Research Article

Research on Social Work Practice
1-14

DOI: 10.1177/1049731516647486
rsw.sagepub.com

Longitudinal Outcomes for Youth Transported to Wilderness Therapy Programs

Anita R. Tucker[1], Katie Massey Combs[2], Joanna E. Bettmann[3], Te-Hsin Chang[4], Suzanne Graham[4], Matt Hoag[2], and Callie Tatum[3]

Abstract

Purpose: Due to the ethical concern around involuntary treatment, this study sought to investigate if youth participants in wilderness therapy who were transported to the program experienced different rates of change than those not transported. **Methods:** Multilevel modeling techniques were used to investigate rates of change for youth between transported and nontransported youth over 5 points until 6 months postdischarge. In addition, repeated measures analyses of variance investigated parent reports of change over time across transport status, gender, and diagnosis. **Results:** The findings showed no differences between transported and nontransported youth in changes over time. Overall, all youth improved significantly with changes maintained postdischarge regardless of transport status. **Discussion:** This study shows that transporting youth to treatment does not appear to interfere with the treatment outcome; however, more research is needed to understand clients' perception of the transport process.

Keywords

wilderness therapy, adolescents, mental health, transport, outdoor behavioral health care

Historically, some mental health clients in crisis have been involuntarily admitted to inpatient treatment (Menninger, 2001). Currently, many adolescents in residential programs arrive to treatment involuntarily (Harper, 2009; Russell, 2007). In addition, parents and guardians sometimes choose to have their children transported to treatment facilities through the use of third-party transportation services in lieu of personally bringing them (Tucker, Bettmann, Norton, & Comart, 2015). The use of involuntary treatment within mental and behavioral health fields remains a divisive topic. Some argue that coercive treatment processes are in conflict with mental health standards (Ulla, Maritta, & Riittakerttu, 2012), while others suggest that involuntary treatment can provide minors with a needed safe environment (Hardy, 2011). Additionally, social workers question if the addition of transport practices before involuntary treatment is ethical. Is the violation of a client's right to self-determination justified by the positive outcomes of the intervention (Tucker et al., 2015)? Despite this debate, research on the use and impact of transport services on youth is limited. In an effort to fill this gap in the research, the present study explored the impact of transport use on treatment outcomes for adolescents who attended wilderness therapy programs.

Involuntary Adolescent Treatment

Guiding principles for clinicians' ethical practice evolve within disciplines' professional organizations (American Psychiatric Association, 2011; American Psychological Association, 2010; National Association of Social Workers [NASW], 2008). These guiding principles endorse themes of dignity and self-worth of clients (American Psychiatric Association, 2011; American Psychological Association, 2010; NASW, 2008) and client self-determination (American Psychiatric Association, 2011; NASW, 2008). Despite these principles, all U.S. states uphold the right to confine or isolate individuals from society for protection of its citizens from disease, criminal activity, and individuals with mental illness who pose a threat to others (Menninger, 2001). Although state laws surrounding involuntary psychiatric treatment vary (Boldt, 2012; Menninger, 2001), most state laws align closely with the terminology "dangerousness to others or to self" (Monahan, 1984). State laws typically appoint parents or legal guardians as the chief

[1] Department of Social Work, The University of New Hampshire, Durham, NH, USA
[2] Evoke Wilderness Therapy at Entrada, Santa Clara, UT, USA
[3] College of Social Work, The University of Utah, Salt Lake City, UT, USA
[4] Department of Education, The University of New Hampshire, Durham, NH, USA

Corresponding Author:
Anita R. Tucker, Department of Social Work, The University of New Hampshire, 55 College Road, Durham, NH 03824, USA.
Email: anita.tucker@unh.edu

medical decision makers for minors, those with mental illness, and those with mental disabilities (Boldt, 2012). Mandating involuntary treatment of minors as a parental right began in 1951 through the establishment of the *Draft Act for the Hospitalization of the Mentally Ill*. Although there have been several cases since then challenging the *Draft Act* as depriving minors of due process, parents today retain the right to commit their children to treatment (Boldt, 2012).

Adolescents referred for involuntary mental health treatment typically have a history of risky or dangerous behaviors and require protection from themselves and/or their environments (Kaltiala-Heino, 2010; Nijhof, Veerman, Engels, & Scholte, 2011). However, treatment outcomes for youth who enter programs involuntarily are mixed; such outcomes depend on a variety of factors including client perceptions and therapeutic engagement (Katasakou et al., 2010; Kjellin, Høyer, Engberg, Kaltiala-Heino, & Sigurjonsdottir, 2006; Newton-Howes & Stanley, 2012; Szmukler & Appelbaum, 2008). Katasakou et al. (2010) found patient satisfaction was tied to patients' perceptions of coercion, but not documented coercive measures. Notably, patients' admission status—involuntary or voluntary—did not have a causal effect on their perceptions of coercion (Katasakou et al., 2010). Interestingly, not all patients admitted involuntarily believed they entered treatment against their will (Kjellin et al., 2006). In Katasakou et al.'s study (2010), clients who felt listened to and had treatment processes explained to them believed that staff and family were acting in their best interests and reported overall less coercion, even if the circumstances were objectively coercive. The discrepancies in staff-documented coercive measures compared to patient perceptions of coercion (Katasakou et al., 2010; Kjellin et al., 2006) suggest that coercion may exist on a continuum (Newton-Howes & Stanley, 2012; Szmukler & Appelbaum, 2008). In addition, research suggests that poor early treatment motivation can be tempered through strong therapeutic alliance (Snyder & Anderson, 2009), and therapeutic alliance may increase over the course of treatment (Harper, 2009). Yet, critics of involuntary treatment suggest involuntary treatment may diminish the positive impact of therapeutic alliance and client self-determination on treatment outcome (Martin, Garske, & Davis, 2000).

Wilderness Therapy

Wilderness therapy is a therapeutic intervention which includes ''immersion in wilderness or comparable lands, group living with peers, individual and group therapy sessions, and educational and therapeutic curricula, including backcountry travel and wilderness living skills'' (Russell & Phillips-Miller, 2002, p. 415). Clinicians within wilderness therapy programs come from interdisciplinary backgrounds; however, clinical social workers can be found throughout wilderness therapy programs across the United States (Tucker & Norton, 2013). Wilderness therapy is most often used with adolescents and young adults who struggle with emotional and behavioral disorders and substance use disorders (Hoag, Massey, & Roberts, 2014; Tucker, Smith, & Gass, 2014).

Involuntary Treatment and Transport

Youth who attend wilderness therapy typically attend treatment involuntarily. Harper (2007) found that adolescents in wilderness therapy programs commonly had escalating behaviors that led parents to seek treatments alternative to traditional outpatient or inpatient settings. Further, many parents in Harper's study enrolled their children in wilderness therapy programs against their will. Parents utilizing transport services described feeling ''uncomfortable'' or ''guilty,'' but indicated no other options remained viable (2007, p. 112). Other parents expressed similar emotions, noting their children did not ''choose'' to attend treatment (p. 112). Notably, Harper (2007) found that, as treatment progressed, children's emotions commonly moved to acceptance while their parents' feelings progressed to relief.

Russell, Gillis, and Lewis (2008) studied 65 private pay and state run wilderness therapy programs and found that approximately 20 (30.7%) of the programs used transport services. The use of transportation services has become increasingly widespread in private pay treatment facilities (Community Alliance for the Ethical Treatment of Youth, 2011). A typical transport involves two trained adult staff from the transport company with one youth. Transports typically last from a few hours to a few days. Transport staff is trained in a variety of crisis management programs including therapeutic holds in case the minor resists, as well as cardiopulmonary resuscitation (CPR) and First Aid, to assist adolescents with a safe transition to the wilderness program site. Transport staff also have training in therapeutic support and establishing rapport to provide the young person with a smooth transition from home to the wilderness (Association of Mediation and Transport Services, 2016; Safe and Sound Youth Transportation, Inc., 2015). The cost of transport is estimated to average from US$2,000 to US$3,500, though this varies due to travel arrangements and the transport organization's fees (USA Guides, 2016; U.S. Transport Service, 2013). If a youth needs an airline flight to the wilderness program, the transport costs include flights for transport staff.

