

Outdoor Behavioral Health Care: A Longitudinal Assessment of Young Adult Outcomes

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This article details a 3-year outdoor behavioral health care outcome study. Hierarchical linear modeling was used to analyze data from 186 young adults in a wilderness therapy program. Participants completed the Outcome Questionnaire–45.2 (Lambert et al., 2004) 6 times from Week 1 to 18-month postdischarge follow-up. Results indicated that clinically and statistically significant change occurred in treatment. Rates of change varied, and posttreatment scores remained stable, thus demonstrating that in-treatment gains were maintained. Implications and recommendations for future research are discussed.

Keywords: wilderness therapy, young adults, hierarchical linear modeling, outdoor behavioral health care

Young adulthood can be a time of increased intimacy and meaningful relationships as one's identity, social role, and sense of self become clearer. Although identity development and social role processes highlight adolescence, these developmental tasks are known to continue well into, and often throughout, young adulthood (Pottick, Bilder, Vander Stoep, Warner, & Alvarez, 2008). As personally and interpersonally meaningful and promising as this time can be, it can also be fraught with rejection and result in isolation (Erikson, 1959/1980). Individuals experiencing significant psychosocial problems in adolescence and young adulthood have significantly more struggles, compared with peers, in their attempts to complete school, fit into social roles, and acquire occupational skills necessary for adulthood (Pottick et al., 2008). The transition from late adolescence to young adulthood (ages 18 to 25 years) highlights the demand for effective intervention for those heading down maladaptive life paths who are ultimately at higher risk for developing psychological disorders (Pottick et al., 2008).

Unfortunately, effective and engaging interventions can be challenging because a precipitous drop in the utilization of mental health care services occurs among young adult clients age 18 years and older (Pottick et al., 2008; Substance Abuse and Mental Health Services

Administration [SAMHSA], 2012). The 2012 SAMHSA survey report on drug use and health provides additional context to this problem. A significant finding of the survey was that the highest rate (23.9%) of illicit drug use was among individuals between the ages of 18 and 20 years. The next highest rate (19.7%) was found among 21- to 25-year-olds. Combining data on decreased utilization of services with the spike in drug use, we see that the individuals most frequently engaging in illicit substance abuse are those shown to be falling off behavioral and mental health care providers' radars. These and other findings have led researchers to conclude that there is a direct need for "aggressive efforts to design developmentally appropriate, effective services and to increase their availability to young adults with mental disorders" (Pottick et al., 2008, p. 387). In doing so, more successful navigation of young adulthood development may occur.

Outdoor Behavioral Health Care

Otherwise known as wilderness therapy, outdoor behavioral health care (OBH) is a form of counseling that uses traditional counseling techniques in natural outdoor settings. OBH is most commonly defined as "the prescriptive use of wilderness experiences by licensed mental health

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professionals to meet the therapeutic needs of clients” (Pace et al., 2014, p. 1). Over the past few decades, it has grown considerably, receiving increased recognition in the counseling field (Behrens, Santa, & Gass, 2010; Hoag, Massey, Roberts, & Logan, 2013; Reese & Myers, 2012; Russell, Gillis, & Lewis, 2008; Tucker, Javorski, Tracy, & Beale, 2013; Wolsko & Hoyt, 2012).

Kazdin (1991) described psychotherapy as an intervention intended to reduce distress, unhealthy behaviors, and psychological symptoms while encouraging prosocial functioning. These outcomes were obtained through “learning, persuasion, counseling, and discussion integrated into a specific treatment plan. The focus is on how clients feel (affect), think (cognition), and act (behavior)” (p. 785). In OBH programs, the therapeutic environment is a social milieu located in a natural setting where clients are guided by trained staff and treated by licensed therapists. Through this combination of outdoor setting and therapy, an environment is created to promote social learning, symptom identification and reduction, and the acquisition and practice of healthy behaviors. Promotion of these skills is done in an environment that encourages discussion and experiential learning and in a social setting where one’s emotions, cognitions, and actions are more easily accessed. OBH programs de-emphasize dysfunction and failure by focusing instead on the identification and development of strengths and competencies in a holistic manner (Cason & Gillis, 1994).

OBH provides an experiential residential treatment option for adolescents and young adults. This treatment model uses wilderness living experiences, active involvement of clients in their therapy, group therapy and living, individual therapy, the positive use of stress, and a strong ethic of care and support (Pace et al., 2014). It is a valuable intervention for clients with mental health challenges who have not responded to traditional therapy or for clients in need of intensive therapy, assessment, or stabilization (Russell & Hendee, 2000). OBH programs aim to build success-oriented identities for clients by increasing self-concept, internal locus of control, self-confidence, and improved interpersonal and social skills (Hill, 2007; Russell et al., 2008).

