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Spiritual Involvement as a Predictor to Completing a Salvation Army Substance Abuse Treatment Program

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This study investigates successful completion at a faith-based organization providing residential substance abuse treatment services. Method: The authors apply a complex systems paradigm using a single moderator variable. The participants are primarily African Americans and most have current criminal justice involvement. Probabilities of treatment program completion for participants active in spiritual activities versus similar participants not involved in these activities are calculated. Results: Participation in the spirituality component appears to provide a valuable attractor to treatment completion. Conclusions: In the past decade, evaluation methods have included the greater use of probabilistic approaches, most notably Bayesian inference. Findings suggest that this model, as applied to the complexities of a faith-based organization, is useful for understanding treatment completion.

Keywords: *substance abuse; complexity; attractors; Bayesian; faith-based; African American*

Identifying interventions that improve the likelihood of successful outcomes remains central to effective social work practice. This is increasingly true for faith-based organizations as federal, state, and local human service initiatives look to this sector as a promising alternative to the existing service array (Cnaan & Boddie, 2002). Examples of services provided in this sector include programs for persons abusing substances, persons who may be homeless, older Americans, and victims of human trafficking.

Federal programs including the Capital Compassion Fund, U.S. Department of Housing and Urban Development's Super Notice of Funding Availability (NOFA), and the Prisoner Re-Entry Initiative represent recent plans designated to garner additional partnerships between governments and faith-based organizations (White House Office of Faith Based Initiatives, 2005). One apparent reason for the increasing involvement of this sector is that spiritual supports, when provided voluntarily to clients even at moderate levels, produce significant life changes (Yancey

& Atkinson, 2004). In assessing whether outcomes resulting from these faith-based interventions are associated with effective and efficient services, an evolving body of literature seeks to understand complex relationships between religion, culture, practice, and political systems (Kondrat, 2002; Tangenberg, 2005).

TREATMENT COMPLETION

When clients who abuse substances do not complete treatment, they increase their likelihood of relapse (Hser, Polinsky, Maglione, & Anglin, 1999); however, those with a longer length of stay (LOS) improve their treatment outcome. An analysis of data from the National Treatment Improvement Evaluation Study (NTIES) found that for each 1-month increase in LOS, clients were 9% less likely to practice high-risk behaviors such as intravenous drug use during the follow up period (Greenfield, Finkbiner, & Bishop, 2000). A similar study using NTIES data demonstrated that longer LOS showed a consistently positive effect on treatment completion and abstinence (Orwin & Ellis, 2000).

Completion refers to whether a client finished treatment according to the program criteria. Similar to findings from LOS analyses, studies demonstrate that individuals completing treatment have better substance use outcomes than those who did not (Feidler, Screen, Greenfield, & Fountain,

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2001). In a study of women who were crack dependent and had children, those completing comprehensive treatment services demonstrated higher abstinence rates and lower levels of crack cocaine use 12 months after admission when compared to those not completing treatment (Magura, Laudet, Kang, & Whitney, 1999). A study of two 12-month treatment programs similarly demonstrated that clients completing all components of treatment reported less substance use at follow up (Nemes, Wish, & Messina, 1999).

Treatment completion remains essential to successful substance abuse treatment (Wolf-Branigin & Greenfield, 2003). Consumers of services enter into treatment for a variety of reasons ranging from mandatory referrals from court systems and employers to familial or personal desires to change self-destructive behaviors. Reasons participants choose to complete treatment include comfort in receiving services within a given setting, ideological consistencies with the organization providing the service, ability to understand and participate in program activities, and partnership with the provider (Wolf-Branigin, Daeschlein, Cardinal, & Twiss, 2000).

PROBABILISTIC METHODS

To facilitate continued improvement in social workers' ability to understand outcomes resulting from faith-based interventions, evolving methodologies include the recent use of probabilistic methods in areas such as the development of clinical support tools (Patterson, 2000; Wooff & Schneider, 2006) and intervention research for model comparisons (Fraser, 2004). Probabilistic methods, first developed in the 17th and 18th centuries by Jacques Bernoulli (Blakeslee & Chinn, 1971) and Thomas Bayes (1763), have experienced a renewed popularity, with applications ranging from computer programming to clinical trials.

