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Promoting resiliency in adolescent girls through adventure programming

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This study examined whether participation in an adventure program increased the resiliency of adolescent girls. Eighty-seven girls who participated in Dirt Divas, a non-profit, adventure program, completed the Resiliency Scale for Children and Adolescents[®] before and after their experience. Means-comparison tests for within-subjects designs were conducted and revealed that participants reported significantly higher levels of resilience after completing the Dirt Divas program, compared with their pre-program reports. Mixed-model repeated-measures analyses of variance showed that the changes in the girls' resiliency were not affected by their socio-economic status. Lastly, the long-term impact results (one month post participation) indicate that observed increases in resilience persist over time.

Keywords: adolescent girls; resiliency; adventure programs

Introduction

The field of adventure programming seeks to define and develop ways to promote resiliency in youth through intentionally designed programming (Cooper, Estes, & Allen, 2004; Stiehl & Parker, 2007). Adventure programs mimic the internal and external factors necessary for resiliency (Beightol, Jeverson, Gray, Carter, & Gass, 2009; Benard & Marshall, 2001), so they have the potential to improve resiliency in participants (Ewert & Yoshino, 2011; Neill & Dias, 2001). Adventure programs are offered in a variety of settings—wilderness and after-school programs, therapeutic settings, camps, schools and corporate settings (Sibthorp, 2003)—and differ in length, purpose and type of experience offered (Sibthorp & Morgan, 2011). Camps routinely use adventure programming methods as a means for promoting change in individuals and often seek to enhance youths' resiliency through these experiences. Ungar, Dumond, and McDonald (2005) found qualitative evidence that at-risk youth experienced positive outcomes by participating in outdoor programs. Additionally, Whittington and Budbill (2013) found qualitative evidence that an adventure program promoted resiliency in girls. Lacking in the literature is a quantitative analysis of whether adventure programs promote resiliency in girls using a standardized measurement tool.

This study examined whether Dirt Divas, an adventure program offered through a non-profit organization called Vermont Works for Women, supports resiliency in girls. Dirt Divas uses mountain biking as the main adventure activity. The experience occurs in the natural environment and uses a day-camp model. Using the Resiliency Scale for Children and Adolescents[®] (RSCA[®]) this study implemented a pre and post data

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collection on the first and last days of girls' participation in order to examine whether participation in an adventure program, focused on the developmental needs of girls, promotes resiliency. Additional factors analyzed include socioeconomic status (SES) and whether high or low SES altered the outcomes of resiliency. The scale was also administered to a subset of girls one month after participation to examine whether these changes remained after the program's conclusion.

Literature review

The literature review is divided into two sections. The first section describes various definitions of resiliency and the characteristics that make up a resilient youth, explores the internal and external factors that support resiliency, and identifies risks that pose a challenge to resiliency. The second section defines adventure programming, examines positive outcomes of adventure program participation, and describes how adventure programs support the internal and external factors that promote resiliency.

Resiliency and youth

The concept of resilience has been extensively debated and defined in the literature. Ahern (2006) compared resiliency definitions from over 22 articles focused on youth and determined that adolescent resilience is a 'dynamic concept that can change with time' (p. 176). Simply defined, resilience is a combination of traits (Olsson, Bond, Burns, Vella-Brodrick, & Sawyer, 2003), the ability to effectively cope with challenges, stress or adversity (Short & Russell-Mayhew, 2009), and the internal and external factors that shape and/or support an individual (Prince-Embury, 2007).

Furthermore, resiliency is the ability to respond or perform positively in the face of adversity and to achieve despite disadvantages (Bottrell, 2009; Brennan, 2008; Fergus & Zimmerman, 2005; Short & Russell-Mayhew, 2009). Short and Russell-Mayhew describe a resilient youth as an 'emotionally healthy individual who is able to successfully confront and negotiate a multitude of challenges, and effectively cope with obstacles, barriers, or setbacks' (2009, p. 215). Schoon (2006) indicates that resilience has been used to represent at least three distinct processes: maintaining positive functioning while experiencing adversity; returning to baseline levels of functioning after major adversity or trauma; and being strengthened by exposure to adversity.

