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RESEARCH NOTE

Translation and Face Validity of the Portuguese Version of the Pictorial Scale of Perceived Water Competence

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The Pictorial Scale of Perceived Water Competence is a tool used to measure self-perception of water competence in children aged from 5 to 8. The aim of this study was to translate the tool into Portuguese and to evaluate the face validity in 120 children ages from 5 to 8 years from Portugal. Individual interviews were conducted with children to assess familiarity with the 17 Pictorial Scale of Perceived Water Competence aquatic skills and their ability to sequence the scale correctly and logically. Familiarity with aquatic skills (88.2%) and ability to sequence (95.0%) and to logically explain the sequence (97.0%) were high. Nevertheless, these scores were lower ($p < .05$) in the children aged 5. In addition, a dependency relationship between children's familiarity, sequencing, and comprehension of skills with previous aquatic experience was observed when controlled by age—in favor of more experienced children ($p < .05$). The Portuguese version of the Pictorial Scale of Perceived Water

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Competence is well adapted tool for children aged 5–8 years with aquatic experiences and shows very-high level of skill familiarity and good ability to sequence and justify skill progression. However, younger children and those with no previous aquatic experience may have less familiarity and understanding of aquatic skills.

Keywords: swimming, perceived competence, cultural validity, children, aquatic skills

Key Points

- The scale was successfully adapted and understood by Portuguese children aged 5–8.
- Prior aquatic experience improved children's familiarity and understanding of skills.
- Younger children showed lower performance in sequencing and comprehension tasks.

Recently, a group of experts developed an instrument called the "Pictorial Scale of Perceived Water Competence" (PSPWC), which assesses the perceived aquatic competence of children from 5 to 8 years old (Morgado et al., 2020). This tool, for which validation evidence is growing (De Pasquale et al., 2021; D'Hondt et al., 2021; Jidovtseff et al., 2024; Morgado et al., 2020, 2023), is based on 17 aquatic situations covering the main aquatic fundamentals. Each situation is illustrated by images representing three levels of progression for the same situation, from "not able" to "able." The purpose of the tool is to measure how a child assesses themself and perceives their own aquatic skills. The development of this tool is in line with other pictorial tools based on motor competence (Barnett et al., 2015; Estevan et al., 2021) and inspired by Harter's (1978) competence motivation theory and the self-determination theory of Deci & Ryan's (2002). Self-perception of competence plays a key role in several motivational factors, such as the choice to participate in a particular physical activity, the attitude and commitment to physical activity, or even the long-term interest in that activity (Harter, 1982; Ruiz Pérez & Graupera Sanz, 2005).

Children may perceive their own competence as different from one developmental area to another (Harter, 1982). It is therefore relevant to determine perceived competence in specific physical contexts and situations. The area of perceived aquatic competence deserves particular attention because, aside from influencing the motivational component, it can also play a major role in aquatic safety and the risk of accidents and drowning. A child who overestimates his or her aquatic skills could adopt risky behavior and put him or herself in danger. Accidents in and around water are a major concern for children, and a growing body of literature is focusing on the factors that determine the risk of drowning. Children's ability to judge correctly what they are capable of doing in water and to identify hazards is crucial. Of particular interest is the ability to compare children's perceptions with their actual skills to objectively identify children who have an inaccurate assessment of their competence. Costa et al. (2020) recently showed that children's perceived water competence differed significantly from their actual

water competence in several skills, previously identified by Stallman et al. (2017). This is relevant to drowning prevention in the sense that younger children (6–7 years old) were more likely to overestimate their actual water competence.

When studying aquatic skills and drowning prevention, it is important to have instruments that are relevant to the cultural context. There are potentially important differences between countries regarding the characteristics of swimming pools and materials allowed and used, their aquatic programs, and the corresponding teaching approach. The PSPWC was initially developed in English, as this is the language shared by the group of experts who developed it, but it was planned to translate it into several languages (Dutch, French, Portuguese, and Finnish). According to Beaton et al. (2000) a good quality translation takes care to preserve the meaning of the original tool and sometimes needs to be culturally adapted.