Russell (2005) conducted a mixed-methods study on wilderness therapy outcomes 2 years postdischarge and found that 80% of parents ($n = 88$) and 90% of adolescent clients ($n = 47$) believed that OBH was effective. A noted limitation regarding these findings is that the adolescent sample surveyed 2 years postdischarge represented only 33% of the original study sample size ($N = 188$). However, these findings are encouraging and are worthy of further investigation given the findings of traditional residential treatment programs. Residential treatment research has shown that clients often make gains in residential treatment, yet “those gains are frequently lost when they return

to the community” (Leichtman & Leichtman, 2001, p. 21). Findings such as these continue to challenge the counseling profession to attend to the following question: What approaches are associated with the continuance of in-treatment gains, posttreatment and over time?

Russell et al. (2008) completed perhaps the largest OBH survey research project to date. Sixty-five programs participated, and the majority (60%) reported working with clients 18 years and older. In addition, the OBH Council has certified 15 member programs that work with young adult clients (OBH Council, 2014). Thus, young adult clients are clearly participating in OBH, yet the research literature necessary to assess its efficacy and inform ongoing design and delivery improvements is lacking.

To this end, Hoag et al. (2013) published the first data on young adult wilderness therapy outcomes ($N = 297$). A particular strength of this study was its use of the Outcome Questionnaire–45.2 (OQ-45.2; Lambert et al., 2004) to document clients’ change with regard to life effectiveness skills, motivation for therapy, the therapeutic alliance, and dysfunctional attitudes. However, a noted limitation was that participants’ posttreatment follow-up participation rate dropped considerably from the in-treatment rate (61%). As a result, Hoag et al. were unable to assess follow-up outcomes, which ultimately led the authors to conclude,

We see the need to decrease attrition rates and gain more consistent results as we continue the iterative process of understanding the change agents found in wilderness therapy. Additionally improved long-term follow-up is essential to evaluate how young adults respond to this type of treatment and whether gains made in therapy generalize post-treatment. (p. 302)

Other critiques of OBH outcome research seemingly agree: Small sample sizes and a lack of longitudinal data have limited efforts to investigate the long-term effects of wilderness therapy (Cason & Gillis, 1994; Davis-Berman & Berman, 1994; Hill, 2007; Russell, 2003).

In short, OBH with young adult clients is an area in need of further research. As counselors, we know the importance of young adult development and transition in terms of identity development and the ability to develop meaningful relationships with others (Erikson, 1959/1980). We also know that a relationship exists between growth, function, and overall wellness when individuals are connected with nature (Reese & Myers, 2012; Tucker et al., 2013). We are beginning to elucidate OBH effects in general (Bowen & Neill, 2013) and outcomes with adolescents in particular (Russell, 2003, 2005; Tucker, Smith, & Gass, 2014). What we do not yet know are the OBH outcomes for young adults over time, because results to date have been reported (Hoag et al., 2013) for a small number of young adults ($N = 10$).

Aim and Questions

The intent of this study was to build on OBH research by incorporating previous authors' recommendations for assessing wilderness therapy outcomes longitudinally. Specifically, the purpose of this study was to evaluate changes in young adult participants' psychosocial well-being and functioning over time, from OBH intake to 18 months posttreatment. The research questions guiding this study were as follows:

Research Question 1: How does overall psychosocial functioning change from intake to 18 months posttreatment?

Research Question 2: How do distress symptoms change from intake to 18 months posttreatment?

Research Question 3: How do interpersonal relationships change from intake to 18 months posttreatment?

Research Question 4: How does social role performance change from intake to 18 months posttreatment?

Method

Participants

A convenience sample of volunteer participants ($N = 186$) was drawn from young adult clients of an OBH program located in the southwestern United States. Eligible participants were those who completed the program's 35-day minimum length of stay requirement. The participation rate for this study was 77.2%. Of the 241 young adults who entered the program, 28 declined participation in the study and 27 were excluded because they did not meet the minimum length of stay requirement. Regarding gender, 153 participants (82.3%) were male and 33 (17.7%) were female. Length-of-stay decisions were made by the overseeing clinician on the basis of client progress and the establishment of a discharge plan. Length of stay ranged from 5 to 22 weeks ($M = 10.10$, $SD = 2.46$) in the wilderness. Only 5.4% ($n = 10$) stayed between 5 and 7 weeks. At intake, participants' age ranged from 18 to 32 years ($M = 20.30$, $SD = 2.59$), with the majority (89.2%, $n = 166$) being between 18 and 23 years.

