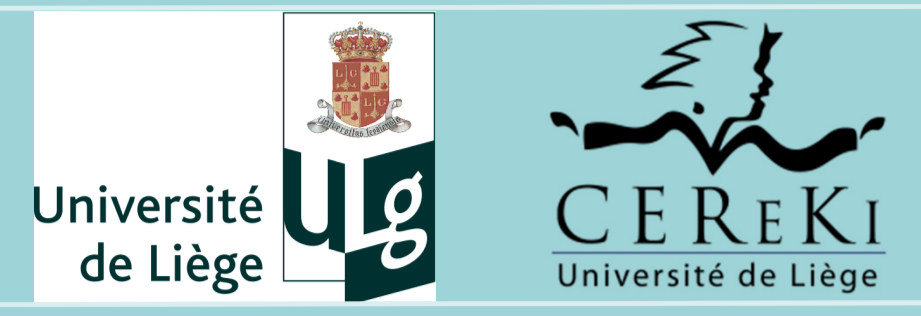
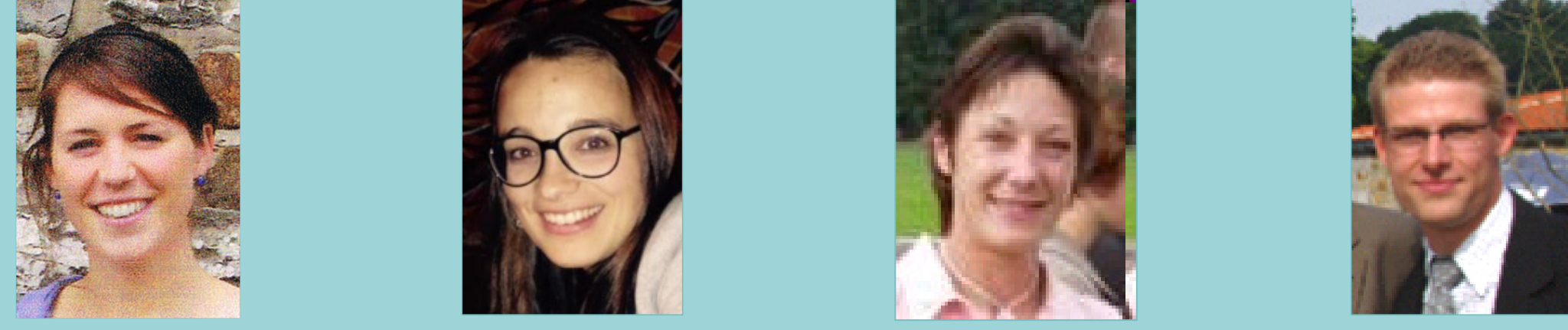


# Water familiarization testing battery adapted for young children



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## INTRODUCTION

The degree of development required to learn a swimming style is not reached before the age of five to six years old (1, 2).

⇒ Before that age, it is very interesting to discover the aquatic environment to **develop specific skills** (2, 3) :

Entering into the water – Immersion – Floatation – Breathing – Propulsion



Not satisfied by the existing water familiarization testing batteries, only evaluating a global level, we elaborated a **testing battery** able to assess the children with an increased precision.

## METHODS

**Quick**  
20 minutes for a group of 5 children

**Video Recorded**  
Allow to test more children at the same time and in a short time

**Longitudinal follow up**  
Testing sequence was the same for all children and presents an increasing difficulty for the 5 skills.

**Complete evaluation**  
5 skills evaluated through 20 subtests.

**Based on a "frogs story"**  
Playful

**3 depth level**

- 1) Paddling pool (±30cm)
- 2) Play pool (±80cm)
- 3) Deep pool (<200cm)

**Accessible to most swimming pools**

- Only usual and light equipment
- Need only one lane

**The testing battery**

- o Testing battery with 20 subtests was identical for all children.
- o According to children performance, a **score** is attributed for each subtest.
- o The sum of all scores gives a total score, representing the **water familiarisation level**.
- o **250 children** from 18 kindergarten classrooms have achieved the testing battery. They were allocated into **three groups** :
  - ▶ Group 1 : < 4yo (n=42)
  - ▶ Group 2 : between 4 and 5yo (n=51)
  - ▶ Group 3 : > 5yo (n=157)