Only a few studies reference transport services and their implication for treatment (Becker, 2010; Harper, 2007, 2009; Russell, Gillis, & Lewis, 2008; Tucker et al., 2015). Becker (2010) highlighted current ethical issues in wilderness therapy including transport use and noted that although transport is a commonly used practice, no research to date had looked at its impact. Thus, it was unclear if the use of this coercive practice helped or hindered the therapeutic outcomes of youth participants. Since Becker's (2010) call for research, one study has specifically investigated the impact of transport on treatment outcomes for youth who attended wilderness therapy (Tucker et al., 2015). Tucker, Bettmann, Norton, and Comart (2015) found that youth transported to a wilderness therapy program

achieved the same reduction in mental health symptoms as nontransported youth (those brought to the program by their parents or other family members). These outcomes were reported both by youth and their parents, suggesting that the transport process itself did not appear to negatively impact treatment outcomes (Tucker et al., 2015). This study was limited by its pre–postdesign; hence, it was unclear if these outcomes remained postdischarge.

Beyond Transport: Outcomes Based on Gender and Diagnosis

Although studies investigating client outcomes in wilderness therapy programs have consistently found clinically significant reductions in overall psychological distress, various studies have found differences in levels of clinical change by gender and presenting issue (Hoag, Massey, Roberts, & Logan, 2013; Russell, 2003; Tucker, Zelov, & Young, 2011; Tucker, Norton, DeMille, & Hobson, 2016). In three different studies, female youth reported higher levels of dysfunction at intake and reported larger improvements from intake to discharge than their male counterparts (Tucker, Norton, et al., 2016; Tucker, Paul, Hobson, Karoff, & Gass, 2016; Tucker et al., 2011). Differences in gender existed not only in the severity of presenting problems and the magnitude of change but also in the types of issues with which youth were struggling. Tucker, Paul, Hobson, Karoff, and Gass (2016) found that at 6 months postdischarge from a wilderness therapy program, female youth were more likely to report clinical dysfunction on the Intrapersonal Distress subscale of the Youth Outcomes Questionnaire, while male youth were more likely to report clinical dysfunction on the Social Problems subscale. Notably, the girls reported high levels of emotional distress such as depression and anxiety, while boys had more inattention and inability to handle frustration as measured by these subscales. A different analysis of 473 youth in wilderness therapy programs revealed that female youth were more likely to have participated in outpatient treatment prior to the wilderness therapy program, more likely to engage in self-harming behaviors and suicide attempts, and significantly more likely to report experiences of sexual abuse, physical abuse, and emotional abuse (Bettmann, Tucker, Tracy, & Parry, 2014). Male youth were more likely to have been significantly involved in criminal activity prior to intake (Bettmann et al., 2014).

Tucker, Zelov, and Young (2011) also investigated differences in treatment outcomes based on presenting issues, finding that youth who presented with depression at intake reported significantly more reduction in mental health symptomology than youth without depression. In contrast, Tucker, Smith, and Gass (2014) looked at if youth in wilderness therapy with different presenting issues compared to those without were more likely to achieve clinically significant outcomes but found no relationship. Put simply, youth did as well regardless of presenting issue (Tucker et al., 2014). Hence, further research is needed to understand how individual characteristics of youth impact outcomes.

Current Study

Considering the lack of research on transport, social workers, other clinicians, programs, and family members cannot clearly know whether the use of transport services is conducive or obstructive to the therapeutic process. Youth attending wilderness programs rarely come to the programs voluntarily, but sometimes are still brought to the programs by their parents or family members. In other instances, parents hire a transport service to physically bring their child to the program; however, it is unclear if this transport process impacts treatment outcomes of youth in wilderness therapy programs. Research indicates that patient perceptions of coerciveness and due process impact treatment outcomes (Katasakou et al., 2010) and receptiveness to future care (Hardy, 2011).

While the literature illuminates differences in wilderness therapy outcomes for participants by gender, additional research should explore factors that account for these differences. Given that existing research is mixed regarding differences in presenting issues and level of change throughout treatment, current research should address differences based on gender and/or presenting problem rather than only outcomes within the whole sample. Thus, the present study investigated the longitudinal impact of transport on treatment outcomes of adolescents in wilderness therapy, seeking to answer the following questions:

1. Is there a difference in the rate of change in psychological functioning of youth participating in wilderness therapy programs depending on whether or not they were transported?
2. Does the effect of transport on rate of change of psychological functioning vary by gender or the four most common diagnoses (mood disorders, substance use disorders, anxiety disorders, and behavioral disorders)?
3. Are there differences between transported youth and nontransported youth functioning as reported by parents?

Method

Participants

This study included 659 adolescents who enrolled in one of four wilderness programs between June 2011 and June 2012. These four programs included Second Nature Uintas and Second Nature Entrada, both in Utah, as well as Second Nature Cascades in Oregon and Second Nature Blue Ridge in Georgia. Though operated independently, common owners and a common treatment model connect the programs. Of the 792 adolescent clients who entered the four programs, 88 refused to participate in the research, 45 were excluded due to leaving the program before completing 5 weeks, and 14 were excluded from the analysis due to missing data. We set 5 weeks as the cutoff for eligibility because the program considers the minimum length of stay as 5 weeks. Those who left before 5 weeks either left without therapist recommendation or were discharged because they were not an appropriate fit for a wilderness program. This left 645 adolescents (81.4% participation rate). Parent data were more

difficult to get at three points of time (intake, discharge, and postdischarge). Although approximately 65% of parents completed outcome data at each point of time (intake, discharge, and postdischarge), there were only 282 matched pairs of data across all three points of time (42.8% participation rate). Consistently obtaining follow-up data has been a challenge for wilderness therapy research (Tucker, Paul, et al., 2016).

Of the 645 youth participants, 68.6% were male, 18.4% were adopted, and 64.5% were transported to treatment. Clients ranged from 12 to 18 years of age with a mean age of 16.0 (SD = 1.1 years). Diagnostic categories drawn from the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth edition, Text revision (DSM IV-TR) included mood disorders, substance use disorders, anxiety disorders, behavioral disorders, attachment disorders, pervasive developmental disorders, and learning disorders. Mood diagnoses included mostly depressive disorders, but also bipolar and dysthymic disorders. Substance-related diagnoses included abuse of or dependence on alcohol, cannabis, opioids, or cocaine. Behavioral diagnoses consisted of roughly 50% attentional disorders and 50% conduct/oppositional defiant disorders. The anxiety category involved primarily generalized anxiety disorders, but also posttraumatic stress and social phobias. Most clients had two or more diagnoses and presented with behavior diagnoses (69.3%), mood disorders (67.8%), substance abuse or dependence (63.9%), and/or anxiety disorders (53.8%).

Data on ethnicity or socioeconomic status were not collected in this study; however, participants in wilderness therapy programs tend to be Caucasian and from higher income families (Russell et al., 2008). A previous study of clients at one of the four programs in the present sample indicated that 85% of the clients were identified as White or Caucasian (Hoag, Massey, Roberts, Logan, & Poppleton, 2011). Clients attended these wilderness therapy programs from 5 to 20 weeks with a mean stay of 10.3 weeks (SD = 2.3 weeks).

Transport services were selected by referral sources working with the families at admission. Parents then selected a transport service from the list provided by their referral sources, who were often educational consultants. These transport companies were licensed, insured, and belonged to the Association of Mediation and Transport Services (http://www.amats.org/).

Analyses were conducted to see if transported youth were different than nontransported youth in terms of gender, primary diagnosis, adoption status, length of treatment, or age. Chi-square analyses revealed that transported youth were not more likely than non-transported youth to be male or female, to have a specific primary diagnosis, or to be adopted. Similarly, independent samples t-tests showed no significant differences between youth who were transported versus not transported in terms of mean age or length of stay.

Data Collection

This study used a preexperimental research design with post hoc subgroup comparisons and follow-up data collected. Upon admission, adolescents and their parents were invited to participate in the evaluation. Participants in the present study signed informed consent forms, which gave permission to the programs to use client records for internal purposes, research, and publication.

Demographic information was gathered from clients' applications to the programs. Primary diagnostic information was collected from discharge summaries. Only the first four diagnoses on each client's discharge summary were utilized in the present study. Clients completed questionnaires at intake, at weeks 3 and 5 of the program, at discharge, and at 6 months postdischarge. Clients completed questionnaires on paper in the wilderness environment, except for the postdischarge instance, which they received via e-mail. Parents completed questionnaires electronically at intake, discharge, and 6 months postdischarge. This study used Outcome Tools (an online data storage program) to collect and store outcome data. Upon completion of data collection, outcome data were merged with diagnostic and demographic data in Excel and analyzed using SPSS 22.0 (IBM Corp, 2013).

