TREATMENT OUTCOME IN A POPULATION OF HOMELESS VETERANS: TESTING

MODELS OF MEDIATION AND MODERATION

A Dissertation Presented to the
Faculty of the College of Education
University of Houston

In Partial Fulfillment
Of the Requirements for the Degree

Doctor of Philosophy

by

Joshua B. Johnson

August 2013

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Abstract

Recent analysis indicates that veterans are overrepresented in homeless populations compared to the general public (Fargo, et al., 2012). This is a concerning statistic with implications of risk deserving empirical clarification. Unfortunately, a clear pattern of factors influencing homeless veterans' success or failure in treatment programs has yet to emerge (Salvatore, Sussner, Smelson, Kline, & Losonczy, 2008). The current study undertakes the objective of contributing to such knowledge. Toward this end, descriptive characteristics of a sample of homeless veterans in treatment for homelessness in the Houston area are reported, binary logistic regression analyses examining predictors of successful treatment outcome is conducted, and tests of mediation and moderation completed. Results indicate treatment duration positively associates with treatment outcome, and mental illness partially mediates a negative association between institutional disaffiliation and treatment outcome. Discussion of results highlights implications for clinical efficacy as well as data driven theoretical conceptualizations of problems inherent to homelessness.

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Chapter I

Introduction

The ongoing military activities of the United States' armed forces make empirical research activities that support the needs of returning veterans an ethical imperative. One such area of research examines the many facets of homelessness. This issue is of particular significance given the large proportion of the homeless population that veterans constitute (Backus, 2008; Fargo, et al., 2012; Kelly, 2001; O'Toole, Conde-Martel, Gibbon, Hanusa, & Fine, 2003; Tessler, Rosenheck, & Gamache, 2002). Moreover, homeless individuals are vulnerable to a wide range of health problems (Plumb, 2000) including: asthma, gastroenteritis, liver disease, diabetes mellitus, cerebrovascular disease, anemia, tuberculosis, and an increased risk of HIV infection (Martens, 2001). Homeless persons abuse drugs at a rate 2 to 7 times greater than the general population (Robertson, Zlotnick, & Westerfelt, 1997), and exhibit mortality rates ranging from 2 to 4 times higher than the general population (Barrow, Herman, Cordova, & Struening, 1999; Hibbs, Benner, Klugman, Spencer, Macchia, Mellinger, & Fife, 1994; Martens, 2001). Indeed, the American Psychological Association (1991) acknowledged the tragic nature of homelessness declaring "adequate and permanent shelter is a basic need, and its absence has a deleterious effect upon physical and mental health, personal development, and the ability to exercise individual rights and obligations" (p.1108). Accentuating the need for veterans specifically, comparisons with non-veteran homeless men suggest homeless veterans have greater mental health and medical needs (O'Toole et al., 2003). Understanding the characteristic makeup of homeless populations and factors related to

positive outcomes is a research agenda of value to many veterans who have served their

country courageously.

Chapter II

Literature Review

Previous studies have examined the impact intervention efforts have on treatment outcome. The relatively recent movement of housing plus additional supportive intervention for homelessness treatment has shown the best efficacy (Greenwood, Schaefer-McDaniel, Winkel, & Tsemberis, 2005; Lafrance, Nelson, & Aubry, 2007; Tsemberis & Eisenberg, 2000). It is unclear how the intervention of an unconditional housing provision achieves superior efficacy. It may help mitigate a negative correlation between length of time spent homeless and employment outcome (Wenzel, 1992), or it may facilitate a greater amount of choice and freedom by shifting attention from basic fundamental needs (such as food and shelter) to the more sophisticated needs of modern life such as job training, self-improvement, and well-being. Indeed, a lack of choice has been shown to accelerate treatment rejection in favor of returning to homelessness (Harp, 1990).

More specific interventions regarding types of housing models implemented have failed to yield differences in outcome (Leff, Chow, Pepin, Conley, Allen, & Seaman, 2009; Stahler, Shipley, Bartelt, DuCette, & Shandler, 1995). Similarly, findings have supported general services rather than interventions tailored to specific needs (Humphreys & Rosenheck, 1998). Thus, outside of a housing provision in treatment, the type of service received by individuals may be of less import to clinical efficacy and social outcomes than other aspects of service delivery. In fact many studies have found positive associations with treatment outcome for a number of factors in various populations. Treatment duration has been found to associate positively with treatment

outcome in substance dependence treatment and homelessness treatment (Moos & Moos, 2003; Mowbray & Bybee, 1998; Rosenheck & Dennis, 2001; Schumacher et al., 1995), and also in the treatment of homeless veterans with mental illness (Rosenheck, Frisman, & Gallup, 1995). Other variables found to associate with treatment outcome include previous treatment for drug dependence (Greenberg, Hoblyn, Seibyl, & Rosenheck, 2006; Justus, Burling, & Weingardt, 2006) and number of service related contacts (Morse, Calsyn, Allen, & Kenny, 1994).