Resiliency consists of both internal and external factors that shape an individual. Internal factors include positive self-evaluation (self-esteem, positive sense of self and strong sense of worth), confidence in one's abilities (self-efficacy, internal locus of control, ability to set realistic goals and expectations, problem-solving skills, fortitude, conviction, tenacity, resolve and self-regulation skills) and the ability to cope (sense of humor, hopefulness, balanced perspective, positive strategies for dealing with stress and coping strategies) (Cooper et al., 2004; Hurtes, Allen, Stevens, & Lee, 2000; Olsson et al., 2003; Prince-Embury, 2008; Short & Russell-Mayhew, 2009).

External factors include environmental and social factors that can support positive youth development. These factors include healthy school environments, positive relationships with family members, peers, older adults and community organizations (Cooper et al., 2004; Fergus & Zimmerman, 2005; Hurtes et al., 2000; Olsson et al., 2003; Prince-Embury, 2008), and a 'sense of relatedness' which refers to relationships and feeling connected socially. Sense of relatedness includes trust, perceived access to support, comfort with others and tolerance of differences (Prince-Embury, 2007). Jordan (2012)

describes a relational–cultural model as being an important component of fostering girls’ resiliency. This model suggests that psychological growth and the development of healthy resistance to stressors and resiliency occur within relationships with others. She states that positive relationships with other human beings allow us to encourage one another; aid in the development of self-esteem, feelings of worth, strength and creativity; and promote the development of courage and confidence to maintain one’s voice. Individuals who move away from healthy relationships experience poor psychological functioning (Jordan, 2012). The relational–cultural model reinforces what Debold, Brown, Wessen, and Brookins (1999) have argued are important components of strengthening girls’ resiliency—having significant and positive relationships with others. These authors further challenge us to think of resiliency for girls not as something solely psychological but also to consider the social and political landscape that girls navigate as they come of age (Debold et al., 1999). This includes helping girls navigate sexism, racism and classism and supporting them to develop positive coping strategies.

Adventure programs, youth and resiliency

Adventure programs use ‘selected adventurous activities as a means for participants to develop physical, mental and social competencies’ (Lee & Ewert, 2013, p. 125). Adventure programs vary in length (i.e. short or long experiences), purpose (i.e. to develop technical skills or foster interpersonal and intrapersonal growth), type of adventure activity used (i.e. challenge course, backpacking, climbing) and setting (i.e. indoor ropes course, wilderness or therapeutic environments) (Sibthorp, 2003; Sibthorp & Morgan, 2011). Common features of adventure programs include: ‘a novel setting and experience, small group size, activities involving problem solving and decision making, tasks that are physically and mentally challenging, and instructors or facilitators who guide participants toward a desired goal’ (Sibthorp & Morgan, 2011, pp. 105–106). Historically, adventure programs emerged from classical expedition style programs (i.e. long durations, extended outdoor adventure) to include shorter formats (Sibthorp & Morgan, 2011). Throughout the literature, ‘adventure programs’ for youth have been labeled as outdoor adventure programs, adventure-based programming, adventure recreation programs, adventure education programs and wilderness programs. This literature review does not distinguish between these various program descriptions as they all contain common features associated with adventure programming (Hattie, Marsh, Neill, & Richards, 1997; Sibthorp & Morgan, 2011) and share a common goal of supporting positive outcomes for youth.

Positive outcomes of adventure programs are extensive and include such factors as personal growth, improved educational outcomes, physical outcomes, group development skills, leadership, improved self-concept, identity development and interpersonal skills (Benard & Marshall, 2001; Hattie et al., 1997; Sibthorp & Morgan, 2011; Stiehl & Parker, 2007) and autonomy, competence and relatedness (Lee & Ewert, 2013). Adventure programs have been found to serve as a model for supporting positive youth development (Lee & Ewert, 2013; Sibthorp & Morgan, 2011) by focusing on youths’ competencies and strengths and not overemphasizing their deficits (Lee & Ewert, 2013).

Several studies focused on outdoor-related programs have analyzed outcomes of resilience in participants using The Resilience Scale™. This scale was created by Wagnild and Young (1993), is valid and reliable, and is considered a well-established resilience measure. Neill and Dias (2001) used The Resilience Scale™ in their study and found that young adults who participated in a 22-day Outward Bound program reported

increases in psychological resilience compared with a control group. Ewert and Yoshino (2011) adapted The Resilience Scale™, combining the scale with other well-established measurements, and found that college students who participated in a short-term adventure program enhanced resilience by gaining perseverance, self-awareness, social support, confidence, responsibility to others and a sense of achievement. Another study conducted with elementary school students examined their resiliency after participation in an adventure program focused on education around bullying. Girls in the program had significantly higher resiliency scores after the program and four months later in the areas of goals, aspirations and self-efficacy (Beightol, Jevertson, Carter, Gray, & Gass, 2012).