In the process of adapting tools to local populations, it is important to translate it into the local language and to check whether the tool is well understood and uses situations that are culturally familiar. This can be achieved by a rigorous process of translation and through a face validation with the targeted population. Face validation is an essential step in the development of quality psychometric tools for children and ensures that the questions are relevant and well understood. In the case of pictorial tools, it is important to ensure that the children understand what the illustrated child is doing and can understand the sequence of images according to their level of ability. The study by Barnett et al. (2015) used this type of procedure to validate the correct understanding of a pictorial instrument for assessing perceived motor competence in land-based skills. Other studies in different cultural contexts subsequently used a similar procedure to check that the children understood the pictorial tool correctly (Barnett et al., 2015; De Pasquale et al., 2021; Estevan et al., 2021; Lopes et al., 2016; Morgado et al., 2023). A face validity study was recently carried out for the PSPWC in an Australian population (De Pasquale et al., 2021) and in a French-speaking Belgian population (Morgado et al., 2023). In both contexts, the tool was well understood by the children and generally relevant to the cultural context. It is also important to ensure that each situation presented in the tool is appropriate for the different cultural context being studied. Ideally, this process of translation and face validity should be carried out in the different languages and cultures that are expected to be studied. The aim of this study is to apply this procedure to the Portuguese context by first translating the tool and then carrying out face validation with Portuguese children in the age group targeted by the tool.

Methods

Adaptation of the Tool to Portuguese Context

Original PSPWC

The original tool used in this study is the PSPWC, which was designed in English by a group of experts and academics from different countries (Australia, Belgium, Finland, Portugal, and the United Kingdom), with the aim of assessing children's perception of water competence through a pictorial scale. The English version of PSPWC and recommended procedure for use is presented in detail in a published

and open access manual (Morgado et al., 2020). Its content has been designed to assess all the aquatic fundamentals and to propose situations considered relevant by the international experts involved in developing the tool. Recommendations for translating the tool into a local language are also provided in the manual.

Translation to Portuguese Language

Translation of the PSPWC into Portuguese language was fully supported by the international research group who developed the English version of the PSPWC. The procedure was achieved in accordance with the standardized technical recommendations (Beaton et al., 2000; Sousa & Rojjanasrirat, 2011). The English PSPWC was first translated into Portuguese by two Portuguese native-speaker professional translators. Then, an experienced researcher synthesized both versions into a single first Portuguese version. Consequently, a professional English translator with experience in psychometric tool development carried out the back translation of this first version without prior knowledge of the original version. The forward and back translations were discussed by a committee of three bilingual experts with experience in swimming education and fluency in aquatic terminology. The selection of experts was conducted using a convenience sampling method. All selected individuals held doctoral degrees and possessed specialized expertise in the field of swimming instruction. Furthermore, they shared a common background as former swimmers and had a minimum of 10 years of professional experience as swimming coaches or educators. As content validity was previously established by an international panel (Morgado et al., 2020, 2023), the Portuguese expert committee focused solely on translation accuracy, not item relevance (Supplementary Material [available online]). No changes were made to the original scale drawings as two Portuguese experts were in the tool development group, and they considered that all drawings were suitable to the Portuguese population.

Face Validity

Participants

The study sample consisted of 120 children aged between 5 and 8 years (47% girls), attending preschool and elementary education. The sample was recruited using convenience sampling from six educational establishments selected based on accessibility and feasibility of collaboration. Within these schools, all children who met the inclusion criteria and whose parents or guardians provided informed consent were invited to participate. Recruitment aimed to form four equivalent age groups (5, 6, 7, and 8 years old), each comprising 30 participants. The process continued until the target number for each age group was reached. While the schools were selected based on convenience, the distribution of participants across age groups was structured to ensure balanced representation concerning age and gender. All parents or guardians were contacted to inform them about the study and its objectives and to obtain permission for their child participation. The recruitment process ended when the number of participants per age group reached 30.

