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PTSD, Depression, Daily Stressors, and Treatment Pathways Among Urban Veterans

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Abstract

Many veterans face various mental health challenges after separation. This study examines change over 14 months in mental health and related factors among 242 veterans returning to low-income predominately minority sections of New York City. Mental health treatment provided more than reductions in symptoms of PTSD and depression. It also resulted in reductions in substance use disorders and daily stresses. However, many veterans not in treatment are experiencing combat-related concerns at subsyndromal levels. The findings highlight the need for low threshold community-based outreach programs for this population.

Keywords

PTSD; Depression; Substance use disorder; Treatment; Leavers stayers model; Low income; Longitudinal; Stress; Support; Outreach

INTRODUCTION

Recent veterans returning from the conflicts in Afghanistan (Operation Enduring Freedom, OEF, and Operation New Dawn, OND) and Iraq (Operation Iraqi Freedom, OIF) face a complex of combat-related mental health (MH) as well as social reintegration problems (IOM, 2010; Tanielian & Jaycox, 2008; Watkins et al., 2011). Those returning to low-income urban areas face the additional daily stresses of life in these communities (Schaefer-McDaniel, 2009; Strike, Goering, & Wasylenki, 2002; Wilson, 2009). This paper examines changes over time in the interconnected experiences of mental health issues, daily stresses, and treatment experiences among veterans returning to low-income predominately-minority sections of New York City. Study participants were recruited and interviewed soon after separation and followed up on average fourteen months later. A major contribution of this study is the use of a sample drawn from the community which allows examination of the

experiences of a broad range of veterans not just those presenting for treatment but also those with unmet treatment need and those whose coping with symptoms that do not meet clinical levels.

Understanding veterans' experiences of MH issues, in context, over time, has important implications for tailoring support services. The signature MH concerns among recent veterans have been post-traumatic stress disorder (PTSD), depression, and symptoms associated with traumatic brain injury (TBI) (IOM, 2010; Tanielian & Jaycox, 2008). Substance use disorder (SUD) has also been common for both alcohol (AUD) and other drugs (DUD). Understanding veterans' experiences of each of these conditions in light of variations in presentation, comorbidity, and the impact of treatment is essential to meet the diverse needs of this population.

The Institute of Medicine (IOM, 2014, p. 3) recently released a comprehensive synthesis of research on PTSD and treatment efficacy as well as an original assessment of the availability of MH treatment for military personnel and veterans' with PTSD in which they explain the complex timing and variation in presentation of PTSD succinctly:

Symptoms of PTSD may occur soon after exposure to a traumatic event or be delayed, sometimes for years. Many people will never have all the symptoms or the right combination of them to meet the criteria for a full diagnosis of PTSD but may suffer with many symptoms nonetheless.

Thus, while it is important to screen veterans for PTSD soon after deployment, as is current practice, screening only soon after deployment will clearly miss military personnel and veterans with delayed and/or subsyndromal experiences of PTSD.

Regarding comorbidity, extensive epidemiological and clinical research have documented that PTSD, depression, TBI and SUD are common and commonly co-occur among veterans (Heltemes, Clouser, Macgregor, Norman, & Galarneau, 2014; Karney, Ramchand, Osilla, Caldarone, & Burns, 2008; Lockwood & Forbes, 2014; Seal et al., 2010; Stander, Thomsen, & Highfill-McRoy, 2014). The co-occurrence among conditions have exhibited extensive variation: individuals differ according to the combination of MH conditions and the order of presentation. These findings suggest that the relationships among comorbid conditions can vary across individuals. Similarly, the pathway to resolution of comorbid concerns can be complex necessitating that one condition be addressed prior to or concomitant with another.

Many veterans with MH concerns do not receive treatment for a variety of reasons including a lack of awareness of their condition as well as inability or unwillingness to present for treatment (Elbogen et al., 2013; Hoge et al., 2004; Vogt, 2011). Treatment, case management, and veteran's own efforts can have broad influences on MH issues and social functioning. Accordingly, this paper looks at interconnections between severity of MH concerns, treatment experiences, and daily stressors. The conclusion examines the policy implications for outreach and treatment.