Adventure programs support resiliency in young people because many of the experiences offered in these programs mimic the internal factors necessary for resilience (Beightol et al., 2009; Benard & Marshall, 2001). Internal resiliency factors include positive self-esteem, sense of self, strong sense of worth, confidence in one's abilities and the ability to cope with and develop positive strategies for dealing with stressful situations (Cooper et al., 2004; Hurtes et al., 2000; Olsson et al., 2003; Prince-Embury, 2008; Short & Russell-Mayhew, 2009). Studies on girls' experiences in adventure programs have shown positive impacts on the development of internal resilience factors. These include increased self-esteem and confidence, increased courage, improved body image and opportunities for positive risk-taking and self-expression (Whittington & Budbill, 2013; Whittington & Mack, 2010).

The external resilience factors that adventure programs support include the positive relationships that youth experience with adult leaders who model behavior and monitor the group's development (Sibthorp & Morgan, 2011; Sibthorp, Paisley, & Gookin, 2007). If adult leaders effectively monitor the group's development they can provide participants with a sense of relatedness. Sense of relatedness refers to feeling connected, supported and comfortable with others (Prince-Embury, 2007). Adventure programs support relatedness and feeling connected socially through communication, cooperation and trust (Lee & Ewert, 2013; Sibthorp & Morgan, 2011). The social environment in adventure programs consists of a small group size, opportunities for leadership, processing and reflecting on one's experience, and feedback from the group (Sibthorp & Morgan, 2011). These program strategies and feelings of connectedness within the group can serve as an important component of developing resiliency in girls (Debold et al., 1999; Jordan, 2012).

Two qualitative studies conducted on girls in two different adventure programs have found positive but mixed results in participants' sense of relatedness. Whittington and Budbill (2013) found qualitative evidence that participation in an adventure program promotes resiliency in girls by providing a supportive environment and developing authentic relationships that differed from other social environments that girls experience. Sammet (2010) revealed that the structure and culture of adventure courses can develop positive relationships between girls by building authentic relationships and trust, sharing feelings and opinions, and helping girls be more confident about making new friendships. However, in both studies some girls resist these programmatic strategies and continue to feel unsafe or experience relational aggression from their peers.

Method

There is no standardized instrument specifically designed for assessing resiliency in the context of adventure programs (Ewert & Yoshino, 2011), so the present study used the RSCA® (Prince-Embury, 2007) to examine the impacts of girls' participation in adventure programs. The RSCA® was created to examine resiliency in a standardized manner that is

grounded in theory. It employs a user-friendly format written at a third-grade reading level and is appropriate for children and adolescents between the ages of 9 and 18 (Prince-Embury, 2007).

The RSCA[®] consists of three self-report subscales: Sense of Mastery (20 items), Sense of Relatedness (24 items) and Emotional Reactivity (20 items):

- Sense of Mastery refers to a youth's ability to interact with and enjoy the cause and effect relationships in one's environment. Sense of Mastery includes three subscales of optimism, self-efficacy and adaptability. Optimism is having a positive attitude about the world and life in general; self-efficacy is one's approach to obstacles or problems; and adaptability is flexibility and problem-solving.
- Sense of Relatedness refers to relationships and feeling connected socially. Subscales include trust, support, comfort and tolerance. Sense of trust, perceived access to support, comfort with others and tolerance of differences all fall under this scale.
- Emotional Reactivity is how one responds to adverse events. Subscales include sensitivity, recovery and impairment. Sensitivity is how a youth reacts to a disruption to their equilibrium; recovery is how well an individual returns to normal functioning after a strong emotion; and impairment is how one reacts to emotional arousal.

Items associated with each scale or subscale were averaged to form scale scores, where a higher score reflects greater endorsement of the respective dimension.

In previous studies with female samples ranging in age from 9 to 18, these measures show high reliability across the major scales (Cronbach's alphas .83+) and at least adequate reliability (.64+) across the subscales. Evidence for the validity of the RSCA[®] is demonstrated by theoretically meaningful correlations with validated measures of self-concept, bullying and negative affect (Prince-Embury, 2007).

