

**VETERANS WITH EARLY PSYCHOSIS: A COMPARISON OF
VETERANS AND NON-VETERANS**

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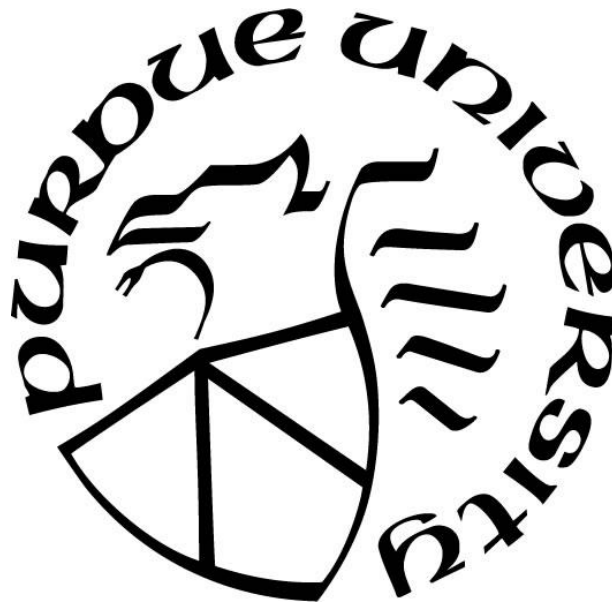
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For everyone who has supported me through this journey. Thank you.

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ABSTRACT

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Title: Veterans with Early Psychosis: A Comparison of Veterans and Non-Veterans

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Aim: Early psychosis has been identified as period during which rapid identification and treatment can lead to significant improvement in clinical and functional outcomes. Despite increased research, no studies have examined early psychosis in Veteran populations. It is unknown whether Veterans differ from non-Veterans at this stage of the disorder, and if the treatments offered to non-Veterans are appropriate to implement in Veteran Affairs Medical Centers. Given differences that appear between Veterans and non-Veterans in chronic psychosis, additional work is necessary to determine the best way to approach specialized treatment for Veterans experiencing early psychosis. **Methods:** The current study is a secondary analysis of assessment batteries collected at a community-based early intervention program and at a local Veteran Affairs Medical Center. Assessment results were compared for Veterans' and non-Veterans' background characteristics, symptoms, and neurocognitive deficits. **Results:** Significant differences were found between the two samples on age of illness onset, marital status, education level, positive symptoms of psychosis, and neurocognitive functioning. Logistic regression analyses identified age of onset as a potential underlying factor. **Conclusions:** While some aspects of illness presentation appear similar between Veterans and non-Veterans, there are important differences between these populations. Pre-existing treatment interventions, such as Social Skills Training, cognitive remediation approaches and cognitive behavior therapy for

psychosis may be appropriate to implement with Veterans. Others— such as family based interventions or supported employment services – may need to be tailored to maximize the benefit for Veterans.

INTRODUCTION

Early psychosis, the first few years of a psychotic disorder (e.g. schizophrenia, schizoaffective disorder), is a critical period that requires rapid identification and subsequent treatment (Breitborde, Srihari, & Woods, 2009; Cuesta et al., 2012; Perkins, Gu, Boteva, & Lieberman, 2005). Over the last decade, interest in early psychosis has increased and research has focused on understanding the presentation of the disorder in the general population (Bertolote & McGorry, 2005; Harris et al., 2005; McGorry, Killackey, & Yung, 2008). One population that has received little attention in early psychosis research is the Veteran population; there have been no studies examining early psychosis in Veterans. It is unknown whether Veterans differ from non-Veterans in their presentation of symptoms or whether specific services are necessary to meet the needs of Veterans experiencing early psychosis. However, given the differences between Veterans and non-Veterans in access to specialized treatment services, as well as differences in illness presentation of Veterans and non-Veterans with chronic psychosis, additional work is needed to determine appropriate treatment approaches.

Specialized programs have been developed to aid in the early identification and swift treatment of early psychosis (Edwards, Harris, & Bapat, 2005; Garety et al., 2006; Marshall & Rathbone, 2011; McGorry et al., 2008). Research suggests that specialized early intervention services can lead to faster symptom reduction, less intense illness trajectory, better illness self-management and increased social and role functioning (Marshall et al., 2005; R. M. Norman & Malla, 2001; Perkins et al., 2005). While many early intervention programs reside in academic centers, teaching hospitals or specialized outpatient clinics (Amminger et al., 2011; Bodén, Sundström, Lindström, Wieselgren, &

Lindström, 2010; Jørgensen et al., 2000; Malla, Norman, McLean, Scholten, & Townsend, 2003), Veterans Affairs Medical Centers (VAMCs), which offer medical services to those eligible after discharge from the United States military, have not yet developed specialized intervention services for Veterans experiencing early psychosis. The existing early intervention programs cater to the general population, and do not provide a focus on Veteran care. While it is tempting to simply recommend the implementation of successful community based early intervention services, research cautions against planning VAMC health care based on non-Veteran patient populations (Agha, Lofgren, VanRuiswyk, & Layde, 2000). It has been noted that the Veteran and non-Veteran populations differ across a variety of health care needs, and basing services on a population with different needs could lead to poor allocation of treatment options (Agha et al., 2000; Peabody & Luck, 1998; Wolinsky, Coe, Mosely, & Homan, 1985). Given this is a new area of exploration, understanding how Veterans and non-Veterans with chronic psychosis differ, may inform important areas to focus early psychosis research efforts.

Within the chronic psychosis literature, evidence suggests a variety of differences between Veterans and non-Veterans (Firmin, Luther, Lysaker, & Salyers, 2016; Harvey et al., 2000; Thorp et al., 2012). The age of onset of psychosis tends to be later for Veterans than for non-Veterans. While the common age of onset in the general population ranges from 16 to 25 years (Lecomte et al., 2008; Reading & Birchwood, 2005), the average age of onset for Veterans is approximately 28 years (Harvey et al., 2000; Marsh et al., 1999; Thorp et al., 2012). In addition to age, Veterans with chronic psychosis have also been shown to have higher levels of education when compared to non-Veterans (Firmin et al., 2016; Harvey et al., 2000; Marsh et al., 1999; Thorp et al., 2012). Finally, research suggests

that Veterans with chronic psychosis are more likely to be married, or to have previously been married, than non-Veterans (Firmin et al., 2016; Thorp et al., 2012). Marital status may be tied both to later age of onset and to higher levels of social functioning, as individuals with greater deficits in social skills may find intimate relationships more challenging. If non-Veterans are experiencing earlier ages of onset, the disruption in functioning may stunt the progress of age appropriate milestones (e.g. serious romantic relationships, completion of education, career development). In addition to background characteristics, there may be aspects of symptomology or functioning that differ between the two populations.

Psychotic symptoms are a highly-researched aspect of psychosis, as is insight into illness. Differences between Veterans and non-Veterans have been noted for chronic psychotic symptom severity. Evidence suggests positive psychotic symptoms do not appear to differ between groups; however, Veterans with chronic psychosis tend to have less severe negative symptoms (Harvey et al., 2000; Thorp et al., 2012). Deficits with insight are prevalent in both chronic and early psychosis as well, and can impact an individuals' perception of their psychotic symptoms (Lysaker, Bell, Bryson, & Kaplan, 1998; Vohs et al., 2015). While differences between Veteran and non-Veterans have not been explored in terms of insight into illness, impaired insight often creates difficulties in an individual's awareness of their own mental illness, and a distinct unawareness of the need for treatment (Ayesa-Arriola et al., 2014; R. J. Drake et al., 2007; Vohs et al., 2014; Vohs et al., 2015). Difficulty in these both areas can negatively impact engagement in treatment, and further exacerbate additional co-morbid symptoms such as depression and suicidality.

