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Drug use disorders and post-traumatic stress disorder over 25 adult years: Role of psychopathology in relational networks

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ABSTRACT

Background: In traumatized populations, drug use disorders and post-traumatic stress disorder (PTSD) persist for many years. Relational factors that mediate this persistence have rarely been systematically examined. Our aim is to examine the relative effects of psychopathology in familial and non-familial networks on the persistence of both disorders over adulthood.
Methods: We utilized longitudinal data from an epidemiologically ascertained sample of male Vietnam veterans ($n = 642$). Measures included DSM-IV drug use disorders, other psychiatric disorders, network problem history and time-varying marital and employment characteristics. Longitudinal measures of veterans' psychopathology and social functioning were retrospectively obtained for each year over a 25 year period. We used generalized estimating equations (GEE) to estimate the relative effects of network problems on veteran's drug use disorders and PTSD after adjusting for covariates.
Results: Veterans' mean age was 47 years in 1996. Prevalence of illicit drug disorders declined from 29.8% in 1972 to 8.3% in 1996, but PTSD remained at 11.7% from 13.2% in 1972. While 17.0% of veterans reported a familial drug use problem, 24.9% reported a non-familial drug use problem. In full GEE models, a non-familial drug problem was a significant predictor of illicit drug use disorders over 25 years (OR = 2.21, CI = 1.59–3.09), while both familial depression (OR = 1.69, CI = 1.07–2.68) and non-familial drinking problem (OR = 1.66, CI = 1.08–2.54) were significant predictors of PTSD over 25 years.
Conclusions: Familial and non-familial problems in networks differentially affect the persistence of drug use disorders and PTSD in traumatized male adults.

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1. Introduction

Drug abuse and addiction decline with age, particularly in middle adulthood. This is in part due to maturation but also altered environmental exposure (e.g., Chassin et al., 2004; Chen and Kandel, 1995). However, drug use disorders remain protracted in traumatized populations when there is additional co-occurring psychopathology (Price et al., 2004). Post-traumatic stress disorder (PTSD) appears to prolong illicit drug disorders in traumatized populations (Lacoursie et al., 1980; Breslau, 2009; Cottler et al., 1992). Both prolonged drug use disorders and PTSD are linked to familial vulnerability and heightened non-familial risks (Najavits et al., 1998). To our knowledge, no study has examined the relative effects of familial and non-familial risks with illicit drug disorders and PTSD in middle adulthood. Discerning the relative influence, and subsequently obtaining more precise information, will help to devise interventions specific to middle adulthood. Such knowledge is important because evidence suggests baby boomers continue to use drugs as they age (Colliver et al., 2006).

There is a long tradition of family studies of substance use disorders. Evidence strongly suggests vulnerability to substance abuse runs in families (Luthar and Rounsaville, 1993; Merikangas et al., 1998) and across multiple generations (e.g., Luthar and Rounsaville, 1993). Familial risks may be specific or non-specific to proband's psychopathology. Merikangas et al. (1998) noted separate factors specific to drug abuse (e.g., parental concordance for drug abuse) from non-specific family environments (e.g., any family psychopathology). More recently, McCutcheon et al. (2012) reported links between maternal depression and alcoholism only in the presence of a comorbid internalizing disorder. In their study, sibling drug use was significantly associated with alcoholism with or without comorbid internalizing and externalizing disorders. A number

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of studies have also implicated family history of substance use disorder as a significant risk for protracting proband's substance use disorder (Maddux and Desmond, 1989; Pickens et al., 2001; Sher, 1991). The evidence is greater for alcohol than for illicit drug use disorder (Merikangas et al., 1998). Despite decades of research on familial history of psychopathology, there still is a dearth of studies on illicit drug disorders encompassing middle adulthood years.

Studies of familial risk for PTSD tend to be more recent. Connor and Davidson (2006) found that 45–74% of the cases of PTSD in the studies they reviewed had a family history of the disorder. The specific nature of familial effects is complicated by heterogeneity in the expression of PTSD. There is also evidence that familial trauma increases vulnerability to the disorder (Yehuda et al., 2001; Solomon et al., 1988). However, longitudinal studies including both illicit drug use disorders and PTSD are rare, especially those encompassing middle adulthood years. Further, no study to our knowledge included a number of familial problem phenotypes to examine cross-phenotype or phenotype-specific effects on proband's illicit drug disorder and PTSD simultaneously. Little is known about their effects during middle adulthood, which may shed light on prevention and intervention target areas, such as implementation of a short screening in primary care.

Substance related problems in friends and spouses also affect drug use disorders and PTSD. Numerous developmental studies document peer clustering of drug use where both assortative mating and socialization play a role in proband's drug use (e.g., Oetting and Beauvais, 1987; Stein et al., 1987). Some evidence exists for person-to-person or horizontal transmission of PTSD through non-familial networks in adulthood (McCubbin and Figley, 1983). A few studies have documented secondary traumatization and PTSD symptoms in spouses or partners of service members who returned from war (Maloney, 1988; McCubbin and Figley, 1983; Dirkzwager et al., 2005). These studies are nonetheless limited because of a lack of longitudinal assessment, inability to differentiate non-familial from familial network effects and a lack of diagnostic measures of both drug use disorders and PTSD.

Familial and non-familial studies also face challenges to appropriately characterize a wide variety of both familial and non-familial relationships. Studies involving familial networks have included one or both parents (e.g., Luthar and Sexton, 2007) or siblings (e.g., Luthar and Rounsaville, 1993). Studies including both over many years in middle adulthood are less common. Non-familial networks include friends (e.g., McCutcheon et al., 2012) but few studies include spouses. Thus, it is difficult to arrive at conclusive evidence for the relative importance of particular relationships that are associated with proband's psychopathology.

