5-1-2007

The Developmental Perspective, the Swimming Reflex, and The Velveteen Rabbit

Stephen J. Langendorfer

Bowling Green State University, slangen@bgsu.edu

Follow this and additional works at: <https://scholarworks.bgsu.edu/ijare>

How does access to this work benefit you? Let us know!

Recommended Citation

Langendorfer, Stephen J. (2007) "The Developmental Perspective, the Swimming Reflex, and The Velveteen Rabbit," *International Journal of Aquatic Research and Education*: Vol. 1: No. 2, Article 1.

DOI: <https://doi.org/10.25035/ijare.01.02.01>

Available at: <https://scholarworks.bgsu.edu/ijare/vol1/iss2/1>

This Editorial is brought to you for free and open access by the Journals at ScholarWorks@BGSU. It has been accepted for inclusion in International Journal of Aquatic Research and Education by an authorized editor of ScholarWorks@BGSU.

EDITORIAL

International Journal of Aquatic Research and Education, 2007, 1, 93-100
© 2007 Human Kinetics, Inc.

The Developmental Perspective, the Swimming Reflex, and *The Velveteen Rabbit*

I am finding that one of the several pleasant benefits of being a journal editor is having my very own soapbox four times each year to ponder various topics of my own choosing. How cool is that? Well, at least until I run out of topics to write about, it seems cool! Of course, relating the developmental perspective, Myrtle McGraw's study of the infant swimming reflex, and Margery Williams's *The Velveteen Rabbit* may be one of the strangest connections I could ever try to make. Readers will have to decide whether this is one whimsical soapbox I should have stayed down from.

Motor Development and Aquatics

As I related in the editorial accompanying Issue 1 of *IJARE*, for some strange reason, I find all things aquatic to be one of the abiding passions in my life (second, of course, to my wife and family). If it's wet, I am interested—even on all those cold winter mornings at 6 a.m. when I literally have to force myself out of a warm bed and onto my trusty Trek to pedal over to the university's student recreation center and plunge into the pool for our daily Masters swim practice.

As a professor and scholar, I often still feel it necessary to “defend” my passion for aquatics because the field does not have the strongest scholarly reputation, another theme that I related in my first editorial. I think one of the reasons I continue to find fulfillment in the study and practice of aquatics is that I am able to bring several of my scholarly interests to bear on the field. For example, I am trained in the subdiscipline of motor development, which I studied while earning graduate degrees from Purdue University and the University of Wisconsin, Madison. As a result, I find that I look at the world from a slightly different vantage point than most other aquatic professionals, for good and ill. My worldview has certain characteristics unique to developmental psychology and typically is labeled a “developmental perspective.”

Viewing Water (and Swimming) Developmentally

So, what is a developmental perspective, and what does it mean to view the world (and aquatics) developmentally? *Development* is a psychological “change perspective” having some characteristics shared with other change terms such as learning, growth, and evolution, each of which has its own qualities and uniqueness. I describe the developmental perspective as the expectation that aquatic (as well as other movement) behaviors change over time (including not just childhood but across the entire life span) in a regular, predictable order. Developmental changes result from alterations in body size and fitness capabilities or from specific experiences such as swim lessons. Developmentally, skills are acquired in a step-by-step fashion, gradually changing from a relatively primitive and ineffective state to one of greater efficiency and effectiveness. For example, Larry Bruya and I (1995)

have described in the *Aquatic Readiness Assessment* how prone aquatic locomotor patterns gradually change in steps from very rudimentary “dog paddle” motions to more effective and efficient front-crawl or breaststroke movements.

In contrast to the developmental perspective, most aquatic professionals think about skill acquisition by employing an error model. An error model presumes that there is a single “right” way of performing skills that is usually equivalent to the movement used by elite adult swimmers. The process of skill acquisition and improvement involves expunging presumed movement errors. Those holding an error model presume that one should teach even the youngest individuals all the characteristics of a proficient fully formed stroke rather than allow them to progress gradually from a beginner stroke to more advanced patterns at their own pace. A danger in holding an error model is that the gradual changes in behavior are not recognized as important to the learning process. It also is frustrating to many young and inexperienced swimmers because even when they improve, they still are not viewed as swimming “correctly” according to the error view. In contrast, the developmental perspective is much more hopeful because it embraces all manner of changes. It can even understand and explain negative changes, or regressions, in behavior as a natural part of the change process.