The risk for co-morbid depression is high in all stages of psychosis (D. Addington & Addington, 1992; Crumlish et al., 2005; Power et al., 2003); however, early psychosis presents a uniquely high risk state (Barrett et al., 2010; Clarke et al., 2006; Pompili et al., 2011; Robinson et al., 2010; Romm et al., 2010; Upthegrove et al., 2010). Studies have found over half of individuals who experience early psychosis will experience at least one major depressive episode (Romm et al., 2010; Upthegrove et al., 2010). Additionally, up to 30% of Veterans are affected by depression, making it one of the most common chronic conditions experienced in VAMC populations (Cully, Zimmer, Khan, & Petersen, 2008; Hankin, Spiro III, Miller, & Kazis, 1999; Kaplan, Huguet, McFarland, & Newsom, 2007). While differences in suicidality have not been explicitly examined between Veterans and non-Veterans with chronic psychosis, Veteran status alone elevates an individual's risk for suicide; the general population experiencing a psychiatric diagnosis has a 15% suicide risk factor, Veteran status elevates this risk to over 50% (Ilgen, Bohnert, Ignacio, & et al., 2010; Kaplan et al., 2007; Lambert et al., 2005; Zivin et al., 2007). This suggests Veterans with psychiatric diagnoses such as psychosis would also experience an increased risk for depression and suicidality. While many non-Veteran early psychosis programs incorporate care for co-morbid depression (White, Luther, Bonfils, & Salyers, 2015), Veteran status may place individuals in this group at an elevated risk.

Functioning, both social and role, is another area of concern for individuals with psychosis. Deficits in functioning have been widely documented for this population (J. Addington & Addington, 1999; Dickerson, Boronow, Ringel, & Parente, 1999; Fett, Viechtbauer, Penn, van Os, & Krabbendam, 2011). Evidence suggests Veterans have better self-care, social functioning, recreation planning, activities of daily living and interpersonal

communication (Harvey et al., 2000; Thorp et al., 2012). It is unclear what drives these differences in functioning, and examining whether these differences are present early in the development of a psychotic disorder could allow for better capitalization on any protective factors that may exist (Firmin et al., 2016).

Few studies exist exploring neurocognitive differences between Veterans and non-Veterans with chronic psychosis. Though some differences in verbal memory and working memory have been noted, results have been conflicting (Harvey et al., 2000; Thorp et al., 2012). Given the lack of research examining neurocognitive differences between Veterans and non-Veterans, it is unclear whether these differences would be present in an early psychosis population. For example, it is possible that the conflicting results may be tied to a separate driving factor, such as differences in antipsychotic medication doses (Keefe, Seidman, et al., 2004; Keefe, Silva, Perkins, & Lieberman, 1999), age of onset, or education levels (R. M. Norman & Malla, 2001; Simonsen et al., 2009).

In addition to the above-noted domains, there are other important areas that warrant exploration in Veteran and non-Veteran early psychosis samples, such as social anxiety. Social anxiety is a common problem in psychosis and, similarly to deficits in insight, can impact the ability of someone in early psychosis to benefit from specialized treatment (Ayesa-Arriola et al., 2014; Birchwood et al., 2007; R. J. Drake et al., 2007; Voges & Addington, 2005; Vohs et al., 2015). For example, social anxiety has been identified as a co-morbid disorder in up to 30% of individuals with a psychotic diagnosis (Birchwood et al., 2007; Voges & Addington, 2005). Moreover, social anxiety is associated with negative symptoms and poor social functioning (Blanchard, Mueser, & Bellack, 1998; Penn, Hope, Spaulding, & Kucera, 1994; Romm et al., 2011; Voges & Addington, 2005). Social anxiety

has not yet been explicitly examined in a population of Veterans with early psychosis; gaining a better understanding of social anxiety may help to overcome treatment engagement and point to the need for special interventions (Goodwin & Fitzgibbon, 2002; Kingsep, Nathan, & Castle, 2003).

Current Study

Given the dearth of information on Veterans with early psychosis and the need for a greater understanding of how this population may differ from the general population with early psychosis, the current study aimed to summarize characteristics of Veterans with early psychosis, and compared this sample to non-Veterans with early psychosis. Existing literature supports the idea of differences being prevalent between Veterans and non-Veterans with chronic psychosis, and it is possible that these differences begin early in the illness trajectory. Given that the age of onset for psychosis has been shown to be later in Veteran samples with chronic psychosis (Firmin et al., 2016; Harvey et al., 2000; Marsh et al., 1999; Thorp et al., 2012), we hypothesized that our Veteran sample would have a later age of onset than non-Veterans, and would have a higher level of education and would be more likely to either be married, or have previously been married than non-Veterans. Evidence suggests that Veterans and non-Veterans with chronic psychosis have similar positive symptom severity (Harvey et al., 2000; Thorp et al., 2012), but Veterans display less severe negative symptoms (Marsh et al., 1999; Thorp et al., 2012). Additionally, Veterans in general display higher levels of suicidal ideations and are at a higher suicide risk. Therefore, we hypothesized that Veterans with early psychosis would have less severe negative symptoms, but more severe suicidal ideation, when compared to non-Veterans with early psychosis. Finally, given the differences noted in functioning between Veterans

and non-Veterans with chronic psychosis, we hypothesized that Veterans with early psychosis would have higher levels of social functioning and role functioning than non-Veterans with early psychosis. We explored differences between Veterans and non-Veterans across neurocognitive domains, co-morbid social anxiety, levels of insight and levels of depression. Additionally, we sought to further explain the role of age of illness onset, medication dosage, education and duration of untreated psychosis (DUP) in explaining differences that arose between Veterans and non-Veterans.

METHODS

Participants

The current study was a secondary analysis comparing cross-sectional data from two early psychosis samples, one from a local early intervention program (non-Veteran), and one from the local VAMC (Veteran). Both samples included data from similar assessment batteries. The non-Veteran sample was combined from two independent projects that occurred at the same early intervention program with the same inclusion criteria. The Veteran sample is a single dataset from a recently completed project. There was no overlap between the samples. Both the local early intervention program and the VAMC approved the use of data for secondary analyses.

The total sample consisted of 76 individuals with early psychosis (16 Veterans, 60 non-Veterans), who were within six years of their first diagnosis of a psychotic disorder at the time of assessment. The definition of early psychosis was determined based on clinic guidelines. All diagnoses were confirmed using the Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1995), by a clinically trained professional, with a Master's degree or greater, under the supervision of a licensed clinical psychologist. All subjects were 18 years or older.

Measures

Measures of the following domains were assessed for the full sample of Veteran and non-Veteran groups: symptoms (psychotic, insight, depression, social anxiety), social and role functioning. The remaining domains (suicidal ideation and neurocognitive functioning) were assessed with the full Veteran sample and a reduced non-Veteran sample

to maintain consistency of measurement, as these measures were not available for the complete non-Veteran sample. All clinician-rated measures were completed by a Master's level clinician, receiving supervision from a licensed clinical psychologist. Demographic data was available for comparison including: age of illness onset, gender, education level, relationship status, race, and CPZ equivalents for medication dosages at the time of assessment.

Symptoms

The Positive and Negative Syndrome Scale for Schizophrenia.

