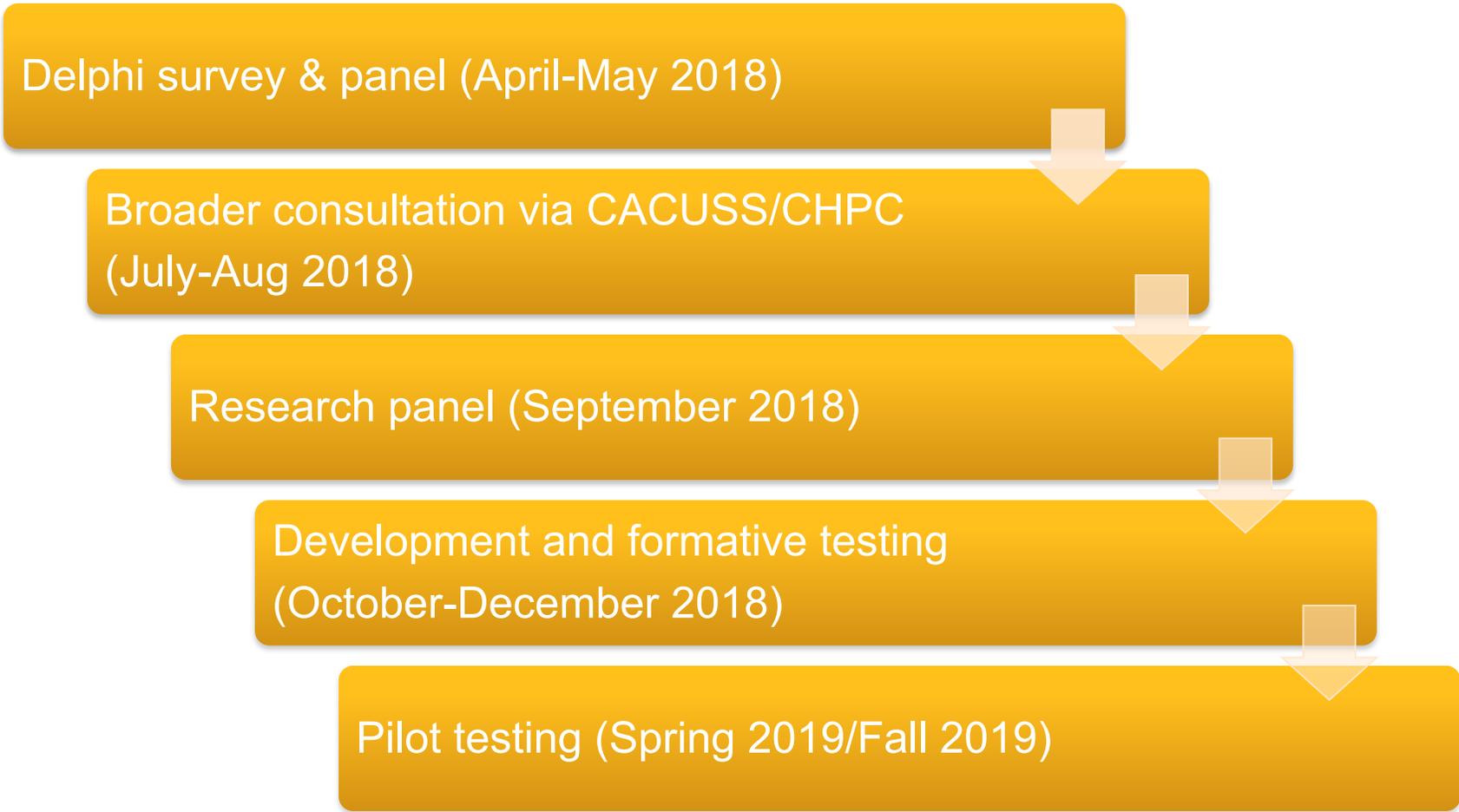
- Programs and Policies Audit

## 2. Student-level

- Canadian Campus Wellbeing Survey (CCWS)

Primary Task: Develop a comprehensive yet succinct tool that can reliably assess student wellness across a variety of PS contexts





# Development Process

- 19 panelists (26 perspectives); 12 post-secondary institutions; 5 provinces
  - Student Service Stakeholders
- 3-round Delphi: 9 sections and associated indicators generated from existing population surveys
  - National College Health Assessment (NCHA)
  - Healthy Minds Study (HMS)
  - Positive Health Surveillance Indicator Framework (from PHAC)
  - Canadian Health Measures Survey (CHMS)