Although graduate study helped me understand a developmental perspective conceptually, I realize in hindsight that I first discovered the essence of the developmental perspective during several months of undergraduate study in Köln (Cologne), Germany, at the *Deutsche Sporthochschule*, the sports college where Germany’s elite coaches and athletes study and train. During a series of special guest lectures, Liselott Diem (1982), then the *Rektor* (or Dean), helped us appreciate the German philosophy of sport, a lifelong commitment to physical activity, health, and wellness. It is amazing to look back 35 years later and realize how far ahead the West Germans were: Only over the past decade have we Americans begun to embrace the importance of integrating physical activity and health as part of a lifelong commitment to wellness!

Myrtle McGraw: Aquatic Pioneer?

Germane to my aquatic interests, Frau Diem introduced me to the work of Myrtle McGraw, a true developmental giant who conducted early-childhood motor-development research at Columbia University during the 1920s, 1930s, and 1940s. Dr. McGraw, a real academic pioneer, was the first woman awarded a PhD in psychology from Columbia University. She was part of an intellectual elite in New York City of the period that included John Dewey and Margaret Mead. Even 17 years after her death she remains one of my true academic heroes. Many of my own interests and works have been shaped by McGraw’s early work.

Perhaps the most important personal event that occurred during my study in Germany was my introduction to Dr. McGraw’s 16-mm film of her twin study of Johnny and Jimmy, based on her 1935 book, *Growth: A Study of Johnny and Jimmy*. In the silent, black-and-white movie, originally shown at an international conference in Moscow in 1958, McGraw dramatically demonstrated the subtle and not-so-subtle influences that early movement experiences can have on a child’s motor development and that persist into adulthood. Of particular interest to Frau Diem and to me was the film segment showing early swimming development. In

fact, I am fond of recalling to my students that that if my mom hadn't insisted that I study abroad and I hadn't seen that film, I probably would never have pursued my professorial career and wouldn't be there teaching them (about which some students undoubtedly have mixed feelings!).

In today's digital age of CDs, DVDs, and YouTube, one may wonder what could be so world changing about a short black-and-white 16-mm film of a baby swimming, especially one not even intended at all for an aquatic audience. Lots, I assure you! With the keen eyes of a good researcher, McGraw had noticed that as human infants progressed over their first year or two of life, many of their motor behaviors changed in regular, predictable patterns. This was particularly true for their aquatic behavior, which she chose to use as an illustrative exemplar.

Readers in 2007 probably have a hard time appreciating how radical it was in the 1930s, during the Great Depression, to put a newborn baby into water other than to bathe him, much less to do so regularly as part of a training regimen investigating the influence of early experience on motor development. Nevertheless, that was exactly what Dr. McGraw did. She captured her observations and behaviors using that relatively new-for-the-time technology, motion-picture film. In fact, my own interest and professional use of film and video dates back to having studied the McGraw films. Ironically, I now find myself to be the curator of what remains of the McGraw film/video collection. Those interested in purchasing copies, especially of the 6-min swimming video, can contact me directly (slangen@bgsu.edu) for information about the available McGraw films in the series.

Aquatic Development in Human Infants

When McGraw submerged a neonate face down in the warm water of a therapy pool at New York's Presbyterian Hospital, she observed a strikingly well-organized movement pattern that she dubbed "the swimming reflex." In truth, similar lateral trunk-flexion and alternating arm- and leg-flexion-extension motions can be observed in newborns lying face down on any surface; on a typical firm surface, these same movements are called the crawling reflex. If a baby is held vertically at the shoulders, often the legs will make alternating flexion-extension movements at the hips and knees, which we call the stepping or walking reflex. Readers of the online version of *IJARE* can click on Figure 1 to watch a short digital-video clip of the swimming reflex as presented by McGraw.