The PANSS (PANSS; Kay, Fiszbein, & Opfer, 1987) is a clinician-rated scale comprised of 30 items, each representing a specific symptom of the disorder. Using a 7-point scale, each item is rated on the degree to which the symptom was present during the interview (1=absent, 7=extreme). A total score is generated by combining the score of each item. Factor analyses of the measure have indicated a five-factor structure (Bell, Lysaker, Beam-Goulet, Milstein, & Lindenmayer, 1994; El Yazaji et al., 2002; Lancon, Auquier, Nayt, & Reine, 2000). The five factors are: negative symptoms, positive symptoms, disorganization/cognition, excited, and depression/anxiety (Bell et al., 1994; Lancon et al., 2000). These factors have been found to remain stable in an early psychosis sample (Emsley, Rabinowitz, Medori, & Group, 2007; Emsley, Rabinowitz, & Torreman, 2003). Additionally, the depression/anxiety factor has been shown to be a comparable and reliable measure of depression in populations with psychosis (El Yazaji et al., 2002; Emsley, Oosthuizen, Joubert, & Stein, 1999; Emsley et al., 2003). The PANSS was used to measure positive symptoms, negative symptoms and total symptoms of psychosis. The PANSS was also used as a measure of depression because it was available for the full sample, and has

been shown to be reliable at measuring this construct in the early psychosis population (Emsley et al., 2003). For our sample, the internal reliability for the total scale was high ($\alpha=.85$). The reliability for the positive ($\alpha=.77$), negative ($\alpha=.73$) and depression ($\alpha=.63$) subscales were all acceptable.

The Scale to Assess Unawareness of Illness.

The Scale to Assess Unawareness of Illness (SUMD; Amador et al., 1994) is a semi-structured clinical interview designed to elicit a subject's level of insight into their psychiatric conditions. The measure is clinician-rated and has three subscales (awareness of illness, awareness of effects of treatment and awareness of consequence of illness). Each subscale is rated on a 5-point rating scale, with higher numbers indicating poor insight. This measure has demonstrated good to excellent reliability in prior studies (Lysaker et al., 2011; Vohs et al., 2015), and in our current study, demonstrated a reliability of $\alpha=.83$.

The Calgary Depression Scale for Schizophrenia.

The Calgary Depression Scale for Schizophrenia (CDSS; D. Addington, Addington, & Maticka-Tyndale, 1993) is a clinician-rated measure of depression, specifically developed for use in a population with schizophrenia. Using a structured clinical interview, trained clinical raters provide scores ranging from 0 ("symptom is absent") to 3 ("symptom is severe"). A total score is calculated by summing all nine items. Higher total scores indicate higher levels of depression. The CDSS has been shown to have strong reliability and validity across samples (D. Addington, Addington, & Atkinson, 1996; D. Addington, Addington, Maticka-Tyndale, & Joyce, 1992), and the predictive and construct validity has been supported (D. Addington et al., 1996; D. Addington, Addington,

& Maticka-Tyndale, 1994). For the current study, the CDSS has been used as a measure of suicidality, as items specifically identify risk of suicidal ideation within a psychosis population. The overall reliability for the CDSS in our sample was high ($\alpha=.77$).

The Liebowitz Social Anxiety Scale.

The Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) is a self-report measure assessing the degree to which specific social interactions or performance situations are being feared or avoided by a subject. For each of the 24 items, the subject is asked to rate the degree to which they have feared the given situation in the past week, and how much they have been avoiding the given situation in the past week. Both fear and avoidance are rated on 3-point Likert-style scale with 0 = “not at all” and 3 = “A lot”. The scale is broken down into two primary subscales of social interactions (11 items) and public performance (13 items), both of which were used to assess social anxiety in the current samples. The measure has been shown to have strong reliability and validity in psychometric studies (Fresco et al., 2001; Heimberg et al., 1999). In the current sample, the reliability for the total LSAS scale was high ($\alpha=.95$); the social interactions ($\alpha=.90$) and public performance ($\alpha=.90$) subscales were also high.

Functioning

The Social Functioning Scale.

The Social Functioning Scale (SFS; Birchwood, Smith, Cochrane, Wetton, & Copestake, 1990) is a self-report measure used to assess seven areas of social and role functioning. The measure contains 79 items, each of which relates to one of the following areas: social engagement (e.g. “how often will you start conversations?”), interpersonal

communication (e.g. “how easy or difficult is it for you to carry on a conversation?”), prosocial activities (e.g. “How often do you visit friends? Go out to eat with others?”), competence (e.g. “How capable do you feel in your ability to take care of personal hygiene? Take transportation alone?”), activities of daily living (e.g. “How often do you clean up? How often do you prepare a cooked meal alone?”), recreational activities (e.g. “How often do you watch TV?”), and occupational activities (e.g. “Are you currently working?”). The SFS asks subjects to rate their ability to engage in specific activities or perform daily living tasks using a 4-point rating scale where higher scores indicate a higher level of functioning. Each subscale is summed, and converted from the summed raw score to a scaled score. The measure was validated on an outpatient schizophrenia sample (Birchwood et al., 1990; Dickerson et al., 1999). The reliability of the total measure in the current sample was ($\alpha=.69$).

The Quality of Life Scale

The Quality of Life Scale (QLS; Heinrichs, Hanlon, & Carpenter, 1984) is a 21-item measure, designed specifically to assess deficits in functioning in psychosis populations. The semi-structured interview obtains data on functioning over the last month, and the items are then rated on a 7-point scale with descriptive anchors. Although anchors vary across the scale, the direction of rating remains the same with a 1 indicating more impaired functioning and a 7 indicating better functioning. The scale assesses interpersonal relationships (8 items; e.g., Intimate relationships with household members), instrumental role functioning (4 items; e.g., Extent of occupational role functioning), intrapsychic foundations (7 items; e.g., Capacity for empathy) and common objects/activities (2 items; e.g., Current possession of common objects required for daily living). The reliability and

validity of this measure has been tested in multiple studies and found acceptable across all subscales (Browne et al., 2000; Heinrichs et al., 1984; Lehman, 1996; Lehman, Postrado, & Rachuba, 1993). For the current study, the instrumental role functioning and common objects/activities subscales were used to measure role functioning in both samples. The reliability for the total score was high for the current sample ($\alpha=.78$).

Measurement of neurocognitive functioning

The Brief Assessment of Cognition in Schizophrenia.

The Brief Assessment of Cognition in Schizophrenia (BACS; Keefe, Goldberg, et al., 2004) is a specialized assessment battery designed to measure the aspects of cognition that are commonly found to be most impaired in schizophrenia spectrum populations. The battery is administered by a trained clinician and has been found to be highly correlated to longer batteries of cognition used with this population ($r=.76$; Keefe et al., 2004). The battery contains six subscales: verbal memory, working memory, motor speed, verbal fluency, attention and executive functions. When used in a population experiencing psychosis, the BACS has been shown to have high reliability and validity across the total score and all subscales (Keefe, Goldberg, et al., 2004). In our sample, the BACS had a high reliability ($\alpha=.75$). Verbal memory ($\alpha=.88$), working memory ($\alpha=.76$) and verbal fluency ($\alpha=.82$) also displayed high reliability in our samples. The remaining neurocognitive functioning domains were assessed with individual items.

Statistical Analyses

Data was analyzed using IBM SPSS Statistics, Version 23 (IBM, 2014). Descriptive statistics were calculated to describe demographic characteristics for both

samples (e.g. means, standard deviations). To control for demographic differences between Veteran and non-Veteran samples, hypotheses were tested for parametric variables using One-Way Analysis of Co-Variance (ANCOVA) analyses; categorical data were compared using Pearson's chi-square tests. Categorical variables were dummy-coded prior to being entered into analyses. Following hypothesis testing, exploratory analyses including bivariate correlations and logistic regressions were used to better understand differences between the two populations. All statistical tests were two-tailed, with p -values <0.05 .