Client Characteristics

Although the literature seems to have converged on a general theme regarding effective treatment of homelessness, other aspects that might impact treatment have yet to be clarified. As elaborated below, client demographics and other characteristics either have mixed pictures relative to treatment outcome, limited evidence, or have yet to be supported as predictors of outcome in a homeless population. Such variables may hold important clinical information in regard to treatment resistant or treatment enhancing factors among the homeless.

Race. A review of the literature uncovered mixed results regarding the role many client variables play in outcomes. One such variable is race. Cassey (2008) found that mentally ill homeless veterans were more likely to successfully complete a course of treatment if they were white; on the other hand Justus, Burling, and Weingardt (2006) found no correlation between race and treatment duration for homeless veterans. Rosenheck, Leda, Frisman, and Gallup (1997) found that white and black homeless veterans showed equivalent treatment outcomes in residential treatment settings, but that whites showed comparatively greater gains in both psychiatric and alcohol problems in

non-residential treatment settings. Although structural discrimination in society has played an inhibitory role in housing and employment opportunities among blacks (Massey & Denton, 1993), research lacks consensus on the role, if any, that race may play in treatment outcomes for homeless veterans.

Age. Age is another client demographic with unclear associations to treatment outcomes among homeless persons. Differences imputed to age specifically may predict treatment outcomes, as well as generational differences associated with experiences of a particular war era. Justus, Burling, and Weingardt (2006) examined the two criterion variables of length of stay in a veterans' homeless program as well as successful graduation. They found that clients in their twenties were more likely to complete a course of treatment compared to all other age groups. On the other hand, the comparatively younger veterans of the Persian Gulf/Middle East era have exhibited significantly more mental health problems than older veterans and have reported these problems as the cause of their homelessness (Smelson et al., 2009). A clear picture of the influence of age in treatment outcome, if any exists, has yet to emerge in research literature.

Gender. Gender may also contribute to variance in treatment outcome. Justus, Burling, and Weingardt (2006) found females had a greater likelihood of completing treatment compared to males. This may be due to better social support among homeless women (Baker, 1994). However, gender differences in distress processes have been shown to mitigate any ameliorative impacts of social support among homeless women (Lagory, Ritchey, & Sells, 1997), a finding which may or may not be relevant to professional treatment outcomes.

Education. Previous research indicates education level may associate with treatment outcome. For example, having at least 12 years of education has been associated with greater service use among both homeless veterans (Wenzel et al., 1995) and non-veteran homeless (Padgett, Struening, & Andrews, 1990). Additionally, previous studies have associated intelligence and education with resilience (Luthar, Cicchetti, & Becker, 2000; Werner, 1989). Taken together, these findings suggest a possible association between level of education and better treatment outcomes.

Mental Illness. Although prevalence rates of mental illness among homeless populations have varied widely (Fazel, Khosla, Doll, & Geddes, 2008), some reviews have estimated rates in a range of 30-50% (Scott, 1993). In the context of the general population, fewer than 1 in 6 individuals with serious mental illness receive minimally adequate care (Wang, Demler, & Kessler, 2002), and among those with serious mental illness who have contact with mental health services, up to one-third disengage from care (Kreyenbuhl, Nossel, & Dixon, 2009). One might expect such trends of poor intervention to be even more extreme among homeless persons due to a tendency toward disaffiliation from institutional support (Bahr & Caplow, 1974). This may explain the finding showing less improvement in housing outcomes among psychiatrically impaired homeless veterans relative to groups with other obstacles (Humphreys & Rosenheck, 1998). Given the a priori association mental illness has with poor functioning (APA, 2000) it is surprising that the current review of literature failed to turn up more than one study associating mental illness with poor treatment outcome.

Treatment Duration. As cited previously, treatment duration among a variety of populations has been found to associate with positive treatment outcome (Moos & Moos,

2003; Mowbray & Bybee, 1998; Rosenheck & Dennis, 2001; Schumacher et al., 1995).

Veteran homeless populations with mental illness have also exhibited the same

association (Rosenheck, Frisman, & Gallup, 1995). To further qualify the

generalizability of this finding, the present study will measure the association between

treatment duration and outcome among a more heterogeneous group of veterans,

compared to the sample studied by Rosenheck, Frisman, and Gallup (1995).

Prior Residence. Veterans entering treatment come from a variety of locations

prior to admission. Related to both treatment duration and mental illness, the variable of

having previous psychiatric treatment has mixed associations with homelessness

treatment outcome. For example as noted above, the aggregation of treatment

experiences may contribute to current outcomes. On the other hand, a history of

psychiatric treatment has shown negative associations with current treatment outcomes

(Humphreys & Rosenheck, 1998; Justus, Burling, & Weingardt, 2006), perhaps

implicating severe mental illness as a more significant impediment to treatment compared

to other obstacles. However, the literature addressing psychiatric treatment has yielded

mixed results. Other researchers found no significant association between number of

prior psychiatric hospitalizations and outcome, although analysis indicated a negative

relationship between emotional problems and employment (Wright & Devine, 1995). A

study examining the length of time spent homeless found pre-homeless psychiatric

hospitalization to be predictive of less time spent homeless (Piliavin, Sosin, Westerfelt, &

Matsueda, 1993); whereas, psychiatric pathology has contributed to a predictive

association with increased length of time spent homeless (Calsyn & Morse, 1991). The

mixed findings related to psychiatric issues and treatment suggest the need for further

inquiry in the area. Perhaps the relative therapeutic success of previous psychiatric treatment mediates variability in homelessness treatment outcome.