METHODS

Participants

Data for this study came from the *Veteran Reintegration, Mental Health, and Substance Abuse in the Inner City* project sponsored by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Respondent-driven sampling (RDS) was used from February 2011 to September 2012 to recruit 269 OEF/OIF veterans who had separated from the military in the last two years (*author reference*). RDS is a network-based recruitment strategy for hard-to-reach populations that allows for the calculation of unbiased estimates of basic statistics for a population of interest using innovative procedures and to a certain extent also yields a sample that is more representative of the underlying populations than other non-population-based methods (Heckathorn, 1997, 2007, 2011; Magnani, Sabin, Sidel, & Heckathorn, 2005).

Informed consent was established with each participant. After about a year, participants were relocated and asked to participate in a follow-up interview. The project had a 90% retention rate: Twenty-two participants could not be located; 4 asked not to participate further in the study; and, 1 had passed away. Results are presented for the 242 participants who were re-interviewed at follow-up. The average time from the baseline (T1) to follow-up (T2) interview was 14 months. Participants were paid \$40 for completing each interview. All recruitment, interview, and data management procedures were approved by the Institutional Review Board of National Development and Research Institutes, Inc. (NDRI).

Measures

Each participant's experience of PTSD symptoms was measured with the 17-item PTSD checklist—military version (PCL-M) which is based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). Weathers et al. (2014, p. 105) noted that despite sweeping changes in the criteria for PTSD in DSM-5, there is fundamental continuity in the conceptualization of core aspects of the condition. The PCL-M items tap into the domains of intrusive thoughts connected to the past combat experience as well as into feelings and behaviors that reflect avoidance or hyperarousal. Respondents rate how much each of 17 items bothered them in the past 30 days on the following scale: 1 (not at all); 2 (a little bit); 3 (moderately); 4 (quite a bit); and 5 (extremely). Their score is calculated as the sum of their 17 responses. The range of possible scores is from 17 to 85. The suggested interpretation of scores are as follows: 30–39 = some PTSD symptoms; 40–49 = moderate PTSD symptoms; 50+ = severe PTSD symptoms. The internal consistency of this scale was very high: Cronbach's alpha of .96 at T1 and T2. Participants were also assessed for PTSD according to a stringent definition. To screen positive for likely experiencing PTSD, a participant had to have a PCL-M score of more than 50 and a score of 3 or more endorsing presence of at least one item associated with intrusion, three with avoidance, and two with hyperarousal.

Depression symptoms were measured at both time points with the Public Health Questionnaire or PHQ-9 (Kroenke, Spitzer, & Williams, 2001). The 9 items measure the

frequency during the past 30 days that participants were bothered by concerns such as having little interest or pleasure in doing things. Response codes include the following: 0 (not at all); 1 (few or several days); 2 (more than half the days); and 3 (nearly every day). Participants' scores were calculated as the sum of responses. The range of possible scores is 0 to 27. The suggested interpretation of scores are as follows: 5–9 = mild depression; 10–14 = moderate depression; 15–19 = moderately severe depression; 20+ = severe depression. The internal consistency of this scale was high: Cronbach's alpha of .91 at T1 and .92 at T2. A participant was identified as meeting the stringent definition of depression if they endorsed at least five of the nine symptoms as occurring on at least half of the past 30 days, one of the symptoms is either anhedonia or depressed mood, and the participant reported these symptoms caused functional impairment.

TBI was assessed only at baseline with the screener used by the US Department of Defense (DoD, 2008) in their Post-Deployment Health Assessment (PDHA) (Schwab et al., 2007). This 4-item instrument identifies traumatic events and related consequences. If a participant listed at least one injury event and endorsed at least one type of alteration of consciousness they were identified as likely to have sustained TBI.

Alcohol use disorder (AUD) and drug use disorder (DUD) were assessed using questions from the National Survey on Drug Use and Health (NSDUH), which are based on the DSM-IV (SAMHSA, 2010b). For DSM-IV a participant was defined as having a disorder if they screened positive for either substance dependence or abuse. In the DSM-5, abuse and dependence were combined into a single disorder that includes the criteria previously associated with each condition as well as dropping legal problems as a criterion and adding craving (Hasin et al., 2013). Participants were identified as having substance use disorder (SUD) if they screen positive for either AUD or DUD. Scales for alcohol and drug dependence consist of 10 and 12 dichotomous items, respectively, and there are 4 items for alcohol and drug abuse. The internal consistency of the components of SUD were high: Cronbach's alpha for alcohol dependence was .83 at T1 and T2; for alcohol abuse .85 at T1 and .87 at T2; for drug dependence .84 at T1 and .79 at T2; and, for drug abuse .86 at T1 and .80 at T2.

