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THE ADAPTED SWIMMING AND EMOTIONAL ADJUSTMENT SCALE (A-SEAS) FOR CHILDREN WITH INTELLECTUAL DISABILITY (ID) AND AUTISM SPECTRUM DISORDERS (ASD)

Dimitrios Kokaridas[i],
Christina Tsolaki,
Charalampos Krommidas
Department of Physical Education and Sport Science,
University of Thessaly,
Greece

Abstract:
Water assessment so far included the development of aquatic tests based mainly on the Halliwick concept, whereas content comparison of these tests used in relevant studies showed that most researches primarily focused on children with cerebral palsy and other neurological disorders. The purpose of this study was to develop a new aquatic test named Adapted Swimming and Emotional Adjustment Scale (A-SEAS) assess its reliability and validity for children with intellectual disability (ID) and autism spectrum disorders (ASD) and adapt and culturally validate the new instrument from the Greek to the English language for wider international use. A-SEAS consists of fourteen (14) items designed to assess aquatic skills and emotional adjustment of children aged 6 years and older with ASD and ID. The internal reliability and validity of A-SEAS were examined via the observational ratings provided by three adapted swimming instructors. Face validity was assessed by two experts, and inter-rater reliability study was conducted with three raters. Kappa Cohen's was used to confirm A-SEAS reliability. Findings suggest that A-SEAS is a reliable and valid tool for assessing measured values. ICC values (ICC = .966 to 1) highlight its excellent internal consistency and inter-rater reliability. Cohen's kappa results ranging from (κ = .77 to 1) underscore its reliability, with high to flawless agreement observed across raters. High face validity confirmed by expert evaluations ensures that A-SEAS is comprehensible, relevant, and effectively aligned with its intended constructs, an overall suitable and reliable tool for future research and practice.

Keywords: adapted swimming, A-SEAS, swimming skills, emotional adjustment, ID, ASD

[i] Correspondence: email dkokar@uth.gr

1. Introduction

Adapted swimming is a comprehensive term for swimming programs that parallel adapted physical education in water and adapt swimming strokes, games and recreational aquatic activities so as to meet individual needs, teach water safety and swimming skills and promote physical health, inclusion, socialization and fun of children with all kind of disabilities (Stan, 2012). Furthermore, adapted swimming ranks high among physical education activities, with actions that can be successfully applied to children with intellectual disability (ID) and autism spectrum disorders (ASD) (Milligan *et al.*, 2022; Vodakova *et al.*, 2022).

Properties of the aquatic environment do not include any of the limitations that children with disabilities may experience on land, due to the effect of buoyancy that offers support to the body without fear of falling (Lee & Poretta, 2013). Hence, adapted swimming helps children with ID and ASD achieve a stable posture, followed by gradual disengagement and independent skill development in water (Shams-Elden, 2017) that promotes water safety (Casey *et al.*, 2020; Martin & Dillenburger, 2019) and diminishes drowning risk for these populations (Murphy & Hennebach, 2020; Kerr *et al.* 2018). Rightfully so, adapted swimming as an enjoyable recreational activity performed in a safe environment (Salse-Batán *et al.*, 2023), is recognized as probably the most prevalent physical activity to improve motor (Battaglia *et al.*, 2019) and social (Alaniz *et al.*, 2017) skills of children with ID and ASD, leading to improvements in physical functioning (Bouzas, Martinez-Lemos & Ayan, 2019; Pan, 2011) mobility skills (Hakim *et al.*, 2017) and social interaction (Kapsal *et al.*, 2019; Pan, 2010).