To fill these gaps, the aims of the current study are to: (1) separate substance abuse and psychiatric problems in familial (father, mother, siblings) versus non-familial (spouses, friends) networks; (2) examine the association of substance abuse and psychiatric problems in specific relational networks with proband's drug dependence or abuse (DDA) and PTSD over adult years, while accounting for demographic characteristics, social functioning and other co-occurring disorders; and, (3) assess the overall relative effects of familial and non-familial problems on proband's DDA and PTSD.

2. Methods

2.1. Participants

The data were gathered as part of a series of long-term follow-up studies on combat veterans deployed to Southeast Asia. The original studies included a total of 1227 servicemen. Army servicemen (pay grades E1–E9), who had positive urine tests (drug positive status at baseline) for opiates, amphetamines, or barbiturates at the time of their departure from Vietnam in September 1971, comprised half of the original veteran sample; the other half of veterans were drawn from the entire roster of September 1971 returnees (drug-negative status). Further details are described elsewhere (Robins, 1974; Robins and Helzer, 1975; Price et al., 2001). All aspects of the series of follow-up studies involving this cohort were approved by the appropriate Institutional Review Boards. The current study utilized data from the Wave 3 follow-up conducted in 1996–1997 which retained over 80% of surviving and located sample members (Price et al., 2004). Analyses used the veteran sample only ($n = 642$).

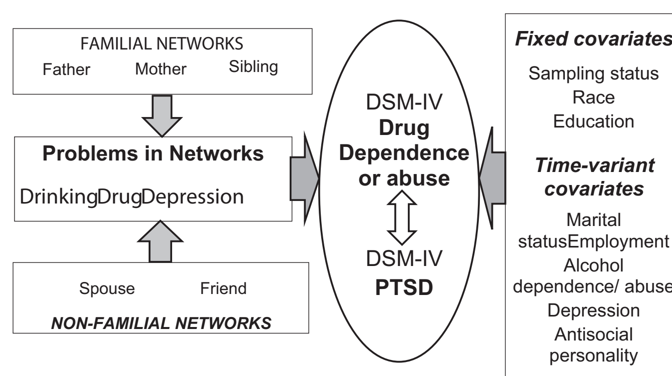

Fig. 1. Psychopathology in relational networks and veteran's own psychopathology affecting drug dependence or abuse (DDA) and post-traumatic stress disorder (PTSD).

2.2. Outcomes

Annual measures of DSM-IV drug dependence or abuse (DDA). Survey questions in 1996–1997 were used to compute annual DDA measures for each year from 1972 to 1996, according to the diagnostic criteria of *the Diagnostic and Statistical Manual of Mental Disorders, 4th ed.* (DSM-IV; APA, 1994). Respondents who reported illicit drug use five times or more since 1972 were asked to respond to each DSM-IV dependence or abuse symptom and verify the years in which they experienced each symptom for each of the following drug classes: sedatives, stimulants, marijuana, cocaine, opiates, PCP, hallucinogens, and inhalants. Based on symptoms endorsed for each year, it was determined whether subjects met DSM-IV drug dependence or abuse criteria in each year from 1972 until 1996. In this study, DDA diagnoses across all classes of drugs were combined to code the presence or absence of dependence, abuse or both for each year.

Annual measures of DSM-IV post-traumatic stress disorder (PTSD). Annual PTSD diagnosis based on the DSM-IV criteria was obtained as follows. First, respondents were asked to recall major psychological traumas (accidents, fires, assaults, witnessing acts of violence, life threatening situations, deaths of loved one, or natural disasters). They were then asked to identify the most severe traumatic event for the period before 1972 and for the period after 1972. Presence of DSM-IV PTSD symptoms was obtained for each of the two most traumatic events. Next, the time from the trauma to onset of each symptom cluster and the duration since the onset was also obtained. Thus a respondent was considered positive for PTSD in a given year if he met three symptom criteria in that year and the lifetime DSM-IV impairment criteria, which combined the diagnosis for pre-1972 and post-1972 most traumatic event.

2.3. Substance abuse and psychiatric problems in familial and non-familial networks

Fig. 1 schematically shows how types of relational networks are categorized into familial and non-familial networks which are in turn used as predictors of longitudinal measures of DDA and PTSD, along with fixed and time-variant covariates (right section). Substance abuse and psychiatric problems of parents, siblings and spouses were obtained from the family history module in the 1996–1997 survey based on a list of family members enumerated in an earlier module. Each respondent was asked to indicate the presence or absence of an alcohol problem among parents, siblings and spouses starting with the question, "*As far as you know, have any of these family members drunk so much that it became a problem?*" The presence of a drug use problem in these networks was assessed by the question, "*Have any of these family members ever had a problem with drugs including abusing prescriptions?*" The presence or absence of a depression problem in these networks was assessed by the question, "*Have any of these family members ever suffered from depression, that is, they felt so low for a period of weeks or months that they hardly ate or couldn't work or do whatever they usually did?*" Family history of PTSD was not asked because the diagnostic construct was established in 1980, thus the validity of off-spring's (veteran's) report of his parental PTSD was judged questionable.

Substance abuse problems in friend networks were assessed in the social network module. First, a gateway question asked the proband to recall all friends "*that have been important to you at any time since 1972.*" This question was then followed by a more specific question which asked the proband to choose the four

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