Measures

This study used the Youth Outcome Questionnaire® 2.01 (Y-OQ 2.01) and the Y-OQ®–Self-Report (Y-OQ-SR) to assess change over time. The 64-item Y-OQ 2.01 is completed by the parent/guardian, while the 64-item Y-OQ-SR is completed by the adolescent. These instruments are used to measure adolescents' psychological symptoms, behavioral symptoms, and social functioning. Higher scores indicate more severe symptoms. To track client outcomes and progress, the Y-OQ 2.01 instrument developers calculated clinical cutoff scores by comparing scores from a normative sample to samples of inpatient and outpatient populations (Burlingame et al., 2005; Wells, Burlingame, Lambert, Hoag, & Hope, 1996). The clinical cutoff for Y-OQ-SR total score is 47 and for Y-OQ 2.01 parent report total score is 46. Additionally, a reliable change index (RCI) was derived for both measures by the instrument developers in order to indicate where findings are clinically significant. The RCIs offer a different, clinically meaningful way to understand the impact of an intervention beyond p values. The RCI for the Y-OQ-SR is 18; the RCI is 13 for Y-OQ 2.01 parent report (Burlingame et al., 2005).

The Y-OQ has excellent psychometric qualities and estimates of internal consistency range from .74 to .93 with a total scale estimate of .96 (Wells et al., 1996). The Y-OQ has been widely used in previous studies on wilderness therapy outcomes (Russell, 2003; Tucker et al., 2014), as well as in the only previous research on transporting clients (Tucker et al., 2015).

Treatment Model

During wilderness therapy, adolescent clients live in a remote area with direct care staff. This approach safely removes the clients from negative environments, home peer groups, and destructive behaviors, while placing them in an unfamiliar environment. Master's or doctoral-level licensed clinicians develop and supervise treatment plans. The primary therapeutic components of the programs are continuous group living and the group

milieu, extensive backcountry travel and primitive living, task accomplishment to build self-efficacy, a strong ethic of self-care and group support, and regular group and individual therapy sessions with a master's or doctoral-level therapist (Gass, Gillis, & Russell, 2012). The wilderness therapy programs in this study were licensed in their respective states.

Statistical Analyses

To address the first two research questions, the authors employed multilevel modeling of change. The first two research questions were:

> **Research question 1:** Was there a difference in the rate of change in psychological functioning of youth participating in wilderness therapy programs depending on whether or not they were transported?
> **Research question 2:** Did the effect of transport on rate of change of psychological functioning vary by gender or four most common diagnoses (mood disorders, substance use disorders, anxiety disorders, and behavioral disorders)?

For purposes of the analyses, dummy variables were created for gender (*male* = 0, *female* = 1), transport status (*not transported* = 0, *transported* = 1), anxiety diagnosis (*without anxiety* = 0, *anxiety* = 1), mood disorder diagnosis (*without* = 0, *mood disorders* = 1), substance diagnosis (*without* = 0, *substance* = 1), and behavior disorder diagnosis (*without* = 0, *behavior disorders* = 1). To answer research questions about change over time, the authors employed multilevel modeling of change (Graham, Singer, & Willett, 2008) to simultaneously investigate (1) whether there was change over time in the Y-OQ-SR for adolescents participating in wilderness therapy programs and (2) whether change in Y-OQ-SR varied by whether adolescents were transported or not, controlling for gender and primary diagnoses. The authors began analysis by determining the appropriate shape of the Level 1 growth trajectory and then subsequently fit more complex models in which the effects of transport, gender, diagnosis, and interaction effects were systematically added to the multilevel model for change.

The authors used repeated measures analyses of variance to address the third research question: Were there differences between transported youth and nontransported youth functioning as reported by parents? Specifically, several two-way (3 × 2) repeated measures ANOVAs were conducted to see if there was a relationship between change over time (intake, discharge, and postdischarge) as measured by the Y-OQ 2.01 total score and transport status (*not transported* = 0, *transported* = 1), gender (*male* = 0, *female* = 1), and the four most common diagnoses (*without* = 0, *with diagnosis* = 1).

Results

Descriptive Statistics

Y-OQ-SR. Table 1 provides descriptive statistics of observed Y-OQ-SR scores, including means, *SD*, and minimum and maximum values at Weeks 1, 3, and 5 of treatment, at discharge, and 6 months postdischarge. The means declined over time from the first week of treatment to discharge, indicating mental health improvement over the course of treatment. Six months after discharge from the program, the average Y-OQ-SR score moved up about six points, less than a fifth of a *SD*. Notably, at week 3 of treatment, the maximum value of Y-OQ-SR was at its highest possible value on the scale. In the analyses that followed, the authors investigated the potential impact of these outlying observations on the results.

Table 1. Descriptive Statistics for Y-OQ-SR Over Time.

Time	*n*	*M*	*SD*	Minimum	Maximum
Week 1	611	64.63	34.14	−16	183
Week 3	597	50.66	34.10	−16	240
Week 5	581	38.66	32.83	−16	193
Discharge	527	28.33	31.04	−16	165
6 Months postdischarge	360	34.17	27.59	−16	136

Note. $N = 645$. Y-OQ-SR = Youth Outcome Questionnaire–Self-Report.

Table 2. Descriptive Statistics for Y-OQ-SR Over Time by Transport Status.

Time by Transport Status	*N*	*M*	*SD*	Minimum	Maximum
Transported					
Week 1	392	63.11	33.68	−16	176
Week 3	392	50.98	33.29	−16	214
Week 5	375	38.94	33.26	−16	168
Discharge	343	28.25	32.01	−16	181
6 Months postdischarge	233	33.69	27.53	−11	147
Nontransported					
Week 1	219	67.34	34.88	−9	183
Week 3	205	50.04	35.68	−16	240
Week 5	206	38.15	31.14	−15	193
Discharge	184	28.48	29.22	−16	117
6 Months postdischarge	127	35.04	27.77	−16	131

Note. $N = 645$. Y-OQ-SR = Youth Outcome Questionnaire–Self-Report.

Because the main focus of the study was on differences between transported and nontransported youth, preliminary investigation also explored patterns of change in mean Y-OQ-SR scores for students transported to the program compared with those not transported. Table 2 illustrates the pattern of means, which appear to follow the same trend as for the full group. Transported students tended to have slightly higher means across all time points (except for discharge). Those patterns were explored further to understand whether there was an impact on the overall growth trajectory.

Multilevel Modeling of Change

Table 3 presents parameter estimates, standard errors (*SE*s), estimated variances, proportional reduction in estimated variances, and goodness-of-fit statistics from a series of multilevel models fitted to the Y-OQ-SR scores. To determine the shape

Table 3. Results From Fitting a Taxonomy of Multilevel Models to Y-OQ-SR Data.

Fixed Effects, and Variance Components	Model 1 Est. (*SE*)	Model 2 Est. (*SE*)	Model 3 Est. (*SE*)	Model 4 Est. (*SE*)	Model 5 Est. (*SE*)	Model 6 Est. (*SE*)	Model 7 Est. (*SE*)	Model 8 Est. (*SE*)	Model 9 Est. (*SE*)	Model 10[a] Est. (*SE*)
Fixed effects										
Initial status										
Intercept	50.49***	61.51***	64.01***	65.79***	64.17***	57.19***	56.41***	54.66***	47.10***	47.01***
	(1.20)	(1.31)	(1.33)	(2.23)	(2.39)	(3.63)	(3.90)	(4.06)	(4.60)	(4.59)
Transport				−2.77	−2.86	3.43	3.36	3.39	5.75	5.74
				(2.78)	(2.77)	(4.25)	(4.25)	(4.24)	(3.83)	(3.82)
Female					5.38†	4.81†	5.04†	4.64	4.91†	5.13†
					(2.80)	(2.78)	(2.82)	(2.82)	(2.81)	(2.80)
Mood disorders						9.59**	9.69**	9.80**	11.27**	11.12**
						(3.78)	(3.79)	(3.78)	(3.81)	(3.80)
Substance abuse							1.11	1.62	2.22	2.34
							(2.08)	(2.11)	(2.11)	(2.11)
Anxiety disorders								2.96	4.61*	4.56*
								(2.00)	(2.09)	(2.09)
Behavior diagnoses									5.59*	5.65*
									(2.24)	(2.24)
Transport × Mood Disorders						−8.25†	−8.33†	−8.68†	−9.09*	−9.03*
						(4.54)	(4.54)	(4.54)	(4.52)	(4.52)
Rate of change										
WEEK_C (linear term)	−0.75***	−5.01***	−7.18***	−7.96***	−7.67***	−7.69***	−7.69***	−7.69***	−6.83***	−6.91***
	(0.05)	(0.20)	(0.37)	(0.62)	(0.62)	(0.61)	(0.61)	(0.61)	(0.37)	(0.38)
WEEK_C (quadratic term)		0.12***	0.39***	0.44***	0.043***	0.44***	0.44***	0.44***	0.37***	0.39***
		(0.005)	(0.03)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.03)	(0.03)
WEEK_C (cubic term)			−0.006***	−0.007***	−0.007***	−0.007***	−0.007***	−0.007***	−0.006***	−0.006***
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Transport × WEEK_C				1.22	1.32†	1.35†	1.35†	1.35†		
				(0.77)	(0.75)	(0.75)	(0.75)	(0.75)		
Transport × (WEEK_C)^2				−0.09	−0.10	−0.10	−0.10	0.10		
				(0.07)	(0.07)	(0.07)	(0.07)	(0.07)		
Transport × (WEEK_C)^3				0.001	0.002	0.002	0.002	0.002		
				(0.001)	(0.002)	(0.002)	(0.002)	(0.001)		
Female × WEEK_C					−1.11**	−1.11**	−1.11**	−1.11**	−1.08*	−1.10**
					(0.41)	(0.41)	(0.41)	(0.41)	(0.41)	(0.42)
Female × (WEEK_C)^2					0.04**	0.04**	0.04**	0.04**	0.04**	0.04**
					(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)