2. Literature Review

There is a wide range of aquatic activities, with the Halliwick Method, Bad Ragaz Ring Method (BRM), Water Specific Therapy (WST), Ai Chi and Watsu representing the main methods of aquatic interventions (Brody & Geigle, 2009) ranging from adapted swimming to aquatic therapy (Kokaridas & Lambeck, 2015). Furthermore, water assessment so far included the development of aquatic tests based mainly on the Halliwick concept that include the early effort of English AST (Association of Swimming Therapy, 1992) evaluating a certain level of swimming skill based on a progression of different color badges, the Humphries' Assessment of Aquatic Readiness –HAAR (Humphries, 2008), the Swimming with Independent Measures –SWIM (Peacok,1993) with sufficient criterion-related validity to be used in future research (Sršen *et al.*, 2012), the Conatser Adapted Aquatics Swimming Screening Test - CAASST (Conatser *et al.*, 2009), the Aquatic Adjustment Test -AAT for children with disabilities (Chacham & Hutzler, 2002), and the Water Orientation Test of Alyn 1 and 2, namely WOTA1 for children with limited functional and cognitive abilities and WOTA2 for children with physical and neuromotor disability conditions (Tirosh *et al.*, 2008). As an assessment instrument, WOTA demonstrates reliability and validity since it correlates with the valid

and widely used Gross Motor Function Measure-GMFM (Palisano *et al.*, 1997; 2006), quantifying changes of gross motor skills concerning children with cerebral palsy. Hence, Lambeck and Gamper (2009) developed a water assessment that connects WOTA with the International Classification of Functioning (ICF) Disability and Health coding system (WHO, 2001).

Nevertheless, content comparison of aquatic tests used in relevant studies showed that most researches primarily focused on children with cerebral palsy (Declerck *et al.*, 2016; Jorgic *et al.*, 2012) and other neurological disorders such as meningomyelocele (Calderón-Porras *et al.*, 2012) and traumatic brain injury (Vanluyten & Iserbyt, 2024) with WOTA 1 & 2 having the highest number of uses compared to other measures (Güeita-Rodríguez *et al.*, 2019).

So far, the development of an aquatic assessment specifically for children with ID and ASD has not been the focus of research efforts. WOTA 1 booklet (Tirosh *et al.*, 2008) states that it "*was developed in response to swimmers who do not understand or cannot execute instructions*", that is, "*for swimmers with limited functional and cognitive abilities*". Nevertheless, the terms ID or ASD were not mentioned as terms specifically, whereas most studies using WOTA 1 focused mainly on cerebral palsy and other neuromuscular disorders of children 3 to 13 years old with accompanying cognitive difficulties (Güeita-Rodríguez *et al.*, 2019), rather than solely on children with ID or ASD. Pan (2011) used HAAR to assess aquatic skills of ASD participants, whereas the recent study of Bakar *et al.* (2023) used CAASST (Conatser *et al.*, 2009) to examine the influence of an aquatic intervention on improving psychomotor skills in children with ASD.

Overall, WOTA 2 and CAAST are comprised of items from a higher number of different domains compared to other aquatic tests (Güeita-Rodríguez *et al.*, 2019). Nevertheless, WOTA 2 refers to people with physical and neuromotor disabilities while CAASST has also been used for cerebral palsy and a wide range of other disabilities. As for WOTA 1, limited functional and cognitive abilities as a term includes many disability conditions facing cognitive difficulties, rather than ID and ASD only. In addition, all aquatic assessments so far have overlooked the emotional adjustment of the participant in each task tested, focusing mainly on individual aquatic performance. WOTA 1 includes only one general adjustment item that provides a general description for adjustment in water, whereas CAASST includes only 3 out of 44 items examining "psychological/physical adjustment skills".

There is a pathway from gross motor skills to emotional understanding of children that is mediated by the improvement of their skills' executive function (Li *et al.*, 2022). The creation of a new adapted swimming test that evaluates not only the swimming performance of children with ID and ASD but also their emotional adjustment to each task has not been attempted yet. Especially in the case of children ID and ASD whose functionality level sets limitations on their motor skills improvement (Fernandes *et al.*, 2024; Odeh *et al.*, 2022), evaluation of the emotional adjustment, satisfaction and joy that these children derive from swimming tasks becomes of equal importance to the assessment of their swimming skills.

The purpose of this study was twofold a) to develop a new aquatic test named Adapted Swimming and Emotional Adjustment Scale (A-SEAS) that evaluates aquatic ability and emotional adjustment of children with ID and ASD in each task and to assess its reliability and validity in the aquatic environment b) to adapt and culturally validate the new questionnaire from the Greek to the English language for wider international use.