***What are the most salient themes and indicators?***



| Round 1  |    | Round 2 M(SD)   | Round 3 M(SD)  | Final M(SD)  |
|--|----|---|--|--|
| Mental health assets   | 1  | Mental health assets<br>1.7(1.3)  | Campus climate and culture<br>(i.e., social determinants of<br>health 2.8(1.2) | Mental health assets<br>1.7(0.9)   |
| Mental health deficits   | 2  | Campus climate and culture<br>4.0(2.1)                                  | Mental health assets<br>2.8(1.6)   | Campus climate and culture<br>(i.e., social determinants of<br>health 2.0(1.1) |
| Mental health service<br>utilization/help-seeking<br>on campus | 3  | Mental health deficits<br>4.2(2.4)                                      | Mental health deficits<br>3.9(2.6)   | Mental health deficits<br>3.3 (1.5)  |
| Campus climate and<br>culture                                  | 4  | Physical health and health<br>behaviours 4.3(1.9)                       | Mental health service<br>utilization/help-seeking on<br>campus 4.3(1.5)        | Mental health service<br>utilization/help-seeking on<br>campus 4.1(1.0)        |
| Substance use  | 5  | Mental health service<br>utilization/help-seeking on<br>campus 4.3(2.2) | Physical health and health<br>behaviours 4.8(2.2)                              | Physical health and health<br>behaviours 4.9(1.4)                              |
| Eating and body image  | 6  | Academic achievement<br>5.4(2.9)  | Academic achievement<br>5.5(1.3)   | Academic achievement<br>5.4(1.5)   |
| Sexual health behavior   | 7  | Substance use 5.9(1.6)  | Substance use 6.6(1.3)   | Substance use 6.7(0.8)   |
| Academic achievement   | 8  | Eating and body image<br>7.3(1.2)                                       | Eating (nutrition) and body<br>image 8.5(1.6)                                  | Eating (nutrition) and body<br>image 7.6(0.6)                                  |
| Physical health and<br>health behaviours                       | 9  | Sexual health behavior<br>7.5(1.6)                                      | Sexual health behavior<br>9.7(1.7)   | Sexual health behavior<br>9.0(0.3)   |
|  | 10 |   | Adverse childhood<br>experiences 11.7(2.1)                                     | Adverse childhood<br>experiences 9.68(0.9)                                     |



# May Panel Meeting, UBC



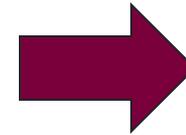
Canadian Campus Wellbeing Survey | Bien-Être sur les Campus Canadiens

Family Medicine



# Measurement Expert Meeting, Toronto September 2018

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|--|---------|---|--|-------|--|-------|
| Mental health assets   | 1       | Mental health assets<br>1.7(1.3)  | Campus climate and culture<br>(i.e., social determinants of<br>health 2.8(1.2) |       | Mental health assets<br>1.7(0.9)   |       |
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| Mental health service<br>utilization/help-seeking<br>on campus | 3       | Mental health deficits<br>4.2(2.4)                                      | Mental health deficits<br>3.9(2.6)   |       | Mental health deficits<br>3.3(1.5)   |       |
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| Substance use  | 5       | Mental health service<br>utilization/help-seeking on<br>campus 4.3(2.2) | Physical health and health<br>behaviours 4.8(2.2)                              |       | Physical health and health<br>behaviours 4.9(1.4)                              |       |
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| Physical health and<br>health behaviours                       | 9       | Sexual health behavior<br>7.5(1.6)                                      | Sexual health behavior<br>9.7(1.7)   |       | Sexual health behavior<br>9.0(0.3)   |       |
|  | 10      |   | Adverse childhood<br>experiences 11.7(2.1)                                     |       | Adverse childhood<br>experiences 9.68(0.9)                                     |       |



- Operationalize indicators
- Identify valid/reliable measures
- Identify measures within population databases



# Example Case: Mental Health Asset

| Round 1              | Round 2 | M(SD)                            | Round 3  | M(SD) | Final                            | M(SD) |
|----------------------|---------|----------------------------------|--|-------|----------------------------------|-------|
| Mental health assets | 1       | Mental health assets<br>1.7(1.3) | Campus climate and culture<br>(i.e., social determinants of<br>health 2.8(1.2) |       | Mental health assets<br>1.7(0.9) |       |

## Flourishing (14 items; Keyes, 2005)

- (i) happy,
- (ii) interested in life,
- (iii) satisfied...

## Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (14 items; Stewart-Brown et al. 2008)

- (i) I've been feeling useful
- (ii) I've been thinking clearly
- (iii) I've been interested in new things



# Validation of WEMWBS

Validation to date has been performed in the UK with those aged 16 and above. WEMWBS was initially validated in student samples recruited at the universities of Warwick and Edinburgh in 2006, and subsequently discussed by two mini-focus groups in Scotland and England (Tennant *et al.*, 2006; Tennant *et al.*, 2007). WEMWBS was then included in two national Scottish population surveys in 2006 allowing validation using population data.