Veterans' sources of stress and support were identified using items selected and adapted from the Hassles and Uplifts Scale (DeLongis, Folkman, & Lazarus, 1988). Veterans were asked about relationships and situations that influenced how they had been feeling lately using the following response categories: 1 (not at all); 2 (a little bit); 3 (moderate); 4 (quite a bit); 5 (extreme). Fourteen stress items were adapted from the Hassles and Uplifts Scale and additional 11 items were created for this study (e.g., stress related to obtaining veterans benefits, medical care, finding a place to live, being homeless, and being arrested or under criminal justice supervision since separation). Similarly, 8 support items were adapted from the Hassles and Uplifts scale and additional five items were created for veterans returning to low-income neighborhoods (support from veterans groups, military friends, veterans at school, ex-partners, and a street gang if they were a member). Participants were also asked to identify up to 3 additional stressors and 3 additional supports and provide scores for the impact of each. For this analysis, responses were recoded into dichotomous categories: those indicating being substantially affected by a response of 4 or 5, and those that were not

substantially affected. A sum score of the number of stressors that substantially affected the participant was calculated (range 0 to 28) as was a separate count of the number of supports (range 0 to 16).

Analyses

Heckathorn (2014) provides an analysis tool (RDSAT) that produces unbiased estimates of a target populations characteristics using RDS data. Unfortunately, this package does not yet provide procedures for multivariate statistical calculations. Consequently, this analysis used conventional procedures in SPSS.

Ordinary least squares (OLS) regression of change scores was used to examine the variation in PTSD and depression over time associated with demographic characteristics, MH treatment, TBI at baseline, and changes in alcohol dependence, drug dependence, support, and stress scores (Bonate, 2000). MH treatment was coded as *no treatment* (not in at time T1 and T2), *new to treatment* (T2 but not T1), *treatment leavers* (T1 but not T2), and *treatment stayers* (T1 and T2). Change scores were calculated for MH, stress and support measures as the difference between scores at T2 and T1. The model specification was challenging because of the moderate sample size, multicollinearity among potential predictors and potential bi-directional relationships between predictors and outcomes. Accordingly, two successive models were fit for each dependent variable. The first model was limited to demographic and MH treatment variables. The variation in PTSD and depression symptoms associated with the demographic variables was not statistically significant, which motivated excluding them from the final model. The second equations examine the variation associated with MH treatment and the MH variables.

Treatment experience was highly related to changes in both PTSD and depression scores. Accordingly, it was decided to prepare a bivariate descriptive table that examined how the MH variables varied across treatment experiences. The sample was first divided into each of the four MH treatment categories. It was further decided to subdivide the relatively large number of participants that received no treatment according to the severity of their mental health concerns at baseline. This differentiated those not receiving treatment because they had no serious MH concerns from those who had unmet treatment needs. The *no treatment/severe issues* group was differentiated as those participants who met the stringent criteria for severe PTSD or depression. An intermediate group, *no treatment/moderate issues*, exhibited moderate MH concerns scoring above 40 on the PCL-M or 10 on the PHQ-9, but did not meet the stringent criteria for either PTSD or depression. The *no treatment/no issues* group scored below the cut-offs for moderate issues. The variation across groups by demographic characteristics was assessed using a χ^2 test. Variation over time on MH variables within each group was assessed by McNemar's test for dichotomous outcomes and paired T-tests for continuous measures comparing participants' scores at T1 and T2.

RESULTS

Table 1 presents the demographics for the six groups as well as the total follow-up sample. Fourteen percent of the veteran sample were women, 60% were Black (including Black Hispanics), 19% were White non-Hispanic, and 17% were non-Black Hispanic. The

majority (58%) of the sample were under 30 years of age, about a third were in their 30's, and 11% were 40 or above. The variation across groups is discussed later in this section.

