The Physical Educator Vol. 80 • pp. 593–606 • 2023
https://doi.org/10.18666/TPE-2023-V80-I6-11616

OUTDOOR EDUCATION

Can a Simple Distraction Lower Fear Levels During a Sudden Scary Outdoor Situation?

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Abstract

Adventure-based teaching can foster social and personal growth yet can scare and cause long-lasting anxiety in some group members. This study examined the effects of a simple distraction to lower stress levels during an approaching scary event. Forty-eight males (M = 20.2 years) were randomly assigned to one of four groups. The stressor involved participants walking on a 3-m tower while blindfolded and jumping off into a pool. Self-report questionnaires, digital counters, heart rate, and peripheral temperature measures were used. A two-way analysis of variance indicated no significant difference in trait and state anxiety/sensation seeking. However, a post hoc Scheffé's test found significant changes in heart rate between the experimental groups and the control groups. Though not statistically different, the study's results suggest that distractions affect heart rate, peripheral temperature, and state anxiety/sensation seeking, with raw scores rising (5% and 18%, respectively, for the latter). Future studies should consider other distraction-type strategies in which stress levels may hamper safety during group adventure activities.

Outdoor adventure activities are an important part of many school physical education programs and summer camps. Known for their many physical, social, and emotional attributes (McCole et al.,

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2019; Shellman & Hill, 2017), students greatly benefit from outdoor experiences (e.g., canoe tripping, rock climbing, hiking, skiing). Such benefits include better academic outcomes, an easier transition to postsecondary institutions, improved mental and physical health (lower stress and anxiety levels), healthier social connections as a result of improved intra- and interpersonal skills, better environmental awareness, and understanding and respect for nature and place (Andre et al., 2017; Cooper, 2005; Gibbons et al., 2018; Stott et al., 2015).

Many organizations have prospered over the years (e.g., Outward Bound, National Outdoor Leadership School, Hébertisme, Project Adventure, Adventure Works). Adventure-based activities have become an integral part of academic planning in many secondary schools and in postsecondary institutions (e.g., Laurentian University's Outdoor Adventure Leadership program in Ontario, Canada; Outdoor Education program at Prescott College in Arizona, United States; Adventure Education at Thompson Rivers University in British Columbia, Canada).

Outdoor-based activities can have positive outcomes; however, these adventure-based experiences can also provoke unpleasant bouts of fear or anxiety (e.g., effects of a "sewing machine" leg when rock climbing, freezing when on the verge of tipping in a canoe or a kayak, fear in traversing icy slopes while skiing), possibly leading to a number of negative outcomes (Ward, 2004).

Fluctuating levels of stress are generally expected during adventure activities (Hallam et al., 2021). Most of the time, outdoor enthusiasts learn to adapt and control their feelings. However, concerns arise when some people, especially beginners, panic or "freeze" mentally (Carnicelli-Filho et al., 2010; Koole & Van den Berg, 2005; Meyer, 1979). Given the possibility of an unfortunate reaction, the outcome may lead to panic or terror resulting in an accident (Kerr & Houge Mackenzie, 2020; Robinson & Stevens, 1989).

These reactions manifest in different ways. Physiologically, some reactions include a faster heart rate and rapid breathing, greater muscle tension, and overexcitability. Psychologically, the participant may develop a blank mind or have feelings of despair with no escape (loss of inner control). Emotionally, the person may show signs of panic, faint, or behave irrationally (Wiemer et al., 2013). Fortunately,

stress management techniques can help people return to a normal state of thinking (Yusufov et al., 2019).

There are many techniques and strategies that reduce or control stress levels. Kivisto and Couture (1997) provide a comprehensive overview of available techniques, particularly related to three general coping categories (i.e., behavioral, cognitive, and psychological). Many of the techniques require weeks of pre-event training before noticeable benefits can be seen. Unfortunately, some unexpected wilderness events require a quick reaction time, sometimes in compromising situations. A fast-acting strategy is necessary for a person to address unexpected bouts of stress. One such study looked at having beginners reduce their stress levels when necessary, during a 5-day introductory course in white water kayaking (Couture, 1990). The experiment took place on the upper Red Deer River (Alberta, Canada) in late fall. The river intensity ranged from Class 1 to Class 3 in difficulty with glacial water flowing down snow-covered shores. Daily temperature ranged from -5 to +5 °C. Nine university participants were evaluated before, during, and after the course. A simple intervention (distraction) called the "Calming Down Response" or "Calming Reflex" (Everly in Allen, 1983) was taught and practiced for 2 weeks, 14 days before the white-water kayak course. The change from "response" to "reflex" infers that with 2 weeks of training, the strategy may become a "reflex" rather than a cognitive effort. This quick-thinking technique was meant to be used if or when the individual felt a bit overwhelmed (too stressed). Results showed that participants maintained their level of sensation seeking and lowered their heart rate and state anxiety levels when necessary. This current study looked at unexpected circumstances needing a quick solution without having had prior training.