Participants in this study had a primary diagnosis that led them to seek treatment in an OBH program for mood disorders (38.7%, $n = 72$), substance use disorders (30.6%, $n = 57$), and anxiety disorders (13.4%, $n = 25$), with the remaining participants seeking treatment for pervasive development, behavior, and attachment disorders (17.2%, $n = 32$; percentages do not total 100 because of rounding). When we looked at the prevalence of diagnosis by accounting for the first four diagnoses listed for each client, substance use disorders were the most frequently listed

(74.7%, $n = 139$). In addition, 84.9% of the participants ($n = 158$) had a diagnosis for either a mood or anxiety disorder. Our findings regarding participants' primary diagnosis mirror those of a study that examined the typical profiles and diagnostic breakdown of OBH clients (Hoag, Massey, & Roberts, 2014). We did not collect data regarding participants' race/ethnicity and socioeconomic status; however, the clients served by the OBH program involved in this study tend to be Caucasian and of a higher socioeconomic status (R. Hiezer, personal communication, August 28, 2015). Of the participants enrolled in the study, 154 (82.8%) reported a discharge plan that included some form of continued care or supportive transition service (e.g., sober living, job support, academic coaching). As with other OBH studies (Hoag et al., 2013; Russell, 2003), we did not collect additional data on the nature and duration of the aftercare plans.

Treatment

Treatment entailed weekly individual and group therapy sessions facilitated by the assigned therapist. The therapist oversaw the clinical assessment, treatment planning, and service delivery, which Hill (2007) highlighted as key to what differentiates wilderness therapy programs from wilderness adventure offerings. The clinician created a weekly treatment plan intended to provide structure and guidance for the wilderness staff and clients in how to incorporate the therapeutic and relational goals of each client into daily wilderness processes. In addition to the work of the therapist, and in line with OBH practices (Pace et al., 2014), staff facilitated the day-to-day processes and psychoeducation by aligning them with the weekly treatment plans.

Participants worked with one of five Caucasian licensed therapists: a female psychologist, a male psychologist, a female master's-level licensed professional counselor, a male master's-level licensed professional counselor, or a male master's-level marriage and family therapist. Given that all therapists and participants were within the same OBH program, the overall structure and progression were similar. However, individual treatment plans differed based on the unique approach of the therapist and the client's needs. Therapists provided a minimum of 2 hours of direct counseling (individual and group) each week. Participants were grouped based on therapist assignment. Over the course of this study, participants were somewhat evenly distributed across the five clinicians, with 43 participants (23.1%) representing the highest caseload and 33 participants (17.7%) being the lowest. The number of participants was a function of rolling admissions, with a range of 10 to 60 participants receiving treatment at any one time across all five groups.

Measure

Overall psychosocial function and symptom distress were measured by the OQ-45.2 (Lambert et al., 2004). Well established in the literature, the OQ-45.2 is sensitive to psychological changes session to session, assesses a wide range of symptomatology, and was designed for repeated measurements and outcome assessment (Lambert et al., 1996). The 45 items assess key personal and social characteristics related to quality of life across three subscales: Symptom Distress (SD), Interpersonal Relationships (IR), and Social Role Performance (SR). Respondents rate each item on a 5-point Likert-type ranging from 0 (*never*) to 4 (*almost always*). Total scores range from 0 to 180 and serve as a global assessment of functioning (Lambert et al., 2004), with higher scores indicating greater endorsement of struggle. Nine reverse-coded items assess positive indicators of mental health and life function. The SD subscale, consisting of 25 items (e.g., “I tire quickly”), assesses a broad range of symptoms across the most common disorders, including anxiety, affective, adjustment, and stress-related disorders. The 11-item IR subscale assesses loneliness, friction, and conflict in family relationships, friendships, and marital relationships. A sample item is “I am satisfied with my relationships with others.” The nine-item SR subscale assesses dissatisfaction, conflict, distress, and inadequacy related to school/work, family, and leisure. A sample item is “I feel angry enough at work/school to do something I might regret.”

Following Jacobson and Truax’s (1991) two-step criterion for assessing clinically significant change, the OQ-45.2 has established cutoff scores and reliable change indices (RCIs) for the total and subscale scores. A total score below the threshold score (63) indicates that the respondent is in the community nonpatient range of functioning as found in a diverse sample of U.S. adults (Lambert et al., 2004). Given that statistical significance does not always equate to clinical significance, the RCI identifies whether the magnitude of change is clinically significant (Jacobson & Truax, 1991). An overall score reduction of 14 points or more is considered indicative of reliable change (Lambert et al., 2004). Clients with an overall score reduction of 13 points or more and who report a score below the established cutoff score of 63 are deemed to be recovered and to have experienced reliable, clinically significant change. Those whose change surpasses the RCI but not the cutoff threshold are considered improved (Lambert et al., 2004). Clinical cutoff scores for the SR, IR, and SD subscales are 12, 15, and 36, respectively. In addition, the RCIs for the OQ-45.2 subscales are 7 (SR), 8 (IR), and 10 (SD).

Lambert et al. (2004) demonstrated that the OQ-45.2 has high internal consistency ($\alpha = .70$ to $.93$) and test-retest reliability ($r = .78$ to $.84$). Adequate statistical reliability was similarly evidenced for OQ-45.2 scores in the present

study, with standardized regression coefficients ranging from $.68$ to $.95$ (Raudenbush, Bryk, Cheong, & Congdon, 2004). Psychometric research comparing the OQ-45.2 with similar commonly used assessments (e.g., the Beck Depression Inventory; Beck, Steer, & Carbin, 1988) has determined that the “concurrent validity for the OQ-45.2 and its individual domains with the criterion measures were all significant beyond the $.01$ level of confidence” (Lambert et al., 2004, p. 13).

