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Enhancing resilience in youth through a 10-day developmental voyage

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The present study sought to examine the potential for resilience to be enhanced in a group of youth participating in a developmental voyage, and to identify the factors that contribute to increased resilience following the voyage. Two studies are reported. Study 1 revealed that voyage participants experienced increased resilience over the course of the voyage. Study 2 sought to replicate and extend these findings by assessing the extent to which increased resilience was maintained five months following the voyage and was associated with other psychosocial variables (i.e. self-esteem, social effectiveness, self-efficacy, belonging, social support and perceived weather). The findings revealed that increased resilience was maintained five months following the voyage. A regression revealed that the predictors explained 37% of the variance in increased resilience. Increased social effectiveness, self-efficacy and less positive perceptions of the weather were the only variables to make unique contributions.

Keywords: resilience; youth development; adventure education; self-efficacy; self-esteem; social effectiveness

Introduction

In light of increasing rates of depression, youth suicide and child poverty, many argue that there are more risks present for young people today than in the past (Goldstein & Brooks, 2005). Many of the threats young people face are to their emotional and mental well-being as much as to their physical health (Call et al., 2002). This highlights the need for elucidating the variables that contribute to positive outcomes despite risk, and specifically the potential to influence the lives of young people in order to encourage the process of resilience.

Traditionally, a large proportion of research concerning young people has focused on 'disease, disorder, and dysfunction' (Liebenberg & Unger, 2009, p. 3). Indeed, much research aimed at promoting positive development is built on the foundation of understanding adversity. Resilience research grew from observations that some children appeared to thrive under the same adverse conditions that caused serious trauma in others (Wagnild & Young, 1993; Werner & Smith, 1982). The concept of resilience is now understood as a complex and multifaceted phenomenon, with perhaps as many definitions as there are studies (Liebenberg & Unger, 2009). Generally, resilience is documented as the ability to react to adversity and challenge in an adaptive and productive way, and is therefore considered crucial to healthy development (Brooks, 2005; Ewert & Yoshino, 2011). The concept is characterised by both the lack of negative outcomes as well as the

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presence of psychological assets such as social competence (Olsson, Bond, Burns, Vella-Brodrick, & Sawyer, 2003; Scales, Benson, & Mannes, 2006).

Resilience has many benefits for young people. Successful coping with disruptive life events is facilitated by resilience, as well as the development of new protective coping skills that are effective when dealing with future adversity (Richardson, Neiger, Jensen, & Kumpfer, 1990). Thus, resilience processes not only promote skills and strengths that help youth adapt to past and present adversity, but also decrease the likelihood of future difficulties (Winslow, Sandler, & Wolchick, 2005).

Understanding the capability of young people to overcome adversity and the potential for practitioners to increase their chances of healthy development cannot be understated. Despite this, there is a dearth of research concerning resilience interventions and young people (Hattie, Marsh, Neill, & Richards, 1997). Similarly, researchers have highlighted the need for clarifying the concept of resilience as it relates to adolescence (Liebenberg & Unger, 2009).

Enhancing resilience is complex. Factors that promote health in one context might prove maladaptive in another (Rutter, 1990). Moreover, many of the variables that contribute to resilience are difficult to operationalise (see Werner, 2000). In addition, many of the adversities that young people face (such as poverty, war or abuse) are outside the influence of resilience-focused interventions.

There are, nevertheless, many potential pathways that lead to resilience (Luthar & Zelazo, 2003). Weissberg and colleagues argue that problem-prevention efforts are most beneficial for youth when the specific goals of increasing competence, sense of belonging and involvement with their communities are achieved (Weissberg, Kumpfer, & Seligman, 2003). Accordingly, Pittman and colleagues recommend that youth development is enhanced when adolescents have an active role in choosing and controlling their environments and situations (Pittman, Irby, Tolman, Yohalem, & Ferber, 2003). Research suggests that resilience-focused interventions should be designed to increase positive chain reactions, reducing risk while developing individual competencies such as self-efficacy (Hunter et al., 2010), the ability to recruit social support when needed (Werner & Smith, 1982) and increasing opportunities for positive experiences (Waatkaar, Christie, Borge, & Torgersen, 2004).