Addressing the influence of another prior residence variable, Stahler, Shipley, Bartelt, DuCette, and Shandler (1995) found that a criminal history had a significant negative association with stable housing after treatment. This may be due to a high incidence of serious mental illness in prison populations. Steadman, Osher, Robbins, Case, and Samuels (2009) identified a serious mental illness incidence rate among jail inmates of 17% for males and 34% for females. For comparison, a nationally representative survey of the general population found a 6.2% rate of serious mental illness (Kessler et al., 2001). The high prevalence of serious mental illness in prison populations may explain the association found between having a criminal history and housing instability after treatment (Stahler, Shipley, Bartelt, DuCette, & Shandler, 1995).

One possible way of organizing hypotheses concerning the variable of prior residence may be through the concept of institutional disaffiliation (Bahr & Caplow, 1974). This concept suggests the etiology of homelessness rests within a disconnection from social institutions such as the family or social agencies. Conley (1996) examined the narratives of homeless individuals and found self-reported information confirming the presence of institutional disaffiliation as a salient obstacle to obtaining housing. Hence, prior residence indicative of institutional disaffiliation may associate negatively with successful outcomes. Conceptually, institutional disaffiliation may be descriptive of a lack of social support, a contextual variable which contributes variance to outcomes (Backus, 2008; Main, 1998; Mowbray & Bybee, 1998; Tessler, Rosenheck, & Gamache, 2002) either directly or perhaps indirectly through increases in social service use (Lam &

Rosenheck, 1999). In any case, veterans who were able to temporarily stay with friends

or relatives have shown much better housing outcomes as a cohort relative to veterans

who were literally homeless upon entry into treatment (Greenberg, Hoblyn, Seibyl, &

Rosenheck, 2006).   Thus, prior residence data indicative of institutional and social

disaffiliation may associate negatively with treatment outcome.

     In the current study, the above three prior residences of jail, psychiatric facility,

and place not meant for habitation were interpreted as representative of institutional

disaffiliation. The prior residence of jail/prison seems representative of externally

enforced disaffiliation from society generally. Jail inmates are physically separated from

society preventing affiliative behavior. Also, criminal behavior generally represents a

stark contrast to affiliative behaviors. Moreover, in a previous study criminal behavior

has been theoretically related to institutional disaffiliation (Piliavin, Wright, Mare, &

Westerfelt, 1996). Second, having resided in a psychiatric facility indicates problems

with severe mental illness, symptoms of which may have arisen in the context of poor

social support and/or may inhibit affiliative behaviors. Last, coming from a place not

meant for habitation (i.e., living on the streets) denotes active withdrawal from supportive

affiliations (Bahr & Caplow, 1974).

     Effective interpretations of problems inherent to homelessness may require Bahr

and Caplow's conceptual organization of the problem. Namely, issues such as substance

abuse and mental illness may only contribute meaningful variance in terms of how they

maintain institutional disaffiliation. Countering a problematic tendency of institutional

disaffiliation may yield favorable treatment outcomes for homeless individuals.

Research Aims

Although studies have found correlations between homelessness and various

client variables such as substance abuse, mental illness, and childhood experience of poor

family functioning (Baum & Burns, 1993; Burt, 1993), a clear pattern of factors

influencing homeless veterans' success or failure in treatment programs has yet to emerge

(Salvatore, Sussner, Smelson, Kline, & Losonczy, 2008). Uncovering individual

differences with significant impacts on success in a treatment program for employment

and housing in a homeless veteran population may help improve clinical efficacy by

clarifying at risk populations and other factors enhancing or inhibiting treatment. Toward

this end, the present study conducted a binary logistic regression with success or failure

in treatment serving as the criterion variable. Independent variables examined included

mental illness, marital status, education, substance use, prior residence, entry income,

gender, race, age, and treatment duration. It was hypothesized that this model would

significantly predict category membership between successful and unsuccessful program

completion.

A review of the literature also uncovered a lack of studies examining mediating or

moderating relationships impacting treatment outcome in homeless veterans; only one

study was found outlining a mediating relationship (Morse, Calsyn, Allen, & Kenny,

1994) and one examining a moderation (O'Connell, Kasprow, & Rosenheck, 2008).

Following logistic regression analyses, the present study aimed to test models of

mediation among variables of interest and treatment outcome in a population of homeless

veterans. Based on previous research it seems that perceived control (Greenwood,

Schaefer-McDaniel, Winkel, & Tsemberis, 2005), number of program contacts (Morse,

Calsyn, Allen, & Kenny, 1994), treatment duration (Rosenheck & Dennis, 2001), and

evidence of internally directed institutional affiliation (Conley, 1996) all contribute to

positive treatment outcome. However, there may be variables mediating the therapeutic

effect. The present study tested the presence of mental illness as both a mediator and

moderator within several models outlined below.

