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A Reasoned Action Approach Assessment of Instructional Youth Swim Safety Messaging

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Cover Page Footnote

Abstract

Youth drowning remains a primary cause of injury and death in the United States, particularly within demographic disparities involving: (a) sex, (b) ethnicity, (c) socioeconomic status, and (d) geographic location. Research has examined knowledge acquisition for injury prevention, but little has been done to understand impact on future behavior. This study examined a learn-to-swim and water safety education program using the Reasoned Action Approach to predict future behavior in/around the water. Youth participants ages 5 to 11 at summer camp programs completed a 55-question survey designed to test 7 competencies through the lens of attitudes, intentions, perceived norms, and self-efficacy. Results indicated that several safety messages are not predicted to produce the desired behavior. These include actions related to concepts such as "rescue" and "calling for help". Information derived from this study calls for researchers and practitioners to examine water safety programs for efficacy as an injury prevention tool.

Keywords: Youth, Drowning, Behavior, Education, Reasoned action

Youth Drowning in the United States

It is well established that drowning is the leading cause of unintentional injury death for youth ages one to four in the Unites States, with the phenomenon ranked second nationally for those between the ages of one to fourteen (CDC, Home and Recreational Safety, 2016). These facts can be extrapolated further to reveal that every hour 4.5 youths under the age of 18 die from drowning in some form meaning an estimated 3,600 youths drown annually in the U.S. Within these statistics, we can find disparities among factors related to sex, economic status, geographic location, and ethnicity. For example, male youth sustain a higher rate of injury and drowning death than females, those under the age of four a greater risk than those older than five, and those identified as African-American are at a 50% greater fatal drowning risk when compared to all other ethnic categories combined (Howland, Hingson, Mangione, Bell, & Backs, 1996; Sabel, 2015; Gilchrist & Parker, 2014). These statistics clearly demonstrate why dedicating time and resources to prevent injury and death related to drowning among youth is important.

Drowning Injury Prevention through Skill Acquisition and Education

Several empirical studies have documented the impact of youth-based swimming educational programs. On one side, evidence exists that the skills taught in learn-to-swim (LTS) programs are effective (Linnan et al., 2012). On the other side, although far fewer in numbers, are studies that examine the long-term impact and effectiveness of the water safety education components that often accompany skill acquisition in many LTS programs. This paucity of studies is key since we

generally understand that learning the skills of swimming alone does not eliminate the risk of drowning.

A recent meta-analysis by Wallis and colleagues (Wallis, Watt, Franklin, Taylor, Nixon, & Kimble, 2015) examined research related to youth drowning prevention culminating in three main areas which included: (a) education, (b) swim lessons and water safety; and (c) fencing/barriers. Although each area was recognized to contribute in some way as an intervention, fencing as a physical barrier stood out as the single most effective countermeasure. Within this meta-analysis, unfortunately a majority of studies were omitted since they did not focus on the LTS program as an intervention.

Oliveira and collaborators (Oliveira, Aranha, Resende, Cardoso, Pimenta, & Garrido, 2013) examined drowning prevention and its relationship to swimming skills acquired in youth-based programs. They discovered that, although youth were credited with achieving proficient levels of aquatic readiness, apparent proficiency did not directly correlate to participants actually passing a survival swim test. The article concluded by reiterating Langendorfer's (2011) call for the need for water safety education in *addition* to skill development as part of a holistic drowning prevention effort. Blitvich (2016) stated in her recently-published text on drowning information and research that few studies exist which take assessment of past knowledge into the area of prediction of future water safety behavior based on attitudes. This current study endeavors to heed that call to action.

A Leader in the Field: American Red Cross Water Safety Program

In 2014, the American Red Cross (hereafter, Red Cross) recently celebrated 100 years of involvement in water safety education. This humanitarian organization is well established in the United States as a leader in drowning prevention. The Red Cross delivers its programming through a series of evidence-based courses targeted to audiences of all ages, but most especially to youth. The collection of courses considered to be most impactful and well received is the Learn-to-Swim (LTS) program. The LTS program consists of a series of levels that take a participant through a progressive learning experience to gain skills and water safety knowledge with the goal of preventing injury and drowning.

