

Dying to Swim: Lifeguards' Response to Simulated Aquatic Emergencies

Lauren Winston

University of Tulsa

Author Note

Lauren Winston, Department of Psychology, University of Tulsa.

Correspondence regarding this article should be addressed to Lauren Winston,
Department of Psychology, University of Tulsa, Tulsa, OK, 74104. E-mail: lauren-
winston@utulsa.edu

Abstract

Drowning is recognized as one of the leading causes of death in children (Dean & Mulligan, 2009; Hastings, Zaharn, & Cable. 2006). Little research evaluates the lifeguarded aquatic environment. The research that does evaluate the aquatic environment does not adequately generalize to larger pools and water parks (Harrell, 1999; Harrell & Boisvert, 2003; Schwebel, Simpson, & Lindsay, 2007a, 2007b). The current research was designed to evaluate the effectiveness of lifeguard scanning through the use of Vigilance Awareness Training (VAT). In addition, the current research evaluated if required weekly preparedness training provided a cumulative effect in producing faster response times. Finally, the current study included past significant predictors from previous research. Results indicated that active VATs were recognized by lifeguards significantly faster than passive VATs. In addition, results indicated that lifeguard previous experience lead to significantly faster response times across all VATs. The current research has important implications for injury prevention in children as well as effective lifeguard training models. Overall, increased vigilance and scanning is related to a safer aquatic environment.

Dying to Swim: Lifeguards' Response to Simulated Aquatic Emergencies

Drowning is recognized as the third leading cause of death in children under the age of 5 (Dean & Mulligan, 2009). Children under the age of 5 (ages 1 to 4) have the highest rates of accidental drowning (Hastings, Zaharn, & Cable, 2006). Research focusing on an older age group of children to young adults ages 5 to 24, indicate that African American males have overall higher incidences of drowning in comparison to African American females, Caucasian males/females, and Hispanic males/females (Saluja, Brenner, Trumble, Smith, Schroeder, & Cox, 2006). Drowning in swimming pool related incidents only accounts for an estimated three percent of yearly drowning (Dean & Mulligan, 2009). However, Saluja et al. (2006) found that in regards to swimming pool drowning, public swimming pool drowning accounts for the second highest percentage (37%) of drownings.

Regardless of this clear safety concern in children and adolescents, research focusing on accidental drowning currently has a dearth of research devoted to the lifeguarded aquatic environment. The limited research that exists regarding drowning in the lifeguarded aquatic environment is predominately limited to specific case and pool examples with a low number of lifeguards, guests, pool size and capacity (Harrell, 1999; Harrell & Boisvert, 2003; Schwebel, Simpson, & Lindsay, 2007a, 2007b).

In an attempt to measure the relationship between risk taking and lifeguard surveillance, Schwebel et al. (2007b), conducted a pre-intervention study in which they observationally measured lifeguard surveillance, risk taking, and factors contributing to risky behavior; their research took place in a single outdoor pool with five lifeguards and average guest attendance of 61 patrons in water and 21 people on land during observation. Risky behaviors were determined as, "pushing people under the water, dangerous diving, aggressive acts, jumping into the water

near someone else, and running on the deck” (Schwebel et al., 2007b, pp. 368-369). Schwebel (2007b) determined lifeguard surveillance by coding lifeguard behaviors of, “looking at the pool, distractions, warnings, and scans” (pp.369-370). Results from Schwebel et al., (2007b) indicated a positive correlation between risk taking and number of patrons; the researchers also found that lifeguards tended to be predominately vigilant in their surveillance. Schwebel et al. (2007a), then conducted a midsummer intervention with all lifeguards and staff. The intervention consisted of three parts that included relaying the results from the pre intervention, raising awareness of drowning potential and providing education, and overcoming any potential barriers that lifeguards held regarding scanning (Schwebel et al., 2007a, p. 864). Post intervention Schwebel et al. (2007a), found that overall risky behavior decreased and lifeguard vigilance increased.

In order to investigate patron attendance and lifeguard surveillance, Harrell (1999) observationally measured in water patron attendance and lifeguard surveillance at three separate indoor pools. Harrell (1999) averaged 42 in water patrons per hour. Results indicated that time of day, number of children, and increased child to adult ratio significantly contributed to decreased lifeguard scanning (Harrell, 1999). In a follow-up to Harrell (1999) Harrell and Boisvert (2003) observationally measured lifeguard surveillance at three separate indoor facilities as well as number of guests (separated by children and adults). In water patron attendance averaged 23 swimmers an hour and researchers concluded that as more children were present, especially in relation to number of adults, lifeguard scanning decreased (Harrell & Boisvert, 2003). However, these findings fail to adequately generalize to the larger pools and water parks, which typically are equipped with more lifeguards, guests, and pools.