Overall, the veterans showed improvement regarding both PTSD and depression. (This is shown in the last column of Table 3). The mean PCL-M score decreased four points at follow-up from a score of 39 which is near the cutoff of 40 for moderate PTSD symptoms down to 35 which is the midpoint of the some PTSD symptoms range. The mean PHQ-9 score decreased by two points from 10, the cutoff for moderate depression down to 8 which is in the range for mild depression. The remainder of this section examines which veterans showed the greatest improvements and covariates of their experiences.

Regression analyses of changes in PTSD and depression

Table 2 presents regression coefficients from the analyses of change in PTSD and depression symptoms. Model 1 for both PTSD and depression indicate that the demographic variables were not significantly related to change. Of the dummy coded treatment groups, only the *new to treatment* group of veterans had significant associations with the depression change scores but not with the PTSD change scores. Veterans who were *new to treatment* showed a substantial increase of 4 points more than the reference group, those receiving no treatment. PTSD scores were also 6 points higher for this group and much higher than the negative coefficients of -5 for *treatment leavers* and -4 for *treatment stayers*. Accordingly, the *new to treatment* group had an average change that was 11 and 10 points higher than *treatment leavers* and *treatment stayers*, respectively.

An increase in stress was associated with an increase in both PTSD and depression. An increase in alcohol dependence symptoms or a decrease in support was associated with a significant increase in PTSD but not depression. The variation associated with TBI at baseline and change in drug dependence was not significant.

Variation across treatment pathways

Table 1 indicates that there were no significant differences in the distributions of gender and race/ethnicity across the six subgroups. There was significant variation with age. The youngest participants tended to fall into very disparate categories: the *no treatment/no issue* (68% under age 29) and the *treatment stayers* (64%) as compared to their 58% representation in the sample. The oldest veterans (age 40+) were most common among three groups that had severe MH issues at baseline but differed according to their treatment experience; they represented 19% of *treatment stayers*, 18% of *treatment leavers*, and 21% of *no treatment/severe issues*, compared to their overall 11% of the sample.

Table 3 examines the experiences over time for each of the groups. The last column identifies an overall decline in PTSD and depression scores. However, these declines were not uniform across groups. The *new to treatment* group exhibited modest but not statistically significant increases on both measures. However, these increases stand in strong contrast to the other groups that exhibited statistically significant decreases on both measures in almost all of the groups. (The exception is the *no treatment/no issues* which experienced stable, low levels on both measures.) This confirms the finding from the regression analysis that those

entering treatment were more likely to have experienced an increase in symptoms. Their mean scores at T2 on PTSD (52) and depression (13) indicate high PTSD and moderate depression symptoms. Indeed, the PTSD score indicates a clinical level need for MH treatment.

Of great substantive significance, *treatment leavers* had higher scores at baseline and substantially lower levels at follow-up after leaving treatment. PTSD declined from an average of 50 (severe PTSD) down to 42 (near the bottom of the range for moderate PTSD symptoms). Depression declined from 12 (moderate severity) down to 9 (mild symptoms).

Treatment stayers had among the highest mean symptom scores at baseline of all six groups (PTSD score of 57 in the high severity category; depression score of 16 in the moderately severe category). They also had the highest rate of TBI of all groups (71%) which is over 40% higher than the overall sample mean (29%). *Treatment stayers* experienced substantial improvement on both measures (PTSD 50; depression 12 at T2). However, even after these significant reductions in symptoms, *treatment stayers* still had the second highest scores (after the *new to treatment* group) at follow-up, which indicated their continuing treatment need. The *no treatment/severe issues* group exhibited the largest improvement in MH symptoms. PTSD decreased from 56 down to 42. Depression decreased from 17 down to 9.

The last column of Table 3 reveals that SUDs also declined substantially over time. Less than half of the veterans with AUD at T1 (27%) had AUD at T2 (12%). There was a slightly smaller percentage decline in DUD (14% to 9%). Of great significance, this decline was not uniformly reflected across groups. The largest decline by far was among *treatment leavers* who experienced decreases in AUD from a majority of 54% at T1 down to 14% and in DUD from 32% down to 7%.