Rutter (1990) suggests that the pathway to resilience develops not from the avoidance of risk but through successful engagement with it. From this view, the growth of psychological resilience may be likened to the physical process of immunisation (Rutter, 1987). Using this metaphor, just as one's ability to fight illness grows via inoculation with the disease-causing pathogen, so too will resilience grow when one encounters adversity and overcomes it.

However, exposure to adversity itself does not necessitate resilience, and attempting to enhance resilience through exposure to risk is more complex than it first appears (Olsson et al., 2003). If coping mechanisms are overwhelmed, adversity can result in poor mental health. Therefore both the 'dose' of adversity and protective factors (e.g. social support) must be taken into account (Olsson et al., 2003) when designing resilience-enhancing interventions. Programmes that aim to increase resiliency must allow young people to successfully overcome adverse situations in a manner that increases self-efficacy and confidence in one's ability to influence the environment (Hunter et al., 2013; Short & Russell-Mayhew, 2009; Werner, 2000).

Evidence consistent with this view has been provided by Neill and Dias (2001). These researchers examined resilience among young adults who took part in a challenging (but supportive) 22-day outward bound course (i.e. a wilderness expedition

involving ropes courses, hiking, caving, rock climbing, abseiling, canoeing, cross-country running and three days spent alone). The findings revealed that (amongst those who did not drop out) resilience increased from the first to the last day of the course. More recently, Ewert and Yoshino (2011) demonstrated that college students who participated in a three-week adventure education programme also experienced increases in resilience compared with controls. Ewert and Yoshino performed a series of follow-up interviews that suggested positive outcomes experienced on the programme may be long term (see also Hunter et al., 2013).

The present investigation sought to examine the potential for such effects to emerge amongst youth undertaking a very different kind of challenge (see Grocott & Hunter, 2009; McCulloch, 2007)—a 10-day developmental voyage onboard the Spirit of New Zealand. There is some evidence that young people involved in sail training have positive experiences in terms of opportunities for learning, and a sense of increased social competence, teamwork abilities and practical skills (McCulloch, McLaughlin, Allison, Edwards, & Tett, 2010). Likewise, it has been noted that sail training, like many adventure education programmes, has resilience-enhancing variables present such as social support and a challenging environment. Despite this, there has been little exploration of the potential for psychological resilience to be increased through a developmental voyage. In this regard, two studies are reported. Study 1 examined increased resilience from the first to the last day of the voyage. Study 2 assessed the extent to which increased resilience was maintained five months following the voyage and was associated with other psychosocial variables (i.e. increased self-esteem, social effectiveness, self-efficacy, belonging, social support and perceived weather).

Study 1

Participants

One-hundred and twenty-six people (54 males and 72 females) took part in this study. The experimental group consisted of 63 trainees who undertook a 10-day developmental voyage on the Spirit of New Zealand (mean age = 16.55). For this study three different voyages were examined. Trainees were recruited by the Spirit of Adventure Trust (SOAT). Each trainee comes from a different school. Every secondary school in New Zealand has a SOAT liaison officer and all are given the opportunity to nominate one trainee per voyage. This process may be based on who teachers and counsellors believe will benefit most from the experience (Basham, 2003). Although the Trust advises that those ‘lacking a little in self-confidence might benefit more’ (Sharp, 1994, p. 60), there are no strict criteria in this regard. Thus, youth may be nominated if they are doing well or experiencing difficulties at home, at school or in the court system. It is also possible to apply directly to the SOAT, although few use this option.

The control group consisted of 63 undergraduate students (mean age = 19.42) taking part in a psychology course. University students have been used in past research of resilience because of the high amount of stressors they experience during their time of study, and because of the potential benefit that increases in resilience can confer on their lives as students (Ewert & Yoshino, 2011).

Design

A 2 (condition: voyage vs. non-voyage) \times 2 (time of resilience assessment: day 1 of voyage/course vs. day 10 of voyage/course) mixed-model design was used. The first factor was between subjects. The second factor was within subjects.

A 10-day developmental voyage on the Spirit of New Zealand

The Spirit of New Zealand is a 45-metre, three-masted Barquentine that sails around New Zealand. Although an important part of the voyage entails 'Sail Training' (i.e. learning to sail a masted sailing ship), the core purpose of the voyage is to foster youth development (Leppington, 2003). The onboard programme emphasises communal living, teamwork, cooperation, problem-solving ability, social communication and self-esteem. These qualities are imparted via positive encouragement and the successful completion of the many challenges encountered during the voyage (e.g. being away from home, making new friends, the daily 6:00 a.m. swim around the vessel, cooking, cleaning the toilets, climbing the rigging, completing one's duties regardless of seasickness, tiredness, rolling ocean swells, or inclement weather, working with others, living in a confined space and eventually sailing the ship without help from the crew).