It was hypothesized that the previously described association between education

and outcome (Luthar, Cicchetti, & Becker, 2000; Padgett, Struening, & Andrews, 1990;

Wenzel et al., 1995; Werner, 1989) would be mediated by mental illness. Indeed,

previous research has indicated that having a dual diagnosis associates with less

education (Gonzalez & Rosenheck, 2002), and that less education associates with higher

morbidity rates for psychiatric disorders (Bijl, Ravelli, & Zessen, 1998).

It was also hypothesized that mental illness would mediate the previously

described associations between a prior residence of a psychiatric facility and outcome

(Greeberg, Hoblyn, Seibyl, & Rosenheck, 2006; Humphreys & Rosenheck, 1998; Justus,

Burling, & Weingardt, 2006), jail and outcome (Stahler, Shipley, Bartelt, DuCette, &

Shandler, 1995), and literally homeless and outcome (Wenzel, 1992). These three prior

residence variables have also shown associations with mental illness. By definition,

having resided in a psychiatric facility indicates a diagnosis of mental illness. Mixed

findings related to previous psychiatric residence and homelessness treatment outcome

(Wright & Devine, 1995) may suggest the relative efficacy of previous psychiatric

treatment mediates outcome. Next, surveys of prison populations have shown a high

prevalence of mental illness. Steadman, Osher, Robbins, Case, and Samuels (2009)

identified a serious mental illness incidence rate among jail inmates of 17% for males and

34% for females. For comparison, a nationally representative survey of the general

population found a 6.2% rate of serious mental illness (Kessler et al., 2001). Finally, the

APA (1991) has affirmed that homelessness has a deleterious impact on mental health,

and some reviews have estimated mental illness prevalence among homeless persons at

30-50% (Scott, 1993).

Finally, a moderation model was tested. An association between treatment

duration and outcome (Rosenheck & Dennis, 2001; Rosenheck, Frisman, & Gallup,

1995) was expected to be moderated by mental illness. Schumacher et al. (1995)

examined attendance over the course of a two month intensive treatment program for

homeless persons abusing cocaine and found more frequent attendance associated with

better outcomes. Moreover, individuals who received transfers from a treatment program

into case management services demonstrated superior results on several clinical metrics

as well as higher levels of service use, compared to other clients (Rosenheck & Dennis,

2001). Other research has found that homeless veterans' previous treatment for drug

dependence associated positively with a higher likelihood of positive outcomes

(Greenberg, Hoblyn, Seibyl, & Rosenheck, 2006; Justus, Burling, & Weingardt, 2006).

These findings indicate that treatment duration, number of days in treatment, and

treatment aggregation across multiple programs overtime, associate with positive

outcomes.

Intuitively, such treatment duration and outcome associations seem related to the

amelioration of mental illness and/or other problems during treatment. Unfortunately,

fewer than 1 in 6 individuals with serious mental illness receive minimally adequate care

(Wang, Demler, & Kessler, 2002), and among those with serious mental illness who have

contact with mental health services, up to one-third disengage from care (Kreyenbuhl,

Nossel, & Dixon, 2009). Indeed, the psychiatrically impaired have shown significantly

less improvement in housing outcomes compared to groups with other obstacles

(Humphreys & Rosenheck, 1998), and by definition have problems functioning (APA,

2000). In conceptual contrast to these facts indicating poor outcomes for the mentally ill,

another study found more psychiatric problems associated with a diminished risk of

shorter housing tenure, which the researchers hypothesized relates to increased

engagement in supportive services (O'Connell, Kasprow, & Rosenheck, 2008). In sum,

mental illness likely poses a significant impediment to therapeutic treatment outcome

among homeless veterans, particularly when treatment rigor is lacking. However, it may

be that among individuals who remain engaged in treatment, persons with mental illness

gain the most. In other words, mental illness may serve to moderate treatment outcomes

by enhancing the association between treatment duration and therapeutic outcome.

Based on the above elaborated context of previous findings and gaps in the

literature base, the present study examined the following hypotheses:

Hypothesis 1: Independent variables tapped in the logistic regression analyses

would predict treatment outcome.

Hypothesis 2: It was hypothesized that an association between education and

outcome would be mediated by mental illness.

Hypothesis 3: It was also hypothesized that mental illness would mediate an

association between institutional disaffiliation (as represented by a prior residence

of jail, psychiatric facility, or literally homeless) and outcome.

Hypothesis 4: An association between treatment duration and outcome was

expected to be moderated by mental illness.

Chapter III

Methods

Program Description.

The goal of treatment at U.S. Vets is independent living, operationalized as having full time employment, a savings account with $500, a rented apartment home, and paying program fees to U.S. Vets. Clients at U.S. Vets are provided with shelter, an onsite case manager, job related training off site at Goodwill, group counseling, psychoactive medication when indicated, contact with a Psychiatrist, contact with a social worker, and individual counseling when desired. In order to become a client at U.S. Vets, individuals must have problems maintaining independent living, must be willing and able to obtain employment, and have at least 90 days of sobriety when diagnosed with substance abuse.

