Baseline Dissociation and Prospective Success in Special Forces Assessment and Selection

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Abstract

Introduction: Although dissociation at the time of trauma (peritraumatic dissociation) has been shown to predict the development of posttraumatic stress disorder (PTSD), it is not yet known whether the tendency to dissociate under nonstressful circumstances (i.e., at baseline) can also serve as a predictor of vulnerability to stress in healthy individuals. **Method:** Baseline symptoms of dissociation (CADSS) were assessed in 774 active duty male Soldiers enrolled in Special Forces Assessment and Selection (SFAS). **Results:** Soldiers who endorsed experiencing any symptoms of dissociation at baseline were significantly less likely to be successful in SFAS. The greater the number of symptoms of dissociation endorsed at baseline, the greater the likelihood of failure. **Discussion:** These data explain our earlier findings of fewer symptoms of dissociation in elite troops and may have relevance for the selection and hiring of personnel for nonmilitary, at-risk professions. Better screening may lead to improved primary intervention strategies, better job placement, and lowered risk of PTSD.

Introduction

In a recent investigation, we prospectively assessed the degree to which healthy, active duty Soldiers would experience symptoms of dissociation before and in response to acute, uncontrollable stress.[1] The results of the study provided robust evidence that 1) stress-induced symptoms of dissociation are extremely common in healthy humans; 2) individuals who endorsed greater symptoms of dissociation at baseline exhibited greater symptoms of dissociation under stress; and 3) members of Special Forces troops exhibited fewer stress-induced symptoms of dissociation than general troops.

Multiple risk factors for the development of trauma-related psychopathology have been identified in the scientific literature. One of the most replicated risk factors for the development of trauma-related psychopathology is peritraumatic dissociation (i.e., dissociation at the time of exposure to a traumatic event).[2–11] Although peritraumatic dissociation may be useful in predicting PTSD in individuals who have already been traumatized, it is not yet known whether the tendency to dissociate under nonstressful circumstances (at baseline) can also serve as a predictor of vulnerability to stress in healthy individuals.

In our previous studies of military personnel, individuals endorsing baseline symptoms of dissociation were at greatest risk for stress-induced symptoms of dissociation and stress-induced cognitive deficits, which in turn were associated with poor military performance.[1,12,13] However, we are aware of no studies that have measured the relationship between baseline (nonstress) dissociation and overall performance under conditions of high stress such as SFAS training. In this study, we hypothesized that individuals who endorsed baseline symptoms of dissociation would be less likely to tolerate the stress of Special Forces Assessment and Selection (SFAS) and would be more likely to fail. Predicting stress vulnerability would be of great relevance to job selection for high stress professions and may be useful in the development of primary prevention strategies targeting trauma-related psychopathology.

Methods

Prior to beginning the course, SFAS candidates provided written informed consent to participate in this study. Due to fact that the military personnel were active duty and being recruited to participate in a research study while enrolled in an official selection and assessment program, our research team took a number of precautions in order to ensure that subjects would not experience undue pressure to participate in the research study. First, and in keeping with the guidelines and recommendations of the Human Studies Committee (VA Connecticut), the research team took pains to ensure that Soldiers would be able to make free and informed decisions about participation in the study. In order to reduce any element of coercion, all subjects were recruited by a member of the research team who was explicit in the following information: 1) the recruiter/researcher was a civilian and not in the service of the U.S. Army. In addition, the researcher indicated that he was not receiving any money from the SFAS program; 2) participation in the research would in no way affect a candidate's status (positively or negatively) in SFAS. The researcher further explained that information about enrollment and information provided by enrollees on the questionnaire would be kept confidential and not shared with anyone apart from the research team. Potential participants were also explicitly told that no information would be given to the SFAS personnel; 3) the research project was designed to help scientists evaluate and understand psychological,

biological, and physiological aspects of why individuals differ in their performance under stress.

The principal investigator (CAM) then gave an oral description of the study (i.e., described what would be required of them if they agreed to participate) after which consent forms were passed out to all potential participants. The principal investigator read through each section of the consent form aloud to the potential participants. After this was completed, all were given time to review the consent forms if they chose to do so. The consent forms provided a description of the study and explicitly indicated that the purpose of the National Center for PTSD study was to evaluate psychological, biological, and physiological aspects of military training stress in an effort to better understand how and why individuals differ in stress tolerance. This information was included in the consent form. Soldiers were not told that we were trying to predict who would fail in SFAS.

Finally, all the candidates recruited for this study were on active duty status and therefore were not allowed by the command to accept payment for their participation in the study. All were informed of this fact and told that the only benefit they would receive for participating in the study was the knowledge that their participation in the research may help advance medical science about stress hardiness and stress vulnerability. All were told once more that they were free to refuse participation and that the refusal to participate would not affect their status (positively or negatively) in SFAS. Of the 794 SFAS candidates who were given the study recruitment speech, 774 candidates enrolled in the study. Thus, the refusal rate was three percent. Information on the 20 individuals who refused to participate in the study was not available to the research team.