Table 1 below lists whether or not the psychometric tests involved in validating a scale have been performed on WEMWBS and if so the sample(s) used. Details of the results are given on the following pages.

**Table 1: Psychometric testing of WEMWBS**

| Psychometric test                    | Tested | Sample   |
|--------------------------------------|--------|--|
| Principal components factor analysis | ✓      | Student population samples & Scottish general population samples   |
| Construct validity                   | ✓      | Student population samples & Scottish general population samples   |
| Internal consistency                 | ✓      | Student population samples & Scottish general population samples   |
| Test-retest reliability              | ✓      | Student population samples   |
| Response Bias                        | ✓      | Student population samples   |
| Face (or content) validity           | ✓      | WEMWBS research advisory group & Focus groups  |
| Rasch analysis                       | ✓      | Scottish general population samples  |
| Sensitivity to change                | x      | Currently being assessed   |
| Criterion validity                   | x      | 'Gold standard' measure to assess WEMWBS against does not currently exist  |
| Cross-cultural validity              | x      | Interest has been expressed in using WEMWBS in other countries. An Icelandic version has been created by translation and back-translation. |

# Criterion Validity

**Table 2: Correlation of WEMWBS to other scales**

| <b>Scale</b>  | <b>n</b> | <b>Correlation with WEMWBS<sup>α</sup></b> |
|---|----------|--|
| WHO-Five Well-being Index                                 | 79       | 0.77**                                     |
| Short Depression Happiness Scale                          | 71       | 0.76**                                     |
| Positive and Negative Affect Scale<br>– Positive Subscale | 63       | 0.73*                                      |
| Positive and Negative Affect Scale<br>– Negative Subscale | 63       | -0.55**                                    |
| Satisfaction With Life Scale                              | 79       | 0.72**                                     |
| Global Life Satisfaction Scale                            | 77       | 0.55**                                     |
| Scale of Psychological Well-being                         | 63       | 0.73**                                     |
| EQ-5D Thermometer   | 72       | 0.42**                                     |
| Emotional Intelligence Scale                              | 67       | 0.51**                                     |

<sup>α</sup> Pearson's correlation coefficient

\* => significant at 0.05 level

\*\* => significant at 0.01 level

# Test of Reliability

## Internal consistency

Considers whether the scale describes a consistent underlying theme – in this case, it considers the extent to which WEMWBS's items are focused on assessing mental well-being. Scores range from 0 to 1 and are measured by Cronbach's alpha coefficient. The higher the co-efficient, the more highly correlated the items in the scale. A coefficient of 0.7-0.8 is ideal (Nunnally, 1978), and higher coefficients may suggest that some degree of item redundancy exists in the scale.

Cronbach's alpha coefficient = 0.89 (n = 348).

This high coefficient suggests that, while there is a good level of internal consistency, there may be scope to reduce even further the number of items in the scale (analyses are currently underway to explore the potential for a shortened scale, see section 10)

## Test-retest reliability

Considers the stability of responses over a period of time. Test-retest reliability is determined by calculating the correlation between two sets of scores for the same group of people who repeat the test after a set period of time. For WEMWBS, the time period was one week.

Correlation<sup>α</sup> = 0.83 after one week (n = 124)