By the time infants reach 4–5 months of age, McGraw noted that their regular "swimming-like" reflex motions had subsided somewhat, often resulting in their rolling over on the back, floating supine near the surface of the water, usually with the face partially submerged. She called this the "disorganized phase." Figure 2 illustrates a digitized example from McGraw's film collection. I have heard some baby-swimming proponents suggest they actually "teach" infants to float on their backs as a method of "drown proofing" them. McGraw's films illustrate this isn't so much a matter of teaching or conditioning as it is the baby's natural increase in body fat that causes the infant to physically and naturally roll over onto his or her back in the water.

Sometime late in the first year of life, coincidently about the same time that children are beginning to crawl, creep, sit, stand, and walk on land, infants' aquatic movement changes again (Langendorfer & Willing, 1985). McGraw titled this

Figure 1 — An example of a 1-month-old demonstrating Myrtle McGraw's reflex swimming phase.

Figure 2 — An example of the disorganized phase of infant swimming, in which the 5-month-old infant has rolled over onto his back.

behavior the “voluntary phase.” As the online reader can observe in the video for Figure 3, this swimming motion appears to be very similar to what we might call “dog paddle” or the “beginner stroke,” with the exception that the young child still does not lift his head, preventing him from breathing. The inability to lift the head and breathe is a critical omission that those advocating similar early water

Figure 3 — A 15-month-old infant demonstrating McGraw's voluntary phase of swimming.

experiences as a conditioning method to “drown proof” young children should note. Even when children do demonstrate voluntary-phase movement, it does *not* have a functional survival value, at least not until a much more advanced level when they are several years older.

Although many of us now consider McGraw's theory of neuromuscular maturation (McGraw, 1963) an inadequate theoretical explanation of why aquatic (and other movement) behaviors change during infancy, I believe that the developmental implications from her descriptive observations about changing movement patterns are still apropos and important for today's aquatic professionals. They reflect the fact that aquatic movements, like infant motor behaviors on land, the so-called motor milestones, regularly and systematically change over time, and not only as a result of structured swimming lessons. In fact, I firmly believe that children regularly exposed to an appropriate and safe aquatic environment will acquire voluntary swimming behavior in virtually the same fashion they learn to walk: through regular (and closely supervised!) trial-and-error exploration in the water (Langendorfer & Willing, 1985).

Figure 4 illustrates how all movements tend to change over time: The earliest behaviors (e.g., reflexive-phase swimming) gradually decline in frequency and are replaced by more intermediate behaviors such as disorganized-phase behaviors. The intermediate levels initially increase and then decline. Finally, the most advanced behavior (e.g., voluntary aquatic behavior) very gradually increases in frequency until it becomes the most commonly observed behavior sometime during the second year of life. These changes in aquatic behaviors exemplify a hallmark of

Figure 4 — The developmental graph illustrating how the frequencies of each of McGraw’s infant-swimming phases regularly change in an ordered pattern over the first 800 days of life.

developmental changes: the coming to be and passing away of movement patterns, in this case, of swimming behaviors.

I suppose that adopting a developmental perspective happens something like the process of “becoming real” as the Skin Horse describes to the Velveteen Rabbit in Margery Williams’s fanciful children’s tale:

Real isn’t how you are made. . . . It’s a thing that happens to you. . . . It doesn’t happen all at once. . . . You become. It takes a long time. That’s why it doesn’t often happen to people who break easily, or have sharp edges, or who have to be carefully kept. Generally, by the time you are Real, most of your hair has been loved off, and your eyes drop out and you get loose in the joints and very shabby. But those things don’t matter at all, because once you are Real, you can’t be ugly, except to people who don’t understand. (Williams, 1975, p. 17)

That’s how my own personal journey in adopting and gaining a developmental perspective seems to me. Acquiring a full appreciation for the developmental perspective—like becoming “real”—certainly doesn’t happen all at once, and it does take a long time and quite a bit of effort. I am not certain how much the struggle to understand swimming developmentally can be blamed for my own aging vision, looseness in the joints, shabbiness, and other characteristics, but it certainly sounds

as if the Skin Horse's words could have been aimed at this particular aging journal editor. Who would ever have thought I would identify with a worn-out toy bunny rabbit?