The voyage is organised so that none of the participants know each other beforehand. Cell phones, personal computers and other electrical equipment are not permitted on board. The intention is a similar experience for all of the trainees relative to their level of comfort and sense of belonging at the start of the voyage. Integral to the voyage are the opportunities that trainees have to learn through experience. Trainees are divided into four groups (or watches), consisting of 10 trainees. Each watch comprises even numbers of males and females. The ship is divided up into four sail stations. Each watch moves through different stations over the course of the voyage in order to learn and practise the correct method of manoeuvring the sails in question. The rigging of the vessel has been purposely set up to guarantee that the trainees have a high chance of learning the correct methods of manoeuvring the sails. Ensuring that activities, whether setting a sail or other watch exercises, have every chance of success is an important part of the voyage programme, in so far as the successful completion of such activities has the potential to aid feelings of achievement amongst participants.

Each day, a different trainee is leader of their watch. The trainee's job is to lead the watch in the various activities throughout the day, from cleaning the ship in the morning to the final discussion session in the evening. The trainee watch leader is encouraged by the crew to ensure every member of the watch has a job to do when sailing or participating in an activity. After each activity and in the evening the crew debrief the trainees by discussing the activities and day's events. Debriefing involves an activity introduction (to prepare participants for any given activity) and a discussion of what the activity itself entails, followed by debriefing to process the experience of the activity and what participants may gain from it. In addition to a member of the crew facilitating a final debrief at the conclusion of the day's activities, trainee watch leaders of the day each take a turn at talking about what they personally gained from the day, how well their watch worked together and what they liked or disliked and passing on suggestions to others about ways of succeeding in the tasks set.

Trainees participate in a number of activities over the course of a voyage. The timing of activities is often determined by the weather and the location of the ship around New Zealand. A voyage does, however, follow a general pattern. On day one, trainees are given

a talk on safety and day-to-day shipboard procedure (e.g. safety harness must be worn during rough weather, night sailing, traversing the bowsprit, climbing the rigging), presented with wet-weather gear (jackets and leggings) and assigned a bunk in a single-sex, cramped communal dorm. Procedures for dealing with emergencies are emphasised. Trainees also receive a tour of the ship and a rundown of the sail station method used to sail the vessel.

Days two to four usually involve exercises that encourage intragroup and intergroup cooperation. To facilitate this, a range of tasks are introduced that require the combined effort of all group members to ensure effective task completion. One such activity is the Spider's Web, in which a rope is looped, in a web-like fashion, around the ship's rigging. The web has 10 spaces in it, and the task requires that every person in the watch get through a different hole without coming into contact with the ropes. To complicate the task and further necessitate teamwork, some of the spaces in the web are positioned higher than the trainees' heads. During this phase, the crew adopts a 'hands on' policy, whereby the crew are closely engaged in all watch exercises, including teaching trainees to use the sails and offering them help with other tasks.

During days five to eight, working together as a team remains an important focus. Dialogue about the processes that lead to the success of each activity is an important part of the programme, and is not just limited to the debriefing discussions in the evenings. Activities that have a high chance of successful completion, both within individual watches and as part of the wider shipboard group, are fundamental to this segment of the voyage. Challenges at this stage include climbing the rigging and negotiating the bowsprit. In the initial stages of this part of the voyage, the crew is still hands on, providing the trainees with guidance and support when necessary. A 'hands free' policy is adopted from day seven, or thereabouts, onwards. Trainees are taught to turn to those on their watch for assistance, instead of depending on guidance from the crew when attending to sail and other duties. Trainee Day takes place on day nine. On Trainee Day, the trainees have sole responsibility for operating the ship. On the eve of day nine, the trainees elect a Captain and two Mates, as well as Navigators, Engineers, Cooks and Watch Leaders. Trainee Day is a critical stage in the developmental voyage and trainees aim for it from the voyage's outset, when it is outlined as an objective that individuals and groups are encouraged to work towards. Trainee Day provides trainees with the chance to showcase newly acquired skills, take on leadership roles and work as a team to solve problems, rather than relying on guidance from the ship's crew. At the end of the day, prizes and certificates are given to each trainee. The ship is generally back at the dock by seven o'clock the next morning, and from here the trainees return to their respective homes.