Subjects. Approval from U.S. Vets management as well as the authors' University Human Subject's Committee was obtained. Demographic and outcome related data were collected for clients of U.S. Vets who both enrolled and exited treatment between 1/2007 through 1/2011. This criterion yielded a total of 422 subjects. All subjects in the study also met the previously mentioned criteria to qualify for treatment at U.S. Vets.

Procedure. First, data regarding descriptive statistics of this studies' sample was compiled and reported. Second, binary logistic regression analysis was conducted to examine variables predictive of veterans who successfully complete treatment. In the last phase of this study, mediation and moderation models based on previous research were tested. Mental illness was hypothesized to mediate the following associations uncovered in previous research: a positive association between level of education and outcome, and

a negative association between having a prior residence of either jail, psychiatric facility, or a place not meant for habitation and treatment outcome. In a moderating system of influence, mental illness was expected to enhance a positive association between treatment duration and treatment outcome.

Independent variables assessed in this study included: race (1=white, 0=nonwhite), age at time of program entry, gender (1=male, 0=female), treatment duration (number of days), prior residence (1= jail/prison, psychiatric facility, or place not meant for habitation, 0=emergency shelter, transitional housing, substance abuse treatment facility, staying with family temporarily, staying with friends temporarily, hospital, residence owned by client, subsidized permanent housing, rental by client), marital status (1=married, 0=not married), education (6=post-secondary school, 5=high school diploma/GED, 4=made it to 12th grade, 3=made it to 11th grade, 2=made it to 10th grade, 1=made it to 9th grade), substance use (1=alcohol/drug use, 0=no reported use), mental illness (1=mental illness, 0=no mental illness), and having income upon entry in the program (1=having income, 0=no income). The outcome variable assessed was successful completion of the treatment program (1=complete, 0=failure to complete).

Analyses. Statistical analyses were conducted using SPSS statistics 18. Descriptive characteristics of the sample were analyzed and regression analyses conducted. Next, an examination of mental illness as a mediator of treatment outcome was pursued. Mediation analysis adhered to the model outlined by Baron and Kenny (1986). The methodology suggested follows linear regression analysis in three distinct variations within the model of mediation: the mediator on the independent variable, the dependent variable on the independent variable, and the dependent variable on both the

mediator and independent variable. If regression coefficients are found to be significant,

and the mediator decreases the beta weight of the independent variable, then a mediating

association can be identified. Finally, moderation analysis (Barron, Frazier, & Tix, 2004)

of psychiatric illness on the association between treatment duration and treatment

outcome was conducted. To do this the continuous variable of treatment duration was

centered proportionally around 0. Then hierarchical regression analysis regressing

treatment outcome onto treatment duration and psychiatric illness in step one, followed

by the interaction term of the IV and moderator in step two tested the presence of a

moderating relationship. If a moderating influence had been established then the slopes

of the two regression lines would have had to be examined to test if they were

significantly different from 0 to make certain the regressed associations had general

significance rather than simply significance relative to each other.

Chapter IV

Results

The sample population consisted of 29 females (6.9%) and 393 males (93.1%), of whom 239 identified as a racial minority (56.6%) and 174 as white (41.2%). The mean age at time of treatment was 49 years old, with 6.9% in their twenties, 7.6% in their thirties, 31.5% in their forties, 45.5% in their fifties, and 8.5% in their sixties. Table I displays these sample demographics.

Table II displays results of the logistic regression analysis. A test of the full model with all predictors against the constant-only model indicated that together, the ten predictor variables explained .19 of the variance in treatment outcome (Nagelkerke R^2=.190). The Hosmer-Lemeshow test, a test of the model's goodness of fit, failed to reject the null hypothesis, χ^2 ($N = 283$) =12.160, $p = .144$, indicating a lack of evidence supporting the claim that the present data set fits the resulting regression model poorly. At the average level of all other predictors, only treatment duration was found to significantly associate with treatment outcome (OR: 1.008).

Tables III and IV display results of the mediation analysis for treatment outcome. No significant associations were found within the mediation model where mental illness was hypothesized to mediate an association between education and outcome. On the other hand, the mediation model where mental illness mediates an association between institutional disaffiliation and treatment outcome was found to have partial significance. The mediator of mental illness regressed on the predictor of institutional disaffiliation yielded a significant regression coefficient (B=.615; p<.05). The criterion variable treatment outcome regressed on the predictor variable also reached statistical significance

(B=-.552; p<.05). When entered into the regression equation at the average level of the

mediator, the predictive power of institutional disaffiliation no longer surpassed the

cutoff defining significance (B=-.522; p>.05).

Finally, Table V displays test results of the hypothesized moderation model. No

interaction was detected between mental illness and the association of treatment duration

to treatment outcome (B=.004; p>.05). Thus, no evidence supporting the hypothesized

moderation model was found.