RESULTS

Participants

For the full sample, participants were predominantly male (86.8%), Black (73.7%) and – on average – 25.2 years old at the time of assessment (see Table 1). Amongst the total sample, most participants were diagnosed with schizophrenia (72.4%). The mean age of onset for the full sample was 22.8 years, with an average of 318 days between onset of psychosis and subsequent first treatment (see Table 1). More than half of participants had a high school degree or less (53.9%), and 22.4% were currently, or had previously been married (see Table 1).

Background Characteristics

Overall, the three hypotheses regarding differences in background characteristics between Veterans and non-Veterans were supported. Veterans had a later age of onset ($M=26.8$ years, $SD=4.9$) than non-Veterans ($M=21.4$ years, $SD=3.7$; $t(67)=-4.74$, $p<.001$). Veterans were more likely to have completed education beyond high school than non-Veterans (81.3% vs 36.7%; $X^2(1,76)=10.11$, $p<.001$). Similarly, Veterans were more likely to either be married, or have previously been married (56.3% vs. 13.3%; $X^2(1,76)=13.40$, $p<.001$). In order to explore other potential sample differences, Veterans and non-Veterans were compared on gender, race, diagnosis, duration of untreated psychosis, and chlorpromazine (CPZ) equivalent at the time of assessment. The groups did not significantly differ on gender (see Table 1). Non-Veterans were significantly more likely to be minorities (81.7% vs. 43.8%; $X^2(1,76)=9.37$, $p=.002$), and more likely to have a diagnosis of schizophrenia (83.3% vs. 31.3%; $X^2(1,76)=17.14$, $p<.00$). Veterans had a

significantly longer duration of untreated psychosis ($M=749$ days, $SD=511.6$; $M=188$ days, $SD=4.7.8$; $t(69)=-4.32$, $p<.001$). The Veteran sample also had a significantly lower average dosage of CPZ equivalent medication at the time of assessment ($M=158.3$, $SD=215.2$; $M=357.4$, $SD=309.7$; $t(74)=2.41$, $p=.02$).

Symptoms

The hypotheses regarding symptoms were not supported (see Table 2-3). A One-way ANCOVA was conducted to determine whether negative symptoms significantly differed between Veterans and non-Veterans while controlling for differences in demographics and medication (see Table 2). Veteran status did not have a significant effect on negative symptoms after controlling for demographic variables (Veteran $M=21.3$, $SD=6.1$; non-Veteran $M=19.1$, $SD=6.5$; $F(1,69)=.74$, $p=.39$; see Table 2). In addition, Veterans were not significantly more likely to report suicidal ideation when compared to non-Veterans: 15% Veterans vs. 12.5% non-Veterans endorsed mild to moderate suicidal ideations ($X^2(2,36)=.56$, $p=.65$). Contrary to expectations, Veterans had significantly *more* positive symptoms than non-Veterans, when demographic variables, including medication, were controlled for (Veteran $M=22.4$, $SD=6.1$; non-Veteran $M=14.5$, $SD=5.3$; $F(1,69)=13.54$, $p=.001$; see Table 3). When exploring differences in depression, social anxiety and insight into illness, no significant differences were found between Veterans and non-Veterans (please see Table 4-6).

Functioning

The hypotheses regarding social and role functioning were not supported. One-way ANCOVA analyses, examining Veteran status on the seven subscales of the Social

Functioning Scale, controlling for demographic variables, did not result in any significant differences between groups (see Table 7). On the QLS, One-way ANCOVA results indicated no significant differences between Veterans and non-Veterans on the instrumental role functioning subscale, nor the common objects/activities subscale when controlling for demographic variables (see Table 8).

Neurocognitive Functioning

Using One-way ANCOVAs, we explored differences in neurocognitive deficits between the Veteran and non-Veteran results on the BACS. Overall, Veterans had significantly fewer neurocognitive deficits than non-Veterans, after controlling for demographic variables and medication (Veterans $M=35.9$, $SD=12.4$; non-Veteran $M=21.4$, $SD=14.2$; $F(1,36)=4.86$, $p=.03$), based on the BACS total score. Domain-specific results varied (see Table 9). While Veterans and non-Veterans did not significantly differ on verbal memory, reasoning/problem solving or processing speed domains (see Table 9), working memory appears to significantly differ between the groups. On the Digit Sequencing task, which measures working memory, Veterans ($M=44.3$, $SD=11.9$) performed better than non-Veterans ($M=25.8$, $SD=12.4$) suggesting fewer deficits with working memory domains ($F(1,36)=10.38$, $p=.003$).

Exploratory Analyses

Bivariate correlations were conducted to assess the relationship between the marital status, education level and background characteristics (see Table 10). Logistic regression analyses were conducted to determine whether Veteran status was significantly related to marital status, and education level, controlling for age of illness onset (see Table 7-8).

When age of illness onset is held constant, Veteran status was no longer significantly related to marital status or education level (see Table 11-12).

DISCUSSION

Of the seven hypotheses examined in the current study, three were supported by our results. As hypothesized, Veterans were significantly older at their illness onset, were more likely to be married, or have previously been married, and had received higher levels of education than non-Veterans. However, the remaining four hypotheses were not supported. Veterans did not differ on negative symptoms, suicidal ideation, or social functioning and role functioning. Exploratory analyses of neurocognitive deficits highlighted potential differences between the two populations. In addition, the differences between Veterans and non-Veterans on positive symptoms of psychosis was the opposite of the expected direction - Veterans had higher levels of positive symptoms than non-Veterans, this remained even after controlling for other demographic differences, including medication at the time of assessment. These results are based on a small sample of Veterans, and as such the results should be interpreted with caution. As a Veteran population, has never been examined within the context of early psychosis, these results may act as preliminary data to support further research with Veterans experiencing early psychosis, and the potential treatment implications for this population.

Comparisons between Veterans and non-Veterans on background characteristics mirrored those of the chronic psychosis population (Firmin et al., 2016; Harvey et al., 2000; Thorp et al., 2012). Further exploratory examination suggested that the age of onset accounted for the relationship between Veteran-status and both marital status and educational level. When age of onset was entered into the prediction model, the relationship between Veteran status, marital status and education level was no longer significant; the differences that existed between the Veteran and non-Veteran groups can be attributed to

their respective differences in age of onset. This suggests a later age of onset is related to an increased likelihood to be married, and an increase in education level. It is possible that the age of onset acts as a driving factor for reaching age-related milestones such as marriage and education; an early age of onset may lead to a greater disruption in functioning, and could have the capacity to stunt the progress of age-related developments such as these (Gómez-de-Regil et al., 2010; Kessler et al., 2007). It has also been suggested that marriage may act as a protective factor, resulting in a later age of onset (Gureje, 1991). To better understand the role marriage may play as a protective factor, future studies should aim to identify the start of the relationship compared to the onset of psychotic symptoms.

While knowing that the age of onset is accountable for these differences, they are still important factors to consider in terms of treatment planning. Veterans are more likely to be married, thus the inclusion of family focused services may be an important aspect of treatment for Veterans with early psychosis. Early intervention programs have identified the importance of including family as a support system (J. Addington, Amminger, et al., 2005; J. Addington, McCleery, & Addington, 2005; Bird et al., 2010), and a number of interventions have been adapted to suit the early psychosis population (Fjell et al., 2007; Leavey et al., 2004; Zhang, Wang, Li, & Phillips, 1994).

Offering multifamily group therapy (Asen & Schuff, 2006) or family focused therapy (McFarlane, Dixon, Lukens, & Lucksted, 2003) should be considered. These interventions typically focus on working with the individual's parents or immediate family members (i.e. siblings; J. Addington, Coldham, Jones, Ko, & Addington, 2003; Onwumere, Bebbington, & Kuipers, 2011), and thus modifications may be necessary to tailor these approaches for spousal support. Offering couples therapy may also be necessary, as a

means of developing healthy coping mechanisms for the stress and burnout associated with caregivers of those with early psychosis (Boydell et al., 2014; Onwumere et al., 2011).