Bayesian statistics regained popularity among researchers for three reasons. First, the approach addresses the limitations posed by classical statistics; for example, it offers the ability to compare means when groups have unequal variances. Second, it allows the use of preexisting information that commonly is available within organizational databases (Iverson, 1984). Finally, this approach yields useful findings given limited data sets. When applying Bayesian statistics, three concepts are useful. The first concept, *prior probability*, refers to the assumption that the model is true prior to data collection. When applied to a model with two outcomes (e.g., completing treatment and not completing treatment), the probability is assumed to be .50 for each outcome. The second concept, *posterior probability*, refers to the probability that a model is correct after data collection. The

third concept, *likelihood*, describes the conditional probability that the data will assume the model that has been developed (Lee, 2004).

We chose a Bayesian approach because it provides an alternative to classical experimental hypothesis testing. When compared to classical inferential statistical methods, probabilistic inference enables program planners to use decision-making information by evaluating the probable success of a model (or set of models) given the available observed data and enables program planners to develop conclusions using known sample data. To demonstrate the usefulness of this method we developed a case study of persons participating in substance abuse treatment. These individuals sought treatment with multiple issues as identified on the Addictions Severity Index (McClellan et al., 1992). These issues included co-occurring mental illness, involvement in legal systems, and familial dysfunction, all of which compound the search for a substance-free lifestyle.

COMPLEXITY

We approached this study from a complex systems perspective. Complex systems (or complexity) theory seeks to identify an order underlying apparently disorderly phenomena by using agent-based (client) modeling to discern choice making that leads to an emergent behavior or pattern. Components of complexity include being agent based, having heterogeneous options, having attractors, being self-organizing, and resulting in an emergent behavior. This theoretical approach, given social work's person-in-environment perspective, has potential applications in consumer and organizational decision making, planning, and outcomes management.

We focused on the *attractor* concept in complexity theory to encourage successful treatment. Substance abuse programs benefit by identifying and providing attractors leading to successful completion. These attractors—forces that lead to clients grouping together to improve likelihood of success—fit within a complexity approach and lead to a desirable and emergent group behavior (Johnson, 2002; Wolf-Branigin, 2006). Similar attempts with other at-risk populations have included persons with developmental disabilities and physical disabilities and housing patterns for persons with low to moderate incomes (Galster, Pettit, Santiago, & Tatain, 2002; Wolf-Branigin, LeRoy, & Miller, 2001). These studies focused on principles of self-organization and attractors as related to temporal and spatial autocorrelation. For example, persons with disabilities may choose to live near public transportation to increase their mobility.

Self-organization as a concept applied by social service planners and evaluators relies on general systems theory to identify and understand consumer choices (Proehl, 2001; Wheatley, 1999). Whereas this framework provides a model for understanding these interactions, it has limited ability to quantify emergent and iterative changes. As an alternative, Patton (2002) suggests that complexity theory provides a promising framework for shaping and structuring the information collected when planning for these interventions.

As applied to this exploratory study, the components are agent based because the focus is the individual client who has been abusing substances. Heterogeneity of choices expresses itself through the ability to choose participation in spiritual activities or not. The complex system displays dynamic tendencies because the agent (client) can choose between treatment options, including the decision to come to a faith-based organization. The attractor is the clients' use of the optional spiritual component to treatment. Self-organization refers to the clients' synthesis of information with their participation in spiritual activities to reach the emergent behavior (Johnson, 2002) as represented by treatment completion. Table 1 provides an overview of these components and their application.

METHOD

Participants

Data were collected on a cohort of program participants ($N = 46$). The majority ($n = 38$) were referred from criminal justice settings with which the District of Columbia Pretrial Services Agency has service contracts. The remaining participants ($n = 8$) were referred from the central assessment and intake of the single state authority in Washington, D.C. This cross-sectional sample included all clients actively participating in the program at the time of data collection.