(continued)

Table 3. (continued)

Fixed Effects, and Variance Components	Model 1 Est. (*SE*)	Model 2 Est. (*SE*)	Model 3 Est. (*SE*)	Model 4 Est. (*SE*)	Model 5 Est. (*SE*)	Model 6 Est. (*SE*)	Model 7 Est. (*SE*)	Model 8 Est. (*SE*)	Model 9 Est. (*SE*)	Model 10[a] Est. (*SE*)
Variance components										
Level 1: within person	587.55***	352.21***	305.20***	304.73***	306.78***	307.51***	307.48***	307.77***	309.07***	280.82***
	(20.65)	(15.21)	(14.44)	(14.44)	(15.06)	(15.60)	(15.55)	(16.18)	(17.04)	(13.68)
Level 2: in initial status	712.20***	861.08***	881.98***	879.74***	870***	849.14***	847.14***	840.26***	834.78***	850.30***
	(52.78)	(61.91)	(64.35)	(64.22)	(63.77)	(62.9)	(62.97)	(62.73)	(62.41)	(62.21)
Linear term										
In rate of change	0.33***	9.50***	32.88***	32.93***	30.73***	30.22***	30.23***	30.03***	29.49***	35.04***
	(0.09)	(1.61)	(5.88)	(5.91)	(6.42)	(6.92)	(6.87)	(7.49)	(8.13)	(5.88)
Quadratic term										
Variance		0.007***	0.19***	0.19**	0.17**	0.16**	0.16**	0.16†	0.15	0.20**
		(0.001)	(0.06)	(0.06)	(0.07)	(0.08)	(0.08)	(0.09)	(0.10)	(0.06)
Cubic term										
Variance			0.0001**	0.0001**	0.0001†	0.0001	0.0001	0.0001	0.0001	0.0001**
			(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00004)	(0.00005)	(0.00003)
Proportion reduction in Level 1 variance		40.05%	48.06%							
Proportion reduction in Level 2 variance	Initial			0.25%	1.36%	3.72%	3.95%	4.73%	5.35%	
	Linear			−0.2%	6.54%	8.09%	8.06%	8.66%	10.31%	
Goodness of fit										
−2LL	25,761.00	25,180.51	25,060.68	25,057.33	25,039.70	25,033.17	25,032.89	25,030.74	25,028.42	24,931.41
AIC	25,773.00	25,200.51	25,090.68	25,095.33	25,083.70	25,081.17	25,082.89	25,082.74	25,076.42	24,982.41
BIC	25,808.36	25,259.43	25,179.06	25,207.28	25,213.33	25,222.58	25,230.19	25,235.94	25,217.83	25,123.81

Note. $N = 645$. Full ML, SPSS mixed. Y-OQ-SR = Youth Outcome Questionnaire–Self-Report; AIC = Akaike information criterion; BIC = Bayesian information criterion; LL = log likelihood.
[a]Delete ID 567. †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

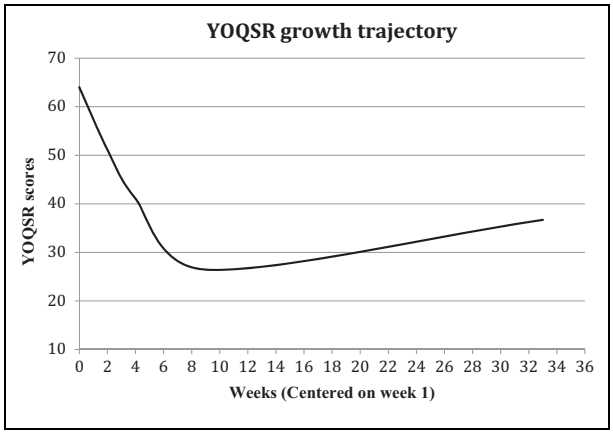

Figure 1. Prototypical plot displaying the effects of time on Youth Outcome Questionnaire–Self-Report scores between Week 1 and Week 34 at wilderness therapy programs. This plot shows a general growth trajectory with time variables only.

of the trajectory of change in Y-OQ-SR over time, the authors started by fitting Model 1, an unconditional linear growth model with linear time as the only predictor. To capture the shape of the growth trajectory, the authors also fit unconditional curvilinear growth models by adding quadratic (Model 2) and cubic effects (Model 3) of time. After exploring these different options, the authors found that the best fitting Level 1 specification included linear, quadratic, and cubic time components:

$$\begin{aligned} \mathrm{Y-OQ-SR}_{ij} = [\pi_{0i} + \pi_{1i} \times (\mathrm{WEEK}-1)_{1j} + \pi_{2i} \\ \times (\mathrm{WEEK}-1)_{ij}^2 + \pi_{3i}(\mathrm{WEEK}-1)_{ij}^3] + \varepsilon_{ij}. \end{aligned} \quad (1)$$

Equation 1 represents the change trajectory for each participant in the population. $\mathrm{Y-OQ-SR}_{ij}$ is the observed value of Y-OQ-SR for adolescent *i* at time *j*. By centering wilderness therapy treatment at Week 1, the interpretation of the model parameters is as follows: The intercept π_{0i} represents participant *i*'s true Y-OQ-SR value at Week 1 (initial status); and parameters π_{1i}, π_{2i}, and π_{3i} represent the linear, quadratic, and cubic components of participant *i*'s true rate of change over time, respectively; ϵ_{ij} represents the Level 1 residual, the part of participant *i*'s observed Y-OQ-SR score at week *j* that is not predicted by the weeks that she or he participated in the wilderness therapy program. In comparing the estimated variances of these Level 1 residuals between Models 1 and 3, we find that 48% of the original within-person variance is reduced by fitting a cubic rather than linear growth model (see Table 3).

The cubic growth can be best understood by examination of the fitted average growth trajectory in Figure 1. Figure 1 presents the average cubic growth trajectory illustrating a curvilinear relationship characterized by a rapid decline of Y-OQ-SR scores from Week 1 to approximately Week 7, then a slower decline in Week 7. There is almost no change in Y-OQ-SR between Weeks 7 and 10. However, around Week 10 or 11, the Y-OQ-SR scores slowly increased. This is not surprising because Week 10 is the average discharge week. Between Week 10 (estimated Y-OQ-SR = 26.45 points) and Week 34 (estimated Y-OQ-SR = 36.70 points), the Y-OQ-SR was predicted to increase by approximately 10.25 points. Over the 6 months following treatment, the average Y-OQ-SR scores moved close to the participants' scores at approximately 6–7 weeks into the program.