The current research on larger pools and water parks is virtually nonexistent and the research that does exist is incredibly lacking and does not generalize to larger facilities. The area of injury prevention, as measured by proactive lifeguard scanning and recognition is an area that needs increased research.

Background

Scanning

Research on drowning prevention has focused on several factors such as, lifeguard scanning, children to adult ratios, time of day, lifeguard location, and type of rescue equipment. Research by Harrell (1999) evaluated lifeguard scanning patterns, location of lifeguard, and number of patrons. Harrell (1999) and Harrell and Boisvert (2003) used two observers to measure lifeguard scanning at three indoor pools, lifeguard scanning at each pool was measured by observing only one guard actively scanning the water. Scanning in the Harrell (1999) and Harrell and Boisvert (2003) research was measured at 12 different five minute time points for an hour, in which only three minutes of each five minute segment was devoted to observation of lifeguard scanning, totaling 36 minutes spent in evaluation of lifeguard scanning. Harrell (1999) qualified scanning as the lifeguard's head focused on the water and not distracted from the water, if the lifeguard moved their head to a different part of the water then it was deemed an additional scan and was counted as such. Of the four lifeguards that the researchers observed there was a mean number of 2.5 scans (Harrell, 1999). Of the six lifeguards that Harrell and Boisvert (2003) observed there was a mean of 15 scans.

Harrell and Boisvert (2003) suggest that an algorithm can determine the number of decisions that an individual lifeguard must process when scanning their zone, this is known as the Hick-Hyman law. The Hick-Hyman law is a combination of both Hick and Hyman's

separate original research arising from Merkel's work with information theory. Merkel is crucial in the Hick-Hyman law by discovering that in choice tasks reaction times decrease as target stimuli must be recognized from a larger set of stimuli (Seow, 2005). In regards to choice-reaction times this would mean that "the display is the transmitter of information; each alternate stimulus the message; the sensory-perceptual system the channel; the participant the receiver, and the appropriate action the destination" (Hyman, 1953; Laming, 1968; as cited in Seow, 2005). The Hick-Hyman law built upon the research of choice-reaction time by developing an algorithm that can be expressed as bits of information, as the number of stimuli increases, the ability to recognize the target stimuli decreases and represents a linear function that can be expressed algebraically in terms of bits of information (Harrell & Boisvert, 2003). These bits of information all represent a message for which the receiver must determine an appropriate destination (Seow, 2005). In terms of Harrell and Boisvert (2003) this means that each swimmer (message) creates a bit of information that must be factored algebraically into the algorithm in order for the lifeguard (receiver) to determine whether an action is necessary (destination).

Ratio

Harrell's (1999) initial research used two minutes of each of the 12 segments, totaling 24 minutes, in order to observationally count number of in water patrons (children and adult). Children were approximated to be 17 and under (Harrell, 1999). Results from Harrell (1999) indicate that there was a mean of approximately 8 and 34 adults and children respectively. The mean ratio of children to adults was 5:1 (Harrell, 1999). Results indicated that as the number of children to adult ratio increased lifeguard scans decreased, suggesting that lifeguards view children as representing a bigger risk of drowning than adult patrons (Harrell, 1999). Building on these initial findings of decreased lifeguard scanning in relation to increased child to adult

ratio Harrell and Boisvert (2003) found that each additional child located in a lifeguards zone of protection created a linear relationship between the lifeguards decision regarding safety of the child (rescue/no rescue). Thereby, each additional child swimmer creates additional cognitive processing demands for the lifeguard which slows and decreases overall scanning (Harrell & Boisvert, 2003).

Lifeguard location

Harrell (1999) recorded lifeguard location and activity of lifeguard during each observation of lifeguard scanning. Observers noted whether lifeguards were located at deck level or in a guard stand which was elevated above deck level(Harrell, 1999). Lifeguards were predominately recorded deck level (75%) (Harrell, 1999). Results indicated that lifeguards who were elevated in the stand had significantly greater number of scans (Harrell, 1999).