The sample included 34 men (73.9%) and 12 women (26.1%); 41 (89.1%) were African American and 5 (10.1%) were Caucasian. The sample's mean age was 30.8 ($SD = 6.78$) and ranged from 22 to 53. Current criminal justice involvement was present in 83.4% of the sample. Participant program placement was determined by each participant's referral source using the Addictions Severity Index to evaluate functional levels in several domains, including medical status, substance use, social relations and psychological status (McClellan et al., 1992). The resulting program level placements were consistent with American Society of Addiction Medicine (2001) criteria.

TABLE 1: Overview of Complexity Components Applied to Faith-Based Programs

<i>Complexity Component</i>	<i>Application of Characteristic</i>
Agent based Heterogeneous	Person abusing substances Choice to continue participation or not
Dynamic	Choosing from a variety of treatment options and coming to a faith-based organization
Attractor	Presence of the spiritual component to treatment
Feedback	Interactions with family, counselors, and others
Self-organization	Choosing involvement in spiritual activity
Emergent behavior	Successful treatment completion

Setting

Clients received treatment services within a faith-based long-term residential substance abuse treatment center with a core treatment protocol of group therapy, individual counseling, didactic lectures, and 12-step meetings. The program uses an overarching cognitive-behavioral treatment approach (Kadden, 1994) with LOSs spanning 30 to 90 days. The program provides spiritual activities in which program participants may voluntarily participate. The treatment program uses the University of California, Los Angeles, Matrix Model (Rawson et al., 1995) and is a licensed standard-of-care operation that has full Rehabilitation Accreditation Commission (formerly known as the Commission on Accreditation of Rehabilitation Facilities and still referred to as CARF) accreditation for residential and outpatient services. CARF provides external peer review of behavioral health and other human services to promote quality services and optimal outcomes to the persons served.

The Salvation Army Harbor Light Center in Washington, D.C., one of about three dozen such programs operated throughout the United States, was the setting. Unlike traditional Salvation Army shelters and mission programs that serve a substance abusing and transient clientele (McNeece & DiNitto, 2005), Harbor Light treatment centers typically provide residential and outpatient substance abuse treatment services for adults with limited financial resources within licensed and accredited facilities. Whereas pastoral and spiritual counseling are available along with other treatment interventions, Harbor Lights have the unique characteristic of being Salvation Army Corps programs. These are church programs that provide a range of spiritual activities including Bible study, fellowship meetings, religious services, music programs, youth activities, and pastoral counseling. These spiritual

TABLE 2: Group Differences by Client Characteristics

Characteristic	Treatment Successfully Completed	
	Yes	No
Gender		
Male (n = 34)	23	11
Female (n = 12)	8	4
X ² probability = .608		
Age		
M	31.33	29.67
SD	7.26	5.74
p = .444		
Race		
African American (n = 41)	28	13
Caucasian (n = 5)	3	2
X ² probability = .532		
Criminal justice		
Parole (n = 10)	6	4
Probation (n = 13)	9	4
Court referral (n = 16)	11	5
None (n = 7)	5	2
p = .789		

services are available to the treatment clientele and to the larger neighborhood or community in which the centers are located.

Data Collection and Analysis

Data collected included administrative data that the organization routinely collects at treatment completion and a brief questionnaire. The administrative data included variables for gender, referral source, race, and age. Participants completed a brief questionnaire regarding their involvement in spiritual activities and were considered spiritually active if they participated at least 1 hr per week in the optional Corps services. Group comparisons using *t* tests, chi-squares, and Mann-Whitney *U* tests assured that client characteristics were not significantly different between the group completing and the group not completing treatment. (See Table 2.) Using a Bayesian analysis, we assessed the moderator variable, involvement in spiritual activities. Based on these probabilities, likelihoods (conditional probabilities) were determined.

