

COMBINED MOVEMENT

CONCEPT 4.10

Combined swimming movement patterns change in a regular ordered sequence from rudimentary dog paddle to advanced formal strokes.

Finally, a *combined movement* category attempts to describe the combined interactive effect of body position, arm actions, leg action, and breath control. The checklist presented draws heavily on the work of Erbaugh (1978) and Langendorfer (1984a; Langendorfer et al., 1987). Note that this checklist predicts that a number of rudimentary styles of stroking naturally will be used by the young child prior to the onset of advanced formal strokes. This suggests that instructors should delay introducing advanced formal strokes until earlier forms of stroking (e.g., dog paddle or human stroke) are well established. This suggestion unfortunately is contrary to traditional methods of instruction, in which advanced formal strokes such as front crawl are normally introduced early. This component of swimming stroke readiness suggests that formal strokes traditionally are introduced much too early for optimal aquatic learning.

In some senses, the combined movement component is a composite of arm, leg, breath control, and body position components. However, because these components can vary independently from one another, the combined stroke composite profile produces a simple means for describing the holistic aspects of prone aquatic locomotion. The motor sequence begins with the inability to independently move through the water and progresses to more refined levels of locomoting through the water (see Table 4.9 and Figure 4.7).

Validity—Developmental and construct validity established by Langendorfer et al. (1987) and Balan and Langendorfer (1988a).

Reliability—Categorizations exceed 90% consistency across trials.


Objectivity—Raters agree 90%.

ADMINISTERING THE AQUATIC READINESS ASSESSMENT

CONCEPT 4.11

Administration of the ARA involves observing multiple trials and in varying conditions to achieve satisfactory results.

Table 4.9 Combined Movement Checklist

Step/level	Decision rule
1. No locomotor behavior	Child is unable to locomote independently in water.
2. Dog paddle	Front stroke is characterized by plantar push or rudimentary flutter kick, circle downward arms, and vertical or inclined body position.
3. Beginner or human stroke	Front stroke is characterized by bent-knee flutter kick, pull-push arms, and inclined body position. Rotary breathing optional.
 4. Rudimentary crawl	Front stroke is characterized by rudimentary alternating arms with flutter kicking. Breathing pattern may vary.
5. Advanced crawl or other advanced formal stroke	Front stroke with defined arm, leg, and breathing patterns, usually with horizontal body position.

Note. Adapted from Erbaugh (1978), Langendorfer (1984a), and Langendorfer et al. (1987).

There are several things you can do to prepare for using the ARA effectively, including establishing adequate levels of observer objectivity, acquiring necessary test administration equipment, preparing the child for testing, and actually administering the test. The following sections provide some detail on these recommended preparations.

Establishing Objectivity

To use the ARA, you must establish an adequate level of objectivity in observing the sequential movements described within the components of the instrument. As we suggested in chapter 3, objectivity means general agreement both with other instructors and with oneself on different occasions. Operationally, we suggest being able to agree 80% or better on each component with another observer and with oneself on separate occasions. Make copies of Table 4.10, the ARA checklist, and use them for establishing both inter- and intraobserver objectivity.

HOW TO USE THE ARA CHECKLIST TO IMPROVE OBJECTIVITY

1. Familiarize yourself with the decision rules for each level within the components of the ARA. Ask yourself what is the critical feature that categorizes that behavior according to the decision rule.
2. Study Figures 4.1 through 4.7 to get a visual image of what the decision rule is describing. Focus *only* on one component and sequence level at a time.
3. Observe several children of different abilities actually swimming. For arm, leg, and body position components, it is helpful to do this underwater with goggles or a mask or through an underwater window if one is available.
4. Ask a coinstructor to repeat Steps 1 to 3. Then both of you should *again* observe the same children from Step 3, either live or on videotape.
5. Compare both instructors' observations on both occasions on the checklist. Take the total number of agreements between instructors and divide it by the total possible observations and multiply by 100. This figure should be 80% or greater. If not, repeat Steps 1 to 4 until you can agree 80% of the time or more. It may be helpful to go over the decision rules from Step 2 above together.
6. Compare each instructor's first and second observations in Steps 3 and 4. Again divide the agreements by the total observations and multiply by 100. If this value does not meet or exceed 80%, further training is still needed by the instructor who is not consistent.