Psychology course

The psychology course was one semester long. Participants were given a class outline on the first day. This included a detailed description of what the workload and assessments would entail.

Method and procedure

Voyage participants completed a measure of resilience on the first and last days of their 10-day voyage. Non-voyage participants completed the same measure on the first day of a psychology course and then again 10 days later. Resilience was assessed using a shortened version of Wagnild and Young's (1993) Resilience Scale (RS). This 15-item version of the

scale was adapted by Neill and Dias (2001) to measure changes in resilience brought about by outdoor interventions. The scale contains questions such as ‘When I make plans I follow through with them’, ‘When I am in a difficult situation, I can usually find my way out of it’ and ‘I can usually find something to laugh about’. Responses are scored on Likert scales (1 = strongly disagree to 7 = strongly agree). Neill and Dias provide data to show that the scale is both valid and reliable. These findings were supported in the present context with respect to internal consistency (Cronbach’s alpha = 0.75, $N = 126$) and test–retest reliability over a 10-day period ($r = 0.79$, $N = 63$).

Results

A repeated-measures analysis of variance (ANOVA) found no effects for sex or age. These variables were excluded from further analysis. A one-way ANOVA found no differences between the T1 resilience scores of voyage participants (mean [M] = 84.30, standard deviation [SD] = 9.47) and psychology course students ($M = 84.92$, $SD = 7.59$), $F(1, 124) = 0.16$, $p = 0.69$.

A 2 (voyage: yes vs. no) \times 2 (time of resilience measurement: day 1 vs. day 10) mixed-model ANOVA was conducted. Voyage participation was a between-subjects factor. Time of resilience measurement was a within-subjects factor. Cell means are presented in Table 1. The only effect found was an interaction between voyage and time of measurement, $F(1, 123) = 5.95$, $p < 0.02$, $\eta^2 = 0.05$. Planned comparisons conducted to assess this effect further revealed that participants who undertook the voyage experienced an increase in resilience, $t(62) = 5.54$, $p < 0.0005$, $\eta^2 = 0.35$, from the first to the last day of the voyage. This effect was also significant when Dunn’s correction was incorporated (Critical alpha value = 2.97, $p < 0.01$). No effect was found amongst non-voyage participants, $t(62) = 1.71$, $p = 0.10$, $\eta^2 = 0.05$.

Discussion of Study 1

This study examined whether taking part in a 10-day developmental voyage would enhance resilience. The results suggest that it does. Participants experienced increased resilience from the first to the last day of the voyage. No effect emerged for non-voyage participants. Although such findings are encouraging, the design utilised in this study contains a number of methodological weaknesses. Firstly, the experimental group (trainees) were not randomly selected, but instead were nominated through various methods at their secondary schools. Likewise, the trainees were younger than the psychology students. Despite this, the resilience scores of both groups at the first time of measurement were indistinguishable. Furthermore, our preliminary analysis did not find any effects for age. Still, it may be argued that this comparative group did not serve as an adequate control.

Table 1. Mean resilience scores at day 1 and day 10 for voyage and non-voyage controls.

	Day 1	Day 10
Voyage	84.30 (9.47)	89.92 (9.81)**
Non-voyage	84.92 (7.59)	85.92 (7.59)

Note: ** $p < 0.01$ increase in resilience from day 1 to day 10 by Dunn’s test.

Second, a further weakness relates to the baseline measure of resilience taken on the first day of the voyage. This is problematic because, on the first day of such programmes, participants (who have concerns about climbing the rigging, sea sickness, the weather or being among strangers in a confined space; see McCulloch, 2007) may manifest increases in anxiety (Leppington, 2003) or decreases in self-esteem (Marsh, Richards, & Barnes, 1986). For this reason, it might then be argued that participants' levels of resilience may have been somewhat lower on the first day of the intervention. If this occurs, then any subsequent increase in resilience found on the last day of the programme would not necessarily be a true reflection of increased resilience but rather a return to pre-existing levels of resilience after the dissipation of threat or challenge.