RESULTS

Group Comparisons

Comparisons between the groups that completed treatment and the group not completing treatment were not significantly different by age ($p = .444$), race (Fisher's $p = .532$), criminal justice involvement (Mann-Whitney

$U_p = .789$), or gender (Fisher's $p = .608$). The mean age for those completing treatment was 31.32 ($n = 31$; $SD = 7.26$) compared to 29.67 ($n = 15$; $SD = 5.74$) for participants not completing treatment. Likewise, age was not significantly different for those participating ($M = 30.94$; $n = 29$; $SD = 6.73$) compared to those not participating ($M = 30.94$; $n = 17$; $SD = 7.12$) in spiritual activities ($p = .905$).

Bayesian Analysis

The Bayesian analysis began by using estimates to calculate posterior probabilities for the proportion of participants involved in spiritual activities, $P(S)$: $P(S) = .630$ or 63.0% ($29 / 46 = .6304$). Successful completions of all persons involved in the program, $P(C)$, was $P(C) = .674$ or 67.4% ($31 / 46 = .6739$) whereas the percentage of participants involved in spiritual activities and completing the program, $P(S \cap C)$, was $P(S \cap C) = .931$ or 93.1% ($27 / 29 = .9310$). The probability of the participant being involved in spiritual activities and not successfully completing treatment was $P(S \cap \text{not } C) = .069$ or 6.9% ($2 / 29 = .0690$).

Using a single moderator variable, the participant's involvement in available spiritual activities, we estimated the probability of completion for participants active in spiritual activities versus similar participants not involved in these activities. Where $P(\text{not } C) = 1 - P(C) = .326$ or 32.6% ($1.0 - .674 = .326$) and $P(C \cap S) = P(C) \times P(S \cap C) = .627$ or 62.7% ($.674 \times .931 = .627$). This reflects the probability of both completing the program and having been involved in spiritual activities, whereas $P(\text{not } C \cap S) = P(\text{not } C) \times P(S \cap \text{not } C) = .022$ or 2.2% ($.326 \times .069 = .022$) represents the probability of not completing the program but having been involved in spiritual activities. Given this information, a probability table (Table 3) was calculated for predicting the likelihood of future participants' completion of treatment services given their voluntary participation in spiritual activities.

The likelihood of involvement in spiritual activities and completing the program was .627 (62.7%), and the likelihood of involvement in spiritual activities and not completing the program was .022 (2.2%). The likelihood of not being involved in spiritual activities and completing the program was .047 (4.7%), and the likelihood of not being involved in spiritual activities and not completing the program was .304 (30.4%). The probability of successfully completing the program, given involvement in spiritual activities, was $P(C \cap S) = P(S \cap C) / P(S) = .930$ or 93.0% ($.627 / .674 = .930$). The probability of a participant not completing the treatment program and not being involved in spiritual activities was $P(\text{not } C \cap \text{not } S) = 1 - P(C \cap S) = .866$ or 86.6% ($.304 / .351 = .866$). The probability of not being involved in spiritual activities and

TABLE 3: Probabilities of Involvement in Spiritual Activities and Completing Treatment

Spiritually Involved	Probabilities of Treatment Completion		
	Completing (C)	Not Completing (not C)	Total (C + not C)
Yes (S)	.627	.022	.649
No (not S)	.047	.304	.351
Total (S + not S)	.674	.326	1.000

completing the program calculates to $P(not\ S\ I\ C) = 1 - P(S\ I\ C) = .070$ or 7.0% ($.047 / .674 = .070$). The probability of not being involved in spiritual activities and not completing the program was $P(not\ S\ I\ not\ C) = 1 - P(S\ I\ not\ C) = .933$ or 93.3% ($.304 / .326 = .933$). The probability of the participant completing the program and not having been involved in spiritual activities was $P(C\ I\ not\ S) = P(not\ S\ I\ C) = P(C) / P(not\ S) = .134$ or 13.4% ($.047 / .351 = .134$). The prevalence of the sample, those involved in spiritual activities, was 67.4%. The positive likelihood ratio is 6.53 with a sensitivity of 0.87 and a 95% confidence interval of 79% to 98%.