Time of day

Harrell (1999) also found that overall number of lifeguard scans decreased at later times of the day which occurred both independently and in conjunction with increased presence of child patrons. Harrell (1999) did not attempt to measure why vigilance declined later in the day and Harrell and Boisvert (2003) did not further explore that variable in follow up research. Overall, results of the research by Harrell (1999) and Harrell and Boisvert (2003) indicates that lifeguard scanning tends to decrease in consistency and prevalence as the numbers of children to adults increased, later in the day, and pool level location.

Lifeguard training

Lifeguards typically are responsible for an individual zone of protection while on duty (Ellis & Associates, 2007). Each zone of protection is specifically designed to where the lifeguard can recognize a guest in distress within ten seconds and can reach a guest in distress

within 20 seconds from the lifeguards' location. This idea of ten seconds to recognize and 20 seconds to respond is known as the 10/20 protection standard (Ellis & Associates, 2007).

There are a number of different scanning patterns that lifeguards are trained to use, including up and down, side-to-side, circular, triangles, figure eights, and the alphabet (Ellis & Associates, 2007). The important thing for lifeguards to remember when scanning is to continually scan the zone, scanning from the bottom to the top of the pool and from one far extreme of the pool to the other as well as under the stand or under the lifeguard's feet (Ellis & Associates, 2007). Additionally, lifeguards continually utilize different scanning patterns throughout a rotation that are designed to adequately cover their zone of protection while detracting from creating scanning routines which can lead to less efficient scanning and cognitive attention (Ellis & Associates, 2007).

When scanning a zone of protection the lifeguard wants to keep in mind many things that can affect their ability to adequately scan their zone and recognize a guest in distress (Ellis & Associates, 2007). Common environmental elements such as a glare or shadows on the water's surface can lead to increased scanning difficulties (Ellis & Associates, 2007). When scanning difficulties emerge it may be hard to maintain the 10/20 protection standard for a lifeguards individual zone of protection and may require zone revalidation and lifeguard relocation in order to adjust to unavoidable environmental conditions (Ellis & Associates, 2007). According to Ellis and Associates (2007) number of patrons and overall water quality can also affect lifeguard scanning. If the water is murky, it can become hard to see the bottom of the pool or below the surface (Ellis & Associates, 2007). The number of guests in the pool can also affect scanning efficiency (Ellis & Associates, 2007; Harrell, 1999; Harrell & Boisvert, 2003). Each guest creates an additional cognitive load for the lifeguard in terms of bits of information according to

the Hick-Hyman law (Harrell & Boisvert, 2003). Increased attendance should lead to the lifeguard scanning more proactively and diligently, yet research shows that scanning duration slows and fixation begins to develop in the lifeguards routine (Harrell & Boisvert, 2003). Fixation prevents efficient scanning of the individuals' zone of protection within the 10/20 protection standard and can lead to major aquatic emergencies (Ellis & Associates, 2007).

The present study

One way to address vigilance and attention in lifeguards is by vigilance awareness training (VAT). VAT's occur during normal operations and is a way to test lifeguard scanning without counting the number of times a lifeguard moves their head. VAT's involve the insertion of a mannequin or live actor in the water and the lifeguard is responsible for recognizing the VAT within the ten seconds allotted to scanning a zone. VAT's have the ability to safely simulate major aquatic emergencies as well as the vigilance and response time of the lifeguard.

The limited research has shown that increased ratios of children to adults' leads to decreased as opposed to increased scanning (Harrell, 1999; Harrell & Boisvert, 2003). The research by Harrell (1999) has also shown that time of day is a significant factor concerning lifeguard vigilance and attention while on duty. The current research aims to evaluate lifeguard-scanning behavior as measured by lifeguards' response time in seconds to a simulated aquatic emergency, referred to as VAT, during daily operations and the influence the number of guests has on reaction time. The research further aims to determine if providing required preparedness training sessions through weekly inservice trainings, is effective at keeping lifeguard skills at a test ready level and does it have a significant and cumulative effect on overall response time in seconds to a VAT. Specifically, does response time in seconds decrease after multiple preparedness training sessions. The research will further evaluate if there is a difference in

response time to simulated (passive versus active) guests in distress and if time of day significantly adds to the overall difference in response times.

The current research has an ability to fulfill a much-needed gap in the literature. There are currently no studies that evaluate the effectiveness of lifeguard scanning in conjunction with differences in active versus passive rescue responses during normal operations or the effect that training has on improving response time. In addition, limited research evaluates the effect of number of patrons and time of day on lifeguard scanning.