***Participants*:** Of the 794 candidates approached, 774 (97%) active duty male Soldiers (mean age 26, SD=4) agreed to participate in the study. All participants were enrolled in a U.S. Army SFAS program. The participants' mean years of service in the Army was 4.9 (SD=3.2). Two-hundred eighty Soldiers (36%) were married, 403 (52%) Soldiers were single, and 86 (11%) Soldiers were divorced. Eighty-six percent or 677 candidates were enlisted and 110 (14%) were officers.

***Procedure*:** After providing informed consent, participants completed the self-report portion of the Clinician Administered Dissociative Symptom Scale (CADSS). The CADSS is a reliable, valid, self-report instrument designed to assess state symptoms of dissociation in response to a specified stressor.[14] Subjects were instructed to complete the CADSS using the week previous to enrollment in the course as their reference point. Subjects were instructed to inform the research team (orally and in writing) if during the previous week they had experienced any traumatic or highly stressful events. We did not include the clinician-observer component of the CADSS given the low intercorrelation coefficients for this component. After completing the CADSS, participants commenced participation in SFAS.

***Data analysis*:** In order to test the hypothesis that symptoms of dissociation would be significantly related to success or failure in SFAS, the following variables were created: total CADSS scores (the sum of individual CADSS items); classification scores indicating whether or not subjects reported symptoms of dissociation at baseline (1=yes; 0=no); and two additional classification scores designed to classify subjects in a binary fashion based on whether or not their CADSS total score was greater than, at, or below a specified value (less than 5; equal to, or greater than, 5; less than 11; equal to or greater than 11). These classification cut-off points were selected based on the distribution of responses from subjects in this study and on the mean pre-stress CADSS dissociation scores noted in our previous studies.[15] Chi-squared analyses were performed to test whether subjects endorsing baseline symptoms of dissociation (any, greater than 5 points, greater than 11 points) were more likely to fail SFAS compared to peers who did not report such symptoms.

***Receiver operator characteristics (ROC) curves*:** ROC curves were created by using the CADSS baseline total score (the test variable) in order to predict outcome in the SFAS program (the state variable, where 1= failed SFAS). ROC graphs were created for the group as a whole and for the sub-group of subjects whose CADSS score was 1 or greater. For both ROC graphs, the area under the curve as well as coordinate points for the curve were calculated (SPSS 11.5). The null hypothesis assumption was that the true area under the curve equals 0.5. With regard to the parameters for the standard distribution of error, the distribution assumption was nonparametric and the confidence interval 95 percent.[16] Although this method is also a regression model, it offers an advantage over the logistic regression format in that a classification table corresponding to specific scores on the CADSS and to the likelihood of success or failure in the course is possible.

Results

Of the 774 who participated in the study and in SFAS, 318 successfully passed the course; 456 candidates did not. The mean CADSS score at baseline was 2.39 (SD=4.5; range=44). The distribution was not normal (skewness 3.30). Of the 774 subjects, 425 subjects (55.0%) did not endorse any symptoms of dissociation at baseline; 349 subjects (45.0%) endorsed such symptoms. As shown in Tables 1, 2, and 3, the pass rates in SFAS were significantly different between the group of candidates who reported dissociation and those who did not (Score of 1 or greater on the CADSS versus CADSS score of zero: Chi-Square=4.5; df=1; asymptotic significance [asymp. sig.] (2-sided) $p<0.035$; Fisher's Exact Test, Exact Significance: $p<0.04$ (2-sided); $p<0.021$ (1-sided); Score of five or more on the CADSS versus a score of less than 5 on the CADSS: Chi-Square=9.3; df=1; asymp. sig. (2-sided) $p<0.002$; Fisher's Exact Test, Exact Significance: $p<0.002$ (2-sided); $p<0.001$ (1-sided); Score of 11 or more on the CADSS versus a score of less than 11: Chi-Square=10.7; df=1; asymp. sig. (2-sided) $p<0.001$;

Fisher's Exact Test, Exact Significance: $p<0.001$ (2-sided); $p<0.001$ (1-sided).

***ROC curve data*:** When an ROC curve is created, the area may take values between 1 and zero. A value of 1 or zero would indicate that the test is always right or always wrong, respectively. If the test performs no better than chance at detecting the state variable (for example, failure in SFAS), the area under the curve would be 0.5. Using the variable "total dissociation score" as the "test variable" and "status" as the "state variable" (value of the state variable=failure in SFAS), ROC analyses indicated that the area under the curve was 0.6 (nonparametric standard of error=0.021); $p<0.01$. Thus, the total dissociation score performed better than chance at predicting likelihood of failure at SFAS.

Table 4 lists the coordinate points of the ROC analysis and indicates, for a given score on the CADSS, the probability of being right (sensitivity) or of being wrong (1 minus the specificity) in predicting whether a subject who endorsed any particular score on the CADSS would fail the SFAS course. As noted in Table 4, the probability of being wrong in predicting that a candidate who obtains a particular dissociation score on the CADSS can be calculated. For example, using these signal detection methods, the likelihood of being wrong in predicting that a candidate obtaining a score of 5 or more on the CADSS will fail SFAS is approximately 9.0 percent; similarly, the probability of error in predicting that a candidate who obtains a score of 11 or greater on the CADSS will fail SFAS is less than 2.0.