Description of the program

This research examined an adventure program called Dirt Divas, a mountain bike program in Vermont, USA, designed to support the positive development of adolescent girls, ages 10–16. Grounded in research on girls' development and psychology, the program methods follow an adventure programming model. The combination of an adventure activity (mountain biking) coupled with the natural environment, small group size, activities designed to create a warm and supportive environment, trained caring adult leaders, challenging tasks, risk-taking and opportunities for reflection and feedback provides a model that aims to support positive youth development. Dirt Divas is one of several programs offered through Vermont Works for Women, a non-profit organization. Vermont Works for Women was founded in 1987 and helps women and girls recognize their potential and explore, pursue and excel in work that leads to economic independence.

Dirt Divas is open to girls in the sixth through eighth grades. Participants are recruited by a program coordinator through established partnerships with community agencies and schools that assist in the identification and recruitment of girls who will most benefit from their participation in a Dirt Divas program. Girls are recruited by school guidance counselors or social workers based on social and economic disadvantages such as poverty, lack of support at home, a history of social or emotional challenges and/or trauma and abuse, and lack of other summer activities. During the course of this study, 14 five-day

programs were offered over the course of two summers. The program sites are located throughout northern Vermont and are typically based at a school. Instructors are adult women who are experienced educators and mountain bikers and are passionate about empowering girls. In order to ensure the program is accessible to all girls regardless of their families' economic situation, tuition is charged on an income-based sliding scale and equipment is provided to any girl who needs it.

Dirt Divas uses adventure programming methodologies combined with a day-camp model. Methods include: a daily opening circle in which girls participate in get-to-know-you, teambuilding, goal-setting and self-expression activities; journal writing; curriculum-based mountain bike skills and mechanics; daily trail rides; activities and discussions on topics including sexual harassment, beauty standards and body image, friendships, healthy relationships and finding your own identity; a two-part self-defense workshop; and each day is concluded with closing circle in which girls reflect on their day, their goals and how they can use what they have learned at Dirt Divas in their lives outside the program.

Mountain biking offers abundant and often literal opportunities to practice resilience—getting up when you fall down, being determined to tackle challenges, persevering when things are hard, and finding courage to act in the face of your fears. Because these experiences are so prevalent at Dirt Divas, there is a lot of discussion throughout the program about how to navigate the physical and mental challenges of mountain biking. Examples of these discussions/activities include the following: how to check in with oneself to make an authentic choice about what new, and potentially frightening, things one wishes to try or not; how to communicate one's needs—for physical or emotional support, for rest, for water or food; how to draw on one's inner resources and the resources available externally (support from peers and adults) to push forward in the face of exhaustion or fear; and how to use positive self-talk to create a supportive narrative within one's own head, replacing the often common barrage of negative thought patterns with thoughts that help with the accomplishment of goals and the ability to get through tough challenges and situations.

Data collection

Institutional Review Board approval was granted through an accredited university, and parental consent and child assent were obtained prior to the girls' participation in this study. Parents/guardians of registered participants were sent a letter that described the purpose of the study and communicated the voluntary nature of each child's participation. Parental consent forms and child assent forms were returned to the organization.

The RSCA[®] was collected on the first and last days of the girls' participation in a Dirt Divas program. In order to examine any lasting impacts, 54 girls were asked to complete the RSCA[®] one month after their participation. The RSCA[®] was mailed to each participant, a self-addressed stamped envelope was provided, and incentives in the form of a lottery (to win a bike helmet or bike socks) were included. The return rate was 48% ($n = 26$).

Results

The results are organized in four major sections. The first section provides a description of the girls who participated in the study. The second section reports the overall effects of program participation on resiliency. The third section evaluates possible differential program effectiveness attributable to differences in SES. The final section examines

responses from the one-month follow-up data and explores whether the program had any lasting impacts after program completion.