Required Equipment

You need very little equipment to administer the ARA. Basically, a writing implement (a pencil is best), copies of the ARA checklist, a clipboard, and perhaps a copy of the text with the decision rules and figures are all that are necessary. If possible, it is helpful to have a chair, small table, or lectern on which to set materials while writing on them and to keep them dry and out of the way. If you expect the materials to get wet, it is a good idea to have one copy of the checklist copied onto a piece of waterproof paper (which can be obtained from a drafting store) or laminated. An inexpensive lamination procedure is to put clear "Contac" paper on both sides of the paper.

As previously mentioned, a videocamera is ideal for later analysis, but it is not necessary. If you use a videocamera, position it on a tripod a safe distance away from the pool edge. Avoid filming into windows or other sources of glare on the water surface. It is best if a person other than the test administrator does the actual taping, because giving the test requires the instructor's full attention. If an underwater window or filming periscope is available, the swimmer should be positioned to obtain a sideview picture.

Setting the Stage for the Child

An important and often overlooked step in testing is preparing the child to be tested. This at first may seem

to be an unimportant procedure, but an evaluative situation to a child can be very stressful. The social facilitation literature suggests that low-skilled children's performance may be affected negatively in such a situation. The best thing is usually to describe the administration of the ARA as "playing some games" or "doing some fun things." If the child appears to be anxious, especially if he or she scores Level 1 or 2 on the water orientation and adjustment component (which you should always administer first), it may be appropriate to delay testing until she or he feels more relaxed. Sometimes letting a child sit on the side and watch a classmate being tested can reduce anxiety significantly. For some children it is helpful to get them involved by letting them look through the camera lens, use a stopwatch, or hold the clipboard. The purpose of the testing is to elicit the most advanced behavior from a child possible. Anything that assists that effort can be beneficial.

Testing the Components

Testing each of the components can be accomplished by organizing your observational strategies to match the child's actions:

- Restrict observations to one component at a time.
- Observe the water orientation and adjustment component first.
- If they score at least Level 2, observe water entry as the child enters the water.

- Next, request that the child show how she or he can swim, or put his or her face in the water, or move independently away from the wall (depending upon the child's apparent skill level).
- Observe slow-moving components such as breath control and buoyancy while the child is warming up.
- Use several repetitions to observe, one at a time, the arm and leg actions, composite stroke, and body position.
- Where possible, try to get an underwater side and front view of the stroking components using a periscope or goggles.

The ARA has been validated in several situations. Students have been requested to swim both short distances (5 to 10 feet) and long distances (45 to 75 feet). The child just starting to stroke, slowing down, or reaching for a wall or object often alters her or his stroke to a more primitive level. It appears that stroke observations obtained when the child is "up-to-speed" with her or his stroke present the tester with the most accurate description of the child's "best" pattern.

HELPFUL HINTS FOR USING THE ARA

CONCEPT 4.12

There are several "tricks of the trade," such as observing multiple trials and in varying conditions, that can enhance use of the ARA.

Administration of any developmental sequence instrument presupposes that the most advanced level of behavior of which the person is capable can be elicited in a reliable manner. Often the use of a goal requiring rapid or forceful movement helps (Robertson, 1977, 1978). Other times a number of trials and varying conditions may need to be employed to ensure that the most advanced behavior level is observed. Nevertheless, there are times when a fearful, fatigued, or otherwise distressed child will not provide valid, reliable aquatic behaviors. At such a point, it is best to postpone assessment until a later period.