Centennial Campaign. To mark their century milestone of involvement in water safety and drowning prevention, the Red Cross began an initiative, known as the Centennial Campaign, to attempt to assist areas throughout the U.S. identified as having higher than average drowning rates to expand the delivery of the Red Cross LTS program as an intervention to combat the problem. The program exists in partnership with Red Cross Licensed Training Providers, who deliver the training

to their community. The goal of the program is to reach areas which otherwise may not have the infrastructure in place to deliver swim lessons or water safety training programs. As part of the Centennial Campaign, the Red Cross has worked with local providers across the U.S. to make free or low cost swim lessons available and accessible to at-risk community members at reduced-cost, and training for lifeguards and water safety instructors to establish the systems needed to deliver the LTS program. To date, the Centennial Campaign has been active in 84 communities across 17 states, has trained over 600 new swim instructors, and has impacted over 36,000 youth participants (Connie Harvey, personal communication, November 14, 2016).

The Reasoned Action Approach (RAA)

The Reasoned Action Approach (RAA) is a method of inquiry that is a means of predicting future behaviors based on knowledge, attitude, beliefs, and intentions. This approach was selected as the theoretical framework for this study because of its usefulness in exploring decision-making in a variety of domains and age ranges (Armitage & Conner, 2001; Ajzen & Driver, 1992; Albarracin, Johnson, Fishbein, & Muellerleile, 2001; McEachan, Conner, Taylor, & Lawton, 2011; Fishbein & Ajzen, 2016). The RAA states that behavior is primarily determined by intention, defined as the likelihood of performing the action. With intention as the driving force in the theory, outcomes from examining the constructs of a) attitude towards the act; b) perceived norm; and c) perceived behavioral control, coupled with beliefs, can result in a prediction for future behaviors (Middlestadt, Bhattacharyya, Rosenbaum, Fishbein, & Shepherd, 1996). In its totality, the theory assumes that intention will increase the more a person believes in each of the three other construct areas.

The purpose of this study was to determine if water safety messages embedded in a LTS program can be effective in injury and drowning prevention by examining predicted future behaviors.

Method

Participants

A survey design grounded in the RAA framework was used to create an instrument and collect data with youths ages 5-11. The instrument was constructed to examine participant attitudes, intentions, and beliefs about water safety behaviors. The water safety learning objectives highlighted in the study were derived from those outlined in the Red Cross LTS curriculum. Topic areas included: (a) wearing and use of a lifejacket, (b) calling for help, (c) supervision, (d) presence of lifeguards, (e) recognition of emergencies, (f) water competency, and (g) rescue.

Purposeful sampling was employed to find volunteer participants among youth involved in programs operating at city-sponsored summer camps. Selection sites were based at summer camps that included a swimming instruction component and used only Red Cross certified Water Safety Instructors (WSI) and the associated LTS curriculum. A total of 10 sites were used in the study, including six within central and south eastern Florida and four sites in Atlanta, Georgia.

Procedures

Instrumentation for the study included a paper booklet survey which was read to all participants in small groups. The process of reading a survey aloud for guidance during administration is a customary and recommended practice with youth under the age of ten (Terzidis et al., 2007). Most survey groups consisted of two to ten participants with a few instances of one-on-one delivery taking place. Attempts were made to keep group sizes smaller for younger participants, ages five to eight years. In the event of larger groups, additional members of the research team were provided for support.

Survey Instrument. Survey questions were designed and printed in the form of a picture book with minimal text. Participants were asked to respond to a total of 55 questions based on those necessary in an RAA research framework. Each survey item employed a three-point scale in either the form of photographs (6 questions) or expression icons (49 questions) from which participants chose. A script was prepared that was used when administering the survey to clarify, provide consistency, and enhance reliability. In order to prepare for data collection, the primary investigators performed a training session with all members of the research team to practice and confirm content delivery to help ensure consistency. Additionally, the survey and administration procedures were piloted on two different occasions with varying age groups to identify potential issues and make any necessary adjustments to the survey, script, or administration process.

Survey Administration. During survey administration, each member of the research team worked with a group of children within a similar age range. After introducing the survey and obtaining verbal consent (passive parental consent was obtained prior to collecting data through distributed and emailed study information), participant groups were read each question aloud and asked to respond by using an indicator of their choosing on the picture or icon that best represented their response (e.g., circle, check mark, smiley face, star). We requested that participants not use an "X" as their indicator since this was reserved to indicate that a change was made in a response. Participants were required to complete each question before moving on as a group and to progress at the same pace as the research team member. Researchers facilitated groups so that participants would

not look to others for guidance in their responses, but instead provided the answer they felt was best. Care was taken to tactfully and respectfully keep participants from sharing their views on the questions out loud with the group to avoid influencing others.

Surveys were number coded so that they could be matched to participant demographic information including: (a) camp location, (b) age, (c) sex, (d) Learn-to-Swim level, and (e) whether the participant actually then participated in the swim program offered by the camp. Timing for preliminary survey administration was determined to engage participants just prior to beginning swim instruction with the post-survey occurring just after the end of their swim lessons course. Responses from participants either completing only the preliminary round of data collection or only completing the secondary round were used to create a cross-sectional view of responses for comparison purposes. All study protocols were approved and sanctioned through the principal investigator's Institutional Review Board (IRB).