After specifying the functional form of the Level 1 model, the authors added Level 2 predictors (i.e., transport) to determine whether there were systematic differences in the Level 1 individual change trajectories as a function of the condition (i.e., transported to the program or not) and/or characteristics (i.e., gender and diagnoses) of adolescents. For example, in adding these Level 2 predictors, the authors were able to determine whether initial status and/or rate of change (linear, quadratic, and/or cubic) were related to whether adolescents were transported to the program or not (TRANSP). To answer this question, the Level 2 submodel had the following form:

$$\begin{aligned} \pi_{0i} &= \gamma_{00} + \gamma_{01} \times \mathrm{TRANSP}_i + \zeta_{0i} \\ \pi_{1i} &= \gamma_{10} + \gamma_{11} \times \mathrm{TRANSP}_i + \zeta_{1i} \\ \pi_{2i} &= \gamma_{20} + \gamma_{21} \times \mathrm{TRANSP}_i + \zeta_{2i} \\ \pi_{3i} &= \gamma_{30} + \gamma_{31} \times \mathrm{TRANSP}_i + \zeta_{3i} \end{aligned}. \quad (2)$$

In Equation 2, the intercept (π_{0i}), slope (π_{1i}), quadratic (π_{2i}), and cubic (π_{3i}) effects of time at Level 1 were treated as the Level 2 outcomes. This allowed the authors to understand how the Level 1 parameters were associated with the predictor, TRANSP. Eight fixed effects—$\gamma_{00}, \gamma_{01}, \gamma_{10}, \gamma_{11}, \gamma_{20}, \gamma_{21}, \gamma_{30}$,and$\gamma_{31}$—modeled systematic differences between change trajectories for transported and not transported youth. The residuals—$\zeta_{0i}, \zeta_{1i}, \zeta_{2i},$ and ζ_{3i}—allowed variability of each adolescent from the relevant population parameter.

The study's primary research question asked whether there were differences in participants' growth trajectories based on transport status (TRANSP). The fitted model results presented in Table 3 (Model 4) show that participants who were transported and those who were not did not differ by either initial status or any of the time parameters. However, the authors kept the effect of TRANSP in the model to further test whether the effect of TRANSP (parameters) changed when adding other Level 2 variables or whether the effect of transport status interacted with other variables.

In Model 5, the authors investigated the relationship between individual growth parameters and predictors (i.e., FEMALE). The authors also tested two-way interaction between FEMALE and TRANSP, but no effect was found. The authors found significant differences between genders on their initial status at $p < .10$ level ($t = 1.92$, $p = .055$), and on linear (-2.69, $p < .05$) and quadratic ($t = 3.24$, $p < .05$) effect on rate of change at $p < .05$ level. Female participants (gray line) tended to have a faster improvement rate on their Y-OQ-SR scores while they attended the program (Weeks 1–10; see Figure 2). Although females' average Y-OQ-SR scores were estimated to be about five points higher than males' scores (black line) in the first week of the program, Model 5 estimated that females had about the same average Y-OQ-SR scores as males by Week 5 or 6. By Week 10 (the average discharge week of

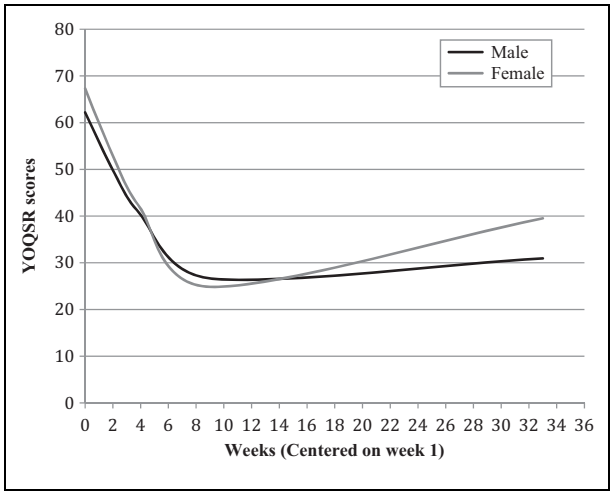

Figure 2. Prototypical Youth Outcome Questionnaire–Self-Report trajectory displaying fitted growth curves for GENDER.

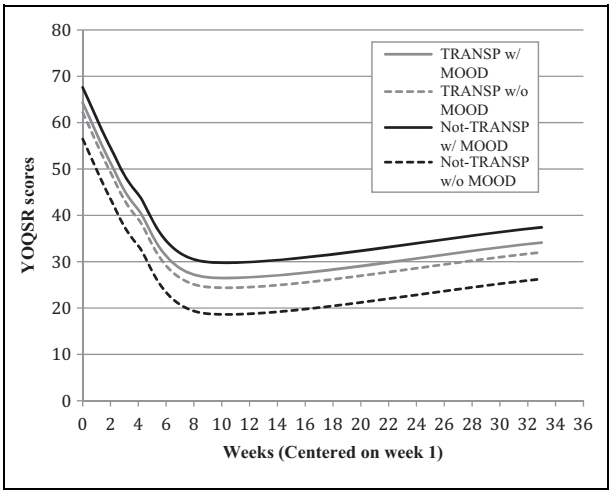

Figure 3. Prototypical Youth Outcome Questionnaire–Self-Report trajectory displaying fitted growth curves for mood disorder and transported to program.

the program), female participants' average Y-OQ-SR scores were estimated to be about two points lower than male participants' scores. However, females' average Y-OQ-SR scores tended to rise following discharge at a faster rate compared with their male counterparts. By 6 months after program discharge, the female–male differential was about nine points, almost twice as large as the initial difference.

In Models 6–10, the authors added the four diagnosis dummy variables (MOOD, SUBST, ANX, and DISBEH) individually into the Level 2 model. After fitting Model 9, the authors conducted a normality test and found an unusual data point: ID 567 second measurement. The authors decided to remove the data points from the data set; hence, Model 10 was the final model. For each diagnosis, the authors tested its effect on initial status, rate of change, and its interaction with TRANSP. The results show that the effects of those diagnoses do not differ by time; further, there were no two-way interactions between TRANSP and three of the diagnoses (ANX, DISBEH, and SUBST). Therefore, the authors removed these three diagnoses from the model and proceeded to the next model. After adding all variables in the model, the effect of TRANSP did not differ by time. Therefore, the authors removed all interaction between TRANSP and time variables in Model 9. As shown in Table 3, compared with the unconditional cubic growth model, the estimated variance in initial Y-OQ-SR scores is reduced by approximately 5% by including Level 2 predictors, and the estimated variance in rate of change (linear component) is reduced by approximately 10% by including these predictors. These statistics are not computed for Model 10 because that model is estimated with a different sample (atypical case 567 removed), and therefore the estimated variances for Model 10 cannot be directly compared with prior models.

The authors found that among the four diagnoses, only substance use/abuse did not reach significance level on its initial status, meaning that there was no difference between participants who used substance and those who did not in terms of mean Y-OQ-SR scores ($t = 1.12$, $p = .27$). However, the authors kept substance use/abuse in the model because it is one of the four most common diagnoses for adolescents in wilderness therapy programs. Participants with anxiety disorders tended to have Y-OQ-SR scores that were about 4.56 points ($t = 2.18$, $p < .05$) higher than their counterparts without anxiety disorders. Participants with behavioral disorders tended to have Y-OQ-SR scores that were about 5.65 points ($t = 2.52$, $p < .05$) higher over time than participants without behavioral disorders.

The only notable interaction found was between TRANSP and MOOD ($t = -2.00$, $p < .05$; see Figure 3). When students were transported to the program, the authors estimated that average Y-OQ-SR scores differed by 2.12 points between those adolescents with and without mood disorders (the vertical separation between gray solid and dashed lines), at all points in time. The effect of MOOD for students who were not transported to the program was much larger: approximately 11.12 points (difference between black solid and dashed lines). Compared to students diagnosed with mood disorders, transported students (gray solid line) tended to have average Y-OQ-SR scores that were about 3.26 points higher than students who were not transported (black solid line). This effect of transport was also evident for students without mood disorders, but the effect was the opposite and larger—with an average difference of 5.74 points—between those who were transported (gray dashed line) and who were not (black dashed line; see Figure 3).

Parent Data

To answer the third research question, repeated measures ANOVAs were conducted. Table 4 shows the Y-OQ 2.01 means as reported by parents on the Y-OQ 2.01 total score over time (TIME) as well as comparisons based on transport status, gender, and diagnosis. For the one-way repeated

Table 4. Comparisons of Mean Y-OQ 2.01 Total Scores at Week 1, Discharge, and 6 Months Postdischarge as Reported by Parents Across Transport Status, Gender, and Diagnoses.