As in the study of Morgado et al. (2023), previous experience (or not) in swimming education programs was not a criterion for participation. The aquatic experience of the children was recorded using a simple dichotomous scale, similar

to the approach in Costa et al. (2020), and was based on whether the child had a history of participation in aquatic programs. Children involved in competitive swimming, who did not speak Portuguese, and those with a medical diagnosis of a disease or disorder (e.g., obesity, autism spectrum disorder, and intellectual disability such as Down's syndrome) were excluded from the study.

All children's parents or guardians were informed about the study procedures and provided written informed consent. Additionally, written consent was also obtained from the head teacher of each institution to allow the study to be conducted within the educational setting. It was emphasized that children were asked to participate, and if they joined in willingly, this was taken to mean assent to participation. Data confidentiality and anonymity was ensured throughout the research process and analysis. This study was conducted in parallel with the one carried out in Belgium (Morgado et al., 2023) and led by the same researcher. Ethical approval was obtained by the University of Liège ensuring compliance with the Declaration of Helsinki.

Face Validity Procedure

The procedure for face validity in the Portuguese population was similar to the one described in the study of Morgado et al. (2023) for the French-speaking Belgian population. To familiarize the evaluator with the procedure and to ensure the quality of data, preliminary interviews, assisted by another researcher with experience in interviewing children, were carried out in a restricted group ($n = 5$) not belonging to the final sample. Each child of the 120, whether able to read or not, was interviewed individually by the principal researcher. The interviews were conducted in a calm environment, away from external stimuli within each participating school.

The evaluator started the interview with a short and standardized explanation of the scale and the procedure. The interview was contextualized in the form of a children's story—"pirates faced with a set of attractive challenges to discover treasures at the bottom of the sea," which contributed to motivating and attracting the children's attention throughout the interview. The child was never asked to compare himself with any character or classmate. The use of contextualized stories is reported to help young children understand and relate to the theme of the story (Kotaman & Tekin, 2017), and the addition of characters has been proposed as a support to help children understand and identify with the themes (such as aquatic skills; Strouse et al., 2018). This procedure was used successfully in the face validity procedure in a French-speaking population (Morgado et al., 2023).

The face validity interview consisted of three distinct questions systematically applied to each of the 17 aquatic skills. The first question ("Do you understand this situation?") aimed at ensuring the child's familiarity with the situation, and a more detailed explanation of each skill was added if needed, using gestures to facilitate the representation of the skill. Measuring skill familiarity is important because previous studies in land-based skills have shown that a child who has tried a skill is more likely to have a higher self-perception (Barnett et al., 2016).

The second question ("Can you put these images in order from the one showing a child not able to perform the skill, to the one showing a child able to perform") was asked after the images were randomly presented to the child (the images were printed on plastic cards to be easily manipulated by the children).

After observing the three images that represented the mastery levels of each skill, and without any additional information, each child placed the images in the order they considered most correct. It is important to assess skill sequencing to know if the child has understood the skill progression for each scenario.

The third question ("Why did you put the pictures in that order?") concerned gaining a child's cognitive understanding of the images. The assessor was given an encoding grid to record the results item by item for each child. A dichotomous approach was used for familiarization (Q1) and the sequence of images (Q2). If the child failed, the incorrectly classified images were noted.