Method

Participants

Subjects were initially 117 lifeguards, at least 16 years old, observed in June and 107 lifeguards observed during July at a large water park in the Midwest during the summer of 2012. Of the initial 117 lifeguards, 52 lifeguards met observation criteria for both June and July. These 52 lifeguards had a minimum of two drops (one active and one passive) in both June and July and had no missing observations. Ellis and Associates certified subjects as either a special facilities or shallow guard. Special facilities guards at this park were certified from 0.0 meters to 3.4 meters in water depth. Whereas, shallow water guards were certified 0.0 meters to 1.5 meters in water depth. There were a total of 24 special facilities guards and 28 shallow water guards. There were a total of 116 special facility VAT drops and 121 shallow water VAT drops. All lifeguards had normal vision or corrected vision to meet Ellis and Associates vision requirement of 20/15.

Materials and Procedure

Task and stimuli

During normal park operation, lifeguards were required to recognize a VAT within 10 seconds of its insertion in their zone of protection. Lifeguards task was to maintain constant scanning patterns as indicated by Ellis and Associates (2007). A minimum of one active and one passive VAT per month evaluated lifeguard scanning. Lifeguards initiated one long whistle blast within ten seconds and then performed a rescue within the 10/20 protection standard (Ellis & Associates, 2007) indicating successful task completion.

VAT. The passive VAT was administered using an industry standard Ellis and Associates VAT mannequin. According to the water safety products website (www.watersafetyproducts.com) from which the mannequin was purchased the mannequin is, “the size of an adolescent child, she weighs 30 lbs. when dry. She sinks within 10 seconds and retains water when pooled from a pool, replicating the weight of a real swimmer” (Water Safety Products, 2012). The active VAT was performed by either an on duty or off duty lifeguard and simulated an active guest in distress as defined by Ellis and Associates (2007). An active guest in distress has a nearly vertical body position with head back and little to no forward body movement (Ellis & Associates, 2007). All active VAT’s only required use of one rescuer.

Procedure

Each lifeguard received a minimum of two unannounced VATs (one active and one passive) per month. Lifeguard supervisors duties included performing the VAT drops, recording response time in seconds, and entering results into the computer. Data was analyzed for the months of June and July 2012.

Passive as well as active VAT drops were unannounced to the lifeguards. This ensured that lifeguards were performing their scanning abilities at a test ready level. Lifeguards were deemed to have passed a VAT if they recognized the VAT within 10 seconds, or it was recorded

a fail. VAT recognition was indicated by one long whistle blast. Supervisors were responsible for recording lifeguard response time to each VAT in number of seconds. If lifeguards failed, VAT remediation training was provided and lifeguards were retested. VAT remediation training consisted of one hour of one-on-one recognition and response retraining. For safety reason, if a lifeguard failed a VAT (irregardless of type) three times they were terminated or transferred to a non-aquatic department.

In addition, to VAT's, lifeguards were required to attend four one-hour inservice training sessions a month. Four hours of inservice training was required by Ellis and Associates as part of their licensure and was designed to keep lifeguard skills at a test ready level. Inservice training was offered Monday through Saturday one hour prior to the park opening. The aquatics management set the inservice curriculum weekly and lifeguards were scheduled one hour of training per week. An example of an inservice training consisted of 15 minutes of CPR training, 35-40 minutes of in-water lifesaving skills, and five to ten minutes of returning equipment and signing the inservice log.

In park attendance was tracked hourly. Attendance was tracked in terms of total attendance and was not separated by gender or age. Additionally, due to the large number of guests and attractions, it was not feasible to count the number of in water guests versus those on land. Therefore, hourly in park attendance was the closest way to try to replicate findings from the Harrell (1999) findings regarding attendance.

Results

Results consist of demographics, correlations, t-tests, and binary logistic regression. Guest attendance for June and July ranged from 218 to 3593 ($M = 1626.39$, $SD = 753.97$). Reaction time for June and July ranged from 1 to 30 seconds ($M = 4.46$, $SD = 4.86$). There were

a total of 237 VAT drops for June and July 103 and 134 respectively. Of those, 113 were active and 124 were passive.

Pearson Chi-Squares were conducted for each predictor and lifeguard outcome (pass/fail) (see Table 1). Results of the correlation between experience level (new hire vs. rehire) and the criterion were not significant ($p = .62$). Results of the correlation between time of day and the criterion were not significant ($p = .54$). Results of the correlation between certification level (special facilities vs. shallow) and the criterion were not significant ($p = .26$). Results of the correlation between type of VAT (active vs. passive) and the criterion were significant ($p = .02$) suggesting that active VATs were easier to recognize on average, which significantly contributed to lifeguards likelihood of passing or failing. Results of the correlation between cumulative number of inservices and the criterion were not significant ($p = .29$).