A third weakness of the study was that we did not include any longer-term follow-up measures. Marsh et al. (1986) have noted that, immediately following the completion of such programmes, participants often experience a sense of 'post-group euphoria' (i.e. a strong sense of belonging, support, confidence and effectiveness). These positive feelings usually diminish once the participants are removed from the environment in which these feelings developed. Research also suggests that although many interventions can achieve positive outcomes for the duration of the programme, the effects soon dissipate when the programme ends (Seligman, Reivich, Jaycox, & Gillham, 1995). To guard against such eventualities, in Study 2 resilience was reassessed five months following the last day of the voyage.

A final criticism that may be levelled at Study 1 is that although resilience increased over the course of the voyage we failed to examine any of the psychosocial processes that may have contributed to this. To overcome this problem we assessed a series of variables (i.e. self-esteem, social effectiveness, self-efficacy, belonging, social support and perceptions of the weather) in Study 2. Each of these variables has been identified as being important in the promotion of resilience (Rutter, 1990) or highly relevant to the context in question (e.g., Grocott & Hunter, 2009; Hunter et al., 2010; McCulloch, 2007).

Study 2

Participants

One-hundred and forty-six participants (73 males and 73 females) took part in this study. The experimental group consisted of 72 trainees who undertook a 10-day developmental voyage on the Spirit of New Zealand. The mean age of the trainees was 16.51. The control group consisted of 74 high school students. The mean age of the high school students was 16.43.

Design

The core design of the study was repeated measures. The resilience of voyage participants was assessed on four different occasions: Time 1 (T1) was one month prior to the voyage; Time 2 (T2) was the first day of the voyage; Time 3 (T3) was the last day of the voyage; and Time 4 (T4) was five months following the last day of the voyage. Although this design does not contain a formal control condition, it does incorporate controls as part of its procedure. These controls relate to the stability of responses from T1 to T2, and from T3 to T4. Provided that there are no pre-voyage concerns (which can lead to decreases in resilience from T1 to T2) or post-voyage euphoria effects (which can lead to decreases in resilience from T3 to T4), the T1 to T2, and T3 to T4, resilience scores should not be

significantly different. The lack of such differences at each of these times would suggest that any effects (i.e. increased resilience) found between T2 and T3 are a function of the intervention (and not the result of some other factor that threatens the validity of our results). To examine whether voyage participants' levels of resilience differed from those of non-voyage participants, a cohort of high school students (who did not undertake the voyage) were included. These participants served as an isolated baseline control condition.

Method and procedure

Participants completed the RS as utilised in Study 1 (Cronbach's $\alpha = 0.80$, $N = 140$). High school students completed the RS once, at T1. Among voyage participants the RS was administered on four separate occasions: T1 was one month prior to the voyage, T2 was on the first day of the voyage, T3 was on the last day of the voyage and T4 was completed five months following the voyage.

Self-esteem, social effectiveness and self-efficacy were also assessed at T2 and T3. Self-esteem was measured using the 13-item short form of the Self-Description Questionnaire III (Marsh & Hocevar, 1985). This version of the scale retains many of the extensive psychometric qualities contained in the full Self-Description Questionnaire III (Marsh et al., 1986) and was found to be reliable amongst the current sample (e.g. 'Overall, I don't have much respect for myself'; Cronbach's $\alpha = 0.70$, $N = 72$). Social effectiveness and self-efficacy were assessed using the self-efficacy and social (communication) effectiveness subscales of the Review of Personal Effectiveness (ROPE; Purdie, Neill, & Richards, 2002). Each of these three-item measures is designed to assess the experiences of young people taking part in outdoor-based interventions. Extensive research has established that the efficacy and social effectiveness scales are reliable and valid (Purdie et al., 2002). These findings were replicated in the present sample: social effectiveness, 'I communicate competently and effectively in social situations' (Cronbach's $\alpha = 0.80$, $N = 72$) and self-efficacy, for example 'No matter what the situation is, I can handle it' (Cronbach's $\alpha = 0.82$, $N = 72$). Responses to the three measures above were scored on Likert scales (1 = definitely false to 8 = definitely true).