2. Material and Methods

2.1 Instrument

A-SEAS has fourteen (14) easy-to-understand items designed to assess aquatic skills and emotional adjustment/response of children aged 6 years and older with autism spectrum disorders (ASD) and intellectual disability (ID). Motor experiences and body awareness are closely related to how emotions arise on each task (Critchley *et al.*, 2004) and physical activity yields behavior and emotional benefits for children and adolescents with intellectual disability (Borland *et al.*, 2022). In practice, motor action is always accompanied by emotion and vice versa, whether planned movements are made to address the cause of an emotion or a reactive facial expression serves to regulate emotional experience of children with ASD in an attempt to communicate (Huggins *et al.*, 2019) and socially interact (Ohara *et al.*, 2019) with others. Hence, A-SEAS assesses not only the swimming performance but also the emotional adjustment of each child with ASD or ID to each swimming task, an issue of equal or even greater importance in case of children with ASD and ID, whose level of functioning may set limits on performance but not on emotional adjustment and joy.

Swimming activities included in A-SEAS were formulated in a simple and understandable way for children with ASD and ID. Consequently, no combined rotation tasks were included in the test, since children with developmental and cognitive disabilities respond better to one simple task at a time for successful performance, often with the provision of more time and repetitions compared to their peers without disability (Neto *et al.*, 2023). Selection of swimming activities was made by identifying the most representative exercises that have been used so far in reliable and valid aquatic tests and seem to a) reflect an overall view of the aquatic performance and functionality of children with developmental and cognitive disabilities and b) allow for motor skill delays in gait, postural control, motor planning and motor imitation that children with ASD and ID usually exhibit (Ruggeri *et al.*, 2020).

As an example, the task "jumping across the pool (5m)" was chosen, since a) it has been previously used as a task item in other reliable aquatic tests (e.g., Tirosh *et al.*, 2008) b) it's a fundamental motor skill that along with other skills such as walking, running, kicking, throwing and catching is considered an essential building block for more complex gross motor movement (Colombo-Dougovito & Block, 2019) and c) it's an excellent way especially for children with ASD to regulate and integrate sensory input, develop coordination, balance, and muscle control and engage in social interaction and

fun (Schoen *et al.*, 2021). Children with ASD may feel insecure and vulnerable towards gravity and the possibility of falling when their feet are not on the ground, whereas others may exhibit repetitive jumping behavior as an action that helps them reduce stress and self-regulate (Fazlioglu & Gunsen, 2011). Thus, inclusion of this task in A-SEAS was deemed necessary as a mean to monitor relative improvement, especially within the aquatic environment with its hydrodynamic properties that place minimal stress on the joints without excessive strain (Bakar *et al.*, 2023) and foster swimming performance (Pan, 2010) of children with ASD and ID to perform such tasks easier.

Aquatic performance in each swimming task was rated on a 5-point scale (from 0 to 4), with 4 representing the successful performance of each activity. Therefore, the maximum overall score that a child with ID and ASD could achieve in swimming was 56 points. When in doubt as to which grade to give, the instructor provided the lower of the two grades. In addition, each activity was rated on a four-point scale (from 0 to 3) based on the emotional adjustment/response of the child with ASD and ID in each activity, as follows:

Emotional Adjustment	**Score**	**Description - Assessment**
Emotional adjustment/response of the child with ASD or ID in each task.	0 😟	Frightened, denies, cries.
	1 😐	Uncertain or indifferent, seems to be capable, but does not always cooperate and/or perform.
	2 😏	Performs of his/her own will, occasionally happy, a bit hesitant.
	3 😊	Performs the task happily and relaxed.

Thus, the maximum overall score that a child with ID and ASD could achieve in the test concerning emotional adjustment/response, was 42 points. A-SEAS tasks no. 1-6 and 14 included mental adjustment and disengagement activities, whereas tasks no 7-13 refer to balance control, rotation and movement activities. The English version of A-ASEAS is included in the supplementary files section (Appendix A) of this article.