Although based on a small sample, exploring how the needs to Veterans may differ based on their higher degree of education may allow for the implementation of effective education and employment interventions. Education and vocational based interventions are important within early psychosis treatment, and these are common services that participants express desire to become involved in (Bird et al., 2010; Bond, Drake, & Luciano, 2015; White et al., 2015). Early intervention programs typically offer Supported Employment and Education (Bond et al., 2015), focusing on rapid introduction back into the academic or workforce, with follow-up support as needed. For most early intervention programs, the primary focus is place on the completion of educational goals (Bond et al., 2015; R. E. Drake, Xie, Bond, McHugo, & Caton, 2013; Ramsay et al., 2011) . Given that Veterans experiencing early psychosis appear to have completed higher degrees of education, shifting the primary focus to career development may be warranted. Future research should explore the type of services that would benefit Veterans with early psychosis in furthering their career aspirations. Since VAMCs currently offer vocational rehabilitation services (Resnick & Rosenheck, 2007), ensuring that these services are offered immediately to Veterans in early psychosis may help to maintain role functioning. Even with age of onset driving these differences in education level, accounting for them within treatment may help to tailor VAMC interventions for an early psychosis population by providing Veterans an intervention starting point that better meets their current stage of functioning.

Contrary to the pattern observed within the chronic psychosis population (Marsh et al., 1999; Thorp et al., 2012), negative psychotic symptoms did not significantly differ between the two samples. The chronic psychosis literature suggests differences in negative psychotic symptoms exist (Harvey et al., 2000; Thorp et al., 2012); however, it is possible that these differences do not develop until later stages of the disorder. For example, non-Veterans may experience a later worsening of negative symptoms, while Veterans with psychosis remain protected. With many disorders, such as schizophrenia, Post-Traumatic Stress Disorder (PTSD), depression and suicidality, social support, has been identified as a protective factor.

Given that Veterans are more likely to be married, they may have an embedded social support network at home, thus increasing the likelihood of benefiting for the protective factors of social support. In addition, research suggests later age of onset – which Veterans experience – allows for the development of a greater number of social supports (E. M. Macdonald, Hayes, & Baglioni, 2000; R. M. G. Norman et al., 2005). The relationship between social support from family and friends has been positively linked to higher levels of both social and role functioning and better prognoses of psychotic symptoms (David H. Erickson, Beiser, & Iacono, 1998; David H Erickson, Beiser, Iacono, Fleming, & Lin, 1989; E. Macdonald, Sauer, Howie, & Albiston, 2005; E. M. Macdonald et al., 2000; R. M. G. Norman et al., 2005). It has been noted that although social support in early psychosis is linked with improved illness outcomes and functioning, the relationship is the most predictive after five years post-first-episode (David H. Erickson et al., 1998; E. M. Macdonald et al., 2000; R. M. G. Norman et al., 2005). Over time, social support has the capacity to bolster functioning and aid in the decrease of symptoms, which

may explain the later development of differences in negative symptoms between Veterans and non-Veterans. Examining social support provided to Veterans with early psychosis, could prove beneficial in identifying protective factors for negative symptoms.

While unable to be assessed in the current study, baseline symptom severity is also known to predict negative symptoms severity (Haim, Rabinowitz, & Bromet, 2006; Larsen, Moe, Vibe-Hansen, & Johannessen, 2000). It is possible that baseline symptoms for the Veteran group were more severe than the non-Veteran group, or that the non-Veteran sample did not reflect the common level of baseline symptoms experienced by the remainder of the non-Veteran population. Since the non-Veteran sample was comprised of individuals actively seeking specialized treatment at an early intervention program it is possible that their level of negative symptoms is not reflective of the general population. Given the lack of understanding of root causes for negative symptoms, examining potential protective factors, as well as potential predictors may be fruitful next steps.

Although the samples did not differ in negative symptoms, Veterans had significantly higher positive symptoms of psychosis than non-Veterans. This is contrary to the limited literature available for the chronic psychosis population that suggests Veterans and non-Veterans do not differ in their level of positive symptoms (Harvey et al., 2000; Thorp et al., 2012). Anti-psychotic medications are typically prescribed as a means of reducing positive symptoms (Conley & Mahmoud, 2001; Geddes, Freemantle, Harrison, & Bebbington, 2000). Although medication dosages significantly differed between the Veteran and non-Veteran samples – this difference did not fully account for the significant relationship between greater positive symptoms and Veteran status. While the dosage of

anti-psychotic medications is a contributing factor to the differences observed, it doesn't fully explain the differences between the samples.

It is possible the differences in positive symptoms were attributable to the high prevalence of PTSD that occurs within the Veteran population (Hamner et al., 2000). Research provides evidence for a high association between PTSD and positive psychotic symptoms – further, the literature indicates for Veterans who experiences co-morbid PTSD and psychotic symptoms, the degree of positive psychotic symptoms is higher than those experiencing PTSD or psychosis independently (Coentre & Power, 2011; Hamner, Frueh, Ulmer, & Arana, 1999; Hamner et al., 2000; Kilcommons & Morrison, 2005; Sareen, Cox, Goodwin, & J. G. Asmundson, 2005; Sautter et al., 1999). While differences in co-morbid PTSD could not be explored in the current study, examining how the prevalence rates of PTSD may differ between Veterans and non-Veterans may prove helpful in future studies.

In addition, Veterans had a significantly longer DUP than non-Veterans, suggesting they experienced a greater period of active psychotic symptoms prior to receiving treatment. Longer DUP has been tied to more severe psychotic symptoms, and less improvement in future clinical outcomes (Chang et al., 2012; Cuesta et al., 2012; Marshall et al., 2005).

While the current study examined a small number of Veterans and additional research is needed to better understand these unexpected differences, early psychosis research *has* highlighted psychosocial treatment options that target positive psychotic symptoms (J. Addington & Gleeson, 2005; Allott et al., 2011; Bird et al., 2010; David H Erickson, 2010). Cognitive Behavioral Therapy (CBT) for Psychosis has been shown to significantly reduce positive psychotic symptoms for individuals experiencing early

psychosis (J. Addington & Gleeson, 2005; Bird et al., 2010; David H Erickson, 2010). The VA has included CBT approaches for depression (U.S. Department of Veterans Affairs, 2010), anxiety and chronic pain (U.S. Department of Veterans Affairs, 2008, 2012) in their rollout of evidence based practices, thus it may be feasible to implement an additional version of the protocol to specifically target Veterans with early psychosis.

The remaining symptoms examined – depression, suicidality, social anxiety and insight – were not significantly different between the two samples. As this current study is the first to explore these symptom differences in a Veteran vs. non-Veteran capacity, the lack of findings is not surprising. While Veterans experience a high risk for both depression and suicidality (Cully et al., 2008; Hankin et al., 1999), it has been well documented that early psychosis *in general* is a highly susceptible time for these symptoms to emerge (Barrett et al., 2010; Clarke et al., 2006; Upthegrove et al., 2010). Given the tumultuous nature of the disorder at this early stage, it is likely that all individuals experiencing early psychosis run a high-risk of developing deficits in social anxiety and insight, and experiencing feelings of depression or suicidality. Additional research may be warranted to see if any differences develop at any later stages of psychotic disorders, or if these co-morbid disorders are prevalent across all populations experiencing psychosis.