## RESULTS

	Test /max score	Skill categories	GROUP 1 (3-4yo)	GROUP 2 (4-5yo)	GROUP 3 (5-6yo)
<b>Shower</b>	Shower /2	Entering Immersion	2 ± 0	2 ± 0	2 ± 0
	Walking-Running /4	Immersion Propulsion	3,4 ± 0,49	3,8 ± 0,54	3,9 ± 0,9
	Crocodile /4	Floating	3,2 ± 0,9	3,5 ± 0,78	3,8 ± 0,55
<b>Paddling Pool</b>	Bubbles /3	Breathing	2,4 ± 0,85	2,5 ± 0,96	2,8 ± 0,56
	Head Submersion /4	Submersion	1,8 ± 1,06	2,1 ± 1,32	2,9 ± 1,24
	Looking into the water /2	Submersion	0,3 ± 0,67	0,7 ± 0,81	1,1 ± 0,91
	Jump /4	Entering	1,5 ± 1,23	2,3 ± 1,3	3,1 ± 1,26
	Body Submersion /5	Submersion	2,4 ± 1,71	2,9 ± 1,73	3,8 ± 1,41
<b>Play Pool</b>	Repeated bubbles /3	Breathing	1,25 ± 1,05	1,7 ± 1,04	2,2 ± 0,8
	Dorsal Starfish /4	Floating	1,5 ± 1,13	1,9 ± 1,26	2,7 ± 1,31
	Front Starfish /4	Floating	1,3 ± 1,16	2 ± 1,31	2,7 ± 1,22
	Eskimo roll /2	Floating Propulsion	0,1 ± 0,53	0,2 ± 0,62	0,7 ± 0,94
	Push off /6	Submersion Floating	0,4 ± 0,79	1,7 ± 1,76	3,1 ± 2,03
	Collect object /4	Submersion	0,4 ± 1,15	0,9 ± 1,39	2,1 ± 1,76
	Arm propulsion /2	Propulsion	0,8 ± 0,79	1,3 ± 0,75	1,5 ± 0,64
	Leg Propulsion /3	Propulsion	0,5 ± 0,71	0,9 ± 0,92	1,5 ± 1,06
	Dorsal leg propulsion /3	Propulsion	0,4 ± 0,74	0,8 ± 0,83	1,5 ± 1,11
	<b>Deep Pool</b>	Jump /4	Entering	0,5 ± 1,22	1,3 ± 1,37
Submersion /2		Submersion	0,2 ± 0,57	0,4 ± 0,7	1 ± 0,9
Propulsion /2		Propulsion	0,2 ± 0,44	0,7 ± 0,63	1,1 ± 0,63
<b>TOTAL /67</b>			<b>29,55 ± 15,46</b>	<b>37,69 ± 14,73</b>	<b>50,76 ± 14,66</b>

o The testing battery was **successful** to assess and compare the water adaptation level of children from 3 to 6 years old.

o **Linear score progression** was observed from three to six years old for most items.

o However, we observed that very well familiarized children, who were already able to swim, obtained nearly maximal scores... So, for those children, it would be interesting to add an **assessment of the swimming styles**.

o A problem is the very long **time spent to analyze videos**.

## CONCLUSION

o The testing battery elaborated in this present study appears to be an **effective method to assess the five skills implicated in children water familiarization**. Reference datas have been established for each age and could be used to **detect backwardness** or to verify a program effectiveness.

o The testing battery needs to be improved... Including **swimming style assessment**.  
 Evaluation **in live** to avoid video recording and to spare time.

References : 1. Pedroletti, M. (2004). Mon enfant et l'eau. Paris : Amphora Sports

2. Moulin, J-P. (2007). Bébés-nageurs : effets des séances de piscine sur le développement du jeune enfant. *Journal de pédiatrie et de puériculture* 20, 25-28

3. Parker, HE. & Blanksby, BA. (1997). Starting age and aquatic skill learning in young children : Mastery of prerequisite water confidence and basic aquatic locomotion skills. *AUS J Sci Med Sport*. 29, 83-87