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Annual Meeting Abstracts

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SEE ATTACHED ABSTRACT

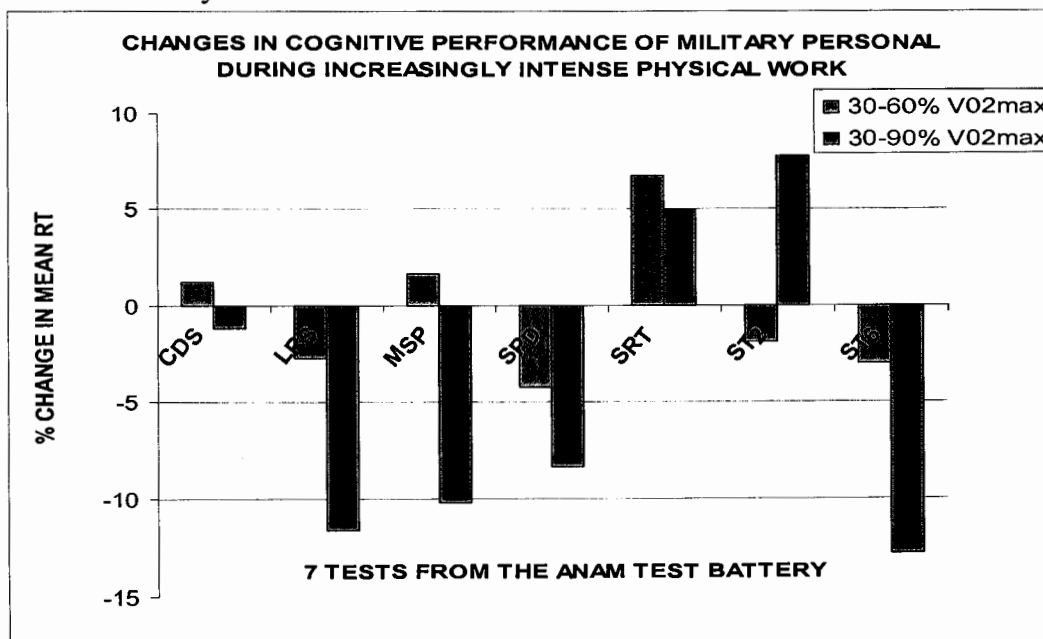
CHANGES IN COGNITIVE PERFORMANCE OF SOLDIERS DURING EXERCISE
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Technological advances in battle continue to place increasing demands on soldiers who must process much information to make fast & accurate decisions. But they continue to operate in physiologically stressful environments. Changes in response time of military personnel (12 ♂, 8 ♀) to a battery of 7 sub-tests of the Automated Neuropsychological Assessment Metric (ANAM) given at 30%, 60%, & 90% VO_{2max} were measured. Active duty or active reserve soldiers (24.4 ± 6.2 yr, $M \pm SD$) volunteered to perform a VO_{2max} test walking @ 3.4-3.7 mph while carrying a 35 lb pack. Metabolic, HR, & RPE measures were monitored. Ss performed subsequent tests at 30%, 60%, & 90% VO_{2max} . Ss reached steady state at each intensity; & responded to ANAM while continuing the exercise. Differences in the % change for mean response time (MRT) were observed for Logical Reasoning (LES, $p=.002$), Match of Sample (MSP, $p=.001$), Sternberg 2 (ST2, $p=.009$), & Sternberg 6 (ST6, $p=.005$). Code substitution (CDS), Simple Reaction Time (SRT), & Simultaneous Spatial Processing (SPD) % changes were not significant ($p>.05$). Interestingly, MRT actually decreases in many of these measures as the work rate became more challenging. Further analysis revealed no change in accuracy scores ($p>.05$) for the measures that had significantly different response times except for ST2. ST2 data had a 1.5% decrease ($p<.05$) in accuracy scores @ 90% VO_{2max} , however, this may not be a meaningful decrease since it still represents a high percentage of accuracy (96.5-98.0% accurate). These data suggest that soldiers may have the ability to respond to cognitive challenges quickly, even in the face of increasing physiological stress & that the accuracy of those responses show little decrement related to the work intensity of short duration.

CHANGES IN COGNITIVE PERFORMANCE OF MILITARY PERSONAL DURING INCREASINGLY INTENSE PHYSICAL WORK

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The technological advancements on the modern battlefield place an ever increasing demand on military personal at all levels to process enormous amounts of information and make quick and accurate decisions. However, with all the labor and time saving improvements soldiers continue to operate in a physiologically stressful environment. This project investigated the mean percent changes in response time of twenty military personnel (12 men; 8 women) to a battery of seven sub-tests of the Automated Neuropsychological Assessment Metric (ANAM) given at three increasing levels of physical exertion; 30%, 60% and 90% maxVO₂. Twenty active duty or active reserve soldiers (mean age 24.4[±]6.24 years) volunteered to perform a VO_{2max} test walking 3.4 – 3.7 mph while carrying a 35 lb ruck sack on their back. Metabolic measures were monitored, as well as heart rate and RPE. Participants returned to the lab to perform a treadmill walk test at 3.4 mph at increasingly steeper grades until HR matched values associated with 30%, 60% and 90%VO₂ values. Participants reached steady state at each intensity then responded to the ANAM test battery while continuing to walk on the treadmill. The figure below shows % changes in mean response time between the 30% to 60% increase in work (light bar) and changes from 30% to 90% VO_{2max} work. Significant differences in the % change for mean response were seen for Logical Reasoning (LRS) $p = .002$, Match to Sample (MSP) $p = .001$, Sternberg 2 (ST2) $p = .009$, and the Sternberg 6 (ST6) $p = .005$. Code Substitution (CDS), Simple Reaction Time, and Simultaneous Spatial Processing (SPD) % changes were not significant at $p < 0.05$. Interestingly, response time actually decreases in many of these measures as the work load becomes more challenging for each soldier. Further analysis reveals no statistically significant change in accuracy scores for the measures that had significantly different response times except for ST2. The ST2 data had a significant 1.5 % decrease in accuracy scores at 90% VO₂, however, this may not be a very meaningful decrease since it still represents a high percentage of accuracy (from 98 to 96.5% accurate). These data suggest that soldiers may have the ability to respond to cognitive challenges quickly, even in the face of increasing physiological stress and that the accuracy of those responses show little decrement related to work intensity of short duration



This is table from my excel date file but you can see the results.

I like the figure much better for the abstract but it probably won't fit and will end up being just text.

% Changes between Work Intensities				Changes in % Accuracy		
ANAM TESTS	30-60% V02max	30-90% V02max	<i>p</i> values	30-60% V02max	30-90% V02max	<i>p</i> values
CDS	1.23	-1.18	0.107	0.87	0.003	0.997
LRS	-2.70	-11.67	0.002	1.00	1.03	0.714
MSP	1.62	-10.22	0.001	0.75	-2.50	0.287
SPD	-4.25	-8.36	0.081	xx	xx	
SRT	6.75	4.94	0.556	xx	xx	
ST2	-1.85	7.82	0.009	-0.27	-1.50	0.03
ST6	-3.01	-12.94	0.005	-3.01	-12.94	0.937