Belonging, social support and perceptions of the weather were assessed at T3. Belonging was measured using Sheldon and Bettencourt's (2002) three-item inclusion scale. The items were modified slightly in the present study (e.g. 'I feel a sense of belonging with my "watch"'); Cronbach's $\alpha = 0.87$, $N = 72$). Social support was measured using four items developed by Neill and Dias (2001) to assess the kinds of social support likely to be experienced in adventure education. Questions focused on the perceived supportiveness of the most supportive person, the least supportive person, the other trainees and the crew. Scoring was on Likert scales (1 = not at all to 5 = very much). The present findings indicate adequate reliability for a four-item scale (Cronbach's $\alpha = 0.61$, $N = 72$). Finally, because sailing is weather-dependent, a final question asked if the weather during the voyage was good. Responses to the belonging, social support and weather questions were all scored on Likert scales (1 = strongly disagree to 7 = strongly agree).

Results

Preliminary analysis showed no main or interaction effects for gender. This variable was therefore excluded from further analysis. A one-way ANOVA found no differences between the T1 RS scores of voyage participants ($M = 85.11$, $SD = 8.67$) and high

Table 2. Mean resilience scores at Time 1, Time 2, Time 3 and Time 4.

Time 1	Time 2	Time 3	Time 4
85.11 (8.72)	84.81 (8.36)	88.28 (9.22)**	87.39 (8.75)

Note: Time 1, one month before the voyage; Time 2, first day of voyage; Time 3, last day of voyage; Time 4, five months after voyage. ** $p < 0.01$ increase in resilience from Time 2 to Time 3 by Dunn's test.

school students ($M = 84.77$, $SD = 8.34$), $F(1, 138) = 0.05$, $p = 0.81$. A repeated-measures ANOVA was conducted to assess the resilience scores of voyage participants over the four measurement periods. Cell means are presented in Table 2. Because not all participants completed the RS on all four occasions, the number of participants varies across analyses. The minimum number of participants in each analysis is 57. As expected a main effect emerged, $F(1, 56) = 24.21$, $p < 0.001$, $\eta^2 = 0.30$. To assess the effect further, three planned comparisons were conducted. The first compared resilience scores at T2 and T3. The second compared resilience scores at T1 and T2. The third compared resilience scores at T3 and T4. The only significant effect found was for the T2 to T3 comparison $t(71) = 4.18$, $p < 0.0005$, $\eta^2 = 0.20$ (this effect was also significant when Dunn's correction was incorporated; critical alpha value = 3.08, $p < 0.01$). This finding demonstrates that resilience increased over the course of the voyage. It is noteworthy that the T1 to T2 comparisons were not significant, $t(65) = 0.16$, $p = 0.87$, nor were the T3 to T4 comparisons, $t(62) = 0.21$, $p = 0.83$. These latter findings indicate that there was no change in resilience scores from one month before the start of the voyage to the first day of the voyage and that there was no change in resilience scores from the last day of the voyage to five months following the voyage. Taken together these findings therefore demonstrate that resilience increased over the course of the voyage (i.e. from the first to the last day) and that enhanced resilience was maintained at the five-month follow-up.

Among voyage participants, potential changes in self-esteem, social effectiveness and self-efficacy from the first to the last day of the voyage (T2 to T3) were assessed using repeated-measures ANOVAs. These analyses revealed increases in self-esteem ($M = 73.43$, $SD = 9.37$ to $M = 77.14$, $SD = 9.94$), $F(1, 71) = 22.01$, $p < 0.001$, $\eta^2 = 0.24$; social effectiveness ($M = 17.76$, $SD = 2.81$ to $M = 19.12$, $SD = 2.63$), $F(1, 72) = 39.69$, $p < 0.001$, $\eta^2 = 0.36$; and self-efficacy ($M = 18.08$, $SD = 2.46$ to $M = 19.50$, $SD = 2.62$), $F(1, 72) = 24.11$, $p < 0.001$, $\eta^2 = 0.25$.