Independent t-tests were conducted for experience level and VAT as a follow up to correlational results. Continuous reaction times were used to help explain findings. Independent t-tests indicated experience level across all trials had a mean of 3.7 seconds ($SD = 4.32$) for experienced and 5.08 seconds ($SD = 5.2$) for inexperienced new hires ($p = .025$) indicating there was a significant difference in response times based on level of experience (see Table 2). VAT type across all trials had a mean of 3.53 seconds ($SD = 3.33$) for active and 5.31 seconds ($SD = 5.8$) for passive ($p = .004$) indicating there was a significant difference in response times based on type of VAT (see Table 3).

A binary logistic regression was conducted to predict VAT outcome (pass/fail) for 237 VAT drops with attendance, time of day, cumulative number of inservices, certification level, and previous experience as predictors. The predictors did not significantly contribute to the original model (chi square = 6.095, $p = .297$, $df = 5$). This finding was further supported by the

Wald criterion, which indicated none of the predictors were significant. Nagelkerke R's of .065 indicated a negligible relationship between VAT outcome and predictors meaning that the predictors explained only 6.5% of the variance. VAT outcome correctly predicted by the model was 93.2% (100% for pass and 0.00% for fail), the model was not better predicted by the inclusion of the predictors. These results indicate that with the current model 93% of VAT drops will be successfully predicted for pass; whereas, the model will be poor in predicting failed VAT drops.

Discussion

The current study added to the existing research regarding lifeguard scanning by quantitatively measuring lifeguard scanning. Lifeguard scanning and effectiveness was measured by lifeguards' response to simulated aquatic emergencies, known as VAT drops. The VATs provided a means to test lifeguards vigilance and attention to their zone as utilized by lifeguard scanning and reaction. Previous research has failed to measure the effectiveness of lifeguard scanning and reactions. Therefore, the current research provides a better operational definition for scanning and transcends previous results regarding lifeguard scanning, vigilance, and attention.

Specific results provide evidence for reaction time differences between type of VAT (active vs. passive) and experience level (new guard vs. rehire) of lifeguards. Type of VAT (active vs. passive) was significantly correlated with VAT outcome (pass vs. fail). An analysis of the differences in response times showed a significant difference between active and passive VAT responses; wherein, active VATs were recognized quicker. Furthermore, when looking at response times in seconds to VATs, experience level played a significant role in how fast a VAT was recognized. Rehires tended to recognize a VAT faster than new hires. The difference

between rehire and new hire response times to VATs was significant. All response VAT response time averages were under 10 seconds.

The significant findings regarding differences in response time based on type of VAT is consistent with existing literature, which indicates that rescues on the surface are easier to recognize than submerged rescues (Ellis & Associates, 2007). Furthermore, this seems to indicate that experienced lifeguards recognize VATs faster than non-experienced lifeguards do. Therefore, a critical aspect of lifeguard training should focus on submerged aquatic incidents helping lifeguards learn factors that affect recognition and scanning skills to aid faster recognition.

The results from the current study are inconsistent with results from previous research by Harrell (1999) and Harrell and Boisvert (2003) which indicated that time of day is significantly associated with decreased lifeguard scanning. A possible reason for the difference in the results from the current study and past research could be due to the operational definition of scanning and the way in which scanning was measured. Past research by Harrell (1999) and Harrell and Boisvert (2003) measured and defined scanning by counting the number of times lifeguards moved their heads from one point to another. However, the current study defines scanning as a consistent pattern of lifeguard head movement in order to observe an individual's zone of protection. In addition, the current study went beyond lifeguard head movement and evaluated the effectiveness of lifeguard scanning. The effectiveness of lifeguard scanning was measured in the current study by recognition response to VAT drops.

The current studies results were consistent with results from Harrell and Boisvert (2003) regarding attendance, being that increased overall attendance did not lead to decreased lifeguard scanning. The current study did not find a significant relationship between guest attendance and

lifeguard scanning (measured by VAT outcome). Past research by Harrell and Boisvert (2003) used the algorithm from the Hick-Hyman Law to indicate that the increased processing demands of increased child to adult ratios lead to a decrease in lifeguard scanning. Past research by Harrell and Boisvert (2003) had the ability to count child and adult patrons. The current study was on a much larger scale than past research by Harrell and Boisvert (2003) and size of guest attendance did not have the ability to count child and adult patrons. Instead, the current study used hourly guest attendance matched to the nearest hour of the VAT drop. Therefore, while the current study did not find a significant association between overall attendance and scanning, which is consistent with Harrell and Boisvert (2003), there was an overall weakness in the current studies inability to replicate the findings regarding the Hick-Hyman Law due to the way attendance was measured in the current study.