2.2 Study Design

Validation procedures are relevant to the steps of fundamental processes for developing an observational measurement system (Aithal & Aithal, 2020; Yoder & Symons, 2010; Omar *et al.*, 2011; Tan *et al.*, 2013). The Adapted Swimming and Emotional Adjustment Scale (A-SEAS) was developed to assess the performance of children with ASD and ID to basic swimming skills and their emotional adjustment during aquatic tasks. The swimming exercises included were formulated in a simple and understandable way for children. Their selection was made following a systematic review of corresponding reliable and valid aquatic tests for people with disabilities and the detection of the most

representative exercises that have been used so far and reflect an overall view of the aquatic performance and functionality of children with limited developmental and cognitive abilities, allowing for motor skill delays in gait, postural control, motor planning and motor imitation that children with ASD and ID usually exhibit.

The internal reliability and validity of the new instrument were examined via the observational ratings provided by three swimming and adapted physical activity instructors with previous relevant experience with children with ID and ASD in adapted swimming environments. The three raters were asked to evaluate the swimming performance and the emotional adjustment of 6 children overall (3 with ASD and 3 with ID, age 6-15 years) based on the A-SEAS. The main hypothesis was that since rating differences among raters are expected, an acceptable degree of at least 0.50 value of both inter and intra-observer reliability among the three observers verifies internal reliability of the A-SEAS (Portney & Watkins, 2009; Smith *et al.*, 2014).

The validity and reliability of the A-SEAS were assessed with face validity by two experts, and inter-rater reliability study was conducted with three raters. Also, Kappa Cohen's (k) was measured to confirm the reliability of the A-SEAS instrument.

2.3 Face Validity

Face validity, though subjective, is a critical first step in validating a questionnaire to ensure it resonates with its target constructs before further empirical testing (Boateng *et al.*, 2018; Holden, 2010). Face validity of A-SEAS was established through the experts' review. In particular, a panel of specialists in adapted physical activity and swimming evaluated the clarity, relevance, and comprehensiveness of A-SEAS items and confirmed that the items adequately represent the dual domains of swimming skills and emotional responses, ensuring the tool aligns with its intended purpose.

Assessment sessions were recorded using two cameras, one that was set outside the pool and an underwater camera, so as to help raters have an overall detailed picture and relevant data concerning aquatic skills and emotional response of children with ASD and ID. Prior to the assessment, the items were demonstrated to the raters by the primary researcher, and a briefing was provided for any explanations concerning the A-SEAS instrument and its scoring system.

The three raters observed and evaluated the swimming performance and emotional adjustment of each one of the 6 children (3 with ASD and 3 with ID) separately. Children with ASD and ID are usually difficult to assess due to their limited developmental and cognitive skills (Houwen *et al.*, 2016). Therefore, assessment was conducted during the first three aquatic sessions with systematic observation over time and the use of visual demonstration and/or kinesthetic guidance, plus continuous feedback provided to each child with ASD or ID by the instructor during performance of each swimming task that was tried out at least three times.

2.4 Translation Procedure

The translation process, which followed the guidelines for correct performance in other languages (Wild *et al.*, 2005), consisted of the following steps. Two freelance translators, familiar with physical education terminology, translated the scale from Greek to English language and compared their translations. The common result obtained from the two translations was given to a third independent translator, equally familiar with the terminology, to translate again into Greek, without knowing the original foreign language version of the test. Then the three translators met with each other and discussed the result to agree on the final version of the test in the English language (Jalaludin *et al.*, 2013; Omar *et al.*, 2011; Yunus *et al.*, 2013).

2.5 Analysis

Face validity refers to the expert judgment used to determine whether a questionnaire appears to measure what it is intended to measure, based on a superficial evaluation of its items. This form of validity is subjective, involving experts who assess the clarity, relevance, and alignment of the questionnaire with the conceptual domain it seeks to address (Sangoseni *et al.*, 2013). Experts evaluate whether the items are clear, relevant, and unambiguous to ensure that the instrument is easily understandable and that its purpose is evident (Bornstein, 2004; Oluwatayo, 2012). The goal of face validity is to ensure that the questionnaire is straightforward to complete, with items that are simple and unambiguous, making it clear to respondents what is being asked (Bornstein, 2004). By gathering opinions from lay experts, researchers can ensure the reliability of the questions and responses, confirming that the items and overall meaning of the questionnaire are consistent for all respondents (Floyd & Fowler, 2013).