Transport Status, Gender and Diagnoses	Week 1 *M* (*SD*)	Discharge *M* (*SD*)	6 Months Postdischarge *M* (*SD*)
All youth ($N = 282$)	**96.16** (25.7)	29.20[a] (27.6)	34.32[a] (28.9)
Transported ($n = 184$)	**97.54** (24.6)	28.19[a] (26.0)	34.46[a] (29.5)
Nontransported ($n = 97$)	**93.90** (27.7)	31.06[a] (30.7)	34.24[a] (28.0)
Males ($n = 190$)	**94.12** (24.8)	28.31[a] (28.1)	33.49[a] (28.6)
Females ($n = 92$)	**100.38** (27.2)	31.03[a] (26.7)	36.02[a] (29.6)
Mood disorder ($n = 196$)	**98.02** (24.9)	30.24[a] (26.8)	33.92[a] (26.9)
No mood disorder ($n = 84$)	**91.98** (27.1)	26.11[a] (29.4)	34.73[a] (33.3)
Anxiety ($n = 159$)	**99.26** (25.2)	29.33[a] (27.8)	35.66[a] (27.3)
No anxiety ($n = 121$)	**92.19** (26.1)	28.63[a] (27.5)	32.19[a] (30.7)
Conduct/behavior disorder ($n = 187$)	**96.73** (25.3)	29.86[a] (29.0)	35.74[a] (30.0)
No conduct/behavior ($n = 93$)	**95.14** (26.8)	27.35[a] (24.7)	30.98[a] (26.4)
Substance abuse ($n = 177$)	**95.11** (25.2)	26.25[a] (27.0)	30.99[a] (28.0)
No substance abuse ($n = 103$)	**98.08** (26.7)	33.80[a] (28.1)	39.61[a] (29.7)

Note. Bold scores indicate scores at or above clinical cutoffs for Y-OQ 2.01. Y-OQ 2.01 = Youth Outcome Questionnaire Parent Report.
[a]Reflects changes considered to be clinically significant as measured by reliable change index of 13 points for Y-OQ 2.01.

measures ANOVA looking at change of Y-OQ 2.01 across time, the Huynh-Feld test was utilized to adjust for the violation of the assumption of sphericity. The corrected results of the Huynh-Feld test show an overall significant difference for TIME, $F(1.98, 558) = 658.524$, $p < .001$. The results of the multivariate Wilks's λ test also show an overall significant difference between the Y-OQ 2.01 means at Week 1, at the point of discharge, and 6 months postdischarge, $F(2, 278) = 593.10$, $p < .001$. Results of the Bonferroni pairwise comparisons show that all three means were significantly different from each other. The mean total Y-OQ 2.01 score at intake was significantly different higher than that at discharge ($p < .001$) and 6 months postdischarge ($p < .001$). In addition, the mean total Y-OQ 2.01 score at postdischarge was significantly higher at 6 months postdischarge ($p = .04$). Over 80% of the variance in Y-OQ 2.01 total scores was accounted for by TIME (partial $\zeta^2 = .81$). It is important to note that means at discharge as well as postdischarge were below the clinical cutoff of 46. The mean level of change over time was large enough to be considered clinically significant (RCI = 13).

Additional two-way repeated measures of ANOVA were conducted to see the differences between Y-OQ 2.01 total scores over time and to see whether these measures were different based on transport status, gender, and diagnosis. For all of the analyses, the results of the within-subjects effects (TIME) show significant differences at Week 1 of treatment, at discharge, and 6 months postdischarge. The results of the two-way repeated measures ANOVA tests of between-subjects effects showed no significant differences between transported versus nontransported youth, $F(1, 279) = .017$, $p = .895$, or between males and females, $F(1, 280) = 2.27$, $p = .133$. Similarly, there were no differences found between youth with or without mood disorders, $F(1, 278) = 1.428$, $p = .233$, youth with or without anxiety, $F(1, 278) = 2.393$, $p = .123$, and no significant differences found between youth with or without conduct/behavior disorders, $F(1, 278) = 1.339$, $p = .248$. The

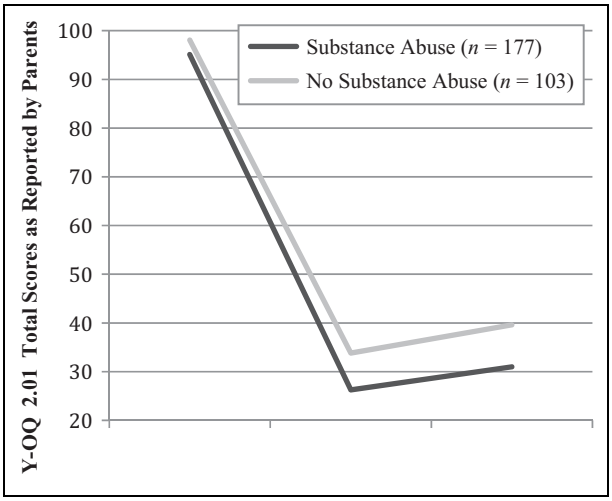

Figure 4. Comparisons of mean Y-OQ 2.01 change over time for youth with or without substance abuse diagnoses as reported by parents.

results of the repeated measures ANOVA test of between-subject effects for substance abuse did find significant mean differences between youth with and without substance abuse diagnoses, $F(1, 278) = 6.663$, $p = .01$. Youth with a substance abuse diagnoses had lower Y-OQ 2.01 total scores as reported by parents at intake, discharge, and postdischarge. Figure 4 shows the means across time. However, less than 3% of the variance in Y-OQ 2.01 mean change was accounted for due to substance abuse (partial $\zeta^2 = .023$). There were no significant interaction effects between time, transport status, gender, or diagnoses.

Discussion and Applications to Practice

This study adds substantially to the literature regarding transport services in wilderness therapy programs. Previous

literature suggests that youth who attended wilderness therapy have reduced mental health symptomology after treatment (Bettman, Russell, & Parry, 2013; Combs, Hoag, Roberts, & Javorski, 2015; Harper & Russell, 2008; Hoag, Combs, Roberts, & Logan, 2016; Russell, 2003). The present study supports these findings, but adds to them by analyzing the trajectory of change of transported and nontransported adolescents in wilderness therapy and investigating the effect of transport after discharge. The findings of the present study concur with the results of Tucker et al.'s (2015) study that youth transported to wilderness therapy programs achieved the same reductions in mental health symptoms as nontransported youth, according to both adolescent self-reports and parent reports. The addition of the present study's multiple in-treatment data points, postdischarge data, and sophisticated methodology further strengthens the findings here by supporting that change was maintained after youth left treatment.

The present study found that transport alone did not appear to affect treatment outcomes. Transported and nontransported youth were similar in terms of initial mental health acuity and had similar trajectories of change from intake to 6 months postdischarge as reported by youth and according to parents' reports of mean differences over time. These findings suggest that transport was not associated with negative wilderness treatment outcomes. Previous research suggests that clients who felt listened to and had treatment processes explained to them believed that staff and family were acting in their best interests and reported overall less coercion, even if the circumstances were objectively coercive (Katasakou et al., 2010). From this perspective, perhaps adolescents who were transported had the experience of being listened to and had treatment processes explained to them by the transport professionals who brought them to the wilderness programs. Participants may have formed alliances with the transport staff and experienced transport as less coercive.

In order to increase the confidence in our findings, data were collected both from youth and their parents. Wilderness therapy outcomes research at times has relied only on youth self-report data (Bettmann, Russell, & Parry, 2013; Magle-Haberek, Tucker, & Gass, 2012; Tucker et al., 2014); this study used a stronger research design to fill the gaps in the previous research. In terms of transport, youth and parent outcomes were aligned; yet, this use of triangulation did find some interesting discrepancies between youth and parents. According to youth, mood disorder was the only variable which had a significant interaction with being transported. As shown in Figure 3, students who were not transported and had a mood disorder scored more than three points higher on the Y-OQ-SR (indicating greater distress) than students who were transported and had a mood disorder. Those students without a mood disorder who were transported scored close to 6 points higher than those students not transported without a mood disorder. Thus, being transported from the youth's perspective was associated with better functioning for youth with mood disorders, but was the opposite for those without mood disorders. Those transported without mood disorders arrived at the program in more acute distress than those not transported and their level of functioning remained more acute over the course of treatment than those not transported.

The reasons for these findings are unclear, especially since there were no other interactions found between transport status and the other three diagnoses and parent data did not find such a difference for youth with mood disorders, anxiety, or conduct/behavior disorders or their interactions with transport status. Besides the present study, previous research has not considered the interaction of transport and diagnosis on treatment outcomes. Tucker et al. (2015) found that parents reported transported youth were more acute at intake according to the Y-OQ, thus suggesting a reason for the parents' choice of transport. It may be that those with mood disorders present more acutely to treatment. As shown in Figure 3, youth with mood disorders regardless of transport arrived at wilderness therapy more acute than those without mood disorders. Perhaps transport as a process is better paired with youth experiencing certain presenting issues, such as mood disorders. It is also possible that, in this sample, youth with mood disorders transported to treatment by their parents or guardians felt they escalated during the transport process. Clearly, more research is needed in order to understand how transport and diagnosis interact, especially if transport might be contraindicated for youth with certain diagnostic issues.