To assess the extent of the relationship between increased self-esteem, self-efficacy and social effectiveness as well as belonging, social support and perceptions of the weather and increased resilience, a standard multiple regression was conducted. An index of increased resilience was constructed by subtracting resilience scores at T2 from resilience scores at T3. This index was entered as the dependent variable. Indices of increased self-esteem, social effectiveness and self-efficacy were created by subtracting each of these respective T2 scores from their respective T3 scores. Each index was then entered separately as a predictor variable. Also entered as predictor variables were belonging, social support and perceptions of the weather. Given the potential for multicollinearity among these constructs, correlations between the variables are presented in Table 3. The results of the regression are presented in Table 4. As can be seen there, the results of the overall regression were significant, $R^2 = 0.37$, $F(6, 60) = 5.81$, $p < 0.001$. Inspection of beta weights revealed significantly positive effects for increased social effectiveness, $\beta = +0.30$, $p < 0.05$, and increased self-efficacy, $\beta = +0.42$, $p < 0.01$. A negative effect was found for perceived weather, $\beta = -0.23$, $p < 0.05$ (thus, the less

Table 3. Correlations between increased resilience and increased self-esteem, social effectiveness, self-efficacy, belonging, social support and perceived weather.

	1	2	3	4	5	6	7
1		+0.12	+0.37**	+0.45**	+0.19#	+0.31**	-0.24*
2			+0.26*	+0.09	-0.08	+0.14	+0.06
3				+0.10	+0.31**	+0.37**	-0.11
4					+0.28*	+0.38**	-0.07
5						+0.52**	-0.12
6							-0.16

Note: 1, increased resilience; 2, increased self-esteem; 3, increased social effectiveness; 4, increased self-efficacy; 5, belonging; 6, social support; 7, perceived weather. # $p < 0.06$, * $p < 0.05$, ** $p < 0.01$.

Table 4. Standardised regression coefficients between increased resilience and increased self-esteem, increased social effectiveness, increased efficacy, belonging, social support and perceived weather.

Predictor variable	Standard regression coefficient (beta value)
Increased self-esteem	+0.04
Increased social effectiveness	+0.30*
Increased self-efficacy	+0.42**
Belonging	-0.08
Social support	+0.06
Perceived weather	-0.23*

Note: N = 71 for all variables. $R^2 = 37$, $F(6, 60) = 5.81$, $p < 0.001$. * $p < 0.05$, ** $p < 0.01$.

positive the perceived weather, the greater the increase in resilience). The unique association between increased social effectiveness and increased resilience was measured via semipartial correlation. Controlling for each of the other predictors, the two variables were still significantly correlated, $sr = +0.32$, $p < 0.02$. Significant semipartial correlations (controlling for each of the respective variables) were also found with respect to self-efficacy, $sr = +0.44$, $p < 0.001$, and perceived weather, $sr = -0.27$, $p < 0.05$.

Discussion

The current investigation sought to examine the effect of a 10-day sailing programme on the resilience of the young people who took part. Taken together, the findings reveal that participants experienced increased resilience from the first to the last day of the voyage and that increased resilience was maintained five months following the voyage. Increased resilience was predicted by elevated social effectiveness, self-efficacy and less positive perceptions of the weather.

A developmental voyage onboard the Spirit of New Zealand provides many challenges for youth (e.g. being away from home, making new friends, 6:00 a.m. swims, climbing the rigging, completing one's duties regardless of circumstances, working with others, living in a confined space and eventually sailing the ship without help from the crew). The finding that less positive perceptions of weather are linked to resilience may reflect the particular importance of challenge in promoting resilience processes. The present study suggests that the programme also fosters the means by which to successfully

overcome these major obstacles. In keeping with Rutter's (1987) immunisation metaphor, we would argue that it is this process that provides the psychological inoculation of increased resilience. Our findings suggest that increased social effectiveness, perceived self-efficacy and less positive perceptions of the weather over the course of the voyage, may be especially relevant in this regard.

Caution must be used when interpreting the direction of causality between the predictor variables (such as social effectiveness) and resilience. Future research could explore these relationships further by exploring the links between social effectiveness, perceived self-efficacy and resilience longitudinally. The current findings, however, highlight some important relationships between resilience and key psychosocial and environmental factors. In this way, the present study supports emerging trends in adventure education literature that emphasise challenge, perseverance (Ewert & Yoshino, 2011), social support (Neill & Dias, 2001) and positive self-esteem (Hunter et al., 2013; Kafka et al., 2012) in encouraging resilience.

While young people face increasing levels of adversity, interventions such as the Spirit of New Zealand voyage are one way in which to enhance positive development despite exposure to stress. Since health-promoting behaviours established in adolescence often continue throughout life (Call et al., 2002), further investigation into this exciting and under-studied area is clearly warranted.

Author biographies

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