<sup>α</sup>Intra-class correlation coefficient

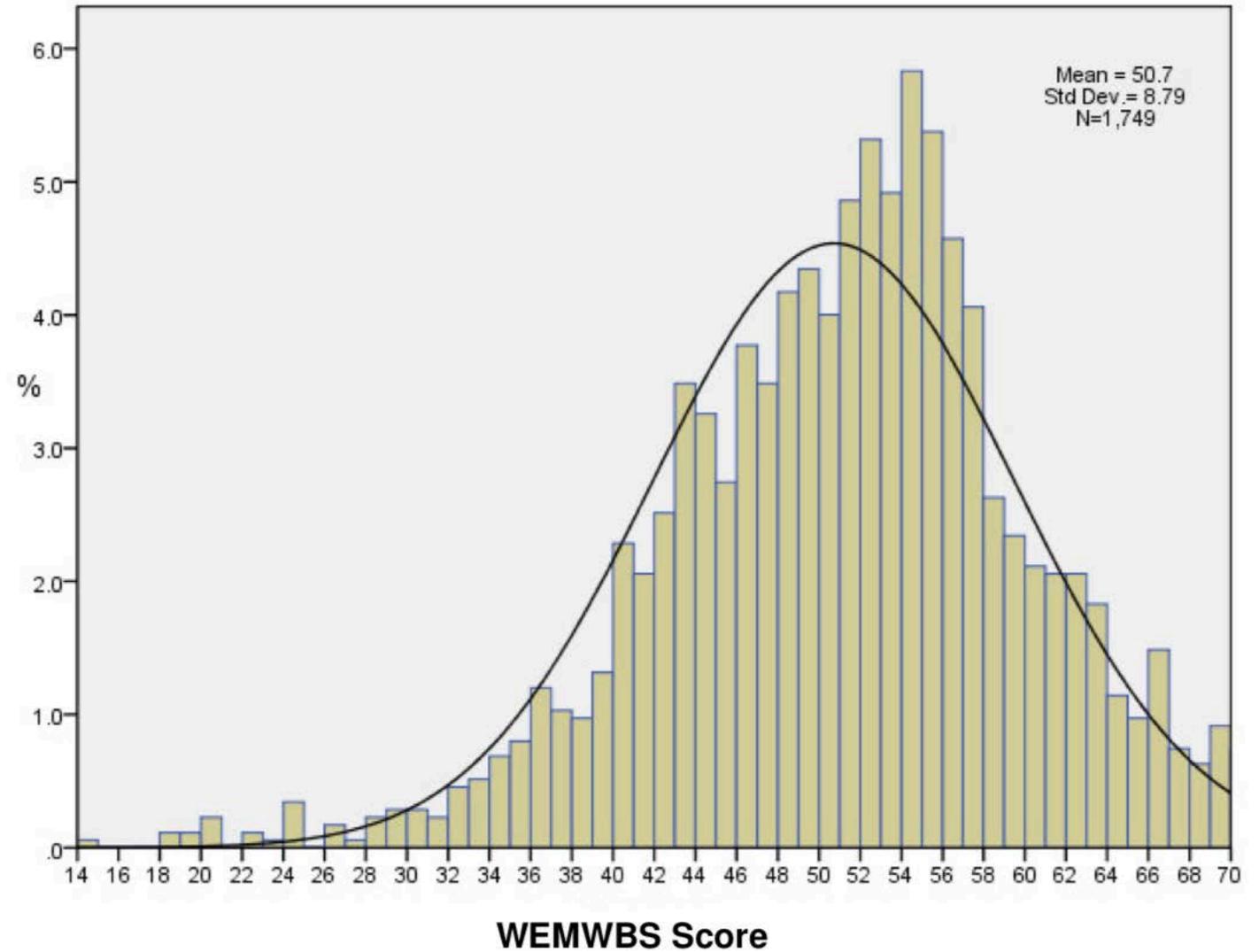
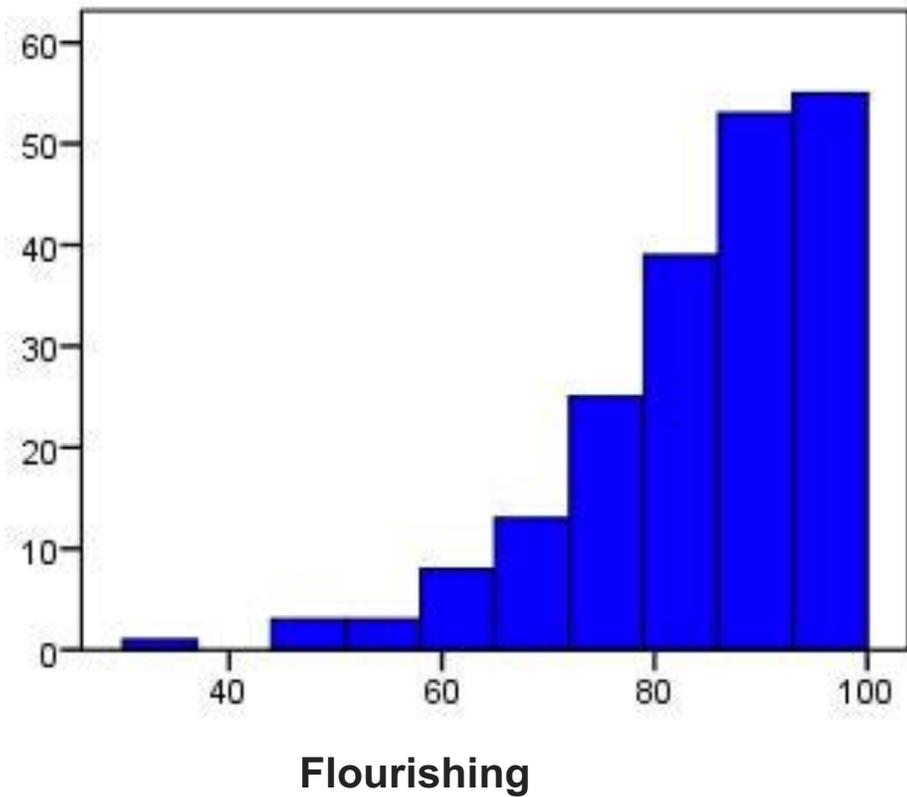
The test-retest reliability score was high for WEMWBS after one week. This suggests that the transient fluctuations that a person may experience from one day to the next are not reflected in the scores, and these scores remain robust over a short period of time.