Procedure

Office staff invited all clients enrolling in the OBH program to participate in this institutional review board–approved study. Clients were informed that declining to participate in the study would not affect their treatment. Participants completed the OQ-45.2 six times: Week 1 (Time 0), Week 3 (Time 1), Week 5 (Time 2), discharge (Time 3), and 6- and 18-month post-discharge follow-ups (Times 4 and 5, respectively). Because of the wilderness setting, the OQ-45.2 was administered by the field staff as a paper-and-pencil measure at Times 0, 1, 2, and 3. Scores were inputted into Outcome Tools, an online data management system. Score sheets were scanned into electronic form for record keeping. Follow-up questionnaires were administered via e-mail, with a link to the questionnaire. The research coordinator for the study (fourth author) sent an e-mail at the 6-month mark requesting completion of the OQ-45.2 for the 6-month data point. If the questionnaire was not completed within 1 week, a reminder e-mail was sent. Nonrespondents received a third and final reminder using alternative contact information provided at intake. The same procedure was followed for the 18-month follow-up, although participants were also offered a \$10 electronic gift card to an outdoor gear store, iTunes, or Amazon for completing the questionnaire. Follow-up scores were entered into Outcome Tools, exported to Excel, and then exported to SPSS (Version 22) for analyses. See Figure 1 for participants’ OQ-45.2 total and subscale scores by time.

Data Analysis

We chose hierarchical linear modeling (HLM) for its utility in analyzing correlated data typical of repeated measures designs (Carey, 2013). This methodology offers greater precision over other multivariate repeated measures approaches, because it allows the researcher to look at individual starting points and rates of change as opposed to group means. Such an approach was especially important given the doubly nested data structure of this study (i.e., repeated observations within individuals, who are nested within a particular group setting; Raudenbush & Bryk, 2002). Also important is the ability to retain incomplete data sets as long as data are missing at random (Garson, 2012; Raudenbush & Bryk, 2002; Seltman, 2015). Ultimately, HLM allows for a dynamic understanding of how variables of interest change over time (Osborn, 2000). Therefore, HLM is considered

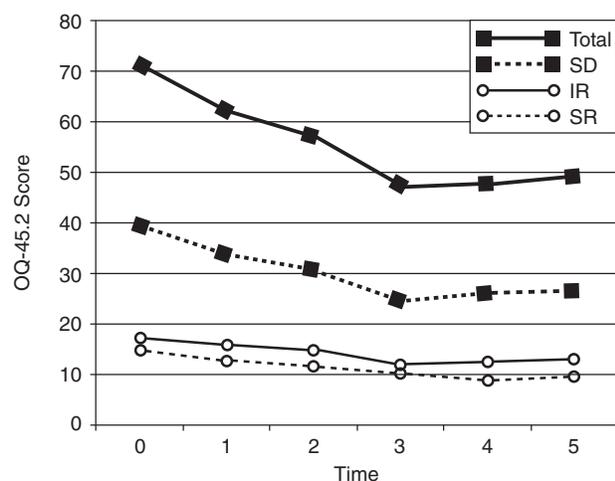


FIGURE 1

Outcome Questionnaire–45.2 (OQ-45.2) Total and Subscale Scores by Time

Note. Total = total score; SD = Symptom Distress; IR = Interpersonal Relationships; SR = Social Role Performance; Time 0 = Week 1; Time 1 = Week 3; Time 2 = Week 5; Time 3 = discharge; Time 4 = 6-month postdischarge follow-up; Time 5 = 18-month postdischarge follow-up.

appropriate for understanding study results in relation to clinical implications (Carey, 2013; Seltman, 2015; Sink & Mvududu, 2010).

The first step in the analysis was to plot the mean OQ-45.2 total and subscale scores by time. Visual examination of the histograms and scatter plots suggested a normal distribution and a linear relationship between time and change. In addition, a normal distribution was found when we plotted the residuals to check the assumptions of an unconditional growth model.

Assessment intervals varied across participants from Week 5 (Time 2) to discharge (Time 3), and time spacing between assessments varied from 2 weeks to 12 months. Because of these unequal intervals, we analyzed data using a three-piece time-trend model (Jaggars & Xu, 2015). The

first timepiece included the data gathered at Weeks 1, 3, and 5 (Times 0, 1, and 2, respectively). One unit of time in the first timepiece equaled 2 weeks. The second timepiece included data from Week 5 (Time 2) to discharge (Time 3). Time between assessment at Week 5 and discharge varied among participants because of differing lengths of stay in treatment. The third and final timepiece spanned discharge (Time 3) to 18 months posttreatment, with each unit of time equaling 6 months. The first unit of time in the third timepiece spanned Time 3 (discharge) to Time 4 (6-month postdischarge), and the 12 months between Time 4 and Time 5 (18-month discharge) were broken into two 6-month units of time. Combined, the three timepieces paint a complete picture of the participants’ journey while allowing for a consistent measurement of time in Timepieces 1 and 3 to calculate the mean rate of change.