To access the children's understanding of the images and their sequence progression (Q3), the justifications provided by the children were classified into two categories: "verified understanding" or "unverified understanding." The classification of "verified understanding" was assigned when the child correctly identified or described the skill depicted in the sequence. Typically, the justifications provided by the children fell into one of two types: (a) arguments based on the complexity or progression illustrated in the images (e.g., recognizing a gradual increase in difficulty or refinement of the aquatic skill). Observations focused on the facial or body expressions of the characters in the drawings, which helped them interpret the depicted situation. (b) Unverified understanding was assigned when the child demonstrated a lack of comprehension, confusion, or difficulty articulating their reasoning, making it impossible to verify their understanding. It is worth noting that some children, especially the younger ones, ordered the images very quickly without adequately observing the situation depicted. When this occurred, the child was gently reminded to take the time to carefully examine each image before finalizing their response. This reminder aimed to ensure that children engaged with the task more thoughtfully and provided a more accurate representation of their understanding. Throughout the interview, the data were recorded in a specific paper-based grid.

Data Analysis

All the data from the interviews and the encoding grids were transcribed into a spreadsheet for statistical analysis using a binary approach (i.e., 0/1 = not correct/correct). For the categorical variables, specifically the answers to the three distinct interview questions about each of the 17 aquatic skills, we adopt a dichotomous approach, classifying responses as either verified success or unsuccessful. Descriptive data for each skill was expressed as a relative frequency. All statistical procedures were performed using Microsoft Excel (for Windows, version 2016) and IBM SPSS Statistics for Windows (version 27.0). The chi-square test was used to verify whether the children's age (age groups) and their responses during the interview (Q1, Q2, and Q3) were independent of each other. Cochran's Q test was used to determine the independence of each dichotomous response in relation to gender and previous aquatic experience. The homogeneity of odds ratios was tested using the Breslow–Day test. The Cochran–Mantel–Haenszel method was used to generate an estimate of an association between age and children's responses (Q1, Q2, and Q3), considering sex and previous aquatic experience (both as confounding variables). Statistical significance was set at $p < .05$.

Results

Skill Familiarity

Table 1 shows the frequency distribution of skill familiarity by age group. Most children were familiar with the aquatic skills presented (overall success rate: 88.2%). However, skill familiarity seems to vary with age ($p < .05$), particularly in S2 ("Standing and submersion in the water"), S3 ("Blowing bubbles under water"), S12 ("Water entry by diving"), and S15 ("Turning from the front to the back in aligned position"). The aquatic skills children were least familiar with were S1 ("Moving forward using hands"; 44.2%), and S8 ("Pushing from the wall and gliding under water"; 60.0%).

Breslow–Day test of homogeneity suggests that both boys and girls in all age groups have the same odds ratio in skill familiarity ($\chi^2 = 4.022$, $p = .259$) but not when tested for prior aquatic experience ($\chi^2 = 10.300$, $p < .05$). In fact, 14.1% of 5-year-olds with previous aquatic experience were not familiar with the skills presented ($\chi^2 = 24.252$, $p < .001$).

Cochran's Q test results also show no independence between skill familiarity and both confounding variables—previous aquatic experience ($\chi^2 = 20.957$, $p < .001$) and sex ($\chi^2 = 12.782$, $p < .001$). The common odds ratio estimates of being familiar with the skill is 0.495 higher for experienced children ($p < .001$) and 0.599 greater for boys ($p < .001$).

Correct Skill Sequencing

Table 2 shows the frequency distribution of correct skill sequencing by age group. Most tested children correctly sequenced the pictorial scale (overall success rate: 95.0%). However, there was a significant variation with age ($\chi^2 = 73.814$, $p < .001$), with particularly low success rates ($p = .05$) in children aged 5 in S1 ("Lying down in prone position"), S3 ("Blowing bubbles"), S16 ("Sagittal rotation"), and S17 ("Transverse rotation").

The odds ratio of correct skill sequencing is not homogeneous across age groups for children of different sex ($\chi^2 = 12.797$, $p = .005$) and aquatic experience ($\chi^2 = 10.061$, $p < .05$). There is independence between correct skill sequencing and sex ($\chi^2 = 1{,}325$, $p = .250$). However, there seems to be a dependency relationship between children's correct skill sequencing and previous aquatic experience when controlled by their age ($\chi^2 = 9{,}090$, $p = .250$). In fact, the estimated common odds ratio of being able to sequence the skill correctly is 0.507 higher for experienced children ($p < .005$).