# Measured in the Scottish Health Education Population Survey (N= 2075)

Analysis of combined data from these two population surveys (n = 2075 for the combined datasets, with complete WEMWBS scores for n = 1749 and complete GHQ 12 scores for n = 1239) have confirmed the findings of the student validation (Tennant *et al.*, 2007):

- verification of a pre-hypothesised single underlying factor (n = 1749)
- Cronbach's alpha = 0.91 (n = 1749), again indicating that while there is a good level of internal consistency, there may be scope to reduce the number of items in the scale even further
- good performance against accepted criteria, discriminating population groups largely as expected and in a way consistent with other population surveys (see section 7 and Appendix iii)
- significant moderate negative correlation to the General Health Questionnaire 12 (GHQ 12) (see section 7).

**Figure 2: Distribution of WEMWBS scores for the combined HEPS (wave 12) and Well? 2006 datasets (n = 1749)**



# Next Steps for CCWS



- Pilot testing content (Think Aloud)
- Test-Retest of CCWS (UBC & Humber College)
- CACUSS: Panel discussion to university services (June)
- Formal Piloting: BC Gov't funding all postsecondary schools to administer the CCWS in Fall 2019.
- Development of a corresponding institutional audit tool





Family Medicine



# Physical Literacy

PLAYfun Tool



# Physical Literacy

- **Physical Literacy** refers to the **competence, confidence, motivation, knowledge and understanding necessary for continued engagement in physical activity** (IPLC, 2014)
  - Multidimensional construct
  - Measuring physical literacy using valid and reliable tools
    - Physical Literacy Assessment for Youth (PLAY) tools
    - Canadian Physical Literacy Assessment (CAPL)



# Physical Literacy Assessment for Youth (PLAY tools)

- Collection of workbooks, forms and score sheets, which comprise the tools designed to assess physical literacy in children and youth.
- Assess individuals **aged 7 and up** and track physical literacy over time.





Physical Literacy  
Assessment  
for Youth

## Domains

### – Physical

- Competence
- Environments
- Diversity

### – Cognitive/Affective

- Comprehension
- Self-efficacy
- Worry
- Confidence

### – Behavioural

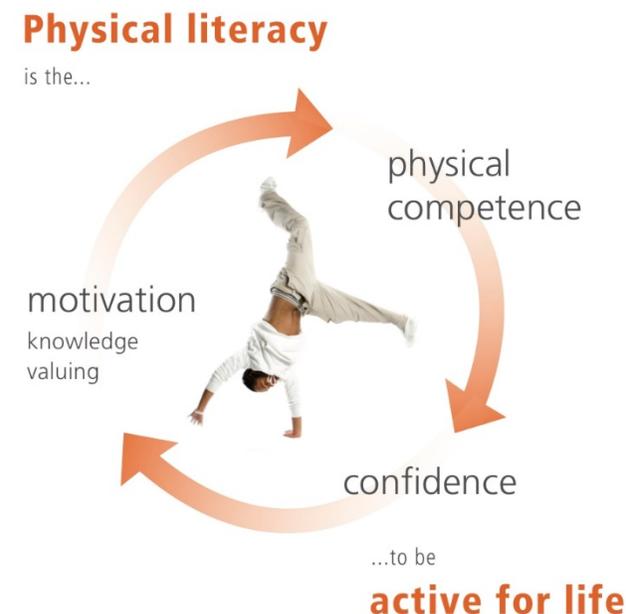
- Participation

## Tools

- **PLAY Fun**
  - Motor Competence
  - Confidence
  - Comprehension of terms
- **Perception**
  - **PLAY** Self
  - **PLAY** Parent
  - **PLAY** Coach
- **Participation/ Behaviour**
  - **PLAY** Inventory
    - Number of activities
    - Environment

# PLAYfun tool

- Assessment of 18 tasks that cover key **movement skills** across 5 domains
  - Running
  - Locomotor
  - Object Control – Upper Body
  - Object Control – Lower Body
  - Balance, Stability, & Body Control



