Summary: Close quarters combat (CQC) places complex challenges on sensorimotor functions that require high perceptual and psychological demands for processing information. To date, there are few assessments that measure these foundational abilities in an interactive context. Therefore, the cognitive marksmanship assessment (CMA) was developed to address this gap by testing validated cognitive assessments through an indoor marksmanship training platform. The purpose of this study was to measure the ability of the CMA to determine differences in cognitive and tactical skills as a function of experience in CQC training.

Methods-Results: Experienced active-duty male military personnel (EXP, n=123) and novice students in advanced military phase of training (NOV, n=352) participated in this effort. Active-duty personnel were highly proficient at marksmanship based upon annual qualification training and experience exceeding 6 years (experienced, EXP). Student personnel consisted of novice participants with only six weeks of training experience (novice, NOV). All participants completed the eight CMA tasks designed to assess various cognitive and tactical skills. Hit factor scores from each task was calculated as a function of performance and time before being used in the principal component analysis (PCA) to determine if the newly defined dimensions can cluster EXP and NOV populations into distinctive groups. Following completion of the analysis, 48.1% of the data set's variance was explained by the top two components with the newly define principal component 1 (PC1) explaining the majority of differences among EXP and NOV participants. Furthermore, the primary cognitive skills that appear to separate the two populations include sustained and divided attention with the accompanying tactical skills of target tracking despite distraction and accurate tracking and shifting.

Conclusions: Detection of differences between level of experience in military personnel may help to focus training to deficient areas, specifically when performing assessments on the CMA. While the results of this test indicate that there is a difference among EXP and NOV populations, further research is needed to determine how to best train the novice population.

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Center Institutional Review Board in compliance with all applicable Federal regulations governing the protection of human subjects. Research data were derived from an approved Naval Health Research Center Institutional Review Board protocol, number NHRC.2016.0020.