Inter-rater reliability measures the consistency of ratings between raters observing the same behavior or response. The Intraclass Correlation Coefficient (ICC) is appropriate, particularly in social sciences where reliability between multiple raters is critical. Using three raters, an ICC model such as ICC (2, k) can be calculated with a two-way random effects model for absolute agreement, capturing consistency among raters and the reliability of the observed scores on questionnaire - based research (Haerens *et al.*, 2013; Van den Berghe *et al.*, 2013). This approach is favored when the focus is on agreement between different raters, not merely consistency, thus ensuring robust measurement accuracy. Intra-class correlation coefficients are interpreted as poor if the value falls below .50, moderate if the value is between .50 and .75, and good if it's above .75 (Portney & Watkins, 2009).

Cohen's Kappa (κ) is particularly helpful for categorical or ordinal data, as it accounts for the possibility of agreement occurring by chance, making it preferable for reliability in subjective assessments (Cohen, 1960; McHugh, 2012). In this study, with three raters observing six children with ASD and ID, Kappa and ICC provide robust methods to evaluate inter-rater reliability and ensure that the A-SEAS can produce reliable, reproducible data. Data analyses were performed using the IBM SPSS Statistics version 29.

3. Results and Discussion

Evaluation of A-SEAS face validity included the utilization of experts' judgment (N = 2) to assess whether the items were clear, relevant, and aligned with the intended conceptual domain. The face validity of A-SEAS was successfully confirmed through expert evaluations, suggesting that the instrument is both clear and relevant for the study's purposes.

Results of swimming display an Intraclass Correlation Coefficient (ICC) of 1, indicating excellent reliability in raters' assessment. As for emotional adjustment, results demonstrate an Intraclass Correlation Coefficient (ICC) of excellent agreement, too. The lowest agreement was noted in ASD1 (ICC = .966). Nevertheless, it was still above .90 (Table 1).

Table 1: Reliability of raters - ICC- Intraclass Correlation Coefficients- Internal consistency

	Raters swimming	**Raters Emotional adjustment**
	ICC	***ICC***
ASD1	1	.966
ASD2	1	.988
ASD3	1	.968
ID1	1	.988
ID2	1	.987
ID3	1	.989

Notes: ICC = Intraclass correlation, ASD1 to ASD3 = children with ASD, ID1 to ID3 = children with Intellectual Disability.

In addition, A-SEAS reliability was evaluated through Cohen's kappa for inter-rater agreement across two domains, that is, swimming skills and emotional adjustment. Perfect agreement ($\kappa = 1.00$, $p < .001$) was observed for swimming assessment across all comparisons (ASD1, ASD2, ASD3, ID1, ID2, ID3) and all rater pairings (Table 2).

Table 2: Cohen's Kappa of swimming skills

Raters	Swimming Skills											
	ASD1		ASD2		ASD3		ID1		ID2		ID3	
	κ	*p*	*κ*	*p.*	*κ*	*p*	*κ*	*p*	*κ*	*p.*	*κ*	*p*
Rater1* rater2	1	<.001	1	<.001	1	<.001	1	<.001	1	<.001	1	<.001
Rater1* rater3	1	<.001	1	<.001	1	<.001	1	<.001	1	<.001	1	<.001
Rater2* rater3	1	<.001	1	<.001	1	<.001	1	<.001	1	<.001	1	<.001

Notes: κ = Cohen's kappa, p < 0.001 as statistically highly significant, ASD1 to ASD3 = children with ASD, ID1 to ID3 = children with Intellectual Disability.