Attentional thinking strategies (concentration and/or distractions) can assist in finding a quick-acting solution. Conceptually, there are associative and dissociative thinking styles for use in many situations (Morgan & Pollock, 1977). Associative thinking infers that an individual focuses on their bodily feedback and the actual event. In a sporting environment, it is subdivided into an internal and external focus (i.e., breathing, muscle tension, pain, and running pace, external indications relevant to the task). Performance outcomes give rise to greater results with more feelings of physical and mental

fatigue (Shücker et al., 2014; Tenenbaum & Connolly, 2008). Unlike associative thinking, dissociative strategies can also be considered.

Dissociative thinking strategies are intentional distractions that block out bodily feedback and external cues by focusing attention away from the situation or activity. For instance, it may involve singing a song while jogging or counting the number of blue cars while bike riding. These strategies are also divided into an internal or external focus (Couture et al., 1999). The dissociative internal focus includes exercises such as solving math equations, meditation while moving, or planning a house addition. An external focus relates to any environmental stimulus (i.e., count the number of evergreen trees while running, distinguish components of traffic noise). Both dissociative strategies have encouraging performance outcomes with generally reduced fatigue and discomfort during sporting and exercise events (Couture et al., 1998; Gabana et al., 2015; Padgett & Hill, 1989).

In nonsporting environments, distracting strategies have favorable results. For example, patients play a computer game on a ceiling during a dental procedure (Redd et al., 1987). Some intentional distraction games improve older adults' memory for face–name associations (Biss et al., 2018). Blood donors can listen to music and play cards during a transfusion (Aydin & Sahiner, 2017). In essence, distractive strategies are easy to do, require no prior training, and have positive outcomes (Brick et al., 2020). Thus, this study examines if an external distraction can have an impact on stress levels during an impending scary event.

Method

Outdoor stressful events are not always easily controlled and fears can be compounded by external variables (e.g., rain, cold, snow, wind, sounds). In an effort to reduce these distractions, the study was done indoors. Forty-eight healthy male university volunteers completed an informed consent before the study and confirmed they were recreational swimmers with no unusual fear of height in general. Their ages ranged from 19 to 23 years old (M = 20.2 years). Participants were randomly assigned to one of four groups: (a) Stressor With No Intervention (SNI), (b) Stressor With Intervention (SWI), (c) No Stressor With Intervention (NSI), and (d) a Control group (CON). The study controlled for as many natural variables as possible.

The stressor was performed in an indoor Olympic-size swimming pool (50-m length and 4.6-m depth) with a diving tower (3 m). The tower level had a 6-m long nonslip approach and was 2 metres wide. The air temperature was 75 °F (24 °C) and the water was 82 °F (28 °C). A qualified lifeguard was on site. Only one experimental group member was in the pool testing area at a time. Two work stations (three portable walls, 2 m high) were placed strategically: (a) close to the pool main entrance and (b) behind the diving tower at the 3-m level. Both stations provided no view of the pool or tower.

Measuring Tools

Two physiological modalities (heart rate and digital temperature) were examined. Participants wore a heart rate monitor (Polar Vantage XL). The watch was calibrated to take measurements every 5 s. This telemetric system consists of a waterproof watch and chest strap. It also has good validity and reliability for measuring heart rate (Lee & Gorelick, 2011). Heart rate measurement showed a person's level of arousal. In essence, a higher heart rate depicted a more excited individual (Clemente-Suárez et al., 2017).

Digital temperature was taken with a specialized thermometer (a 5-ml stock polyester strip) wrapped around the left hand middle finger. The thermometers were light waterproof bands consisting of tiny rectangles filled with tiny amounts of thermochromic liquid crystals of differing colors (Biotic Band). The thermometer's range went from 76 °F (24.4 °C) to 96 °F (35.5 °C). A colored rectangle lit up when a temperature was reached. The accuracy was within 2 °F (about 1.1 °C). Digital temperature was used for measuring a person's arousal level as it relates to vasodilation during relaxation and vasoconstriction during a stressful event (Surwn et al., 1976).

