An Examination of Current Literature on the Effects of Stress on Human Performance

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Disclosure Information
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I have no financial relationships to disclose.

I will not discuss off-label use and/or investigational use in my presentation.
Agenda

• Review Parameters
• Physiological Effects of Stress
• Negative Effects
• Environmental Stressors and Cognitive Functioning
• Conclusions
Review Parameters

- 909 articles 2003 -2013
- Following keywords used
- 300 articles then explored based on abstract
- 90 articles read to complete this review 2007 - 2013
- 10 articles presented here
- Sourced from PubMed, USUHS ER, 360 Link, ProQuest, EBSCO
# Physiological Effects of Stress

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Participants</th>
<th>Aim/Goal</th>
<th>Major Findings</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hannula, et al (2008)</td>
<td>4 interceptor pilots during complex sim F/A-18 Hornet air battles</td>
<td>Compare ANN to MLR in eval of Cog WL</td>
<td>ANN was better than MLR for Cog WL</td>
<td>HF can ↓ mission effectiveness and safety. Indiv w good stress tol. &amp; HR</td>
</tr>
<tr>
<td>Lehrer, et al (2010)</td>
<td>7 professional airline pilots participating in Boeing 737-800 sim</td>
<td>Eval cardiac data vs self-report measure</td>
<td>Cardiac activity was an independent predictor of performance</td>
<td>HR ↓ while performance ↑ due to practice effects over trials in sim. Under repot for self-report.</td>
</tr>
<tr>
<td>Simmons, et al (2012)</td>
<td>10 Navy SEALs and 11 age-matched healthy males</td>
<td>Continue to build a neural model</td>
<td>Navy SEALs activated the middle insula and bilateral frontal lobes more</td>
<td>Elite warfighters -&gt; reduce impact of previous events</td>
</tr>
</tbody>
</table>
# Negative Effects

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<tr>
<td>Day, et al. (2012)</td>
<td>159 Navy personnel</td>
<td>To look at comparison of GHQ &amp; CFQ of accident and non-accident individuals. Look at if can predict someone had an accident based on GHQ</td>
<td>Supports that a high CFQ score does indicate an increased vulnerability to accidents when under high job demand</td>
<td>High scores on CFQ more accident prone because of lower attentiveness. Stress = cog fail = lapses = accidents</td>
</tr>
<tr>
<td>Huttunen, et al. (2011)</td>
<td>15 active duty male Hornet pilots</td>
<td>Find out how certain prosodic features change in different sim flight phases. How change with cog loads.</td>
<td>Can use prosodic features of speech to monitor state and give support</td>
<td>Stress symptoms can be detected in speech. High cog load can neg affect speech</td>
</tr>
<tr>
<td>Taylor, et al. (2009)</td>
<td>45 active duty Navy personnel</td>
<td>Examine the relationship of anger to stress response</td>
<td>Anger characteristics are associated with human stress endpoints</td>
<td>Anger may be predictive to rxn to stress. + association</td>
</tr>
</tbody>
</table>
## Environmental Stressors and Cognitive Functioning

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<tbody>
<tr>
<td>Taber, et al. (2011)</td>
<td>11 university students observed while performing a task</td>
<td>Explore the thermal loading of exposure suit effects on performance</td>
<td>↑ in mean skin and rectal T° but no impairment</td>
<td>Perception is different from reality for performance effect</td>
</tr>
<tr>
<td>Larsen, et al. (2011)</td>
<td>11 articles</td>
<td>To compare literature on effects of body armor</td>
<td>Evidence shows body armor can have an adverse effect on body</td>
<td>Negative effects exacerbated when under load - but relationship not identified</td>
</tr>
</tbody>
</table>
Conclusions

- The literature tending to show an impact on an individual’s ability while under stressful conditions.
- Disorders that are stress related are extremely prominent in military lifestyle and operations.
- Some factors that may make individuals more resilient or more prone include: physiological factors (e.g. genetics, neuro-physiological, etc.), physical fitness, hydration and nutrition levels, personality, hardiness, and coping styles
  - Many of these can be molded or trained.
- Stress can cause fatigue which can cause slower rxn time, memory issues, and errors.
References


References cont.