As for emotional adjustment, Cohen's kappa agreement levels remained excellent between the three raters, ranging from perfect agreement between rater 1 and rater 2, with statistical significance (κ = 1.00, p < .001) across all children, except for ASD1, where the agreement was substantial (κ = 0.77, p < .001). An almost perfect agreement with statistical significance between rater 1 and rater 3 and between rater 2 and rater 3 was also noted, whereas a perfect agreement was illustrated for ASD1 (κ = 1.00, p < .001) (Table 3).

Table 3: Cohen's Kappa of emotional adjustment

Raters	Emotional Adjustment											
	ASD1		ASD2		ASD3		ID1		ID2		ID3	
	κ	*p*	*κ*	*p*	*κ*	*p*	*κ*	*p*	*κ*	*p*	*κ*	*p*
Rater1* rater2	.77	<.001	1	<.001	1	<.001	1	<.001	1	<.001	1	<.001
Rater1* rater3	.77	<.001	.882	<.001	.857	<.001	.882	<.001	.89	<.001	.853	<.001
Rater2* rater3	1	<.001	.882	<.001	.857	<.001	.882	<.001	.89	<.001	.853	<.001

Notes: κ= Cohen's kappa, p < 0.001 as statistically highly significant, ASD1 to ASD3 = children with ASD, ID1 to ID3 = children with Intellectual Disability.

The purpose of this study was to develop a new aquatic test named A-SEAS, assess its reliability and validity for children with ID and ASD and adapt and culturally validate the new instrument from the Greek to the English language for wider international use. Results of swimming display an Intraclass Correlation Coefficient (ICC) of 1 indicating

excellent reliability in swimming ratings. An ICC value of 1 signifies perfect consistency across measurements, meaning that the ratings are identical for all items being evaluated. This level of agreement suggests that there is no variability due to measurement error or differences between raters, highlighting the robustness and reliability of the measurement tool used (Koo & Li, 2016). The excellent ICC values confirm that the raters' assessment of swimming skills is both highly reliable and internally consistent, providing strong evidence of measurement quality in this study.

As for emotional adjustment, results demonstrate an Intraclass Correlation Coefficient (ICC) of excellent agreement too (> .90). As expected, the agreement was the highest concerning the total score, meaning that the raters were all measuring the same construct, that is, emotional adjustment, in a consistent manner. Overall, results suggest that the ICC values demonstrate excellent reliability and consistency among the raters' assessments for emotional adjustment and swimming skills, ensuring that the ratings are both highly reliable and internally coherent.

In addition, A-SEAS reliability was evaluated through Cohen's kappa for inter-rater agreement across two domains, that is, swimming skills and emotional adjustment. Perfect agreement was observed for the swimming assessment across all comparisons and all rater pairings. This indicates that raters consistently classified swimming-related responses with no variability, reflecting exceptionally high reliability in this domain.

As for emotional adjustment, Cohen’s kappa agreement levels remained excellent between the three raters, ranging from perfect agreement between rater 1 and rater 2, with statistical significance across all children, except for ASD1, where the agreement was substantial. An almost perfect agreement with statistical significance between rater 1 and rater 3 and between rater 2 and rater 3 was also noted, whereas a perfect agreement was illustrated for ASD1. These findings align with prior research emphasizing the importance of high inter-rater reliability for the validity of psychometric tools (Landis & Koch, 1977). The ASEAS appears well-suited for assessing both physical and emotional dimensions, with its reliability particularly strong in objective swimming measures.

Additionally, evaluation of A-SEAS face validity included the utilization of experts’ judgment to assess whether the items were clear, relevant, and aligned with the intended conceptual domain. Experts confirmed that the items were comprehensible and straightforward, with no ambiguity in the wording, which supports the claim that face validity enhances the ease of questionnaire completion (Bornstein, 2004). This is consistent with the finding of Sangoseni *et al.* (2013), who argued that face validity is crucial in ensuring that a tool measures what it is intended to measure in a way that is accessible to the targeted population. Furthermore, experts agreed that the questions were directly relevant to research purposes, confirming that the instrument effectively captures the constructs of interest. This aligns with Oluwatayo (2012), who emphasized the importance of aligning items with the intended construct to avoid confusion. Additionally, gathering expert feedback, as noted by Floyd and Fowler (2013), is a vital step in ensuring that the questionnaire's items are unambiguous and consistent, leading to reliable responses across different respondents. Thus, the face validity of A-SEAS was

successfully confirmed through expert evaluations, suggesting that the instrument is both clear and relevant for the study's purposes.

