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| Fiscal Year: | FY 2018 | Task Last Updated: | FY 06/21/2018 |
| PI Name: | Perlman, Greg | | |
| Project Title: | Personality and Biological Predictors of Resiliency to Chronic Stress Among High-Achieving Adults | | |
| Division Name: | Human Research | | |
| Program/Discipline: | | | |
| Program/Discipline--Element/Subdiscipline: | HUMAN RESEARCH--Behavior and performance | | |
| Joint Agency Name: | | TechPort: | No |
| Human Research Program Elements: | (1) HFBP :Human Factors & Behavioral Performance (IRP Rev H) | | |
| Human Research Program Risks: | (1) BMed :Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders | | |
| Space Biology Element: | None | | |
| Space Biology Cross-Element Discipline: | None | | |
| Space Biology Special Category: | None | | |
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| Comments: | | | |
| Project Type: | Ground | Solicitation / Funding Source: | 2014-15 HERO NNJ14ZSA001N-Crew Health-OMNIBUS |
| Start Date: | 07/01/2015 | End Date: | 04/30/2018 |
| No. of Post Docs: | 0 | No. of PhD Degrees: | 0 |
| No. of PhD Candidates: | 0 | No. of Master' Degrees: | 0 |
| No. of Master's Candidates: | 0 | No. of Bachelor's Degrees: | 0 |
| No. of Bachelor's Candidates: | 0 | Monitoring Center: | NASA JSC |
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| Flight Program: | | | |
| Flight Assignment: | NOTE: Extended to 4/30/2018 per NSSC information (Ed., 3/26/18) NOTE: Element change to Human Factors & Behavioral Performance; previously Behavioral Health & Performance (Ed., 1/18/17) NOTE: End date changed to 6/30/2017 per PI (Ed., 6/22/16) | | |
| Key Personnel Changes/Previous PI: | June 2018 report: Towards the end of the project we added a co-Investigator at Purdue University to test out recruitment at another university. | | |
| COI Name (Institution): | Kotov, Roman Ph.D. (State University of New York, Stony Brook) Hajcak, Greg Ph.D. (State University of New York, Stony Brook) Foti, Dan Ph.D. (Purdue University) | | |
| Grant/Contract No.: | NNX15AN96G | | |
| Performance Goal No.: | | | |
| Performance Goal Text: | | | |

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| Task Description: | <p>The objective of this research proposal is to identify the key personality, behavioral, and neurophysiological predictors of resiliency among a population of high-achieving young adults in a high-stress environment. To accomplish this objective, we will recruit 200 adult male and female trainees from nearby highly demanding medical training programs and research labs, a population analogous to astronauts. During the first visit to our laboratory (Wave 1), we will assess trainees with a comprehensive battery of characteristics relevant to resiliency. Self-report predictors include "Big 5" personality, recently-developed subfacets of the Big 5 (i.e., social closeness, melancholia, self-discipline, etc.), IQ, and behavioral-health scales (i.e., mood, anxiety, support, etc.). Neurophysiological predictors will be assessed using a comprehensive battery designed to measure neural reactivity (i.e., electroencephalogram) during experimental tasks relevant to space mission success (i.e., performance monitoring, vigilance). Resiliency will be measured by self-report behavioral health symptoms (i.e., depression, anxiety, sleep, stress) and behavioral performance on tasks (e.g., accuracy, post-error adjustments, reaction time) at Wave 1 (to establish a baseline) and then monthly for 5 months. This prospective, repeated measures design will allow us to track fluctuations in resiliency during the course of their highly demanding medical training program. After completing data collection, we will identify the Wave 1 personality, behavioral, and neurophysiological profile that best predicted successful adaption during intensive training (i.e., better mental health and better performance). We will also use innovative statistical methods to develop validity scales to identify "fake good" personality responses.</p> <p>This research proposal aims to elucidate the personality, behavioral, and neurophysiological factors that predict successful adaptation to chronic stress among high-achieving young adults in highly demanding contexts. The knowledge gained from this research will aid in the design of a new standardized selection protocol, which could then be streamlined and validated in an astronaut sample in close analogues to space travel.</p> |
| Rationale for HRP Directed Research: | <p>This is a first study of stress resilience in high-achieving adults to (1) break down broad personality traits into facets tapping specific contributors to resilience and enhance predictive power of traits, (2) create validity scales specifically for the study questionnaire using a novel and powerful psychometric strategy, and (3) evaluate neural processes underpinning resilience. These methodological advances and substantial sample size will allow us to gain new insight into the nature of stress resilience, understanding specific dispositions to resilience and the neural processes involved. The proposed study also will produce a short, powerful tool to select resilient individuals. It can be useful in selecting personnel for other high stress occupations, such as the military and law enforcement. The resulting validity scale can be applied even beyond personnel selection to where untruthful responding is a risk (e.g., in academic testing, forensic evaluations).</p> <p>Based on study results, a brief, powerful resilience assessment will be developed. NASA can use this tool to more accurately select for resilience among astronaut candidates, reducing the risk of behavioral health and performance threats during space missions. This tool also can aid personnel selection in occupations associated with high stress, workload, and danger, such as the military and law enforcement. Also, the proposed research will advance behavioral science in understanding stress resilience better and clarifying its component processes.</p> |
| Research Impact/Earth Benefits: | <p>During the reporting periods, we successfully enrolled 207 high-achieving adults from our university, as well as from nearby universities. The sample was primarily Asian (n = 98; 47.3%) or Caucasian (n = 80; 38.6%) and had slightly more males (n = 108; 52.2%). The average age was 29.10 years-old (standard deviation 3.68 years-old), with a median age of 28 years-old and range from 25 to 44 years-old. The sample was primarily right-handed (n = 188; 90.8%). The sample self-described as Physicians/Residents (n = 9; 4.3%), Postdoctoral researchers (n = 42; 20.3%), Graduate students (n = 147; 71.0%), and Other (n = 9; 4.3%).</p> <p>The baseline assessment took about 2 hours to complete and included personality traits (Big 5 and facets), current mood and anxiety symptoms, lifetime psychopathology, psychosocial functioning, work-life interference, cognitive ability, response bias (over-claiming), perceived stress, and two computerized tasks requiring the participant to make simple judgement rapidly (button presses). We recorded electroencephalogram while participants completed the tasks, which yielded behavioral markers (reaction time, accuracy) and neurophysiological markers (error-related negativity, P300 amplitude).</p> <p>Five monthly follow-ups assessments of current mood and anxiety symptoms, perceived stress, psychosocial functioning, and work-life interference were completed remotely. Retention was generally high across follow-ups (Follow-up 1: n = 191, Follow-up 2: n=189, Follow-up 3: n=182, Follow-up 4: n=186, Follow-up 5: n=205).</p> <p>All data was extracted, cleaned, and processed. Data analysis was completed.</p> <p>On November 1st, 2017, the project methods and results were presented by teleconference to members of the Behavioral Health and Performance Team.</p> |
| Bibliography Type: | Description: (Last Updated: 06/22/2016) |