Chapter V

Discussion

The present study set out to examine factors predictive of success or failure in a multisite treatment program for homeless veterans as well as the role psychiatric disorder might play in mediating or moderating outcome. This is an area of research without a clear pattern of findings (Salvatore, Sussner, Smelson, Kline, & Losonczy, 2008). Indeed, after reviewing literature on both homeless veterans and non-veteran homeless persons, mixed findings across the variable populations coupled with a dearth of research in particular areas provided support for the present study. Independent variables investigated included race, age, gender, treatment duration, marital status, having income upon program entry, education, mental illness, substance use, and prior residence.

Treatment Duration. Entering all ten predictors into a regression model in the first step resulted in a single significant predictor of treatment outcome: treatment duration. The longer individuals remained in the program, the better their chances of successful treatment outcome. This coincides with similar findings in a variety of specified homeless populations (Greenberg, Hoblyn, Seibyl, & Rosenheck, 2006; Rosenheck & Dennis, 2001; Schumacher et al., 1995), while also providing additional evidence for the external validity of the association due to the relatively heterogeneous nature of the current sample of veterans compared to more delimited samples previously studied. This finding reflects well on the prognosis of homeless unemployed individuals who accrue time in treatment. According to the odds ratio obtained with the current sample, each additional week spent in treatment increased the probability of successful outcome by 5.6%; an additional month of treatment equated with a 24% increase in the

probability of success. Thus, homeless veterans with little or no treatment history, or with inherent obstacles to treatment continuance, should be considered at risk of poor outcome compared to veterans with more extensive treatment history. Based on this finding, clinicians may be well advised to prioritize interventions focused on program retention over other issues.

Education. At the average level of all other predictors, the variable with the second best probability of beating chance in explaining treatment outcome was education ($p = .117$). Interestingly, the regression coefficient did not show the positive association ($B = -.358$) with salutary outcome that might be expected based on previous research (Luthar, Cicchetti, & Becker, 2000; Padgett, Struening, & Andrews, 1990; Wenzel et al., 1995; Werner, 1989). If the findings within the current sample represent a general tendency for more education to be loosely associated with poor treatment outcome among homeless veterans, an explanation for this counter-intuitive trend should be pursued.

One possible explanation may be that such a trend is mediated by self-stigma, a construct defined as a three step process where an individual recognizes a stereotype held in society, understands the stereotype as self-applicable, which leads to a diminished sense of self (Corrigan, Watson, & Barr, 2006). Corrigan, Watson, and Barr (2006) suggest that self-stigma may inhibit progress toward independent living and the acquisition of employment. Under the self-stigma framework, this occurs through decrements in self-efficacy, which is likely to suffer simply due to an awareness of public prejudgments of homeless individuals. Additionally, Link (1982) found that the label of mental illness itself has significant impacts on outcomes such as employment and income distinct from the target of the label (i.e., symptoms of mental illness). Since mental

illness may arise as a consequence of the unemployed lifestyle rather than antecedent to it (Paul & Moser, 2009), homeless veterans may have multiple negative labels through which self-stigma might impair functioning. As suggested by self-stigma, the pejorative impacts of devaluation and discrimination many mentally ill and homeless persons endure may lie within the *recognition* of societally based prejudgments of these conditions and the appraisal of these prejudgments as self-applicable. As such, it makes some conceptual sense that greater educational accomplishments (and the *assumed* increase in mental acuity accompanying education) may correspond to greater awareness and conscious salience of such aforementioned abstractions such as societal prejudgments and their self-applicability. Self-stigma may be a problem for all homeless veterans; however the problem may be exacerbated by educational attainment. In other words, educational attainment may mediate the effect self-stigma has on treatment outcome among homeless veterans.

Prior residence. Self-stigma may also provide a useful framework for explaining Bahr and Caplow's (1974) observation that homeless individuals disaffiliate from institutions, through a tendency to move away from perceived social hostility. Negative stereotypes of homeless individuals, regardless of their merit, may undermine self-efficacy through self-stigma and probably have contributed to poor outcome expectancies for interacting with social institutions.

When accounting for the other nine variables in the present study, the three prior residences interpreted as indicators of institutional disaffiliation failed to yield significant prediction of treatment outcome. On the other hand, within the statistical mediation test, regressing treatment outcome onto these prior residences did reach statistical

significance. Within the framework of the current paper, this suggests multicollinearity between institutional disaffiliation and other variables in the study. Perhaps it is not surprising that a variable based in social connections would have considerable overlap with other variables of interest in treatment settings. Social support itself has broad implications to an individual's health and wellbeing (Cohen, 2004; Leavy, 1983). The social underpinnings of institutional disaffiliation are likely tapping into risks associated with a lack of social support. Resonant with such a hypothesis, Bahr (1973) has used disaffiliation and 'lack of social ties' interchangeably.