We ran unconditional models for each timepiece, with time as the predictor and Time 0 specified as the intercept to establish a baseline. Each model included a random effect for the intercept, which allowed each participant to have his or her own starting point. In the first and third timepieces, the rate of change was also allowed to vary across participants.

Results

Preliminary Analyses

Table 1 presents the means and standard deviations for the OQ-45.2 total and subscale scores by time. Of the participants, 85.5% (*n* = 159) completed the Week 1 assessment, 82.3% (*n* = 153) the Week 3 assessment, 80.6% (*n* = 150) the Week 5 assessment, and 70.4% (*n* = 131) the discharge assessment. Postdischarge, 43.5% of the participants (*n* = 81) responded at the 6-month follow-up, whereas 42.5% (*n* = 79) responded at the 18-month follow-up. Attrition from Time 1 to Times 5 and 6 was close to 50%. However, decreases in response rates postdischarge were expected. The response rates in this study were sufficient because a retention rate of 40% is considered typical when administering questionnaires via e-mail (Sheehan, 2001).

TABLE 1

Descriptive Statistics for Outcome Questionnaire–45.2 Total and Subscale Scores by Time Performance

Time	<i>n</i>	Total Score		Symptom Distress		Social Role Performance		Interpersonal Relationships	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
0	159	71.38	26.06	39.18	16.51	14.82	5.05	17.38	7.45
1	153	62.18	26.12	33.65	16.32	12.76	5.39	15.77	7.25
2	150	57.10	26.78	30.52	15.55	11.67	5.68	14.91	7.35
3	131	47.11	26.44	24.72	15.40	10.21	5.38	12.18	7.24
4	81	47.81	23.03	26.14	14.06	8.96	4.01	12.72	6.79
5	73	49.15	24.99	26.62	14.54	9.38	4.72	13.15	7.70

Note. *N* = 186. Time 0 = Week 1; Time 1 = Week 3; Time 2 = Week 5; Time 3 = discharge; Time 4 = 6-month postdischarge follow-up; Time 5 = 18-month postdischarge follow-up.

To determine whether data were missing at random or because of systematic reasons that would prevent generalizability (e.g., nonresponse bias; Gay, Mills, & Airasian, 2009), we compared the Week 1 OQ-45.2 total score for participants who did not respond at discharge with the Week 1 OQ-45.2 total score for the overall sample. Because primary analyses for this study extended beyond discharge, we similarly compared scores between Week 1 and 18-month follow-up respondents and nonrespondents. There was no statistically significant difference between respondents ($M = 71.38, SD = 26.05$) and nonrespondents ($M = 70.02, SD = 24.30$) at discharge, $t(227) = 0.31, p = .76$. In addition, there was no difference in Week 1 scores between participants who responded ($M = 71.38, SD = 26.05$) at 18 months postdischarge and those who did not ($M = 72.00, SD = 24.34$), $t(293) = 0.20, p = .84$. These findings provided evidence that missing data were more likely missing at random rather than a result of response bias or some other shared characteristic of the nonrespondents (e.g., exhibiting similarly different outcomes compared with respondents; Gay et al., 2009). In addition, to use unbiased parameter estimates and standard errors, we analyzed the full data set using maximum likelihood estimation.

Overall Psychosocial Functioning

We examined participants' overall psychosocial functioning from Time 0 to Time 5 by looking at the OQ-45.2 total score with time as the predictor. As seen in Table 2, the Time 0 expected OQ-45.2 total score was above

the clinical cutoff score of 63, with participants reporting a score at Week 1 (intercept) of 71.16. There was a significant reduction in participants' OQ-45.2 total scores from Time 0 to Time 2 ($p < .001$). Specifically, for every 2-week change in time across Timepiece 1, there was an expected 6.67-point decrease in participants' OQ-45.2 total scores (see Table 2). Similarly, the second timepiece showed that participants' OQ-45.2 total scores significantly decreased from Time 2 to Time 3 ($p < .001$), with an expected reduction of 9.84 points. Finally, participants' OQ-45.2 total scores did not significantly change from Time 3 to Time 5 ($p = .246$), but rather remained relatively stable. These findings suggested that, after 5 weeks, the average client reported considerable improvement, with a 13.34-point change and a score (58) below the community nonpatient functioning cutoff score of 63. These results indicated that participants reported the greatest improvement in overall functioning over the first 5 weeks of treatment (13.34) than during any other time period. Over the 18 months following discharge, participants remained relatively stable, reporting no significant changes in distress levels.