Participants

Participants in this study included 87 girls between the ages of 10 and 15 (mean age of 11.6). There was a great deal of diversity in the categories of SES, geography and life experience among girls who attended Dirt Divas. The majority of girls (60%) qualified for free or reduced-cost lunch (an indicator of low income status), 41% had at least one parent whose highest level of education was high school and 80% identified themselves as white. The girls primarily reside in rural communities in Vermont (95.2%) and a few (4.8%) reside in the more urban setting of Burlington, Vermont. The girls come from a diverse array of backgrounds including: multi-generation Vermont families; families that are new to the area as part of the Refugee Resettlement Project; girls who are homeless or live in inadequate housing; girls who are in foster care; girls who are food-insecure; and girls who have been victims of abuse (sexual, physical and/or emotional) and/or have witnessed domestic violence in their homes. Many live in single-parent families and will be first-generation college students should they choose to attend college. Simultaneously, some participants come from well-resourced, highly educated, middle-class or upper middle-class families and do not have the risk factors described above.

Change in resiliency

To determine whether participants' sense of resilience improved after participating in the Dirt Divas program, the self-report resiliency scores obtained before participating in the program were compared with scores obtained immediately after the program ended. Table 1 reports the paired-samples *t*-tests conducted. Since multiple analyses were conducted, protected tests of significance (Holm, 1979) were conducted to control type I error rates. Participants reported significantly higher levels of resilience—increases in mastery and relatedness, and decreases in emotional reactivity—after completing the Dirt Divas program, compared with their pre-program reports. Evaluation of the individual

Table 1. Change in resiliency after participating in the Dirt Divas program.

Scale	Time point		Paired-sample tests			
	Pre-participation average	Post-participation average	Pre-post correlation	<i>t</i>	(<i>df</i>)	Effect size <i>d</i> ^a
Sense of Mastery	3.06 (.4809)	3.26 (.5814)	.69	-4.26*** ^b	(85)	-.37
Sense of Relatedness	3.30 (.4620)	3.38 (.5462)	.77	-2.25* ^b	(85)	-.16
Emotional Reactivity	1.08 (.7202)	0.94 (.7086)	.78	2.76** ^b	(85)	.20

Notes: Standard deviations appear in parentheses after means.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

^aValue represents the proportion of the differences between averages of the pre-test and post-test scores relative to the pooled standard deviation of the pre-test and post-test scores. Evaluated as small = .02, medium = .50 and large = .80.

^bTest is statically significant based on the Holm (1979) multiple-comparison procedure for protecting type I error rates.

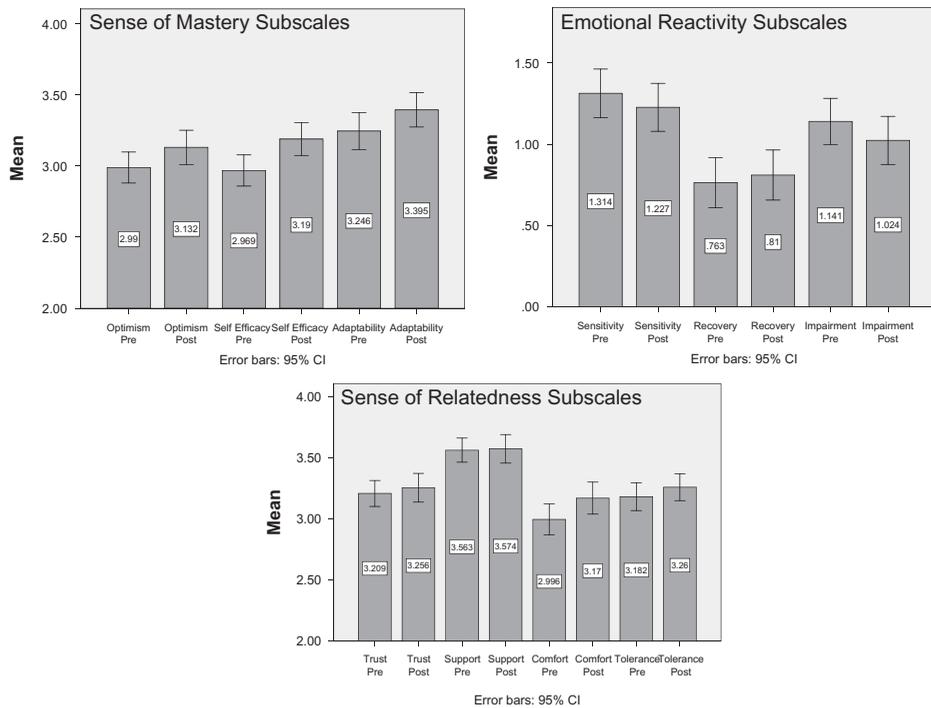


Figure 1. RSCA[®] subscale scale scores before and after participation in the Dirt Divas program.