Discussion

Soldiers who endorsed experiencing any symptoms of dissociation on the CADSS at baseline were significantly less likely to be successful in Special Forces Assessment and Selection (SFAS). Indeed, the greater the number of symptoms of dissociation endorsed at baseline, the greater the likelihood of failure in the course. Fewer than nine in 100 candidates who had a baseline CADSS score of greater than 5 and fewer than two in 100 with a score greater than 11 (maximum score of 79 possible) passed the course. Thus, tendency to dissociate at baseline served as a significant predictor of military training performance under highly demanding and stressful conditions. These data may help to explain our earlier finding that elite Special Forces troops exhibited fewer stress-induced symptoms of dissociation than general troops during high-intensity training. It appears likely that the SFAS process "weeds out" Soldiers who tend to dissociate and selects those who do not tend to dissociate. That said, it is important to underscore the fact that we were not able to assess other life experiences in this particular sample (for example, history of traumatic stress exposure). It is possible that this or other variables contributed to the present findings. In the future, we anticipate having permission from the military to assess other variables of interest.

With the increased operational tempo of Special Operations units in support of the Global War on Terror, U.S. military leaders continue to look for ways to maximize throughput of SFAS programs. With student attrition a primary concern, directors of SFAS programs are faced with the choice of lessening requirements, introducing remedial interventions for poor performers, or improving candidate selection protocols. Many believe that lowering the criteria for successful completion of such programs would be imprudent. However, assessment of candidates for baseline dissociation could help to identify those who may benefit from remedial efforts or be better suited for other military occupations. Screening out candidates who are unlikely to succeed would better focus training resources on candidates more likely to successfully complete the course. Signal detection methods may significantly assist in decision-making. Although they do not replace the decision-making capacity of professionals, signal detection methods provide professions information about the probability that they will err in the predictions they make. Clearly the accuracy of such methods is directly related to the degree to which valid, normative databases for populations of interest have been established.

The present study has several limitations. First, the CADSS data are self-report data and we currently do not know whether they reflect a unique factor or a more generic "first factor." Although the subjective data was predictive of future success, if these data were actually used in selection programs, potential candidates knowledgeable about this relationship might cease to report such information. Future studies are underway to clarify this issue and to assess whether the propensity to dissociation may be more objectively assessed prior to stress exposure.

A second limitation is related to the study population. The present study was limited to U.S. military personnel. To our knowledge, the relationship between propensity to dissociation and success in selection programs for civilian professions exposed to high stress (such as search and rescue, law enforcement, or firefighting) have not yet been conducted. Thus, at present we do not know whether the findings have relevance to non-military professions. However, within the context of the current war, improved screening for military occupations may result in the identification of candidates who are at greater risk for stress-related difficulties; this capability might one day lead to improved primary intervention strategies or to better military job placement decisions.[17,18]

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TABLE 1. Increased dissociation is associated with increased likelihood of failure: any symptom endorsement

	Fail SFAS	Pass SFAS	Total
No Dissociation (CADSS = 0)	236	189	425
CADSS > 1	220	129	349
Total	456	318	774

Chi-square=4.5; df=1 asymp. sig (2-sided): $p<0.035$

TABLE 2. Increased dissociation is associated with increased likelihood of failure: CADSS score of 5 or greater

	Fail SFAS	Pass SFAS	Total
CADSS <5	376	287	663
CADSS > 5	80	31	111
Total	456	318	774

Chi-square=9.3; df=1 asymp. sig (2-sided): $p<0.002$

TABLE 3. Increased dissociation is associated with increased likelihood of failure: CADSS score of 11 or greater

	Fail SFAS	Pass SFAS	Total
CADSS < 11	419	310	729
CADSS > 11	37	8	45
Total	456	318	774

Chi-square=10.8; df=1 asymp. sig (2-sided): $p<0.001$

TABLE 4. Predicting failure at SFAS

ROC coordinates of the curve: area under the curve=0.55; std error=0.02; asymp. sig: $p<0.02$

Positive if greater than or equal to the following:	Sensitivity	1-Specificity
-1.00	1.000	1.000
.50	.482	.406
1.50	.386	.308
2.50	.307	.233
3.50	.246	.189
4.50	.206	.138
5.50	.175	.097
6.50	.151	.075
7.50	.129	.057
8.50	.112	.047
9.50	.094	.035
10.50	.081	.025
11.50	.070	.022
12.50	.059	.019
13.50	.053	.016
14.50	.042	.016
16.00	.033	.006
17.50	.031	.006
18.50	.024	.006
19.50	.018	.006
20.50	.015	.006
23.50	.009	.003
25.50	.007	.003
27.00	.007	.000
36.00	.002	.000
45.00	.000	.000

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