References

- Diem, L. (1982). Early motor stimulation and personal development: A study of four to six year old German children. *Journal of Physical Education, Recreation and Dance*, 53, 23-25.
- Langendorfer, S.J., & Bruya, L.D. (1995). *Aquatic readiness: Developing water competence in young children*. Champaign, IL: Human Kinetics.
- Langendorfer, S.J., & Willing, E. (1985). The impact of motor development research upon issues in infant and preschool aquatic development. *National Aquatic Journal*, 1(1), 14-15.
- McGraw, M.B. (1939). Swimming behavior of the human infant. *Journal of Pediatrics*, 15(4), 485-490.
- McGraw, M.B. (1963). *Neuromuscular maturation of the human infant*. New York: Hafner. (Original work published 1943)
- McGraw, M.B. (1975). *Growth: A study of Johnny and Jimmy*. New York: Arno Press. (Original work published 1935)
- Williams, M. (1975). *The velveteen rabbit*. New York: Avon Books.

In Volume 1, Issue 2

In this Issue 2, readers will find a series of diverse and interesting aquatic articles drawn from many different perspectives and subdisciplines (e.g., biomechanics and motor control, exercise physiology, outdoor education, sport history, sport psychology) written by authors from several different countries. Yes! We are making progress in becoming truly "international"!

The first research article, co-authored by Maija Rumaka and two of her colleagues from the Latvian Academy of Sport Education, describes how a 12-week swimming-instruction program improved students' spirometric (lung and breathing) variables such as inspiratory, expiratory, and forced vital capacities. Our second article comes to us from Leeds Metropolitan University in the UK, authored by Eleftheria Avramidou, Stathis Avramidis, and Remco Pollman. These authors provide a sport-psychology review on differences and changes in competitive anxiety as it applies to competitive swimmers and lifeguards.

The third research article comes from the research team of Erin Rutledge, Matt Silvers, Kathy Browder, and Denny Dolny at the University of Idaho. Their study compared the metabolic costs of treadmill exercises done in the water and on land. From a much different perspective, Dean Witman, from Oshkosh, Wisconsin, presents his exploratory study, "Injury Rates During Water-Based Wilderness Recreation," intended as a call for action about the need to recognize and prepare outdoor leaders for aquatic emergencies in remote locations. Mike Miller and his colleagues from Western Michigan University present a unique study comparing how well plyometric training in different water depths improves force and power production in vertical-jump performance. The final research article comes from Hungary's Semmelweis University authors Laszlo Révész, Jozsef Bogнар, Marina

Salvara, and Szilvia Gita. These authors describe fascinating historical changes in the relative importance of swimming instruction as they relate to revisions in Hungary's national educational curriculum.

Our second issue wraps up with three educational articles and a book review. The journal's most frequent contributor, Lee Yarger from Ball State University, provides readers with two more professional contributions. The first article proposes an outline for developing a college or university curriculum for preparing new aquatic leaders. Lee's second contribution illustrates how aquatic professionals can profitably modify their business cards to better promote themselves and their programs. Finally, Robert Lowry provides us with a provocative article about the latest concern in drinking and recreational water, that is, xenobiotic contaminants. Bringing up the rear of this issue, I have authored a review of Terri Lees's new text, *Water Fun*, which many aquatic professionals may find of interest.

I hope readers enjoy the diverse contributions in Issue 2. I invite all readers who would like to become even more involved in aquatics and in the operation of the *International Journal of Aquatic Research and Education* to log on to our Manuscript Central Web site (http://mc.manuscriptcentral.com/hk_ijare) and create your own account. Be sure to indicate your areas of interest and expertise in aquatics by choosing the keywords provided so that when I do a search for new reviewers I can locate you. With a Manuscript Central account, you have access to become both authors and journal reviewers (or even a book reviewer). In building the journal from the bottom up, we can really use the contributions of as many authors and reviewers as possible. Thank you in advance for helping in this collaborative venture. I will be writing to you again in 3 months in Issue 3. See you then!

Stephen J. Langendorfer