Mediation and moderation. Another explanation for the multicollinearity evident in the analysis of prior residence is the presence of mediating variables in the analysis. Indeed, mental illness was found to partially mediate an association between institutional disaffiliation and treatment outcome. The order of this path analysis also aligns with the previously cited finding that in many cases mental illness is a result of the unemployed lifestyle rather than antecedent to it (Paul & Moser, 2009). In other words, certain aspects of the homeless condition suggestive of institutional disaffiliation (e.g., having lived on the streets or in jail) may precipitate mental illness, which in turn partially impedes treatment outcome.

This understanding of the partial mediation may also explain the lack of evidence in the present study for the hypothesized moderation model where mental illness enhances an association between treatment duration and outcome. Mental illness itself may be incorrectly conceptualized as an exogenous variable to the homeless condition, as a moderation model requires. Future studies may base their hypotheses regarding homelessness in the context of Paul and Moser (2009) and pursue mental illness as

endogenous due to its emergence within the context of homelessness; using the

methodology of the present analysis, such hypotheses would presuppose mediation

analyses.

      The mediation analyses examining mental illness as a mediator between education

and outcome failed to demonstrate any support. This may be due to limitations inherent

to the present study (explicated below) or to the previously outlined explanation for the

counter-intuitive trend between education and treatment outcome.

      Treatment Considerations. With the prevailing knowledge of the critical

problems associated with homelessness a subject of debate over the past several decades,

many different approaches to treatment have been implemented. Lafrance, Nelson, and

Aubry (2007) studied comparative efficacy between three major treatment models: case

management (the oldest model), assertive community treatment, and housing plus support

(the newest model). Under the case management model a single person is assigned

individual clients. With assertive community treatment, an entire team is responsible for

client treatment and makes efforts to bring treatment to clients' natural settings.

Provisions for basic needs are provided contingent upon treatment goal compliance. The

newest model, housing plus support, provides for basic needs such as housing

automatically. A treatment team is responsible for treatment services which clients

access and engage at their discretion. The statistical comparison showed housing plus

support to be the most effective (.67), followed by assertive community treatment (.47),

and case management (.28).

      The relative success of housing plus support over the other models may be a result

of treatment retention as well as intervention countering the detrimental impacts of

institutional disaffiliation and self-stigma. As shown in this study, better treatment retention would result in a gradual improvement in the odds of successful treatment over time. In homeless substance abuse treatment, Orwin, Garrison-Mogren, Jacobs, and Sonnefeld (1999) found that a provision of housing increases program retention. They also offered eight suggestions for further enhancing retention: decrease/eliminate any waiting period between enrollment and program admission, strengthen the orientation process, increase contact with a case manager, increase program accessibility, enrich the program environment, increase responsiveness to individual needs, increase opportunities for recreation and self-improvement, and increase relapse prevention. Such recommendations could be adapted to other homeless treatment programs to facilitate treatment retention and gradually improve the odds of successful treatment over time.

Housing plus support may also effectively combat tendencies toward institutional disaffiliation through the construct of self-stigma. While residing in a highly accessible treatment milieu which provides immediate practical assistance and a place to live, individuals that formerly appraised homeless stereotypes as self-applicable may begin to disentangle their identity from homelessness. This would interrupt the self-stigma process by providing for a new experience from which new identity associations might be developed. Moreover, the enriched environment of the treatment setting and the number of program contacts provided for by a team of professionals may reverse the tendency to disaffiliate from institutional support by demonstrating the pragmatic helpfulness accessible through program affiliation.

Limitations. This study has several limitations. First relying on historical data carries inherent problems such as the possibility for systematic differences in how various

clients' data were recorded; from the 422 client records accessed for this study, SPSS

discarded 139 during the ten variable regression analysis due to missing data fields.

Second, data collected spanned a time frame of more than three years, which calls into

question the possibility for confounding history effects either related to national or local

events over time. Third, sample characteristics may have played a role in the results.

Regarding gender, only 6.9% of the sample (N=29) were female, a problematic

characteristic in terms of statistical power. This may have skewed results due to sample

idiosyncrasies. Moreover, an uneven distribution of age (77% of the sample fell within

the ages of 40-59), may confound analysis regarding the independent variable of age, and

poses a more general threat to external validity. These issues suggest caution when

interpreting the results of this study, and reaffirm the need for further inquiry with other

samples.

Future research. Directions for future research could follow a number of

different lines. First, the results of this study although useful, hardly clarify a consistent

pattern of variables predictive of treatment outcome in homeless veteran populations.

Therefore, future research could examine similar variables and others that might predict

treatment outcome in homeless veteran populations. Once an accurate pattern of factors

contributing to risk and resilience emerges, then further inquiry into intervention

specificity could track efficacy along the resultant demographic parameters of at risk

populations. For example, findings from the population in this study indicate risk of poor

treatment outcomes associated with minimal time in treatment and institutional

disaffiliation. Researchers might examine ways to effectively intervene within these

demographic characteristics. Second, this study has offered support to the theory of

institutional disaffiliation, a theory with previous support in qualitative studies but a lack of support in quantitative studies (Piliavin, Wright, Mare, & Westerfelt, 1996). The lack of quantitative support may be due to significant multicollinearity with other constructs and the mediating influence of mental illness, as was indicated in the present analyses. Future studies might explore institutional disaffiliation in association with other mediating factors that could explain the multicollinearity found in this sample. Last, the explanations offered for some of the present data could be empirically explored. For instance, testing the hypothesis that education mediates between self-stigma and treatment outcome may offer useful information for clinicians to consider in the treatment of homeless veterans; and/or exploring a connection between self-stigma and disaffiliating tendencies.