5. Recommendations

Future researches concerning adapted swimming for children with ASD and ID are recommended to further verify the psychometric properties of A-SEAS in English and other languages. In this way, A-SEAS is expected to further establish its reliability, validity and noteworthy impact both in research and everyday practice.

6. Conclusion

Overall, the findings suggest that A-SEAS is a highly reliable and valid tool for assessing swimming skills and emotional adjustment in adapted swimming settings for children with Autism Spectrum Disorder (ASD) and Intellectual Disabilities (ID). The excellent ICC values highlight the excellent internal consistency and inter-rater reliability of A-SEAS, supporting its robustness as a measurement tool. Similarly, Cohen's kappa results underscore the reliability of raters' agreement, particularly for swimming-related assessments, with high to flawless agreement observed across raters.

Furthermore, the high face validity confirmed by expert evaluations ensures that the questionnaire is comprehensible, relevant, and effectively aligned with its intended constructs, echoing the findings of Oluwatayo (2012) and Sangoseni *et al.* (2013). The results of this study exhibit A-SEAS's exceptional reliability as a robust tool for swimming and emotional adjustment evaluations for children with ASD and ID, as well as its suitability for future research and practice.

Conflict of Interest Statement
The authors declare no conflicts of interest.

About the Author(s)
Dimitrios Kokaridas, Professor, Department of Physical Education and Sport Science, University of Thessaly, Greece.
Christina Tsolaki (M.Sc), PhD Candidate, Department of Physical Education and Sport Science, University of Thessaly, Greece.
Charalampos Krommidas, Assistant Professor, Department of Physical Education and Sport Science, University of Thessaly, Greece.

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Supplementary Files

Appendix A: The Adapted Swimming and Emotional Adjustment Scale (A-SEAS)

	Item	**Description – Evaluation/assessment**	**Score**	**Emotional Adjustment**
1	Enter and exit the pool	Does not perform	0	0 😢 1 😐 2 😊 3 😊
		By instructor carrying the child	1	
		By holding the instructor's hand	2	
		Without holding the instructor's hand, with close supervision	3	
		Without holding the instructor's hand, with discreet supervision	4	
2	Treading/splashing water	Does not perform, has no "sense' of water.	0	0 😢 1 😐 2 😊 3 😊
		Treads/splashes water carefully, avoids water contact, the water with the face.	1	
		Treads/splashes water with both hands, with the instructor's help	2	
		Treads/splashes water with both hands, without help	3	
		Treads/splashes water using both hands and/or feet, without help	4	
3	Entering pool from pool edge (sitting facing the water)	Does not perform	0	0 😢 1 😐 2 😊 3 😊
		With maximum support from the instructor along the arms	1	
		With partial support from the instructor for the forearms/elbows	2	
		With minimal support from the instructor in the hands/palms	3	
		Independent (arms forward, head follows)	4	
4	Blowing bubbles in	Inhales water/objects/does not initiate	0	

	the water	Immerses mouth in water, does not inhale water, but does not blow bubbles	1	0 😢 1 😐 2 😊 3 😊
		Blows bubbles through the mouth	2	
		Blows bubbles through the nose	3	
		Blows bubbles through mouth or nose alternately, head submerged	4	
5	Walking across the pool (5m)	Does not perform	0	0 😢 1 😐 2 😊 3 😊
		With maximum support from the instructor along the arms	1	
		With partial support from the instructor on the forearms/elbows	2	
		With minimal support from the instructor in the hands/palms	3	
		Independent, performs tasks without support	4	
6	Jumping across the pool (5m)	Does not perform	0	0 😢 1 😐 2 😊 3 😊
		With maximum support from the instructor along the arms	1	
		With partial support from the instructor on the forearms/elbows	2	
		With minimal support from the instructor in the hands/palms	3	
		Independent, performs tasks without support	4	
7	Supine (Back) Floating	Does not perform, firmly objects, does not sink ears in the water, tries to stay upright	0	0 😢 1 😐 2 😊 3 😊
		Initiates floating, sinks ears into the water with full support by the instructor along the trunk, but is not relaxed and tries to get up.	1	
		Initiates floating with full support from the instructor along the trunk.	2	
		Initiates floating, with minimum support by the instructor at the pelvis/around the waist	3	