Table 3 also examines variation in daily stresses and supports. The mean number of stress items decreased from 5 to 4. In contrast, there was no significant change in the level of perceived supports which remained steady at 3 from T1 to T2. Sources of stress showed strong improvement among *treatment leavers* (7 to 4) and *treatment stayers* (8 to 5). The *no treatment/no issues* group also experienced a significant decrease. However, their rate of stress at T1 (3) was much lower than among the *treatment leavers* and *treatment stayers*. Thus, this change is of less practical importance. Numbers of stressors remained relatively constant among the *no treatment/moderate issues*, *no treatment severe issues*, and *new to treatment* groups.

DISCUSSION

Many OEF/OIF veterans are experiencing a variety of mental health concerns of varying severity post separation.. Symptoms of PTSD and depression are highly common MH concerns that many veterans cope with at some point, even if their concerns remain below the threshold for a clinical diagnosis. This study presents findings obtained at two time points 14 months apart for OEF/OIF veterans who recently returned to the challenging circumstances of New York City's low-income predominately-minority neighborhoods. The findings yielded several positive results regarding these veteran's experiences.

The first positive finding is that on average veterans' MH improved over the course of a year, for the most part both for veterans that were in MH treatment or those that were not. Hopefully this positive trend will continue further into subsequent years. Another positive finding was that the one group that did not experience MH improvement were those veterans that had just entered treatment during the last year. This suggests that those veterans whose conditions deteriorate over time do seek treatment. It was also reassuring that those veterans with the most severe symptoms of PTSD, depression and TBI were already receiving treatment. The *no treatment/sever issues* group also exhibited substantial improvement, larger than those among *treatment leavers*. However, this figure was likely skewed by construction; those veterans who had not been receiving treatment and experienced increases in MH symptoms would have been among the *new to treatment* group. Still, there is a positive aspect to this finding. It indicates that some veterans with severe untreated MH concerns are experiencing improvements over time and that those that do not experience treatment are deciding to go to treatment.

MH treatment was found to be effective on many counts. Veterans in MH treatment experienced significant declines in symptoms of both PTSD and depression, whether they remained in treatment or subsequently left. This is consistent with the possibility that those who left did so on positive terms after having experienced at least some improvement and not in frustration after not experiencing any improvement. Other benefits of treatment may be even more substantial. Veterans in treatment reported substantial declines in the number of items that caused them quite a bit of stress, whereas those not in treatment generally experienced no improvement, except for the *no treatment/no issues* group who reported modest improvement. This finding is consistent with the likelihood that treatment helps veterans cope with their daily stresses.

Treatment leavers also experienced a four-fold decline in both AUD and DUD. There are several potential alternate explanations for this remarkable decline. The reductions in SUD may have been part of a broader improvement due to MH treatment. However, all of this reduction could not have been due to receipt of treatment specifically for SUD; only 20% of *treatment leavers* with SUD at T1 reported receiving SUD treatment. Another possibility is that elevated rates of SUD at T1 reflected ineffective "self-medication" that eventually resolved through treatment of the underlying MH issues. Lastly, there's the possibility of reverse causation. Resolving SUD may represent a primary improvement that allowed the *treatment leavers* to exit as opposed to the *treatment stayers*, who had high levels of SUD at T1 and T2.

There are several important limitations to the generalization of findings from this study. The estimates provided are for a delimited population from one city. Caution should be taken with regard to generalizing these very specific findings to military personnel and veterans populations that differ by city or demographic attributes. This study is the first to use RDS to study veterans. Although RDS is intended to reduce the statistical impact of sampling bias, it may not have completely done so. Moreover, this analysis had to use conventional multivariate statistics because there are no special purpose multivariate procedures for data obtained using RDS. Clearly further research is needed on the use of multivariate statistics with data obtained using RDS.

CONCLUSION

Overall, these findings suggest that MH treatment has broad positive influences including reduction of MH symptoms as well as reductions in daily stress, and reductions in substance related disorders. The findings also suggest that much healing occurs within the community for many veterans with moderate and even severe MH issues. Those whose MH condition deteriorates tend to enter treatment. These findings underscore the value of providing veterans with MH treatment and to provide low threshold community-based supports for those veterans that are coping with MH symptoms on their own to facilitate their improvement and potentially help them avoid the need for subsequent treatment.