Results

Knowledge Area Aggregate Score

A total of 606 respondents either fully or partially participated in the survey collection process. Only the responses of those who fully completed the survey in a manner that was determined suitable to be confidently interpreted by researchers were included for analysis. Total respondents, mean scores, along with minimum and maximum possible scores in each LTS curriculum knowledge area are listed below (see Table 1).

Knowledge Area	n	Min	Max	Mean	sd
Supervision	569	8.00	24.00	21.29	2.512
Presence of Lifeguards	567	8.00	24.00	21.15	2.607
Wearing/Use of Lifejackets	575	8.00	24.00	20.87	2.662
Recognition of Emergencies	568	8.00	24.00	21.23	2.194
Rescue	574	8.00	24.00	16.95	2.212
Water Competency	581	7.00	21.00	18.73	2.545
Call for Help	572	8.00	24.00	20.29	2.914

Mean scores for the LTS knowledge areas appeared to be high in general; however, the researchers noticed several areas of concern. Specifically, those included the mean scores found in the knowledge areas of rescue, call for help, and the wearing/use of lifejackets. Further investigation of the distribution of scores found the overall mean scores in these areas were more negatively skewed than in the other knowledge areas examined. Further analysis was undertaken to determine which individual questions may have impacted lower overall scores. For the

purposes of analysis, mean scores for individual items that fell below 2.0 (out of 3.0) were considered to be potentially problematic for messaging purposes (see Table 2).

Table 2. Knowledge Area Item Mean Scores

Knowledge Area/Item	n	Min	Max	Mean	sd
Rescue					
I will try to go into the water to help a swimmer in trouble	602	1.00	3.00	1.506	.7302
My parents want me to go into the water to help a swimmer in trouble	599	1.00	3.00	1.720	.8449
My friends want me to go into the water to help a swimmer in trouble	602	1.00	3.00	1.684	.7761
Going into the water to help a swimmer in trouble is… (Dumb/Smart)	599	1.00	3.00	1.861	.8514
Call for Help					
I will hang up after calling the police on the phone to go into the water to help a swimmer in trouble.	601	1.00	3.00	1.785	.8615
Wearing/Use of Lifejackets NO ITEMS UNDER 2.0					

RAA Aggregate Scores

Four composite measures were created from the 55 close-ended RAA items. Intention was measured using the mean of available responses for 13 items (e.g., "I will always swim with someone watching me" (disagree to agree); "I will look for a lifeguard before I go swimming" (unlikely to likely); and "I will try to go into the water to help a swimmer in trouble" (unlikely to likely). Attitude toward the act was measured with the mean of 14 semantic differential items (bad-good, boring-fun, agree-disagree and foolish-wise). Perceived norm was assessed with the mean of 14 items. Seven of these items assessed norms relative to friendship groups (e.g., "Your friends think that it is ok to swim by yourself" (disagree to agree)) and seven of the items assessed norm relative to parental supervision (e.g., "Your parents

think that it is ok to swim by yourself" (disagree to agree)). Perceived behavioral control, or self-efficacy, was measured with the mean of 14 items. These perceived control items assessed autonomy (e.g., "My choice to use a lifejacket is" (not-up-to-me to up-to-me)) and capacity (i.e., "You are sure that you know how to go get help when you see a swimmer in trouble in the water" (disagree to agree)). Mean scores, along with minimum and maximum possible scores in each domain area are listed below (see Table 3).

Table 3. Aggregate RAA Domain Area Mean Scores

Domain Area	n	Min	Max	Mean	sd
Attitude	542	14.00	42.00	35.62	3.340
Intention	571	13.00	39.00	33.44	2.748
Perceived Norm	559	14.00	42.00	34.51	4.224
Self-Efficacy	563	14.00	42.00	37.13	4.134

The mean scores for the RAA domain areas were high in general; however, the researchers noted some areas of concern. Specifically, those included the mean scores found in the attitude and perceived norm domain areas. Further investigation of the distribution of scores in those areas found the overall mean scores were more negatively skewed than in the other domain areas. We undertook further analysis to determine what question items may have impacted these lower overall scores. For the purposes of further analysis, mean scores for individual items lower than 2.0 (out of 3.0) were considered to be potentially problematic for messaging purposes (see Table 4).