DISCUSSION AND APPLICATIONS TO SOCIAL WORK

The results indicate that availability of a spiritual activity component provided a valuable attractor for persons successfully completing treatment. Participants who chose involvement in spiritual activities improved their likelihood of successfully completing the treatment program, whereas other variables, including gender, age, ethnicity, and involvement in the criminal justice system, did not predict successful completion. Motivation is essential in determining a client's receptivity to treatment (Freyer et al., 2005). Whether clients chose spiritual involvement simply as the path of least resistance is worthy of additional investigation. Several questions remain. Did participants not partaking in spiritual activities feel less accepted by program staff? Were participants transferring to another program with less spiritual emphasis? Did participants not maximize their opportunities for mutually cooperating with the treatment and Corps staff (Axelrod, 1984)?

Follow-up interviews with participants provided support for the importance of returning to an environment that encouraged spirituality (Crisp, Williams, Ross, & Timpson, 2006). Many indicated that they had grown up in a religious home, only to stray from it as they entered adolescence and adulthood. Responses typical of the participants included "I was raised in a Christian home and felt

the comfort of returning" and "I forgot my upbringing when I became addicted." Spirituality may have acted as an attractor to maintain and motivate these clients to remain active in the program and complete treatment (Hodge, Cardenas, & Montoya, 2001). The findings also suggest potential applications for participants attracted to optional spiritual activities, given social work's increasing use of family- and ecosystems-based treatment approaches within minority adolescent and young adult populations (Szapocznik & Williams, 2000; Tapia, Schwartz, Prado, Lopez, & Pantin, 2006).

As data were gathered, the primary problem was ambiguity in the terms *successful recovery* and *treatment completion*. When initiating the study, program staff frequently mentioned recovery; however, limited data were available to support this outcome. This led to changing the terminology to better fit the data, resulting in use of the term *successful completion*. Whereas recovery is a better goal than completion, it remains more difficult to measure. Whereas this study's finding appears to be valuable, we must ask why the completion rates for participants not involved in spiritual activities were low.

Because of their iterative and cumulative perspective, Bayesian approaches provide a valuable tool for human service organizations as they attempt to infer future outcomes given data already available in their management information systems. In this study, statistical power in the relatively small sample size was limited (Cohen, 1977). Bayesian inference provided an alternative means to identify significance vis-a-vis its cumulative approach. Given the binomial variables and resulting distributions, in future analyses we can anticipate that as sample size increases, distributions will increasingly approximate normality (Moore & McCabe, 2006).

Human services planners and evaluators seeking greater use of probabilistic methods can readily access elementary programs and templates for calculating probabilities and odds by using online Bayesian calculators. Those seeking advanced methods should review Bolstad (2004) or Lee (2004). As social work practitioners, educators, and researchers continue the development of technology-based practices through informatics (Parker-Oliver & Demiris, 2006), Bayesian and other probabilistic methods will contribute vitally to the development of clinical support tools, treatment pathways, and other predictive items.

Complexity, when applied to qualitative program evaluation activities, often assumes a metaphorical status (Holland, 1998; Hudson, 2000). This study suggests areas for future research; these include seeking a better understanding of why potential clients may be attracted to particular services, regardless of whether they are faith based, and how spirituality can function as one attractor within a

strengths-based paradigm involving multiple systems (Wineburg, 2001). Clients entering substance abuse treatment frequently lead chaotic lives; human services provide structure within which these individuals and their families may regain order. Additional studies can suggest and refine models that predict and quantify social work phenomena within these apparently chaotic environments. Advanced statistical methods (e.g., pattern recognition and cluster analysis using Bayesian estimators) provide a valuable line of inquiry for human services workers to pursue as they plan for the emerging strengths, preferences, and needs of their clients.

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