Results of a random-effects analysis (see Table 3) indicated that participants varied in both their starting points ($p < .001$) and their rates of change from Time 0 to Time 2 and from Time 3 to Time 5 ($p < .01$). Furthermore, covariance parameters showed a significant negative

TABLE 2

Fixed-Effects Analysis Results for the Outcome Questionnaire–45.2 (OQ-45.2) Total and Subscale Scores by Timepiece

Scale	Estimate	SE	df	t	p
OQ-45.2 total score					
Intercept	71.16	2.01	185	35.39	<.001
Timepiece 1	-6.67	1.04	558	-6.40	<.001
Timepiece 2	-9.84	1.67	558	-5.89	<.001
Timepiece 3	1.23	1.06	558	1.16	.246
OQ-45.2 Symptom Distress					
Intercept	39.17	1.28	185	30.55	<.001
Timepiece 1	-4.18	0.62	558	-6.70	<.001
Timepiece 2	-5.35	1.02	558	-5.22	<.001
Timepiece 3	0.95	0.61	558	1.57	.118
OQ-45.2 Interpersonal Relationships					
Intercept	17.30	0.57	185	30.45	<.001
Timepiece 1	-1.05	0.29	558	-3.55	<.001
Timepiece 2	-2.80	0.47	558	-5.95	<.001
Timepiece 3	0.53	0.31	558	1.74	.08
OQ-45.2 Social Role Performance					
Intercept	14.72	0.39	185	37.66	<.001
Timepiece 1	-1.49	0.24	558	-6.34	<.001
Timepiece 2	-1.65	0.34	558	-4.17	<.001
Timepiece 3	-0.30	0.23	558	-1.30	.194

Note. Timepiece 1 = Weeks 1, 3, and 5; Timepiece 2 = Week 5 to discharge; Timepiece 3 = discharge to 18-month postdischarge follow-up.

TABLE 3

Outcome Questionnaire–45.2 (OQ-45.2) Total and Subscale Scores, Variances, and Correlation Matrix

Scale	Intercept	Timepiece 1	Timepiece 3
OQ-45.2 total score			
Intercept	511.70***	-.40 ^a *	-.40 ^a *
Timepiece 1	-67.50*	57.90***	-.10 ^a
Timepiece 3	-63.60*	-5.20	50.90**
OQ-45.2 Symptom Distress			
Intercept	214.36***	-.52 ^a **	-.35 ^a
Timepiece 1	-32.40**	18.15**	-.02 ^a
Timepiece 3	-18.77	-0.28	13.49**
OQ-45.2 Interpersonal Relationships			
Intercept	40.83***	-.44 ^a **	-.49 ^a **
Timepiece 1	-6.09**	4.75***	.29 ^a
Timepiece 3	-6.34**	1.26	4.10**
OQ-45.2 Social Role Performance			
Intercept	15.40***	-.31 ^a	-.40 ^a *
Timepiece 1	-1.87	2.36**	-.51 ^a
Timepiece 3	-2.49*	-1.24	2.46**

Note. Timepiece 1 = Weeks 1, 3, and 5; Timepiece 3 = discharge to 18-month postdischarge follow-up.

^aCorrelation.

* $p < .05$. ** $p < .01$. *** $p < .001$.

association between the intercept (Time 0) and change within Timepiece 1, as well as between the intercept and change within Timepiece 3 ($p < .05$). In both cases, these negative correlations indicated that individuals with higher OQ-45.2 total scores at Week 1 tended to have steeper decreases during the first 5 weeks of treatment, along with more improvement from discharge to 18 months postdischarge. Participants who began with a higher OQ-45.2 total score, suggesting greater distress and endorsement of struggle, saw a more dramatic reduction in distress during their first 5 weeks in OBH treatment and postdischarge.

Symptom Distress

At Time 0, the expected OQ-45.2 SD subscale score was 39.17. As shown in Table 2, a significant reduction in participants' scores of 4.18 points occurred every 2 weeks from Time 0 to Time 2 ($p < .001$). Similarly, the second timepiece showed a significant decrease in symptom distress from Time 2 to Time 3 ($p < .001$), with an expected score reduction of 5.35 points. Finally, SD subscale scores did not significantly change from Time 3 to Time 5. These results suggested that participants improved into the community nonpatient range after Week 3 and reached the threshold for reliable change in symptom distress between Week 5 and discharge. Upon discharge, SD subscale scores did not show any significant fluctuations.

Inspection of the random-effects analysis results for the SD subscale scores (see Table 3) indicated that participants varied in both their starting points ($p < .001$) and rates of change in Timepiece 1 and Timepiece 3 ($p < .01$). Covariance parameters showed a significant negative association between intercept and change within Timepiece 1 ($p < .01$). This finding suggested that participants with greater symptom distress at Week 1 tended to have greater reductions in distress symptoms over the first 5 weeks of OBH treatment.