Veterans did not perform better than non-Veterans on any social or role functioning measures. This is unexpected given the literature supporting the early development of social and role functioning deficits (J. Addington, Penn, Woods, Addington, & Perkins, 2008; Cannon et al., 1997). A number of possibilities should be considered. Given the protective role that social support plays in symptom severity and functioning (Brenner, Homaifar, Adler, Wolfman, & Kemp, 2009; R. M. G. Norman et al., 2005; Pietrzak et al.,

2010), it is possible that social support has the capacity to impact future social functioning. Research suggests that social support in early psychosis is predictive of a rise in functioning later in the course of illness (David H. Erickson et al., 1998; E. Macdonald et al., 2005). If Veterans experience increased social support due to their later age of onset and tendency for marriage, it may be possible that social support impacts a future “rebounding” of social and role functioning. Veterans and non-Veterans may have similar functioning in early psychosis, and Veterans are able to re-gain ground in this area as their illness stabilizes. This future rise in functioning could account for differences observed between Veterans and non-Veterans with chronic psychosis. Future studies should assess the degree of social support provided to Veterans in early psychosis, and monitor these relationships longitudinally to determine the degree to which social support networks predict future improvements in functioning.

In addition to social support, premorbid functioning may also be impacting social and role functioning in our samples. Research suggests that premorbid functioning is predictive of chronic social functioning, as well as role functioning for individuals with psychosis, as these symptoms emerge prior to a full illness onset (J. Addington et al., 2008; Cannon et al., 1997; McClellan, Breiger, McCurry, & Hlastala, 2003). While not measured in the current samples, future research will need to account for premorbid functioning; if Veterans in our current sample were well below the average premorbid functioning in specific areas, it may obscure the ability to detect differences between the Veteran and non-Veteran groups. It is also possible that the differences observed in the chronic psychosis literature do not develop until after a period of stabilization of psychosis – early psychosis is a tumultuous time, and most symptoms are typically more severe as they impact an

individual for the first time (Morrison, Frame, & Larkin, 2003). Additional research is needed to determine the specific Veteran-related factors responsible for driving these chronic psychosis social and role functioning differences.

Neurocognitive deficits varied across domains tested –Veterans showed significantly fewer deficits overall, and on the working memory domain, while displaying no differences on the remaining three domains. These results mirror the limited results found in the chronic psychosis literature (Harvey et al., 2000; Thorp et al., 2012). More research is needed to explore the consistency of the differences between neurocognitive domains. Although less impaired, neurocognitive deficits persist for both Veterans and non-Veterans with early psychosis, thus implementing treatment interventions that target these deficits – such as cognitive remediation (Bowie, Grossman, Gupta, Oyewumi, & Harvey, 2014; Wykes et al., 2007) or cognitive enhancement therapy (Eack et al., 2009), – could benefit Veterans seeking care for early psychosis within VAMCs.

Overall, the results of the current study suggest that while there are differences between Veterans and non-Veterans, there are also similarities that could allow VAMCs to capitalize on existing intervention approaches. While results should be interpreted with caution, due to the small sample sizes, focusing on rapid identification of Veterans in early psychosis is a strong place to start. Given there were significant differences in the DUP between Veterans and non-Veterans, it is evident that the identification and subsequent offering of treatment services is delayed for the Veteran population. It may be necessary to have a better understanding of *when* Veterans' symptoms of early psychosis tend to emerge (e.g. deployment, basic training), to ensure outreach is provided during those high-risk times. Offering existing interventions such as CBT, Family Focused Therapy, or Supported

Employment services would provide a solid foundation to begin incorporating additional specialized interventions. Including adaptations to interventions, is likely warranted given that there are differences in the Veteran population -providing a focus on higher levels of employment or focusing on partners vs. parents in family therapy will allow for a better personalization of services for the Veterans. As Veterans currently have no specialized services offered at VAMCs for early psychosis, the inclusion of any targeted intervention will likely improve outcomes.

Limitations

There are limitations to this study that should be considered. As this was a secondary analysis of existing data, the study was constrained by the measures that were included in the assessment battery. Additional areas that would have been beneficial to explore such as details surrounding job/job performance, co-morbid disorders or premorbid functioning could not be assessed. Based on power analyses, it is likely that the study was underpowered to detect differences across certain measures; a larger sample size of Veterans would have been needed to assess for small or medium differences. Further, the settings for each sample were notably different. The non-Veteran sample were individuals actively engaged in a highly-specialized clinic focused on treating early psychosis. The Veteran sample were from a subject pool who were not receiving specialized care, and may not have been actively seeking treatment from the VA at the time of the study. Finally, although beneficial for the direct comparisons between groups – both samples were from the same small geographical location, making generalization of results difficult. This study should be viewed as a pilot expedition, and should be used as a starting point for a larger

investigation to help determine whether these differences are consistent across Veteran populations nationwide.

Conclusion

Evidence from the current study suggests that Veterans with early psychosis are entering VAMC services, and would benefit from early, specialized treatment. As many similarities appear to exist between Veterans and non-Veterans with early psychosis, it may be possible to begin implementing evidence based interventions utilized in the general population within the VAMC. Studying the services that Veterans with early psychosis *do* receive while at VAMCs would highlight areas to implement additional interventions. For example, identifying specific clinics that these Veterans utilize, may help identify the clinicians or service lines who may benefit most from additional training on identifying the signs and symptoms of early psychosis. Identifying the illness trajectory for Veterans – understanding when psychosis typically starts and how they come to the VAMC for services – may also offer insight as to where and when education and outreach should be added. It is clear that Veterans are experiencing early psychosis, but are not receiving the specialized care that is often made available to non-Veterans – thus understanding where these services would best fit within the Veteran healthcare system should be made a priority.

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TABLES

Table 1. Sample Demographics

	Total Sample			Veteran Sample			Non-Veteran Sample			<i>p</i>
	N	%	Mean (SD)	N	%	Mean (SD)	N	%	Mean (SD)	
Male	66	86.8		15	93.6		51	85.0		.36
Race										<.001*
White	10	13.2		9	56.2		11	18.3		
Minority	66	86.8		7	43.8		49	81.7		
Diagnosis										<.001*
Schizoaffective	17	22.4		10	62.5		7	11.7		
Schizophrenia	55	72.4		5	31.3		50	83.3		
Delusional Disorder	1	1.3		1	6.3		3	5.0		
Brief Psychotic Disorder	3	3.9								
Age of illness onset	69		22.7 (4.6)	16		26.8 (4.9)	53		21.4 (3.7)	<.001*
DUP	69		318 days (511.0)	16		749 days (511.6)	53		188 days (437.8)	<.001*
CPZ Equivalents	76		315.5 (302.4)	16		158.3 (216.2)	60		357.4 (309.7)	.02*
Education										.001*
< HS Diploma	41	53.9		3	18.8		38	63.3		
> HS Diploma	35	46.1		13	81.3		22	36.7		
Marital Status										<.001*

Table 1 Continued

Married/previously married	17	22.4	9	56.3	8	13.3
Single	59	77.6	7	43.8	52	86.7

Notes: Categorical variables assessed using chi-square tests. Continuous variables assessed using independent samples t-tests. DUP=Duration of untreated psychosis. CPZ=Chlorpromazine equivalent medication. HS=High School.

Table 2. ANCOVA table for Veteran status and negative symptoms while controlling for race, diagnosis, marital status, age of onset, duration of untreated psychosis, education and CPZ equivalent at time of assessment

Demographic	F	<i>p</i>	η^2	M_{Vet} (SD)	$M_{\text{non-Vet}}$ (SD)
Veteran Status	.74	.39	.01	21.3 (6.1)	19.1 (6.5)
Race	.18	.67	.00		
Diagnosis	4.12	.05*	.06		
Marital Status	.60	.44	.01		
Age of Onset	1.06	.31	.02		
DUP	.02	.89	.00		
Education	.65	.42	.01		
CPZ Equivalent	1.11	.30	.02		

Notes: The following categorical variables were dummy coded prior to entry into the ANCOVA analyses: Veteran status, race, diagnosis, marital status, education. DV= Dependent variable. DUP=Duration of untreated psychosis. CPZ=Chlorpromazine equivalent medication. Means reported (M) are adjusted for covariates.