Table 3 shows the children's comprehension rate for the three levels of progression of the pictorial scale (pooled values of the 17 aquatic skills). Children's ability to logically explain the PSPWC sequence is very high (97%), although again a significant variation with age is identified ($\chi^2 = 159.790$, $p < .001$), with lower values observed for the 5-year-old group.

The odds ratio in overall skill comprehension (Levels 1–3) is not homogeneous across age groups for boys versus girls ($\chi^2 = 29.738$, $p < .001$) and children with versus without previous aquatic experience ($\chi^2 = 22.097$, $p < .05$), favoring girls and experienced children. However, a dependency relationship was only

Table 1 Rate of Skill Familiarity for Each Skill (Q1)

Skills	5 years	6 years	7 years	8 years	Total	χ^2	*p*
S1—Lying down in prone position	43.3%	36.7%	46.7%	50.0%	44.2%	1.183	.757
S2—Standing in the water	86.7%	100.0%	96.7%	100.0%	95.8%	8.974	.030
S3—Blowing bubbles	90.0%	100.0%	100.0%	100.0%	97.5%	9.231	.026
S4—Catching an object	92.3%	100.0%	100.0%	96.7%	97.5%	3.761	.288
S5—Back star	63.3%	90.0%	83.3%	83.3%	80.0%	7.5	.058
S6—Front star	86.7%	90%	96.7%	96.7%	92.5%	3.243	.356
S7—Water entry by slide	100.0%	100.0%	100.0%	96.7%	99.2%	3.025	.388
S8—Gliding under water	66.7%	53.3%	60.0%	60.0%	60.0%	1.111	.774
S9—Swim on the back	90.0%	96.7%	100.0%	100.0%	96.7%	6.207	.102
S10—Swim on the front	100.0%	100.0%	100.0%	100.0%	100.0%	[a]	[a]
S11—Jump into the water	100.0%	100.0%	100.0%	100.0%	100.0%	[a]	[a]
S12—Dive into the water	86.7%	100.0%	100.0%	100.0%	96.7%	12.414	.006
S13—Exiting deep water	96.7%	100.0%	100.0%	100.0%	99.2%	3.025	.388
S14—Treading water	83.3%	90.0%	90.0%	100.0%	90.8%	5.104	.164
S15—Longitudinal rotation	73.3%	83.3%	96.7%	96.7%	87.5%	10.59	.014
S16—Sagittal rotation	76.6%	86.7%	93.3%	96.7%	83.3%	6.792	.079
S17—Transverse rotation	76.6%	86.7%	93.3%	96.7%	83.3%	6.792	.079
Total	83.7%	89.9%	93.5%	86.7%	88.2%	25.273	.000

Note. Descriptive date presented as frequency by age and in total. Age effect is represented by chi-square score and corresponding *p* value.
[a]No statistics were calculated for the skill as familiarity is a constant.

Table 2 Rate of Correct Skill Sequencing for Each Skills (Q2)