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Table 1
Demographics of Veterans Divided into Six Groups Based on the Mental Health and Treatment Status

	No treatment/no issues (N=96) 39.7%	No treatment/ moderate issues (N=47) 19.4%	No treatment/severe issues (N=24) 9.9%	New to treatment (N=16) 6.6%	Treatment leavers (N=28) 11.6%	Treatment stayers (N=31) 12.8%	Total (N=242) 100%
Gender							
Females	13.5	8.5	20.8	18.8	17.9	16.1	14.5
Males	86.5	91.5	79.2	81.2	82.1	83.9	85.5
Race/Ethnicity							
Black	55.2	70.2	58.3	75.0	64.3	51.6	60.3
Hispanic	17.7	14.9	16.7	12.5	14.3	22.6	16.9
White	20.8	12.8	16.7	12.5	21.4	22.6	18.6
Other	6.3	2.1	8.3	0	0	3.2	4.1
Age*							
Up to 29	67.7	48.9	54.2	56.3	39.3	64.5	58.3
30 to 39	25.0	44.7	25.0	37.5	42.9	16.1	30.6
40+	7.3	6.4	20.8	6.3	17.9	19.4	11.2

* $p < .05$

Table 2

Variation in Mental Health Over Time in a Sample of Inner-City Veterans

	Change in PTSD		Change in depression	
	Model 1	Model 2	Model 1	Model 2
<i>Demographics^a</i>	(Constant)	-1.8	-1.8	-2.0* -1.8**
	White	-0.3		0.4
	Hispanic	-3.5		-0.4
	Other	-4.6		1.2
	Female	2.2		-0.1
	Age 30-39	-1.5		-1.0
<i>MH Treatment^a</i>	Age 40 and more	-1.5		-0.8
	New to treatment	5.6	5.1	4.1* 4.0*
	Treatment leavers	-4.9	-1.6	-0.8 0.2
	Treatment stayers	-4.4	-3.5	-1.3 -0.2
<i>Mental Health</i>	TBI at baseline		1.7	0.0
	Alc. dep. change score		1.7**	0.4
	Drug dep. change score		0.3	-0.3
	Support change score		-0.9*	-0.2
	Stress change score		0.7**	0.5**
	R-square	.047	.132	.037 .11

^aReference categories were Black, males, age up to 29, no treatment.

* $p < .05$,

** $p < .01$

Table 3

Comparison of T2 and T1 MH Issues by MH and Treatment Status

	No treatment/no issues (N=96)		No treatment/moderate issues (N= 47)		No treatment/severe issues (N=24)		New to treatment (N=16)		Treatment leavers (N=28)		Treatment stayers (N=31)		Total (N=242)	
	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
MH assessment														
PTSD (mean)	25.0	24.6	36.4	33.2	55.5	42.2**	48.6	51.6	49.6	41.8*	57.0	49.6*	38.7	35.0**
Depression (mean)	3.8	4.4	12.7	7.5**	17.2	8.7**	11.1	12.8	12.3	8.9**	15.8	12.3**	9.6	7.5**
TBI (%)	15.6	--	14.9	--	37.5	--	31.3	--	42.9	--	71.0	--	28.9	--
Substance use disorders														
AUD (%)	12.5	5.2	27.7	10.6*	25.0	8.3	18.8	6.3	53.6	14.3**	54.8	41.9	27.3	12.4**
DUD (%)	6.3	1.0†	12.8	14.9	8.3	4.2	18.8	12.5	32.1	7.1*	25.8	25.8	14.0	8.7*
SUD (%)	14.6	5.2*	29.8	21.3	29.2	8.3	31.3	12.5	64.3	21.4**	61.3	54.8	31.8	17.4**
Sources of stress & support														
Sum of 28 stresses	3.2	2.4**	5.2	4.5	5.8	4.7	6.0	5.2	6.7	4.1**	7.6	4.7**	5.0	3.7**
Sum of 16 supports	3.9	3.4*	2.6	3.3*	2.4	2.6	2.8	2.6	3.2	3.4	3.5	3.2	3.3	3.2

† $p < .1$;

* $p < .05$;

** $p < .01$