Table 3. ANCOVA for Veteran status and positive symptoms while controlling for race, diagnosis, marital status, age of onset, duration of untreated psychosis, education and CPZ equivalent at time of assessment

Demographic	F	<i>p</i>	η^2	M_{Vet} (SD)	$M_{\text{non-Vet}}$ (SD)
Veteran Status	13.54	<.001*	.18	22.4 (6.1)	14.5 (5.3)
Race	.49	.49	.01		
Diagnosis	1.69	.20	.03		
Marital Status	1.15	.30	.02		
Age of Onset	.05	.82	.00		
DUP	.65	.43	.01		
Education	.03	.86	.00		
CPZ Equivalent	4.06	.05*	.06		

Notes: The following categorical variables were dummy coded prior to entry into the ANCOVA analyses: Veteran status, race, diagnosis, marital status, education. DV=Dependent variable. DUP=Duration of untreated psychosis. CPZ=Chlorpromazine equivalent medications. Means reported (M) are adjusted for covariates.

Table 4. ANCOVA for Veteran status and depression while controlling for race, diagnosis, marital status, age of onset, duration of untreated psychosis, education and CPZ equivalent at time of assessment

Demographic	F	<i>p</i>	η^2	M_{Vet} (SD)	$M_{\text{non-Vet}}$ (SD)
Veteran Status	1.08	.30	.02	11.5 (4.4)	9.9 (4.1)
Race	1.22	.27	.02		
Diagnosis	.32	.58	.01		
Marital Status	3.49	.07	.06		
Age of Onset	.84	.36	.01		
DUP	.78	.38	.01		
Education	1.05	.31	.02		
CPZ Equivalent	5.24	.03*	.08		

Notes: The following categorical variables were dummy coded prior to entry into the ANCOVA analyses: Veteran status, race, diagnosis, marital status, education. DV=Dependent variable. DUP=Duration of untreated psychosis. CPZ=Chlorpromazine equivalent medications. Means reported (M) are adjusted for covariates.

Table 5. ANCOVA for Veteran status and social anxiety while controlling for race, diagnosis, marital status, age of onset, duration of untreated psychosis, education and CPZ equivalent at time of assessment

Demographic	F	<i>p</i>	η^2	M_{Vet} (SD)	$M_{\text{non-Vet}}$ (SD)
Differences in Total Anxiety					
Veteran Status	.03	.88	.00	96.2 (35.1)	92.9 (36.0)
Race	.34	.56	.01		
Diagnosis	.22	.64	.01		
Marital Status	.19	.67	.01		
Age of Onset	.88	.36	.03		
DUP	.02	.89	.00		
Education	3.51	.07	.11		
CPZ Equivalent	.09	.77	.00		
Differences in Social Interaction					
Veteran Status	.01	.94	.00	44.8 (16.9)	44.0 (17.6)
Race	.90	.35	.03		
Diagnosis	.12	.74	.00		
Marital Status	.26	.62	.01		
Age of Onset	.85	.36	.03		
DUP	.00	.98	.00		
Education	2.88	.10	.10		
CPZ Equivalent	.04	.83	.00		
Differences in Public Performance					
Veteran Status	.05	.83	.00	51.4 (19.3)	48.9 (19.0)
Race	.05	.82	.00		
Diagnosis	.33	.57	.01		
Marital Status	.12	.73	.00		
Age of Onset	.83	.37	.03		
DUP	.09	.77	.00		
Education	3.81	.06	.12		
CPZ Equivalent	.14	.71	.00		

Table 5 Continued:

Notes: The following categorical variables were dummy coded prior to entry into the ANCOVA analyses: Veteran status, race, diagnosis, marital status, education. DV=Dependent variable. LSAS = Liebowitz Social Anxiety Scale. DUP=Duration of untreated psychosis. CPZ=Chlorpromazine equivalent medications. Means reported (M) are adjusted for covariates.

Table 6. ANCOVA for Veteran status and insight while controlling for race, diagnosis, marital status, age of onset, duration of untreated psychosis, education and CPZ equivalent at time of assessment

Demographic	F	<i>p</i>	η^2	M_{Vet} (SD)	$M_{\text{non-Vet}}$ (SD)
Awareness of Illness					
Veteran Status	3.3	.07	.05	3.6 (1.3)	2.7 (1.3)
Race	1.92	.003*	.14		
Diagnosis	1.19	.28	.02		
Marital Status	1.69	.20	.03		
Age of Onset	2.25	.14	.04		
DUP	.77	.38	.01		
Education	.72	.40	.01		
CPZ Equivalent	2.32	.13	.04		
Need for Treatment					
Veteran Status	2.36	.13	.04	3.5 (1.3)	2.8 (1.2)
Race	2.65	.11	.04		
Diagnosis	1.64	.21	.03		
Marital Status	4.31	.04*	.07		
Age of Onset	1.39	.24	.02		
DUP	.78	.38	.01		
Education	.21	.65	.00		
CPZ Equivalent	2.19	.14	.04		
Consequence of Illness					
Veteran Status	3.24	.08	.05	4.2 (1.2)	3.4 (1.3)
Race	1.12	.30	.02		
Diagnosis	1.78	.19	.03		
Marital Status	1.51	.22	.03		
Age of Onset	1.12	.29	.02		
DUP	.10	.76	.00		
Education	1.01	.32	.02		
CPZ Equivalent	3.34	.07	.05		

Table 6 Continued:

Notes: The following categorical variables were dummy coded prior to entry into the ANCOVA analyses: Veteran status, race, diagnosis, marital status, education. DV=Dependent variable. DUP=Duration of untreated psychosis. CPZ=Chlorpromazine equivalent medication. Means reported (M) are adjusted for covariates.

Table 7. ANCOVA for Veteran status and social functioning while controlling for race, diagnosis, marital status, age of onset, duration of untreated psychosis, education and CPZ equivalent at time of assessment

Demographic	F	<i>p</i>	η^2	M_{Vet} (SD)	$M_{\text{non-Vet}}$ (SD)
Social Withdrawal					
Veteran Status	1.99	.16	.03	93.2 (10.6)	100.6 (13.8)
Race	1.94	.17	.03		
Diagnosis	.84	.36	.01		
Marital Status	1.58	.21	.03		
Age of Onset	.97	.33	.02		
DUP	.76	.39	.01		
Education	.07	.80	.00		
CPZ Equivalent	1.02	.32	.02		
Interpersonal Communication					
Veteran Status	.00	.97	.00	117.5 (17.4)	117.3 (19.7)
Race	.23	.63	.00		
Diagnosis	.18	.67	.00		
Marital Status	.10	.53	.01		
Age of Onset	.05	.82	.00		
DUP	.76	.39	.01		
Education	1.69	.20	.03		
CPZ Equivalent	.25	.62	.00		
Independent Performance					
Veteran Status	.02	.90	.00	106.0 (9.0)	106.6 (12.7)
Race	2.05	.16	.03		
Diagnosis	1.09	.30	.02		
Marital Status	.61	.44	.01		
Age of Onset	.63	.43	.01		
DUP	1.86	.18	.03		
Education	2.27	.14	.04		
CPZ Equivalent	.10	.75	.00		