Interpersonal Relationships

As seen in Table 2, the expected OQ-45.2 IR subscale score at Time 0 was 17.30. This score was above the clinical cutoff score of 15, thus suggesting the endorsement of clinically significant struggles in interpersonal relationships. Fixed-effects analysis results (see Table 2) showed a significant reduction in participants' IR subscale scores from Time 0 to Time 2 ($p < .001$) of 1.05 points every 2 weeks, and a significant reduction from Time 2 to Time 3 ($p < .001$) of 2.80 points. Finally, IR subscale scores did not significantly change from Time 3 to Time 5. Although this finding suggested that participants dropped below the clinical cutoff score on the IR subscale by discharge, their score decrease (8 points) was not sufficient enough to demonstrate reliable change. In line with the findings for participants' OQ-45.2 total scores and

SD subscale scores, participants' IR subscale scores did not show significant fluctuations postdischarge.

Closer inspection of the patterns and relationships in intercept and change trajectories (see Table 3) revealed that participants varied in both their intercept ($p < .001$) and their rates of change in Interpersonal Relationship subscale scores in Timepiece 1 ($p < .001$) and Timepiece 3 ($p < .01$). Furthermore, the covariance parameters suggested a significant negative association between the intercept and change within Timepiece 1, as well as the intercept and change within Timepiece 3 ($p < .01$). This finding suggested that participants with higher IR subscale scores at the beginning of treatment tended to have greater improvements in relationships from Week 1 to Week 5 and from discharge to 18 months postdischarge.

Social Role Performance

At Time 0, the expected OQ-45.2 SR subscale score was 14.72 (see Table 2). The first timepiece suggested that, for every 2-week change in time, there was a significant 1.49-point improvement in social role performance reported from Time 0 to Time 2 ($p < .001$). The second timepiece also showed a statistically significant reduction in participants' SR subscale scores from Time 2 to Time 3 ($p < .001$), with an expected reduction of 1.65 points. Finally, participants' SR subscale scores did not significantly change from Time 3 to Time 5. Although these findings suggested that participants dropped below the clinical cutoff score (12) on the SR subscale by discharge, their score decrease of 5.4 points was below the 7-point decrease needed to demonstrate reliable change (Lambert et al., 2004).

Participants varied in both their starting points ($p < .001$) and rates of change in SR subscale scores within Timepiece 1 and Timepiece 3 ($p < .01$). Furthermore, the covariance parameters showed a significant negative association between starting point and change within Timepiece 3 ($p < .05$). This finding indicated that participants with higher SR subscale scores at Week 1 reported greater improvements in social role performance from discharge to 18 months postdischarge. However, contrary to findings for the OQ-45.2 total score and the other subscale scores, there was no significant correlation between the intercept and change within the first 5 weeks of treatment on the SR subscale.

Discussion

The overall findings of this study are that participants varied in their starting points and rates of change over time. On average, the participants started high on symptomatology and showed significant reductions across all scales from Week 1 to Week 5 and from Week 5 to discharge. Then, the expected symptomatology levels

stabilized from discharge to 18 months postdischarge. The constructs captured in the subscales of the OQ-45.2 all shifted in a similar pattern throughout the participants' wilderness therapy experience and after they returned to the community. Participants in our study reported an overall level of distress and impairment in functioning (an OQ-45.2 total score of 71) similar to the expected levels found within a population seeking mental health care (Lambert et al., 2004).

Our findings suggest that OBH can be an effective intervention for young adults. Participants showed statistically and clinically significant change in their time in the wilderness and maintained gains up to 18 months postdischarge. Clients reported a reduction in symptoms of distress and interpersonal difficulties and an increased sense of purpose while participating in the intervention. These gains appeared to be maintained as participants integrated back into the community and faced the stressors and challenges of young adulthood (Erikson, 1959/1980; Pottick et al., 2008).

A criticism of residential treatment in general, and a concern for OBH practitioners in particular, is that client gains may be lost after clients leave the controlled treatment environment (Leichtman & Leichtman, 2001). Results from our study showed that there was no statistically significant change in OQ-45.2 scores (total score and all subscale scores) from discharge to the 6- and 18-month postdischarge follow-ups. This finding suggests that treatment gains obtained in the wilderness residential setting were maintained, with participants remaining within the community nonpatient functioning range. In other words, they successfully moved from the inpatient score range to the community nonpatient functioning range up to 18 months after completing treatment. The maintenance of these client gains may be due to the shift in focus at the end of the OBH intervention toward preventing relapse and helping clients prepare for a successful transition out of the wilderness environment (Bray, 2014a; Gass, Gillis, & Russell, 2012). This is an encouraging finding for OBH programs and provides additional evidence for the efficacy of such interventions.

