

# **Agent- Based Modeling For Active Shooter Incidents: Assessing Effectiveness of Run.Hide.Fight. Response for Unarmed Individuals**

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The 2018 Stoneman Douglas High School (Parkland) shooting was a bold reminder which emphasized the importance of active shooter preparedness for the first responder communities and the general public. Since the 1999 Columbine Massacre, the preparedness for active shooter incidents (ASI) proactively took place. Currently, the Run.Hide.Fight. (RHF) response for unarmed civilians is implemented as part of the emergency response for the public and private sectors. Despite the RHF's nationwide implementation, there is lack of literature that supports the effectiveness of RHF to lower casualty. Additionally, Parkland shooting suggests the current mitigation strategies were not effective to lower casualty rate during the incident.

This thesis examined the effectiveness of the following unarmed responses: Run.Hide.Fight.(RHF), Shelter-In-Place, and Evacuate. It is unethical to create mock ASIs to gather realistic data which could place participants in physiological and psychological threats. To exclude human participation, agent-based modeling (ABM) was used to recreate the incidents that occurred during the Columbine High School's library. The flexibility of ABM allows over thousand iterations of the model while manipulating run, hide, and fight probabilities. The ABM approach in the active shooter research eliminates human and logistical errors. The outcome of this thesis evaluated the RHF responses' effectiveness to better implement mitigation policies to lower casualty rate of unarmed individuals during active shooter incidents.