subscales presented in Figure 1 shows that all facets of participants' sense of mastery tended to show improvement. After participating in the program, girls appear to be more optimistic, have improved self-efficacy and feel better able to effectively cope with novelty and challenge. With respect to participants' sense of relatedness, only one facet seemed to improve; girls tend to report feeling more comfortable interacting with others after participating in the program. Finally, the decrease in emotional reactivity appears to be largely the result of a decrease in the degree to which girls reported becoming easily upset (sensitivity) and a decrease in the degree to which they report being overwhelmed by their emotions when they do become upset (impairment). Although the changes in mastery, relatedness and emotional reactivity were statistically significant, statistical significance does not indicate the practical importance of any given effect. To evaluate the practical importance of a given effect, effect sizes were calculated using d , which represents the absolute value of the standardized difference between group means. Cohen (1988, 1992) has offered standards for evaluating d : small = .20, medium = .50 and large = .80. Using these standards for evaluating the difference between means, the changes in self-reported resilience reported by girls were strongest when looking at the girls' sense of mastery, but overall the effects appear to be relatively small. However, it is noteworthy that the increase in resilience appears to have been consistently experienced by participants. The consistency in the effects of participating in the Dirt Divas program is demonstrated by the strong correlations between pre-participation and post-participation scores, which ranged between .53 and .80. These strong correlations suggest that although the benefits of participating in the program were not very large, they were experienced by nearly everyone to some degree.

Socioeconomic status

A set of supplemental analyses assessed the effects of SES on resiliency reports before and after participating in the Dirt Divas program. SES was operationalized as a dichotomous variable representing participants who did or did not qualify for Vermont's free or reduced cost school lunch program. Program qualification considers household income and the number of family members in that household which is then compared with national poverty indicators. A series of 2 (pre participation vs. post participation) \times 2 (free/reduced lunch qualified vs. not qualified) mixed-model repeated-measures analyses of variance (ANOVAs) were conducted which included each of the resiliency scales. Across analyses, type I error rates were protected using the Holm (1979) procedure. A significant main effect of SES was found only when predicting the mastery scale. Girls who qualified for free or reduced lunches reported significantly lower levels of mastery ($M = 3.32$, $SE = .08$, $n = 52$), compared with girls who did not qualify for this assistance ($M = 3.06$, $SE = .07$, $n = 34$); $F(1, 84) = 6.12$, $p < .015$. With respect to effect size for repeated-measures ANOVA, Bakeman (2005) recommends a generalized form of eta squared (η_G^2) which is interpreted as a squared correlation coefficient and represents the percentage of variability in the dependent variable that is accounted for by the independent variable. Suggested standards for evaluating eta squared (η^2) for ANOVA models are small = .01, medium = .06 and large = .14 (Cohen, 1988). In the present study, the value of η_G^2 for the significant main effect of SES was .06, which represents a medium effect size.

With respect to the main effects for participating in the Dirt Divas program (i.e. changes in resilience after participating), including SES in the analyses and thus controlling the effects of SES on resiliency scores did not appreciably alter the pattern of results. Again, girls reported significantly higher levels of mastery and relatedness and significantly lower levels of emotional reactivity regardless of whether or not the effects of SES were controlled.

In summary, although girls with higher SES report greater resilience, the degree to which participation in the Dirt Divas improves resilience did not appear to be confounded with or explained by SES. Similarly, none of the interactions between SES and participation were significant using even the most liberal approach to hypothesis testing [all $F(1, 84) < 1.32$], which indicates that the relative improvement in resilience after participating in Dirt Divas is the same for girls with low or high SES.

One month later

To establish that the increase in resilience after participating in the Dirt Divas program was maintained even after the program ended, the reports collected across three time points (before participation, immediately after participation and one month after participation) were compared using a repeated-measures ANOVA (see Table 2).¹ Self-reported levels of resilience significantly² increased between the pre-participation and post-participation assessments across all of the scales. Similarly, there was a trend toward improved resilience between the post-participation assessment and the one-month follow up, but the differences were small and non-significant.

Effect sizes were again evaluated using η_G^2 and are reported in Table 2. The combined increase in sense of mastery across the three points in time represents medium to large effects. The largest increases in resilience occurred between the first and second time points and much smaller increases occurred between the second and third time points.