A review of the fixed-effects results for the OQ-45.2 subscales indicated that participants' reported levels of symptom distress (but not interpersonal relationships or social role performance) decreased to the point of reaching the threshold for reliable change. The SD subscale assesses for anxiety, stress, and depression (Lambert et al., 2004). Therefore, our finding is not surprising given that wilderness therapy utilizes physical activity, a regimented schedule, a healthy diet, and a highly supportive and emotionally safe environment, all of which have been found to positively influence depression and anxiety (Fox, 1999; Lopresti, Hood, & Drummond, 2013). Elements of this treatment modality may lead to an immediate decrease in symptom distress,

whereas relationship building and the establishment of social roles may take more time before noticeable changes occur. In addition, the SR subscale assesses close relationships, and the remote setting of OBH prevents clients from directly connecting with outside relationships on a regular basis. Counselors working with clients coming out of OBH may want to focus on issues of intimacy, vocation, and purpose that do not get the same attention as the intrapersonal work that occurs during OBH treatment. This focus could include client functioning in work and/or school settings, as well as the management of leisure time.

An important finding of this study was that participants who displayed greater distress at Week 1 showed greater gains both in treatment and postdischarge. The greater the level of impairment for the OBH participants, the greater the change they made in treatment. This finding is in contrast to Lambert, Hansen, and Finch's (2001) study, which found that outpatient therapy participants with significantly higher OQ-45.2 scores at intake showed less improvement over time than did those with lower intake scores. The negative correlation found in our study between the intercept and rate of change suggests that wilderness therapy may be especially effective for individuals with a high level of distress who do not respond as well to outpatient therapy. These individuals may benefit from an intensive intervention such as OBH that completely removes them from their system and the environmental stressors of civilization.

Given the results of this study, counselors can expect a significant reduction in psychological distress symptoms for clients while they are enrolled in an OBH intervention. Furthermore, improvement will show a gradual slowing down as time in the program increases. Given the relatively high, and at times prohibitive, cost of OBH programs (Bray, 2014b), the question of whether lengths of stay could be shortened without compromising outcomes is an area for further research. According to Jacobson and Truax's (1991) formula for identifying clinically significant change, participants in our study met the cutoff score and were very close to the reliable change criteria to be considered recovered after 5 weeks in the program (Lambert et al., 2004). Shorter, less expensive treatment stays could increase accessibility to this unique treatment modality, thereby opening up this intervention to underserved and underrepresented OBH populations, such as those of lower socioeconomic status. However, our finding that the participants maintained their gains postdischarge could be a factor of the intensive transition planning and solidification of learning that occur in the last few weeks of treatment.

Our study has relevant information for the lay counselor not working in an OBH setting. Our results support OBH as an appropriate treatment for clients who have not responded

to outpatient treatment and are in need of a higher level of care. In determining the appropriateness of fit between a client and an OBH program, counselors should conduct an assessment of level of functioning and symptomatology, given that higher distress levels are predictive of a more positive response to an OBH intervention. In addition, counselors may consider incorporating elements of an OBH intervention into their practice with struggling clients, including experiential exercises, exposure to nature, and group adventure activities (Pace et al., 2014).

Limitations

Although the findings from this study are encouraging, limitations exist. First, because we used self-report data and only one outcome measure, our ability to triangulate the findings in this study was limited. Second, our outcome study used a convenience sample and a within-subjects design without a control group, which allows for potential threats to internal validity (Heppner, Wampold, & Kivlighan, 2008). Maturation and history were mitigated as threats to internal validity because of the relative short duration of the OBH experience (Gay et al., 2009; Heppner et al., 2008). An additional threat to the internal validity of this study is the influence of the regression effect in the finding that the clients with the highest scores reported the greatest change. Third, the second timepiece contained only two time points, which limited our ability to examine the variances and correlations between the intercept and change within the timepiece. Fourth, as is typical with repeated measures longitudinal designs (Heppner et al., 2008), attrition affected the sample size of this study. Finally, discharge plans varied dramatically among the participants, thus introducing more potentially confounding variables in assessing the impact of the wilderness therapy intervention. Many OBH clients transition into residential, therapeutic programs to help them transition back into civilization and build off their work in the wilderness, whereas other OBH clients do not. The specific details on transition plans and lengths of stay in residential care are unknown. These differences in discharge plans introduced the possibility of additional uncontrolled variables influencing participants' changes postdischarge.

Recommendations for Future Research

Further OBH research with young adults is needed. Given the various dimensions of this distinctive treatment modality, it is difficult to discern the essential change agents. Research attempting to isolate key change factors associated with this intervention would be valuable. Findings that identify the influential factors in OBH could lead to the integration of these factors (e.g., experiential

processing, adventure-based activities, group work in natural settings) into outpatient therapy with clients in high distress who are often not responsive to traditional outpatient therapeutic approaches yet do not have the resources for OBH (Lambert et al., 2001). Furthermore, control-group study designs would help strengthen what has been solely within-subjects research in the field. Another noted limitation of this study was the introduction of various postdischarge environments for the participants. Future research that can control for and analyze the influence of various aftercare plans to inform discharge planning would be essential to increasing the long-term well-being of clients. An additional need for the field is research focused on the demographics of the participants and other program data to evaluate if outcomes vary based on different presenting problems, gender, age, length of stay, or other factors. Finally, research to determine whether long-term well-being differs based on length of stay in an OBH program would be useful in examining how much time in treatment is optimal.

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