Table 7 Continued

Independent Competence					
Veteran Status	.68	.41	.01	106.6 (10.5)	110.5 (12.7)
Race	.94	.34	.02		
Diagnosis	7.38	.01*	.11		
Marital Status	.07	.79	.00		
Age of Onset	.11	.74	.00		
DUP	.09	.77	.00		
Education	1.96	.17	.03		
CPZ Equivalent	.15	.70	.00		
Recreation					
Veteran Status	.16	.69	.00	112.7 (8.9)	110.5 (15.4)
Race	.70	.40	.01		
Diagnosis	.94	.34	.02		
Marital Status	.44	.51	.01		
Demographic	F	<i>p</i>	η^2	M_{Vet}	$M_{\text{non-Vet}}$
Age of Onset	2.84	.10	.05		
DUP	7.52	.01*	.11		
Education	4.11	.05*	.07		
CPZ Equivalent	.97	.33	.02		
Prosocial					
Veteran Status	2.87	.10	.05	110.1 (14.2)	119.2 (12.3)
Race	1.27	.27	.02		
Diagnosis	.23	.64	.00		
Marital Status	.09	.76	.00		
Age of Onset	.40	.53	.01		
DUP	.00	.95	.00		
Education	.23	.63	.00		
CPZ Equivalent	.02	.89	.00		
Employment/Occupation					
Veteran Status	2.03	.16	.03	111.7 (14.9)	105.3 (10.1)

Table 7 Continued

Race	.86	.36	.02
Diagnosis	.23	.63	.00
Marital Status	1.31	.26	.02
Age of Onset	.02	.88	.00
DUP	4.17	.05*	.07
Education	.00	.95	.00
CPZ Equivalent	4.50	.04*	.07

Notes: The following categorical variables were dummy coded prior to entry into the ANCOVA analyses: Veteran status, race, diagnosis, marital status, education. DV=Dependent variable. DUP=Duration of untreated psychosis. CPZ=Chlorpromazine equivalent medication. Means reported (M) are adjusted for covariates.

Table 8. ANCOVA for Veteran status and role functioning while controlling for race, diagnosis, marital status, age of onset, duration of untreated psychosis, education and CPZ equivalent at time of assessment

Demographic	F	<i>p</i>	η^2	M _{Vet} (SD)	M _{non-Vet} (SD)
Instrumental Role					
Veteran Status	2.87	.10	.05	12.7 (8.4)	7.4 (8.2)
Race	11.67	.001*	.16		
Diagnosis	.02	.90	.00		
Marital Status	.34	.56	.01		
Age of Onset	.11	.74	.00		
DUP	4.18	.05*	.07		
Education	.12	.73	.00		
CPZ Equivalent	.03	.86	.00		
Common Objects and Activities					
Veteran Status	2.10	.16	.07	8.9 (1.3)	7.1 (2.6)
Race	.10	.75	.00		
Diagnosis	.70	.41	.03		
Marital Status	.07	.80	.00		
Age of Onset	.29	.60	.01		
DUP	.00	.96	.00		
Education	1.29	.27	.05		
CPZ Equivalent	1.22	.28	.04		

Notes: The following categorical variables were dummy coded prior to entry into the ANCOVA analyses: Veteran status, race, diagnosis, marital status, education. DV=Dependent variable. DUP=Duration of untreated psychosis. CPZ=Chlorpromazine equivalent medication. Means reported (M) are adjusted for covariates.

Table 9. ANCOVA for Veteran status and neurocognitive functioning while controlling for race, diagnosis, marital status, age of onset, duration of untreated psychosis, education and CPZ equivalent at time of assessment

Demographic	F	<i>p</i>	η^2	M_{Vet} (SD)	$M_{\text{non-Vet}}$ (SD)
Total Score – Composite Total					
Veteran Status	4.86	.03*	.15	35.9 (12.4)	21.4 (14.2)
Race	.00	.96	.00		
Diagnosis	.02	.89	.00		
Marital Status	.96	.34	.03		
Age of Onset	4.07	.05*	.13		
DUP	.91	.35	.03		
Education	11.62	<.01*	.30		
CPZ Equivalent	.02	.89	.00		
Word List – Verbal Memory					
Veteran Status	.29	.59	.01	34.0 (10.9)	36.7 (10.1)
Race	.30	.59	.01		
Diagnosis	.18	.68	.01		
Marital Status	.26	.61	.01		
Age of Onset	1.45	.24	.05		
DUP	.12	.74	.00		
Education	9.82	<.01*	.27		
CPZ Equivalent	1.37	.25	.05		
Digit Sequence – Working Memory					
Veteran Status	10.38	<.01*	.28	44.3 (11.9)	25.8 (12.4)
Race	.05	.83	.00		
Diagnosis	.11	.74	.00		
Marital Status	.58	.45	.02		
Age of Onset	6.75	.02*	.20		
DUP	5.94	.02*	.18		
Education	6.10	.02*	.18		
CPZ Equivalent	.13	.73	.01		

Table 9 Continued

Token Motor Task – Processing Speed					
Veteran Status	3.09	.09	.10	39.4 (8.9)	27.7 (12.8)
Race	.73	.40	.03		
Diagnosis	.01	.94	.00		
Marital Status	1.95	.17	.07		
Age of Onset	.00	.97	.00		
DUP	.05	.83	.00		
Education	.01	.92	.00		
CPZ Equivalent	.29	.59	.01		
Verbal Fluency – Processing Speed					
Veteran Status	1.22	.28	.04	44.9 (9.3)	39.4 (11.8)
Race	1.42	.24	.05		
Diagnosis	3.84	.06	.13		
Marital Status	.05	.82	.00		
Age of Onset	7.62	.01*	.22		
DUP	.42	.52	.02		
Education	12.15	<.01*	.31		
CPZ Equivalent	.94	.34	.03		
Symbol Coding – Processing Speed					
Veteran Status	.13	.72	.01	39.7 (9.6)	37.6 (10.7)
Race	.58	.46	.02		
Diagnosis	2.21	.15	.08		
Marital Status	.01	.92	.00		
Age of Onset	1.29	.27	.05		
DUP	.50	.50	.02		
Education	4.57	.04*	.15		
CPZ Equivalent	.36	.55	.01		
Tower of London - Reasoning					
Veteran Status	1.67	.21	.06	47.3 (17.1)	34.3 (19.8)
Race	2.57	.12	.09		

Table 9 Continued

Diagnosis	3.30	.08	.11
Marital Status	1.71	.20	.06
Age of Onset	.04	.84	.00
DUP	1.03	.32	.04
Education	3.51	.07	.12
CPZ Equivalent	.07	.80	.00

Notes: The following categorical variables were dummy coded prior to entry into the ANCOVA analyses: Veteran status, race, diagnosis, marital status, education. DV=Dependent variable. DUP=Duration of untreated psychosis. CPZ=Chlorpromazine equivalent medication. Means reported (M) are adjusted for covariates.

Table 10. Bivariate Correlations of Demographic Variables

	1	2	3	4	5
1					
2	.50**				
3	.42**	.57**			
4	.37**	.55**	.26*		
5	-.27*	-.31**	-.27*	-.27*	

1= Veteran Status (Dummy coded)

2= Age of Illness Onset

3= Married Status (Dummy coded)

4= Education Level (Dummy coded)

5= CPZ Equivalents

Table 11. Logistic Regression showing association between Veteran Status and Marital Status controlling for Age of Onset

		Marital Status				
Model	Variable	B	B (SE)	df	<i>p</i>	Exp(B)
1	Age of Illness Onset	.30	.10	1	<.01*	1.35
2	Veteran Status	-.99	.80	1	.22	.37

Table 12. Logistic Regression showing association between Veteran Status and Education controlling for Age of Onset

Marital Status						
Model	Variable	B	B (SE)	df	<i>p</i>	Exp(B)
1	Age of Illness Onset	.33	.10	1	<.01*	1.38
2	Veteran Status	-.84	.82	1	.31	.43