Record the Movement on Videotape

In testing the ARA, several things can be useful. First, record the swimming behaviors on videotape. It is ideal if the videotape can be recorded underwater

for the arm, leg, and body position assessments. Some pools have underwater windows; others may have an underwater camera housing available. We have used periscopes in which the video is recorded through a submerged mirror as the child swims. Even if underwater views are impossible, certain behaviors captured on tape from above water are easier to categorize at a later date under slow motion and repeated observations.

Use More Than One Trial

Another important factor in obtaining reliable data is to observe or tape several trials of each behavior. As we suggested in chapter 3, behavior that can only be elicited once should be suspect and may not indicate valid, reliable performance. It may be helpful to ask a child to simply repeat a performance "once more" or "a couple more times." Alternatively, it might be helpful to ask a child to go through a number of skills and then repeat them again later. This may be less boring for both the child and yourself.

Use a Second Pair of Eyes

It is important to have another instructor verify your observations. It is very easy for one person to misinterpret a particular skill or movement, especially if the limbs are moving rapidly or if there is a great deal of water movement or splashing. This is where the videotape can be especially helpful. A second instructor can view the tapes after class and verify or question your classifications. When a disagreement is not resolvable, a second assessment observation is probably in order.

Getting the Best From the Child

When you cannot elicit what you believe is the most advanced behavior the child is capable of, several "tricks" may be tried. The first is to test several children simultaneously and try to encourage a "social facilitation" phenomenon to occur. Often when children see another child perform, they do so also, in a mild form of competition with their peer. Another technique is to switch places with the child and let them test you first. Then switch places again and say, "OK, now your turn." Another technique is to try a different water depth or a second pool if one is readily available. We have even had success testing young and inexperienced swimmers on water adjustment and breath control skills in a warm water plastic pool placed on the deck. Often a simple change of venue or reduction in water depth can alleviate a child's fears.

Table 4.10 Aquatic Readiness Assessment Checklist

Water orientation and adjustment component (Place check or date of accomplishment)

Level	Level name
_____	1. No voluntary entry, demonstrates fear of the water
_____	2. Voluntary entry with hesitancy but minimum fear
_____	3. Voluntary entry with no fear of the water

Water entry component (Place check or date of accomplishment)

Level	Level name
_____	1. No voluntary entry
_____	2. Assisted feetfirst entry
_____	3. Unassisted feetfirst entry
_____	4. Assisted headfirst entry
_____	5. Unassisted headfirst entry

Breath control component (Place check or date of accomplishment)

Level	Level name
_____	1. Reflexive breath holding
_____	2. Spitting or shipping
_____	3. Voluntary face submersion
_____	4. Repeated breath holding
_____	5a. Extended breath holding and/or
_____	Rhythmic breathing with stroke

Buoyancy/flotation checklist (Place check or date of accomplishment)

Level	Level name
_____	1. No flotation
_____	2. Flotation with assistance
_____	3. Flotation with support
_____	4. Unsupported flotation

Body position checklist (Place check or date of accomplishment)

Level	Level name
_____	1. Vertical (90° to 45°)
_____	2. Inclined (44° to 20°)
_____	3. Level (19° to 10°)
_____	4. Horizontal (less than 10°)

Arm propulsion action checklist (Place check or date of accomplishment)

Level	Level name
_____	1. No arm action
_____	2. Short downward push
_____	3. Long push-pull
_____	4. Lift propulsion

Arm recovery action checklist (Place check or date of accomplishment)

Level	Level name
_____	1. No arm action
_____	2. No overwater recovery
_____	3. Rudimentary overarm
_____	4. Straight overarm
_____	5. Bent-elbow overarm

Leg action checklist (Place check or date of accomplishment)

Level	Level name
_____	1. No leg action
_____	2. Plantar push "bicycling"
_____	3. Rudimentary flutter
_____	4. Bent knee flutter
_____	5. Straight leg flutter

Combined movement checklist (Place check or date of accomplishment)

Level	Level name
_____	1. No locomotor behavior
_____	2. Dog paddle
_____	3. Beginner or human stroke
_____	4. Rudimentary crawl
_____	5. Advanced crawl or other advanced formal stroke