Weaknesses

The current study contributed to the existing literature by evaluating different certification levels, experience levels, and required monthly training sessions in regards to lifeguard scanning (as measured by VAT outcome). Results of the current study indicated that the predictors did not significantly contribute to the model in predicting lifeguard success or failure. Furthermore, the results indicated that the model was better at predicting lifeguard VAT success than VAT failure. A possible reason for these findings could be due to the relatively few number of failed VAT trials. Over half the initial participants were lost in the current study due to attrition or missing data. If more participants and trials were included, the model may have been better at predicting lifeguard failures. In addition, it is possible that the predictors that were measured are not significant predictors of VAT failure irregardless of inclusion of increased VAT failure. Therefore, follow up research should continue to look at these and other predictors

in follow up research to determine if there is any significance between the predictors and lifeguard scanning.

Strengths

The current study was the first of its kind to measure the effectiveness of lifeguard scanning. Lifeguard scanning effectiveness was measured by VAT outcome. VAT trials have the ability to simulate aquatic emergencies during normal park operations. The study also evaluated the effects of predictors, which had not been previously studied such as certification level (special facility vs. shallow guard) and experience level (rehire vs. new hire). In addition, the current study added to the literature by including significant predictors from past research. The importance of this was it determined if past results were consistent when included in a large-scale study.

Implications and Future Research

The majority of the existing literature regarding the lifeguarded aquatic environment is correlational (Harrell, 1999; Harrell & Boisvert, 2003; Schwebel et al., 2007a, 2007b). Therefore, there is currently no evidence that less scanning causes drowning. However, increased vigilance and scanning is related to a safer aquatic environment. Lifeguard training models that stress factors that lead to decreased scanning represent an active primary and secondary level approach at preventing unintentional injuries in children in the form of drowning (Roberts, Brown, Boles, Mashunkashey, & Mayes, 2003). According to Roberts et al., "prevention involves taking action to stop the occurrence of negative outcome before adverse effects develop" (2003, p.84). A two-pronged approach regarding changing lifeguard training programs and additional research on the aquatic environment can lead to drastic changes in children's safety in the aquatic environment.

Future research should continue to utilize simulated aquatic emergencies in the form of VATs to measure lifeguard scanning effectiveness. In addition, predictors that were included in this study should be further evaluated in future research to determine if they are significant when the data includes a more equitable number of VAT success and VAT failure. Furthermore, future research should evaluate additional predictors, which lead to lifeguard failure. This could be accomplished by interviewing lifeguards post VAT failure and determining from the lifeguard standpoint what contributed to the failure. Post VAT interviews regarding lifeguard failures could identify problematic scanning patterns that contribute to lifeguard failure. If these patterns are recognized, then inservice training could remedy these problematic scanning patterns leading to a safer aquatic environment for children.

Conclusion

Overall results indicate that submerged VATs are harder for lifeguards to identify than active VATs on the surface. In addition, results indicate that previous experience is important for speediness of VAT response. This was evidenced by overall speedier responses to VAT condition by experienced as opposed to inexperienced lifeguards. However, overall response averages for type of VAT and experience level were within acceptable limits. Therefore, the current study is a good addition to the existing literature.

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Appendix

Table 1

Correlations for Predictor and Outcome Criteria (Pass vs. Fail)

Predictor(s)	Pearson's R	<i>p</i>
Experience Level	.03	.62
Time of Day	.04	.54
Certification Level	-.07	.26
VAT Type	.16	.02*
Cumulative Number of Inservices	.07	.29

Note. Table represents significance level of correlations between predictor(s) and VAT outcome (pass vs. fail). An asterisk (*) indicates significance at the $p < .05$.

Table 2

VAT Reaction Time Based on Level of Experience

Level of experience	<i>M</i>	<i>SD</i>
Rehire	3.7	4.3
New hire	5.1	5.2

Note. Table represents response time in seconds to simulated aquatic emergencies.

Table 3

VAT Reaction Time Based on Type of VAT

VAT Type	<i>M</i>	<i>SD</i>
Active	3.5	3.3
Passive	5.3	5.8

Note. Table represents response time in seconds to simulated aquatic emergencies.