Table 2. Change in resiliency after participating in the Dirt Divas program with one-month follow-up.

	Time ($n = 26$)			F	(df)	η_G^2
	Pre program	Post program	One-month follow-up			
Sense of Mastery	2.90 ^A (.5441)	3.21 ^B (.5146)	3.32 ^B (.5273)	16.39 ^{***a}	(1.55, 38.78) ^b	.11
Sense of Relatedness	3.25 ^A (.5439)	3.32 ^B (.5861)	3.42 ^B (.5469)	4.51 ^{*a}	(2, 50)	.02
Emotional Reactivity	1.10 ^A (.8078)	1.05 ^B (.8470)	0.94 ^B (.6590)	3.50 ^{*a}	(2, 50)	.01

Notes: Standard deviations appear in parentheses after means.

* $p \leq .05$, *** $p \leq .001$.

Means within rows with differing uppercase superscript letters are significantly different at the $p \leq .05$ level using Fisher's least-significant difference *post hoc* tests.

Effect size (η_G^2) represents the generalized formula recommended by Bakeman (2005) and indicates the percent of variability accounted for by the repeated factor relative to the total variability in the model. Evaluated as small = .01, medium = .06 and large = .13.

^aTest is statically significant based on the Holm (1979) multiple-comparison procedure for protecting type I error rates.

^bRepresents Greenhouse–Geisser correction for violations of sphericity.

Thus it appears that girls showed substantive and enduring increases in their perceived resilience—especially with respect to mastery—which persisted after the program was over.

Discussion

This study evaluated the effects of participation in the Dirt Divas adventure program on girls' self-reported resiliency. Girls who participated in the Dirt Divas program showed improved resilience in the form of increased sense of mastery, increased sense of relatedness and less emotional reactivity. Similarly, improved resilience appeared to be differentially demonstrated across specific subscales (Figure 1). With respect to sense of mastery, Dirt Divas graduates showed trends toward greater optimism (having a positive attitude about the world and life in general), self-efficacy (one's approach to obstacles or problems) and adaptability (flexibility and problem-solving), compared with the reports they gave before participating. An improvement in self-efficacy is consistent with other research in adventure education which shows an increase in self-efficacy (Beightol et al., 2012; Hattie et al., 1997). Beightol et al. (2012) reported a significant change for girls' self-efficacy across three time points of pre, post and four months after participating in an adventure education program focused on bullying.

Sense of relatedness focuses on relationships and feeling connected socially, and includes facets of trust, support, comfort with others and tolerance of others' differences. Change in the overall sense of relatedness was modest. Within this dimension, girls report that their comfort with others improved after completing the program but trust, support and tolerance of others' differences did not seem to show improvement. The increase or lack of increase in all facets of sense of relatedness reported in this study is consistent with research on girls' adventure programs which shows mixed results with respect to the outcome of girls' participation (Sammet, 2010; Whittington & Budbill, 2013). This is

especially significant given the important role that positive relationships with other human beings play in promoting healthy resistance and resiliency for girls (Debold et al., 1999; Jordan, 2012).

Within the dimension of emotional reactivity, girls reported being less sensitive to stressors—having less intense emotional responses to adversity—and reported lower levels of impairment—not being overwhelmed by their emotions as frequently. Resiliency research states that a resilient youth should be able to overcome obstacles, risks and/or negative or stressful events and to respond/perform positively after these events (Bottrell, 2009; Brennan, 2008; Short & Russell-Mayhew, 2009). Adventure programs offer ample opportunities for challenge and stepping outside one’s comfort zone and often mimic the internal and external factors necessary for developing resilience (Beightol et al., 2009; Benard & Marshall, 2001).

Although the results suggest change in a positive direction, researchers caution against ‘post-group euphoria’ of self-reported scales implemented on the last day of a program or immediately after participating in a program (Hattie et al., 1997; Marsh, Richards, & Barnes, 1986a, 1986b). Post-group euphoria may cause positive feelings or affect that obscure actual feelings and may be short term (Ewert & Sibthorp, 2009; Hattie et al., 1997). Owing to this concern, data were collected again one month after the girls’ participation using the same measure. Ewert and Sibthorp (2009) suggest sending the survey to participants several weeks after participation. Hattie et al. (1997) state that during follow-up studies an effect size of zero indicates that the effects have been maintained over time and an effect size greater than zero suggests that the change is not only enduring but continues to grow. In the present study, the positive impact of participating in the program was clearly maintained for a period of at least four weeks.