		Floats in supine position without help	4	
8	Changing position from standing position to supine floating and back to standing	Does not perform	0	0 😢 1 😐 2 😊 3 😊
		Performs with full support from the instructor along the trunk.	1	
		Performs with partial support from the instructor in the waist/pelvis/upper trunk.	2	
		Performs with minimal support from the instructor at the pelvis/around the waist	3	
		Independent, performs tasks without support	4	
9	Changing position from standing position to prone floating and back to standing	Does not perform	0	0 😢 1 😐 2 😊 3 😊
		Performs with maximum support from the instructor along the arms	1	
		Performs with partial support from the instructor in trunk/waist/pelvis	2	
		Performs with minimal support from the instructor at the pelvis/around the waist	3	
		Independent, performs tasks without support	4	
10	Allows the instructor to move him/herself through the water in the supine position	Does not perform	0	0 😢 1 😐 2 😊 3 😊
		Performs with maximum support by the instructor along the trunk, occasionally does not immerse the ears in the water or tries to stand up	1	
		Performs with maximum support by the instructor along the trunk, ears immersed in the water.	2	
		Performs with partial support by the instructor in trunk/waist/pelvis, ears immersed in the water.	3	
		Performs with minimum support by the instructor in trunk/waist/pelvis, kicking legs	4	
11	Allows the instructor to move	Does not perform	0	0 😢 1 😐
		With maximum support from the instructor along the arms	1	

	him/herself through the water in the prone position	With partial support from the instructor on the forearms/elbows	2	2 😉 3 😊
		With minimal support from the instructor in palms/hands	3	
		With minimum support by the instructor in palms/hands, kicking legs	4	
12	Supine progression	Cannot be assessed, the child seems capable, but the effort is not continuous	0	0 😢 1 😐 2 😉 3 😊
		Symmetrically 'striking' the palms on the hips	1	
		Performs figure of 8 arm swings, followed by a symmetrical strike of the palms on the hips	2	
		Performs figure of 8 arm swings, followed by a symmetrical strike of the palms on the hips and leg kick	3	
		Back stroke with both hands moving simultaneously out of the water (reciprocal)	4	
13	Prone progression	Cannot be assessed, the child seems capable, but the effort is not continuous	0	0 😢 1 😐 2 😉 3 😊
		'Glides' with bent leg kicks toward the instructor, arms forward	1	
		'Glides' independently up to the instructor with straight leg kicks, arms forward	2	
		Comes to the instructor with straight leg kicks and rudimentary arm movements	3	
		Comes to the instructor independently, with straight leg kicks and free or front-style arm movements	4	
14	Exiting the pool from the pool edge (holding pool edge without standing, raising trunk with push up of hands, rotation of trunk and sitting)	Does not initiate/perform	0	0 😢 1 😐 2 😉 3 😊
		Exits water by crawling with assistance, sits down with or without assistance	1	
		Exits water by crawling without support, sits without assistance	2	
		Exits the water performing the sequence of movements correctly, with the support of the instructor	3	

		Independent, lifts him/herself up and sits properly, unsupported	4	

Emotional Adjustment	**Score**	**Description - Assessment**
Emotional adjustment/response of the child with ASD or ID in each task.	0 😢	Frightened, denies, cries.
	1 😐	Uncertain or indifferent, seems to be capable but does not always cooperate and/or perform.
	2 😊	Performs of his/her own will, occasionally happy, a bit hesitant.
	3 😊	Performs the task happy and relaxed.