

How can lifeguards apply reasoning and decision making to work more effectively? Problem identification, diagnostic strategies, and management decisions

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Drowning is a leading global killer, particularly among children and young adults. The whole drowning process, from immersion to cardiac arrest, usually occurs in seconds to a few minutes. An early and effective rescue may stop the drowning process and prevent the majority of initial and subsequent water aspiration, respiratory distress, need for resuscitation, and medical complications. Lifeguards work in this very stressful scenario, where every second counts. This situation demands a multitude of very quick decisions to be made in physically and emotionally stressful moments. Numerous decisions are required in one single water rescue. Obviously there is a lot of physical training required in advance so the lifeguards' body is prepared, as well as a certain amount of emotional resiliency. Work as a lifeguard is a complicated process which requires problem identification, diagnostic strategies, and management decisions in a highly risk environment. There are a lot of ways this could potentially go sideways, so lifeguard agencies spend a large precious training time on this.

Lifeguard rescue work has two main paths - A pro-active phase, which encompasses prevention and risk management, and a reactive phase, which contains the rescue and first aid. Our research is directed at understanding how to proactively anticipate and control as many variables as possible as this leaves to the reaction phase a fewer variables.

This paper will determine the application of neuroscience principals to effective lifeguard training.

Method

We systematically reviewed articles from 2009-to-2014, searching Scopus for keywords "rescue", "reasoning" or "decision maker". We documented each step among a lifeguard need to do/decide on a daily basis using the concept of a Tree Diagram—a simple way of representing a sequence of events -to demonstrate how there are multiple decisions made by lifeguards for a given situation. We hypothesize that variables related to reasoning and decision making can be classified into two general categories:controlled and non-controlled variables along the entire process of reacting to a drowning. All the selected variables were inserted in a timeline of rescue event.

Results

All variables, both previous to reaction (predominately controlled variables) and reaction (largely uncontrolled variables) throughout a lifeguard's work day were selected from literature and demonstrated. This "Tree diagram" lifeguard of potential decisions has a total of more than 8 million possibilities considering the total of both controlled and non-controlled variables. A lifeguard's reasoning/decision-making could be simplified into two types a "dual processing" system, which includes both naturalistic-intuitive and rational-analytic reasoning.

1. Rational-analytic - Synthesizing large amounts of information and mitigating some cognitive biases (essentially new decisions). These require effort and employ a deductive search for a fit between the available information and appropriate scripts. Novices employ this more frequently than their experienced counterparts.
2. Naturalistic/intuitive -These methods are used to speed up the process of finding a satisfactory solution via mental shortcuts to ease the cognitive load of making so many decisions. While this strategy is a hallmark of experienced professionals, errors may result from an overreliance on automatic reasoning.

Discussion

The selection of variables involved in a single rescue in a timeline of events results in more than 8 million possibilities/outcomes. This shows the complexity of the lifeguards' decision making process. Experienced lifeguards accumulate a vast "library" of response options that can be rapidly and subconsciously accessed for the purpose of generating hypotheses and diagnostic decision-making under pressure. However the potential is there for errors to result from an overreliance on automatic reasoning. Due to the myriad of decisions we are proposing a "rescue script" for lifeguards. These new psychological concepts on lifeguarding and a respect for the power and variability of the aquatic environment are the beginnings of forging competent and professional lifeguards.