# Tasks

1. Run a square
2. Run there and back
3. Run, jump, then land on two feet
4. **Crossovers**
5. **Skip**
6. **Gallop**
7. **Hop**
8. **Jump**
9. **Overhand throw**
10. **Strike with stick**
11. **One-handed catch**
12. **Hand dribble stationary & moving forward**
13. **Kick ball**
14. **Foot dribble moving forward**
15. **Balance walk (heel-to-toe) forward**
16. **Balance walk (heel-to-toe) backward**
17. **Drop to ground & back up**
18. **Lift & lower**

# Domains

1. Running
2. **Locomotor**
3. **Object control – upper body**
4. **Object control – lower body**
5. **Balance, stability, and body control**

# PLAYfun Scoring Form

| Task   | Competence |          |           |            |
|--|------------|----------|-----------|------------|
|  | Developing |          | Acquired  |            |
|  | Initial    | Emerging | Competent | Proficient |
| 1. Run a square                              |            |          | X         |            |
| 2. Run there and back                        |            |          |           |            |
| 3. Run, jump, then land on two feet          |            |          |           |            |
| 4. Crossovers                                |            |          |           |            |
| 5. Skip                                      |            |          |           |            |
| 6. Gallop                                    |            |          |           |            |
| 7. Hop                                       |            |          |           |            |
| 8. Jump                                      |            |          |           |            |
| 9. Overhand throw                            |            |          |           |            |
| 10. Strike with stick                        |            |          |           |            |
| 11. One-handed catch                         |            |          |           |            |
| 12. Hand dribble stationary & moving forward |            |          |           |            |
| 13. Kick ball                                |            |          |           |            |
| 14. Foot dribble moving forward              |            |          |           |            |
| 15. Balance walk (heel-to-toe) forward       |            |          |           |            |
| 16. Balance walk (toe-to-heel) backward      |            |          |           |            |
| 17. Drop to ground & back up                 |            |          |           |            |
| 18. Lift and lower                           |            |          |           |            |

# PLAYfun tool

- **Establishing Reliability**

- INCH lab training workshops (1.5 – 2 day)

- Introduction to Physical Literacy

- Multidimensional nature of the construct

- Use of videos

- Group and individual scoring

- Hands-on practice

- Familiarity of administration and scoring

- **Assessment of inter-rater reliability**

- Everyone assesses the same children (n = 10) individually

# PLAYfun Training Video - Skipping



# PLAYfun tool

## • Inter-rater reliability/agreement

- Intraclass correlation (ICC) was good (0.87)
  - INCH members generally assessing the same children at the same “level” of movement competence
    - Doesn’t matter who does the assessment
  - Necessary for testing in multiple settings and locations
    - Gym, large or small space, different cities
  - Necessary for assessing change overtime
    - Impact of interventions
  - Physical Literacy for Communities project (PL4C)
    - 6 communities across Canada, tracking ~2000 grade 2-3 children over 3-5 years

| Task   | Competence |          |           |            |
|--|------------|----------|-----------|------------|
|  | Developing |          | Acquired  |            |
|  | Initial    | Emerging | Competent | Proficient |
| 1. Run a square                              |            |          | X         |            |
| 2. Run there and back                        |            | X        |           |            |
| 3. Run, jump, then land on two feet          |            | X        |           |            |
| 4. Crossovers                                |            |          |           |            |
| 5. Skip                                      |            |          |           |            |
| 6. Gallop                                    |            |          |           |            |
| 7. Hop                                       |            |          |           |            |
| 8. Jump                                      |            |          |           |            |
| 9. Overhand throw                            |            |          |           |            |
| 10. Strike with stick                        |            |          |           |            |
| 11. One-handed catch                         |            |          |           |            |
| 12. Hand dribble stationary & moving forward |            |          |           |            |
| 13. Kick ball                                |            |          |           |            |
| 14. Foot dribble moving forward              |            |          |           |            |
| 15. Balance walk (heel-to-toe) forward       |            |          |           |            |
| 16. Balance walk (toe-to-heel) backward      |            |          |           |            |
| 17. Drop to ground & back up                 |            |          |           |            |
| 18. Lift and lower                           |            |          |           |            |