Skills	5 years	6 years	7 years	8 years	Total	χ^2	*p*
S1—Lying down in prone position	60.0%	96.7%	96.7%	90.0%	85.8%	22.684	.000
S2—Standing in the water	83.3%	93.3%	93.3%	100.0%	92.5%	6.126	.106
S3—Blowing bubbles	83.3%	96.7%	96.7%	100.0%	94.2%	8.951	.030
S4—Catching an object	100.0%	100.0%	100.0%	100.0%	100.0%	[a]	[a]
S5—Back star	83.3%	93.3%	96.7%	96.7%	92.5%	5.165	.160
S6—Front star	86.7%	96.7%	96.7%	100.0%	95.0%	6.316	.097
S7—Water entry by slide	86.7%	100.0%	93.3%	100.0%	95.0%	7.719	.052
S8—Gliding under water	96.7%	100.0%	96.7%	100.0%	98.3%	2.034	.565
S9—Swim on the back	100.0%	100.0%	100.0%	100.0%	100.0%	[a]	[a]
S10—Swim on the front	96.7%	100.0%	100.0%	100.0%	99.2%	3.025	.388
S11—Jump into the water	100.0%	96.7%	96.7%	100.0%	98.3%	2.034	.565
S12—Dive into the water	96.7%	100.0%	100.0%	100.0%	99.2%	3.025	.388
S13—Exiting deep water	100.0%	100.0%	100.0%	100.0%	100.0%	[a]	[a]
S14—Treading water	90.0%	93.3%	100.0%	96.7%	95.0%	3.509	.320
S15—Longitudinal rotation	83.3%	96.7%	93.3%	96.7%	92.5%	5.165	.160
S16—Sagittal rotation	73.3%	83.3%	93.3%	100.0%	87.5%	11.200	.011
S17—Transverse rotation	73.3%	93.3%	96.7%	93.3%	89.0%	10.611	.014
Total	87.8%	96.5%	97.1%	98.4%	95.0%	73.814	.000

Note. Descriptive date presented as frequency by age and in total. Age effect is represented by chi-square score and corresponding *p* value.
[a]No statistics were calculated for the skill as familiarity is a constant.

Table 3 Rate of Skill Comprehension for Each Level (Q3)

	5 years	6 years	7 years	8 years	Total	χ^2	*p*
Level 1	92.2%	97.8%	98.4%	99.2%	96.9%	52.986	.000
Level 2	90.0%	96.9%	98.2%	99.4%	96.1%	73.044	.000
Level 3	95.1%	98.4%	99.6%	99.2%	98.1%	34.375	.000
Total	92.4%	97.7%	98.8%	99.3%	97.0%	158.790	.000

Note. Descriptive date presented as frequency by age and in total. Age effect is represented by chi-square score and *p* value.

found between children's understanding of the skills and prior aquatic experience when age was controlled for ($\chi^2 = 17.361$, $p < .001$), with the common odds ratio estimate of being able to understand the skill being 0.501 higher for experienced children ($p < .001$).

Discussion

This study aimed to translate the PSPWC into the Portuguese language and to achieve face validity in a sample of Portuguese children aged 5–8 years. According to the results of our study, it would appear that the global tool and the situations proposed seems to be appropriate for the Portuguese population with a very-high level of skill familiarity and a good ability to sequence and justify skill progression.

The first question asked to the children as part of the validation process aimed to assess their familiarity with each aquatic skill. The percentage of familiarization was globally high (88.2%), comparable with what was observed in an Australian population (De Pasquale et al., 2021) and superior to what was described in a French-speaking Belgian population (Morgado et al., 2023). Lower values were observed in younger children (83.7%), especially in S2, S3, S12, and S15 ($p < .05$). Familiarity was also lower for two situations that seem less common in children's aquatic experiences: S1 (lying down in prone position) and S8 (gliding under water). These two situations were also less familiar to children in the study by Morgado et al. (2023). It is also possible that some lexicon used in association with the literal description of the skills (and inherently used during the interview) may have led to confusion as they were not familiar to all the children. It seems that it was the case with using a metaphor for some skills that were associated to the description of situations, such as "imitating a crocodile" in S1 or a "doing back star" in S5. It may be better to give children a more literal description of what the child is doing in the proposed situation. To promote a uniform understanding adapted to all contexts it is therefore advisable to use a presentation that is as descriptive as possible, and if fictional images are associated with the presentation of a situation, it is essential to ensure that they are clearly known and understood by the children.