Additional discrepancies were found between parent and youth reports in terms of gender and diagnosis. Regarding gender, both parent and youth reported significantly higher levels of mental health symptomology for girls at intake, with a difference around five to six points between youth and parent reports. However, youth reported rates of change faster for girls than boys, with girls about two points below males at 10 weeks (estimated discharge) and then nine points above males at 6 months postdischarge (see Figure 2). Parents did not report such large differences over time. In fact, the between-subjects ANOVA found no differences based on gender over time. Parents of females reported less than a three-point difference in Y-OQ 2.01 scores at 6 months postdischarge compared to males (see Table 4).

Youth and parent discrepancies are not uncommon in wilderness therapy research nor are gender differences. Research looking at changes from intake to discharge using the Y-OQ-SR has consistently found females to report higher levels of dysfunction at intake, while doing better than males at discharge (Magle-Haberek et al., 2012; Tucker et al., 2014). However, few studies have considered outcomes postdischarge or included parent reports to understand the differences between youth and parents over time. Combs, Hoag, Roberts, and Javorski (2015) studied parent reports of Y-OQ change until 18 months post wilderness and found no significant differences across gender on postdischarge trajectories of change. More recently, Tucker, Paul, et al. (2016) looked at Y-OQ mean scores at intake, discharge, and 6 months postdischarge as reported by youth and parents from 17 different wilderness therapy programs. Similarly to the present study, female participants and mothers of females reported significantly higher

Y-OQ scores compared to males at intake and 6 months postdischarge. Reports from fathers, however, showed no differences by gender at intake or discharge. But, at 6 months postdischarge, fathers of females reported significantly higher Y-OQ scores for their children than fathers of males (Tucker, Paul, et al., 2016).

Finally, the present study found that from a parents' perspective, youth with substance abuse diagnoses had higher levels of change across time regardless of transport status and were overall less acute than youth without substance issues. Notably, youth in the present study reported no differences between those with or without substance-related diagnoses at intake and no differences in rates of change. These youth findings reflect previous research in which youth report significant improvement between intake and discharge regardless of diagnosis, suggesting it is effective for a variety of youth with complex presenting issues (Combs et al., 2015; Magle-Haberek et al., 2012; Tucker et al., 2014).

In the present study, it is unclear why parents of youth with substance abuse issues reported their children as less acute than parents of those without substance abuse issues. Often, substance abuse is only one of multiple presenting issues (Bettmann et al., 2014; Combs et al., 2015; Tucker et al., 2014), as was the case in our study. Previous research with wilderness therapy youth participants found that 77% of youth had three more presenting issues that led them to treatment (Tucker, Paul, et al., 2016). Hoag, Massey, Roberts, and Logan (2013) found that over 60% of adolescents in wilderness treatment had a substance-related diagnosis; however, mood and behavioral issues were most likely to be a primary diagnosis (Hoag et al., 2013). The inability to differentiate dual diagnoses in the data set in the present study limits the understanding of whether these differences are due to the characteristics of substance abuse or to a combination of characteristics. Ultimately, future research should continue to explore how gender and diagnosis play a role in wilderness treatment outcomes. Many questions remain unanswered.

While it seems clear from the present findings that transport was not associated with negative treatment outcomes, such findings may reflect the practices of transport services that offer the most experienced personnel. Tucker et al. (2015) stressed how their findings reflected the combination of a quality transport with a quality wilderness program. The same caution applies to the present study. The findings of the present study similarly cannot be generalized to all transport practices. Further replication is needed beyond individual program evaluations to truly know if transport indeed does not pose harm to youth. Currently, there are no clear regulations around transport practices (Tucker et al., 2015). The Association of Mediation and Transport Services (2016) does provide basic guidelines for programs that seek membership including three letters of recommendation, liability insurance, Federal Bureau of Investigation background checks, and lack of criminal history for staff. But the type and depth of training required is not enumerated nor are best practices clearly defined. For this reason, future qualitative research looking in depth at the quality of the transport relationship and training of transport staff would help to differentiate reasoning for these findings. Such research could also contribute to dialogue that might delineate best practices around transport services. Without this research, parents and programs considering transport need to be cautious in their screening of transport services and weigh an agency's level of training of staff and safety history in their decision-making.

It is important to understand the present findings in light of their limitations. The preexperimental design with no control group limits the generalizability of the present findings as well as the internal validity of research. In addition, there was a high level of attrition in terms of parent data at 6 months posttreatment. Obtaining follow-up data from wilderness therapy participants has been a consistent challenge in the outcomes research (Tucker, Paul, et al., 2016). Bettmann, Russell, and Parry (2013) note how it can be a significant challenge "compelling parents and adolescent clients six-months post-treatment to complete a series of instruments once they are far from the WT (wilderness therapy) environment" (p. 1042). In addition, many youth do not go directly home after wilderness treatment, but transition to other residential treatment centers which add an additional level of "required consent and communication from administrators" which is needed to collect the data (Bettmann et al., 2013, p. 1042). Despite this trend of high attrition, our study's rate of parent data attrition (52.3%) was significantly lower compared to other research in the field (85%; Tucker, Paul, et al., 2016).

Also, the four programs in this study were connected by ownership and used similar wilderness therapy models. In addition, the programs from the present study are well-established and licensed programs. Thus, the findings from the present study may not be generalizable to all wilderness therapy programs or transport services utilized in the field. Continued research with increased participation from parents that is beyond these few programs is needed in order to establish that transporting youth may not be harmful to youth. Appropriate next steps in evaluating the impact of transport include investigating why parents chose a transport service and adolescents' perceptions of coercion. Measuring clients' perceptions of coercion is critical in understanding the effect of transport on adolescent wilderness therapy outcomes.

Despite its limitations, the present study suggests that use of transport services appears to be conducive, rather than obstructive, to the therapeutic outcomes of wilderness therapy programs. The findings indicate that the participants and their parents reported consistent significant improvements from intake to discharge to postdischarge. Despite gender and diagnosis differences, youth- and parent-reported mean changes were large enough to be considered clinically significant and these improvements were maintained at 6 months posttreatment. These findings suggest that wilderness therapy is a promising alternative treatment for adolescents with a range of issues who have not responded positively to more traditional or less restrictive treatments.

Declaration of Conflicting Interests

The authors declared the potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Katie Massey Combs and Matt Hoag are employed by the wilderness therapy programs where the data were gathered. Both were involved in the data collection; however, neither were involved in the data analysis or writing of the findings for this study.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Katie Massey Combs and Matt Hoag are employed by the wilderness therapy programs where the data were gathered. Both were involved in the data collection; however, neither were involved in the data analysis or writing of the findings for this study.

References

American Psychiatric Association. (2011). *American Psychiatric Association practice guidelines*. Retrieved from http://psychiatryonline.org/guidelines

American Psychological Association. (2010). *Ethical principles of psychologists and code of conduct including 2010 amendments: General principles*. Retrieved from http://www.apa.org/ethics/code/index.aspx?item=3

Association of Mediation and Transport Services. (2016). *AMATS guidelines*. Retrieved from http://www.amats.org/guidelines.html

Becker, S. P. (2010). Wilderness therapy: Ethical considerations for mental health professionals. *Child & Youth Care Forum*, *39*, 47–61. doi:10.1007/s10566-009-9085-7

Bettmann, J. E., Russell, K. C., & Parry, K. J. (2013). How substance abuse recovery skills, readiness to change and symptom reduction impact change processes in wilderness therapy participants. *Journal of Child and Family Studies*, *22*, 1039–1050. doi:10.1007/s10826-012-9665-2

Bettmann, J. E., Tucker, A. R., Tracy, J., & Parry, K. (2014). An exploration of gender, client history and functioning in wilderness therapy participants. *Residential Treatment for Children and Youth*, *31*, 155–170. doi:10.1080/0886571X.2014.943554

Boldt, R. C. (2012). Adolescent decision making: Legal issues with respect to treatment for substance misuse and mental illness. *Journal of Health Care Law and Policy*, *15*, 75–115.

Burlingame, G. M., Wells, M. G., Cox, J. C., Lambert, M. J., Latkowski, M., & Justice, D. (2005). *Administration and scoring manual for the Y-OQ*. Wharton, NJ: American Professional Credentialing Service.