Chapter VI

Conclusion

The results of this study offer empirically validated extensions to the knowledge base concerning homeless veterans. Previous studies indicate treatment duration to be predictive of treatment outcome among homeless populations (Schumacher, et al., 1995). This finding has been confirmed among homeless veterans admitted to inpatient hospital settings (Greenberg, Hoblyn, Seibyl, & Rosenheck, 2006) and diagnosed with severe mental illness (Rosenheck & Dennis, 2001). The population analyzed in this study represents a more heterogeneous sample of homeless veterans and therefore supports greater external validity of previous findings indicating a positive association between treatment duration and treatment outcome among veterans receiving intervention for homelessness.

Furthermore, mental illness was found to partially mediate an association between institutional disaffiliation and outcome. The meaning of this mediation was discussed in terms of the impact deficiencies in a homeless person's environment may have on mental health, which leads to further risk in treatment outcome. This interpretation also resonates with treatment strategy exhibiting the best efficacy—housing plus support. Removing the threat of unfulfilled survival needs through unconditional provisions for food, clothing, and shelter while providing opportunities for more sophisticated community integration activities (e.g., job training, social skills training, counseling, health care, hobbies, etc.) may lead toward successful treatment outcome in part by supporting mental health.

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Appendix A

Data Tables

Table I

Descriptive Statistics for sample population

Demographic Variable	Frequency	Standard Deviation	Mean
Age (Years)	422 (100%)	9.16	49
Twenties	29 (6.9%)		
Thirties	32 (7.6%)		
Forties	133 (31.5%)		
Fifties	192 (45.5%)		
Sixties	36 (8.5%)		
Gender			
Male	393 (93.1%)		
Female	29 (6.9%)		
Race			
White	174 (41.2%)		
Nonwhite	239 (56.6%)		

Table II

Binary Logistic Regression Analysis of associations with successful completion of

treatment

Variable	B	SE B	Odds Ratio (95% CI)
Age (Years)	.002	.016	1.002 (.970-1.034)
Treatment Duration	.008***	.001	1.008 (1.005-1.011)
Gender	-.075	.535	.927 (.325-2.648)
Institutional Disaffiliation	-.337	.367	.714 (.348-1.467)
Race	.373	.281	1.452 (.837-2.519)
Mental Illness	-.341	.390	.711 (.331-1.528)
Substance Use	-.219	.325	.803 (.425-1.518)
Education	-.358	.228	.699 (.447-1.093)
Marital Status	.474	.426	1.606 (.696-3.705)
Entry Income	.260	.319	1.297 (.695-2.422)
Constant	1.299	1.520	3.665

Note: *$p < .05$, **$p<.01$, ***$p < .001$.

Table III

Binary Logistic Regression Analysis of hypothesized mediator Mental Illness between

Education and Treatment Outcome

Regression Steps	B	SE *B*	Odds Ratio (95% CI)
Mental Illness regressed on Education	-.162	.171	.851 (.609-1.189)
Treatment Outcome regressed on Education	-.189	.171	.828 (.592-1.156)
Treatment Outcome regressed on predictor and mediator:	-.385	.264	.681 (.406-1.142)
Mental Illness	-.203	.172	.816 (.582-1.144)
Education			

Note: *p < .05, **p<.01, ***p < .001.

Table IV

Binary Logistic Regression Analysis of hypothesized mediator Mental Illness between

Institutional Disaffiliation and Treatment Outcome

Regression Steps	B	SE *B*	Odds Ratio (95% CI)
Mental Illness regressed on Disaffiliation	.615*	.311	1.849 (1.006-3.401)
Treatment Outcome regressed on Disaffiliation	-.552*	.270	.576 (.339-.977)
Treatment Outcome regressed on predictor and mediator:	-.310	.262	.733 (.439-1.224)
Mental Illness	-.522	.272	.593 (.348-1.011)
Disaffiliation			

Note: *p < .05, **p<.01, ***p < .001.

Table V

Hierarchical Logistic Regression Analysis of hypothesized moderator model of

association between Treatment Duration and Treatment Outcome

Regression Hierarchy	B	SE *B*	Odds Ratio (95% CI)
Level 1:			
Mental Illness	-.304	.272	.738 (.433-1.257)
Treatment Duration	.006***	.001	1.006 (1.004-1.009)
Level 2:			
Mental Illness	-.134	.318	.874 (.469-1.631)
Treatment Duration	.006***	.001	1.006 (1.003-1.008)
Interaction Term	.004	.003	1.004 (.998-1.011)

Note: *p* < .05, **p<.01, ***p* < .001.