# PLAYfun tool

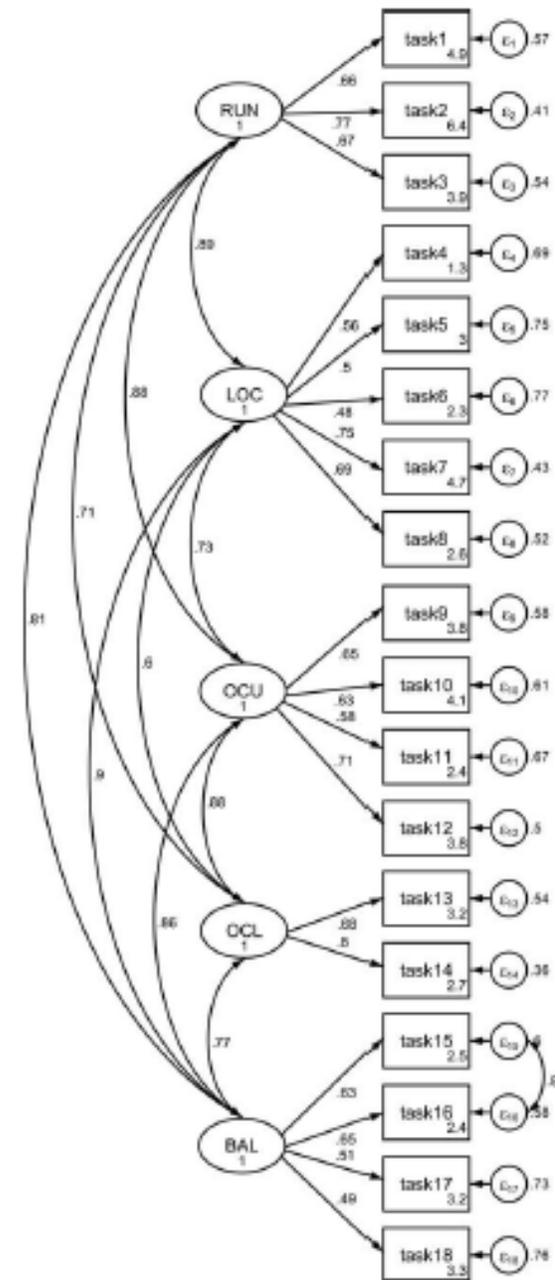
- **Establishing Construct Validity**

- Does PLAYfun assess different domains of motor competence?

- Do the different tasks that make up each domain “map” onto each domain?

- Cairney et al (2018)

- Sample of 215 children across Ontario
- Confirmatory factor analysis confirmed five-factor model of PLAYfun
  - Items map onto unique domains



# PrePLAY tool

- PLAYfun tool limited to children 7 year of age and older
- **PrePLAY → Pre-school Physical Literacy Assessment Tool**
  - 19-items across 3 domains
    - Movement competence, Coordinated movements, Motivation and enjoyment

Compared to other children the same age, how would you rate this child on each of the following skills:

1. Sending upper body (using body only/no equipment; e.g., arms/hands/head):

|                         |                                 |                                     |                            |                                      |
|-------------------------|---------------------------------|-------------------------------------|----------------------------|--------------------------------------|
|                         |                                 |                                     |                            |                                      |
| Does not Display Skills | Displays Skill with Instruction | Displays skills without instruction | Displays with other skills | Displays creativity combining skills |

# PrePLAY tool – Reliability and Validation

- Cairney et al. (2018) – 78 children (19-49 months), brief 45-min training session with Early Childhood Educators across 5 childcare centres in Hamilton
  - **Inter-item reliability was good**
    - Degree items appeared to measure a consistent construct (sending vs. receiving items)
  - **Intra-rater reliability was good**
    - Same rater was consistent overtime
  - **Inter-rater reliability was good**
    - Raters were consistent between each other for the same child
  - **Criterion validity was acceptable**
    - PrePLAY scores similar to gold-standard for assessing gross motor skills in preschool aged children (Peabody Developmental Motor Scale)

# Developing Quality Sport Experiences

A measure for Children and Youth

SSHRC  CRSH

# Sport Experience Measure: Children and Youth (SEM:CY)



Addictive Behaviors

Volume 39, Issue 3, March 2014, Pages 497-506



Sport participation and alcohol and illicit drug use in adolescents and young adults: A systematic review of longitudinal studies

Matthew Kwan <sup>a, b</sup>, Sarah Bobko <sup>c</sup>, Guy Faulkner <sup>d, e</sup>, Peter Donnelly <sup>d</sup>, John Cairney <sup>a, b, d, f, g, h</sup> ✉

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<https://doi.org/10.1016/j.addbeh.2013.11.006>

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- **Blunt measure of sport (i.e., yes/no)**
- **No mention of quality**
- **Not all engagement is good engagement**

# Development Phases

Canadian Sport4Life Summit - Survey & Panel  
(January 2018)

Interviews and Focus Groups with Stakeholders  
(Ongoing)

Qualitative (Thematic) Analysis (Ongoing)