Combs, K. M., Hoag, M. J., Roberts, S., & Javorski, S. (2015). A multilevel model to examine adolescent outcomes in Outdoor Behavioral Healthcare: The parent perspective. *Child & Youth Care Forum*. Advanced online publication. doi:10.1007/s10566-015-9331-0

Community Alliance for the Ethical Treatment of Youth. (2011). *Points of advocacy: Examining the issues of concern surrounding residential programs for youth*. Washington, DC: Author.

Gass, M. A., Gillis, H. L., & Russell, K. C. (2012). *Adventure therapy: Theory, practice, & research*. New York, NY: Routledge.

Graham, S. E., Singer, J. D., & Willett, J. B. (2008). An introduction to the multilevel model for change. In P. Alasuutari, L. Bickman, & J. Brannen (Eds.), *Handbook of social research methods* (pp. 377–394). Thousand Oak, CA: Sage.

Hardy, C. (2011). Adolescent treatment coercion. *Journal of Therapeutic Schools & Programs*, *5*, 88–95.

Harper, N. J. (2007). *A mixed methods examination of family involvement in adolescent wilderness therapy*. Doctoral dissertation, University of Minnesota, Minneapolis, MN. (UMI No. 3287816).

Harper, N. J. (2009). Family crisis and the enrollment of children in wilderness treatment. *Journal of Experiential Education*, *31*, 447–450.

Harper, N. J., & Russell, K. C. (2008). Family involvement and outcome in adolescent wilderness treatment: A mixed-methods evaluation. *International Journal of Child & Family Welfare*, *1*, 19–36.

Hoag, M. J., Combs, K. M., Roberts, S. D., & Logan, P. (2016). What changes in wilderness therapy: Moving beyond outcome. *Journal of Therapeutic Schools and Programs*, *8*, 46–54. doi:10.19157/JTSP.issue.08.01.06

Hoag, M. J., Massey, K. E., & Roberts, S. D. (2014). Dissecting the wilderness therapy client: Examining clinical trends, findings, and industry patterns. *Journal of Experiential Education*, *37*, 382–396.

Hoag, M. J., Massey, K. E., Roberts, S. D., & Logan, P. (2013). Efficacy of wilderness therapy for young adults: A first look. *Journal of Residential Treatment for Children and Youth*, *30*, 294–305.

Hoag, M. J., Massey, K. E., Roberts, S., Logan, P., & Poppleton, L. (2011, September). *What changes in wilderness therapy: Moving beyond outcome*. Paper presented at the meeting of the Utah Regional Conference of the National Association of Therapeutic Schools and Programs, Provo, UT.

IBM Corp. (2013). *IBM SPSS Statistics for Windows, Version 22.0*. Armonk, NY: IBM Corp.

Kaltiala-Heino, R. (2010). Involuntary commitment and detainment in adolescent psychiatric inpatient care. *Social Psychiatry and Psychiatric Epidemiology*, *45*, 785–793.

Katasakou, C., Bowers, L., Amos, T., Morriss, R., Rose, D., Wykes, T., & Priebe, S. (2010). Coercion and treatment satisfaction among involuntary patients. *Psychiatric Services*, *61*, 286–291.

Kjellin, L., Høyer, G., Engberg, M., Kaltiala-Heino, R., & Sigurjonsdottir, M. (2006). Differences in perceived coercion at admission to psychiatric hospitals in the Nordic countries. *Social Psychiatry & Psychiatric Epidemiology*, *45*, 241–247. doi:10.1007/s00127-005-0024-0

Magle-Haberek, N., Tucker, A. R., & Gass, M. (2012). The effects of program differences within wilderness therapy and residential treatment center (RTC) programs. *Residential Treatment for Children and Youth*, *29*, 202–218. doi:10.1080/0886571X.2012.69743

Martin, D. J., Garske, J. P., & Davis, M. K. (2000). Relation of the therapeutic alliance with outcome and other variables: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, *68*, 438–450. doi:IO.I037//0022-006X.68.3.438

Menninger, J. A. (2001). Involuntary treatment: Hospitalization and medications. In J. Jacobson & A. Jacobson (Eds.), *Psychiatric secrets* (2nd ed., pp. 477–484). Philadelphia, PA: Hanley & Belfus.

Monahan, J. (1984). The prediction of violent behavior: Towards a second generation of theory and policy. *American Journal of Psychiatry*, *141*, 10–15.

National Association of Social Workers. (2008). *Code of ethics*. Retrieved from http://www.socialworkers.org/pubs/code/code.asp

Newton-Howes, G., & Stanley, J. (2012). Prevalence of perceived coercion among psychiatric patients: Literature review and meta-regression modeling. *The Psychiatrist*, *35*, 335–340. doi:10.1192/pb.bp.111.037358

Nijhof, K. S., Veerman, J. W., Engels, R., & Scholte, R. (2011). Compulsory residential care: An examination of treatment improvement of individual and family functioning. *Children & Youth Services Review*, *33*, 1779–1785.

Russell, K. C. (2003). An assessment of outcomes in outdoor behavioral healthcare treatment. *Child & Youth Care Forum*, *32*, 355–381.

Russell, K. C. (2007). *Summary of research from 1999–2006 and update to 2000 survey of outdoor behavioral healthcare programs in North America*. Minneapolis: University of Minnesota.

Russell, K. C., Gillis, H. L., & Lewis, T. G. (2008). A five-year follow-up of a survey of North American outdoor behavioral healthcare programs. *Journal of Experiential Education*, *31*, 55–77.

Russell, K. C., & Phillips-Miller, D. (2002). Perspectives on the wilderness therapy process and its relation to outcome. *Child & Youth Care Forum*, *31*, 415–437.

Safe and Sound Youth Transportation, Inc. (2015). *Staff training*. Retrieved from http://www.safeandsoundtransportation.com/index.php/staff-training

Snyder, C. M. J., & Anderson, S. A. (2009). An examination of mandated versus voluntary referral as a determinant of clinical outcome. *Journal of Marital and Family Therapy*, *35*, 278–292. doi:10.1111/j.1752-0606.2009.00118.x

Szmukler, G., & Appelbaum, P. S. (2008). Treatment pressures, leverage, coercion, and compulsion in mental health care. *Journal of Mental Health*, *17*, 233–244. doi:10.1080/09638230802052203

Tucker, A. R., Bettmann, J., Norton, C. L., & Comart, C. (2015). The role of transport use in adolescent wilderness treatment: Its relationship to readiness to change and outcome. *Child and Youth Care Forum*, *44*, 671–686. doi:10.1007/s10566-015-9301-6

Tucker, A. R., & Norton, C. L. (2013). The use of adventure therapy techniques by clinical social workers: Implications for practice and training. *Clinical Social Work Journal*, *41*, 333–343. doi:10.1007/s10615-012-0411-4

Tucker, A. R., Norton, C. L., DeMille, S., & Hobson, J. (2016). The impact of wilderness therapy on physical and emotional health: Utilizing an integrated approach in outdoor behavioral healthcare. *Journal of Experiential Education*, *39*, 15–30. doi:10.1177/1053825915607536

Tucker, A. R., Paul, M., Hobson, J., Karoff, M., & Gass, M. (2016). Outdoor behavioral healthcare: Its impact on family functioning. *Journal of Therapeutic Schools & Programs*, *8*, 21–40. doi:10.19157/JTSP.issue.08.01.05

Tucker, A. R., Smith, A., & Gass, M. (2014). How presenting problems and individual characteristics impact successful treatment outcomes in residential and wilderness treatment programs. *Residential Treatment for Children & Youth*, *31*, 135–153. doi:10.1080/0886571X.2014.918446

Tucker, A. R., Zelov, R., & Young, M. (2011). Four years along: Emerging traits of programs in the NATSAP Practice Research Network (PRN). *Journal of Therapeutic Schools & Programs*, *5*, 10–28.

Ulla, S., Maritta, V., & Riittakerttu, K. H. (2012). The use of coercive measures in adolescent psychiatric inpatient treatment: A nationwide register study. *Social Psychiatry & Psychiatric Epidemiology*, *47*, 1401–1408. doi:10.1007/s00127-011-0456-7

USA Guides. (2016). *USA Guides: Youth transport fees*. Retrieved from http://www.youthtransport.us/

U.S. Transport Service. (2013). *US Transport Service: Transport fees*. Retrieved from http://www.ustransportservice.com/transport_fees_for_safe_transport_Escort_Services_at-risk_teens.amp

Wells, M., Burlingame, G., Lambert, M., Hoag, M., & Hope, C. (1996). Conceptualization and measurement of patient change during psychotherapy: Development of the outcome questionnaire and the youth outcome questionnaire. *Psychotherapy*, *33*, 275–283.