Nevertheless, our findings show that children who were more familiar with the skills also had greater previous aquatic experience. These results are in accordance with those of Morgado et al. (2023) in a population of French-speaking Belgian children of the same age. Unsurprisingly, the likelihood of correct sequencing and

understanding the scale is significantly higher in children with previous aquatic experience. Furthermore, this is an expected result, as previous experience with a given skill significantly influences the quality of the child's interpretation, impacting on the understanding of the item (Lopes et al., 2016).

Gender seems to not be a significant confounding variable for correct skill sequencing or skill comprehension, which seems consistent with previous researches (Moreno Murcia & Pérez, 2008; Ruiz Pérez & Graupera Sanz, 2005). However, boys showed greater familiarity with PSPWC skills, contrasting with studies from other countries that reported no significant gender differences in perceived water competence. This difference may reflect cultural and social factors, as literature suggests that boys often receive more encouragement for sports participation than girls. Fathers who practiced sports are more likely to have sons engaged in sports, while the influence of mothers' sports history on daughters is weaker (Downward et al., 2013). Additionally, parents tend to value sports more for sons than daughters, both ideologically and financially (Heinze et al., 2017). A strong family sports culture supports participation for both genders, but girls with disengaged parents show lower participation rates (Strandbu et al., 2020). In terms of the development of self-perception, an Australian study in girls (mean age of 9 years) noted no associations between fathers' attitudes and beliefs and girls' perceptions of their (land based) motor skills, although there was a negative association between girls' gender-stereotyped attitudes and their perceived skill perceptions. This study indicates that physical self-perceptions reflect the cultural context at a young age. In the context of the current study, conducted in an interior region of Portugal, boys may receive greater encouragement and opportunities for aquatic activities, reflecting broader cultural patterns. Future research could examine how parental attitudes, cultural norms, and extracurricular opportunities influence gender differences in perception of aquatic skills and familiarity.

Evidence of face validity on a pictorial scale in children is provided by understanding the images and expressing the reasons for such understanding and sequencing (Barnett et al., 2015). To this end, it is important that the image is clear, that the transmission of emotions fits with the stage of execution, and that the image correctly indicates the quality of the performance (Moreno Murcia & Pérez, 2008). If the illustration is confusing, the child may focus on secondary elements that may influence his or her understanding (Barnett et al., 2015). For example, the child might focus on a cap, bathing suit, and directional arrows rather than the swimming example. These details may partly explain the lower rate of correct sequencing recorded in S16 and S17, where each level is represented not by a single image but by three sequential images to represent the dynamics of rotational movements in the most understandable way possible. Unsurprisingly, this way of presenting rotation skills led to some misunderstandings, namely, in younger and inexperienced children. These results are in line with those highlighted in the study by Morgado et al. (2023). Users should be aware that the tool may be less reliable for younger children and children with little aquatic experience.

Nonetheless, most children were able to sequence the PSPWC (95.0%) and understand the scale correctly (97%). In a few cases, the child could place the images in the correct sequence but did not express the reason for this ordering. This does not mean that the child did not understand the sequence, but the understanding

was not verified because the child had difficulty expressing himself correctly, sometimes due to shyness. The opposite also happened—the child was not able to place the images in the correct sequence but understood and explained the images correctly. This situation can be explained by the fact that the children rushed to place the images without properly reflecting on the sequence.

The results of this study show a variation in the ability to sequence and understand the scale with age. This result is consistent with what has been described for other tools (Moulton et al., 2019), but also recently with the English (De Pasquale et al., 2021) and French (Morgado et al., 2023) versions of the PSPWC, respectively, and in which it is suggested that preschool children have more difficulty in expressing the understanding of images in relation to good or poor motor skill performance (Moulton et al, 2019).

This study provided an important opportunity to advance the understanding of perceived water competence and move toward the use of this scale as a tool for assessing water competence at a national scale and to show that the PSWPC seems to be well adapted for international cross-cultural research. It should be pointed out, however, that the face validity of the tool was carried out in Western countries where swimming facilities and instruction are highly developed. Studies in more disadvantaged sociocultural contexts are needed to verify the relevance of the tool and its application in all populations. For example, it would be particularly interesting to use the Portuguese version of PSPWC in a population of Brazilian children.