The intervention in the study was for the participants to have one handheld digital counter (3.8 cm × 4.4 cm × 5.1 cm) in each hand. Each counter had a four-digit register (0–9999) and easily reset to 0. These were used in the measurement of performance for the two intervention groups. Participants were told that their digital counter performance was to be compared to others. In reality, the two counters were meant to mentally distract the blindfolded participant from the 3-m jump into the pool.

Three self-report questionnaires were used. The State-Trait Anxiety Inventory (STAI) measures two types of anxiety. State

anxiety identifies unpleasant feelings such as fear, nervousness, and discomfort when a person is exposed to dangerous situations. Trait anxiety relates to feelings of stress, worry, or discomfort and represents how people generally perceive typical situations. The questionnaire comprises 40 questions ("I feel secure" and "I feel worried") and it has a 4-point rating scale (Spielberger et al., 1983). It is a widely accepted measurement of anxiety because of its internal consistency coefficients and test–retest reliability coefficients (Spielberger, 1989).

Given the perceived risk of the study, the Sensation Seeking Scale (SSS-version V) was used for verification of whether this research attracted a particular type of participant. Developed by Zuckerman et al. (1978), this scale was used for identification of participants' general traits in sensation seeking according to four different subscales: (a) Thrill and Adventure Seeking (TAS), (b) Disinhibition (Dis), (c) Experience Seeking (ES), and (d) Boredom Susceptibility (BS). Each subscale contained 10 items (40 items) on a 3-point Likert-type scale. The SSS-V has satisfactory scores of reliability (*M* Cronbach's $\alpha = .85$; Zuckerman et al., 1978) and provides a perspective for the individual's level of desire to engage in the risky activities (Barlow et al., 2013). It was not anticipated that the trait portion of the STAI and the SSS-V results would show differences, because traits are generally stable attributes.

The Sensation Seeking Anxiety State Test contains 36 items on a 5-point Likert-type scale (SSAST; Zuckerman, 1977). These items consist of 15 questions about state sensation seeking, 15 questions about state anxiety, and six filler questions. The SSAST has reliability coefficients ranging from .88 to .95 (Neary, 1975).

Procedure

One participant entered the pool area and sat at Station A with a research assistant. Three self-report questionnaires were answered. Once completed, resting heart rate and digital temperature were taken. Each experimental group member was led upstairs to Station B, where more questionnaires were completed (lasting about 5 min). A second set of physiological measurements was taken (heart rate and digital temperature).

Each SNI participant (blindfolded jumpers without intervention) was given specific instructions. The participant wore a blindfold and

was escorted to the starting point on the 3-m tower. The participant walked 5 m to a nonslip bath mat (60 cm × 1 m) at the end of the tower, where a spotter stopped him. The spotter checked the person's heart rate and peripheral digital temperature and instructed the person to jump outwardly on the count of 3. Following the jump, the participant swam to the side and returned to Station A to answer questionnaires. The person was thanked and, several minutes later, the next participant entered. The routine was slightly different for the participants with intervention.

SWI participants (blindfolded jumpers with the intervention) walked blindfolded to the starting point on the 3-m tower and held a hand tally counter in each hand. The participant was encouraged to have the highest scores in the group for each hand. Once the signal was given, the participant walked 5 m at a regular pace to the bathmat while clicking as fast as possible on both hand counters. The hand counters were given to the spotter while heart rate and digital temperature were noted. On the count of 3, the person jumped. Unlike the two jumping groups, the third group did not jump and did perform the intervention (digital counters).

NSI participants (nonjumpers with the intervention) walked on the 3-m tower to the starting point with no blindfold. With a handheld counter in each hand and the signal given, the participant walked to the bathmat while clicking as fast as possible on the hand counters. Both hand counters were given to the spotter while heart rate and digital temperature were noted. Once completed, the participant returned down the stairs to Station A. With the exception of the control group, self-report questionnaires were collected at Station A, at Station B, and at the end (return to Station A). Heart rate and digital temperature were collected at Station A, at Station B, and prior to the jump.

Results

Physiological and psychological tools were used for study of the effects of a quick distracting technique during a perceived stressful event. Initially, it was confirmed the jump was stressful via comparison of the heart rate levels between the No Jump groups and the Jump groups at pre-jump. A two-way analysis of variance showed a Wilks's lambda of 0.35 with $F(3, 20) = 12.27$ and a high probability ($p = 0.00009$). Heart rate levels were then compared between the

experimental groups at three times (at rest, 5 min, and 5 s prior to the jump; Table 1). A significant time effect was found, $F(2, 66) = 69.92$, $p = 0.001$. For the between-group heart rate differences, a Tukey HSD post hoc test showed a significant time effect from baseline to pre-jump between the jumpers and the non-jumpers, $F(4, 66) = 10.736$, $p = 0.000$. The jump groups at baseline, 5 min (Station B), and 5 s before the jump showed no significant interaction effects..