Table 4. RAA Domain Area Item Mean Scores

Domain Area/Item	n	Min	Max	Mean	sd
Attitude					
Telling an adult anytime I think a swimmer is in trouble is (Dumb/Smart)	596	1.00	3.00	1.787	.9348
Going into the water to help a swimmer in trouble is… (Dumb/Smart)	599	1.00	3.00	1.861	.8514
Perceived Norm					
My parents want me to go into the water to help a swimmer in trouble	599	1.00	3.00	1.720	.8449
My friends want me to go into the water to help a swimmer in trouble	602	1.00	3.00	1.684	.7761

Knowledge Area and RAA Domain Scores

Taken together, the results indicated some specific items of concern in regards to how messages were being received by participants within the Red Cross LTS program courses. These items are found within the rescue and call for help knowledge areas and involved the attitude of respondents toward these knowledge areas as well as the perceived norms of appropriate or expected behavior in these situations.

Discussion

In conjunction with current research that has concluded water safety education and skill acquisition should be key components of drowning prevention efforts, examining the effectiveness of water safety messages embedded in popular learn to swim programs is crucial (Langendorfer, 2011). The results of this RAA framework study provided initial evidence that some knowledge areas in the Red Cross LTS program can be affirmed while some others raise concerns. We have focused the discussion resulting from the results of this study on the areas of concern since we believe those should be considered for future changes in content and/or mode of delivery.

RAA Attitude

One of the prominent messages taught in the Red Cross LTS curriculum was that one should never endanger oneself trying to rescue another person in the water. An extension of this message was the understanding that one should avoid going in the water whenever possible to assist someone in trouble. In this study, items related to entering the water to assist someone in trouble resulted in many participants choosing either the negative or neutral (not sure) response. The choices gave us reason to believe that more investigation was necessary to determine why the message was not being understood more clearly. It was unclear whether this was seen as a predicator of future positive water safety behavior. One possible reason is a phenomenon known as "rescue altruism" that involves deciding to act as a rescuer even in the face of possible injury or death to oneself, which may be driven by attitudes youth acquire through family structures or film, television, and popular media that often deliver messages demonstrating that the "appropriate response" is to take action (Pearn & Franklin, 2012).

As with the previous safety message, students in the Red Cross LTS program are taught to tell an adult when they see someone in trouble in the water. Although the message was clear to those delivering it, it did not seem to have resonated with youth as something to implement when faced with witnessing a swimmer in trouble. This may be due to several factors including multiple overlapping messages that can confound one another or be confusing including always swim with a lifeguard, and always tell a lifeguard when you see a swimmer in trouble.

RAA Perceived Norms

Strengthening the argument that the areas identified were of concern, we saw that the youths' perceptions of norms from family and friends also indicated messages counter to those intended to have been given in the course. This was particularly salient when asked what family and friends would want them to do when it came to attempting to rescue someone in trouble in the water. Many respondents felt that their family and friends would *want* them to risk their safety to go into the water to try to help someone who was in trouble; such beliefs leading to action were contrary to the safety messaging that was intended to have been delivered in the Red Cross LTS program. These results were similar to the attitudinal results discussed previously.

Outside of the possible factors influencing participants' views on water safety messages, one area that must be considered is that the message content and delivery have not been designed in a way that was either developmentally, or educationally, appropriate. We propose that we need to seek guidance from experts

in psychology and educational psychology. Such advice may allow us to examine and support the re-formulation of messaging that did not appear to be effective in changing predicted future behavior. In addition, we may need to draw upon the marketing expertise from the business field to provide information on how to impact youth-oriented messaging.

Implications arising from the results of this study are intended to inform aquatic professionals in their ongoing pursuit to provide safer aquatic facilities and to lessen the rate of aquatic injuries and drownings. We believe these results are particularly important for aquatic agencies and their practitioners who have a large number of youth participants within their aquatic facilities. The incidence of injuries for youth within aquatic facilities is higher than that of their adult counterparts (Hlavsa, 2016), and as such, understanding what types of safety messaging resonate (or not resonate) with youth is vitally important. Facility managers and youth programming professionals can use these results to recognize important gaps in aquatic education and perhaps add their own contextual messaging mechanisms to further address the importance of safe aquatic behavior.

Implications from this study are also especially salient for those who design and administer safety educational programs aimed at decreasing the prevalence of injury for youth within recreational settings. These implications are particularly applicable for those who rely on programs such as the Red Cross LTS program to inform their youth participants of appropriate water safety behavior. Through recognition of the shortcomings and gaps of message delivery within commonly used educational programs, professionals are better able to institute possible changes within the programs moving forward, and to ensure that messages are being received adequately by participants.

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