The general belief in adventure programming is that the longer the program, the more impactful the outcome. The present study suggests that even a short program can have desirable effects. Overall, the data revealed modest but consistent and persisting change experienced by the majority of participants. This becomes especially impressive when one considers that participation in the Dirt Divas program is relatively brief (five days) and that many of the aspects of the self that are associated with resilience represent stable and enduring characteristics that develop over long periods of time and are difficult to change (Prince-Embury, 2007).

The present study also suggests that the impact of adventure programs is not limited by socioeconomic factors. Girls who live above the poverty line reported greater resilience to start with. However, girls who live below the poverty line reported increases in resilience after completing the program that were equivalent to the increases experienced by their higher SES peers. Certainly, we should be cautious about interpreting a null finding for the moderating effects of SES and a great variety of other variables could potentially moderate the influence of participating in adventure programs. Further, socioeconomic factors may become more important to consider when looking at programs that involve longer-term interventions. For example, girls living above the poverty line who participate in programs designed to affect large changes in participants may reach ceiling levels of change earlier in the program than their lower SES counterparts. Such a phenomenon could artificially deflate indicators of program effectiveness if SES was not considered. At a more practical level, program directors may wish to consider the demographic characteristics of the populations they serve when considering the types of programs they offer and to whom they are offered; it is possible that longer-term programs may be ideal for lower SES populations, and higher SES populations may be best served by shorter interventions.

Limitations

One limitation of the study is use of the RSCA[®]. The implementation of the RSCA[®] scale is expensive for many non-profit organizations (\$6.00 for pre and post implementation), relatively time consuming to implement (64 items) and challenging to interpret. While it is a well-designed instrument that measures all facets of resiliency, the focus of the RSCA[®] is on global and relatively enduring aspects of resiliency. This may potentially limit its usefulness as a tool for evaluating the effectiveness of short-term interventions designed to impact resilience. Another potential limitation of the study is the lack of a viable control group which limits any causal conclusions that may be inferred from the data.

Future research

Areas of future research include creating a standardized scale that encompasses the following: has known psychometric properties; is easy to implement and interpret; measures facets of resiliency most amenable to change (such as self-efficacy, challenge, taking risks and relationship building); is designed to measure girls' experiences; and has no or relatively low costs. While the RSCA[®] is a valuable instrument, it is typically used in clinical settings with long-term application. Additionally, the costs for implementing the tool and the significant background in statistical analysis needed to analyze the data make it improbable for small programs/organizations. The Resilience Scale[™] is also a valuable instrument for measuring resilience; it has known psychometric properties and has been used to measure outcomes in outdoor-related settings. Again, while it is a valuable instrument, The Resilience Scale[™] was not created for adventure programs or designed specifically for girls. The creation of a simple, user-friendly tool to measure resilience, designed to analyze outcomes of adventure programs and focused on girls, would aid in program evaluation and allow organizations to measure specific outcomes of girls' adventure programs.

Another area for future research would be examining which program practices are instrumental in promoting resiliency. Programs that focus on the developmental needs of girls purposefully implement activities that are designed with girls' best interests in mind. Being able to pinpoint which of these activities most effectively promotes resiliency in girls would allow for strategic program planning and implementation.

Conclusion

This research examined the impact of participation in Dirt Divas, an adventure program, on adolescent girls' resiliency. This research provides statistical insight into the impact of adventure education on girls' resiliency and the results indicate that Dirt Divas achieves its goal of promoting resiliency in girls. One weak area in the results for Dirt Divas was trust and sense of support. This resulted in the incorporation of an even more robust and intentional focus on activities that build trust and a sense of support among Dirt Divas' participants. This finding is especially important to respond to given the prevalence of negative social dynamics such as gossip, cliques and bullying among girls. In conclusion, it is hoped that this research will lead to further analysis of girls' experiences and an examination of the program strategies that most effectively promote positive change in girls. These efforts will help those who work with girls in adventure program contexts to implement effective strategies for promoting change.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

1. These analyses were also repeated including SES in a 3 (time point) \times 2 (SES) mixed-model factorial ANOVA. Again, including SES in the model did not change the pattern of observed results.
2. Type I error rates were protected using the Holm (1979) procedure.

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