Table 1
Experimental Groups' Mean Heart Rate by Time

		Heart rate	
Group	**Rest**	**5 min**	**5 s**
SNI	96	115	129
SWI	89	111	135
NSI	83	89	93

Note. SNI = Stressor With No Intervention; SWI = Stressor With Intervention (SWI); NSI = No Stressor With Intervention.

Raw scores for the peripheral digital temperatures showed differences between experimental groups. From base temperature (at rest) to 5 s before the jump, NSI (83 °F to 89 °F; 28.3 °C to 31.7 °C) had the warmest range compared to SNI (80 °F to 86 °F; 26.7 °C to 30 °C) and SWI (77 °F to 82 °F; 5 °C to 27.7 °C). The two-way analysis of variance showed a group effect, $F(2, 33) = 3.79$, $p = 0.03$, but there was no interaction effect between groups.

Digital counter scores obtained by the SWI (42, right; 35, left) were higher than that of the NSI (29, right; 26, left) for both hands. Though SWI scores were much higher than NSI scores, the difference was not statistically significant between and within groups (both hands). For the self-report questionnaires for trait and state anxiety/sensation seeking, results showed no significant differences between groups for group and interaction effects.

Discussion

This study examined the effects of a quick distraction on a person's physical and mental reactions when they face a stressful situation. Heart rate scores reveal an obvious level of arousal as a result of the jump. A comparison of the heart rates 5 s before both

groups jumped (SWI and SNI) show no statistical changes. Larger group samples may show stronger effects. Likewise, other evaluation modalities may be more effective, for instance, pre-event measures of urinary catecholamines and cortisol concentrations in saliva (Osika et al., 2007) and hormonal measurements such as blood samples for total catecholamines, noradrenaline, adrenaline, dopamine, lactate, cortisol, and serotonin (Baláš et al., 2017).

The results reveal, as expected during a stressor, generally lower digital temperatures in the jumpers than the non-jumpers. Peripheral digital temperature have a significant group effect, but there is no interaction effect as a result of the distraction. A possible confounding variable is the pool environment with each participant in the warm pool area for 20 to 25 min. Though raw scores in digital temperature show promise, there is no statistical difference. With more accurate instruments (noninvasive), a significance level may be reached. Some research systems use sophisticated telemetric thermometers (Yamakoshi et al., 2013).

The results reveal no changes in trait anxiety and trait sensation seeking, as expected, because of the short-lasting event. Traits normally refer to relatively stable aspects of personality, genetics, and environmental factors (Ashton et al., 2017; Koestner et al., 1994). The results also show generally stable state sensation seeking, as expected. Unexpectedly, the results do not show a marked change in state anxiety despite increases in heart rate and lower digital temperature. However, these scores are not significant, unlike those in Aydin and Sahiner (2017) and Couture (1990). In future studies of this type, a more visual self-report tool, such as the Children's Fear Scale (CFS) might be a better tool for evaluating participants' levels of anxiety on the verge of jumping (McMurtry et al., 2011). The scale functions on showing five cartoon faces ranging from a neutral expression (0 = *no anxiety*) to a frightened face (4 = *severe anxiety*).

As an intervention, properly used digital counters detract attention away from the stressful task ahead. However, such an intervention may increase heart rate 5 s before the jump. For this reason, the results show no effect of the intervention between SWI and SNI experimental groups. In retrospect, digital counters may become a confounding variable. Though taking attention away from the jump, digital counters require additional physical exertion and may cause

performance stress. Future considerations should include nonphysical interventions such as reading out loud, reverse counting from 100 by sevens, and/or listing as many animals or peoples' names as possible.

In summary, this quick distraction technique caused no significant changes in state anxiety/sensation seeking, even with a rise in initial scores (5% and 18%, respectively) and a change in heart rate. Though the attempted distraction wasn't suitable, outdoor teachers and leaders should consider preparing students with several quick anxiety-reducing strategies in the event that a scary situation might occur (Roberts, 2018). School curriculums should incorporate a good mental first aid kit comprised of tips and tricks for overcoming unexpected scary situations.

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