The reader should also bear in mind that the study is based on a convenience sample and, due to practical constraints, the aquatic experience was recorded on a simple dichotomous scale, similarly to other studies (Costa et al., 2020), based on the existence (or not) of participation in aquatic programs. Thus, quantitative data from previous experience (hours/years of practice) were not analyzed, nor was the level of actual aquatic competence assessed at the time of the interview.

In addition, and although emotional parameters were not evaluated, the enthusiasm of children with previous aquatic experience during the interview was visible. This observation was interesting and may be consistent with the positive relationship between motor performance and the intrinsic pleasure in such practice that some authors claim (Shapiro et al., 2002), and which leads to a continuous cycle of participation and engagement (Harter, 1978; Nobre & Valentini, 2019). The researchers of this study believe it is important to highlight the children's enthusiasm throughout the interview. The strategy used to frame the skills in a fictional context (pirate story), which was identical to that conducted in French by Morgado et al. (2023), was a success, as it was proposed as a way of transferring information to real-world contexts (Strouse et al., 2018). Indeed, pictorial scales stimulate children's attention and therefore facilitate the perception of concrete skills (Slykerman et al., 2016). The researchers also felt that it was a useful way tobreak the ice and encourage the children to talk to the researcher, especially those who are shyer. At times, the researchers had to contain the desire of some children who wanted to share their own experiences, whether related to swimming or everyday life. The length of the interview was a challenge particularly for younger children, although it is clear that applying the PSPWC for purposes limited to assessing perceived aquatic competence (as opposed to assessing face validity as well) will be much quicker (D'Hondt et al., 2021).

While this study focuses on the cultural adaptation of a tool for assessing aquatic skills, it is important to note that, to our knowledge, there are no unique characteristics of Portuguese aquatic programs that warrant specific distinction in comparison to other countries. In Portugal, many swimming schools follow the guidelines set by the Portuguese Swimming Federation, which in turn adopts the recommendations of World Aquatics for the organization and structure of swimming education programs. Thus, the structure of Portuguese aquatic programs aligns with the literature on motor control and learning, which identifies at least three phases in the learning process: initial, intermediate, and autonomous stages (Fernandes et al., 2022). These stages reflect a structured progression in learning, emphasizing gradual development and mastery of aquatic skills. Therefore, while there may be variations in teaching methods or institutional autonomy, Portuguese aquatic programs broadly follow established educational frameworks recognized internationally.

There are a number of limitations to this research that should be noted. First, the study sample is not probabilistic and cannot be considered representative of the entire Portuguese population. Second, our study concerns translation and face validity. These are important steps in the validation process, but they need to be followed up by further work to fully explore psychometric qualities of the tool. Finally, the study does not provide any information on children's perceived level of aquatic competence, and it is important for future research to collect data from a large number of children in order to obtain a database that is representative of the Portuguese population.

This study opens new avenues of research in the Portuguese population, and it would be particularly interesting to learn more about the links between aquatic experience, actual level of aquatic competence, and perception of competence. Research of this kind is essential if we are to gain a better understanding of the issues involved in swimming education, from the point of view of developing children's skills but also in terms of aquatic safety and drowning prevention. While the tool developed enables children's representations to be assessed, it also constitutes a pedagogical tool that could be used both by aquatic educators and to inspire children in their activities. Future research will be particularly interesting in exploring how children perceive and translate these illustrations into physical actions.

Conclusions

In summary, the Portuguese PSPWC demonstrates strong face validity for children aged 5–8 years, with translations accurately reflecting the previously validated content of the original scale. Future studies should examine additional psychometric properties (e.g., construct validity) to confirm its robustness in Portuguese-speaking populations.

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