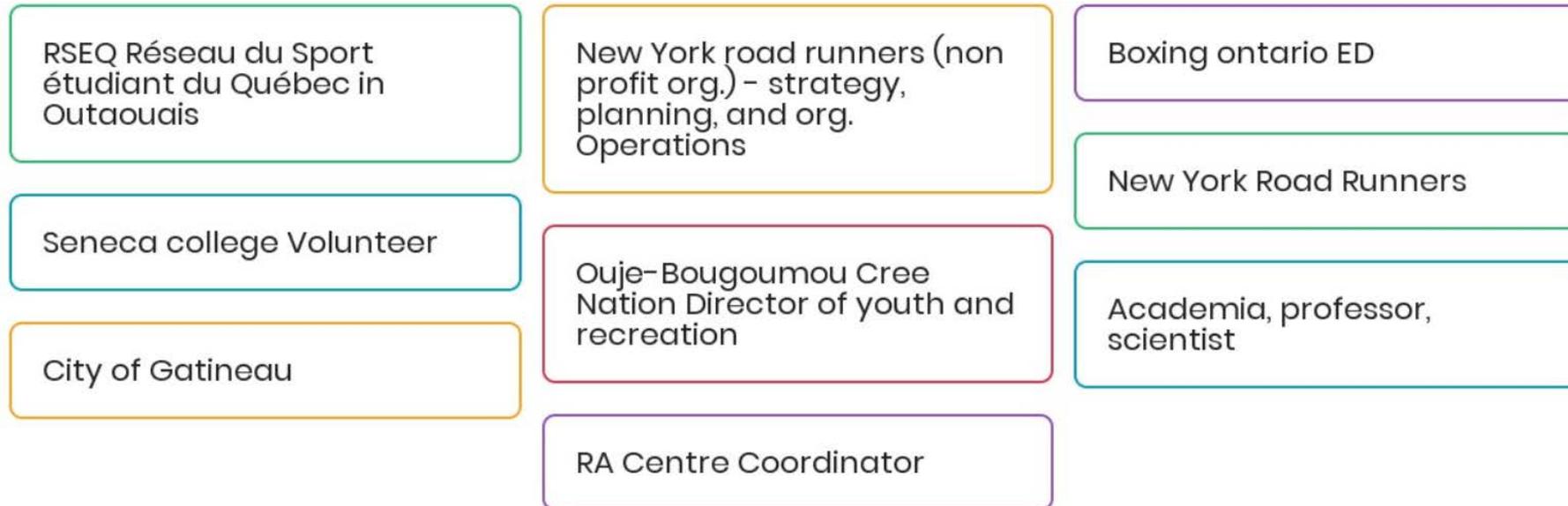
Expert Panel/Consultation (Ongoing)

Item Development/Reduction (Ongoing)

# Development of the SEM:CY

## Phase 1 (Crowd-Sourcing)

- Canadian Sport for Life 2018 – 80 participants



# Development of the SEM:CY

## Phase 1

- How do different stakeholders impact a youth's experience in sport?
- How would you define a quality sport experience in youth?
- Booth + Special session for data collection
  - Paper and pencil survey, video interviews, focus groups, Mentimeter



# Development of the SEM:CY

## Phase 2 (Qualitative Work)

- Identify common themes that define a quality sport experience
  - Interviews and focus groups with different stakeholders within the sport community
    - Coaches, parents, youth, sport policy and community leaders

# Interview Guide 1

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Parents,  
Coaches,  
Community  
Leaders



---

What does a quality sport experience mean to you?

---

What do you feel are some key ingredients of a quality sport experience?

---

How do you feel that ... **coaches/parents/teammates** ... can impact a youth's experience in sport?

---

What does it look like when a youth is having a quality sport experience?

---

Out of all of the stakeholders, which group do you feel has the biggest impact on a youth's experience in sport?

---

# Interview Guide Two

## Youth



What are your favourite things about playing sports?

What are some ways that ... **coaches/parents/teammates** can help you have a good experience in sport?

What are some ways that ... **coaches/parents/teammates** ... help you have a good experience in sport?

How important is winning to your ... **coach/parents/teammates**?

How important is helping you play better to your ... **coach/parents/teammates**?

What are some things that you have learned in sport?

# Development of the SEM:CY

- **Phase 3 → Expert Panel**
  - Based on overarching themes
    - Did we miss anything? If so, go back and do Phases 2 + 3 again?
- **Phase 4 → Item generation**
  - Item reduction 1 – INCH team + experts in the field
  - Item reduction 2 – Factor analysis and/or structural equation modelling

# Development of the SEM:CY



- Phase 5 – Test items against other measures (is this even possible though if others don't exist)?
- Phase 6 – Collect data across a variety of positive youth development outcomes to verify quality sport leads to them?

# Summary:

- Important to consider validation and reliability of research tools – rigorous (sometimes onerous) yet necessary process
- Provided different examples of how we examine validity and reliability for projects within INCH
- Prompted some thinking about how validating tools and testing for reliability may be applicable in your specific projects



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# Family Medicine



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