

The Impact of a Structured Running Program on Female Prison Inmates:  
The Hiland Mountain Running Project

A professional project submitted by Tim Alderson

Submitted in partial fulfillment of the requirements for the degree of  
Master of Science in Counseling Psychology

Alaska Pacific University  
Department of Counseling Psychology and Human Services

April 20, 2012

1. This paper is unpublished research
2. Since this was unpublished it was not subject to peer review beyond a small cohort of fellow graduate students
3. While data measurements achieved statistical significance, the sample size is small
4. While the conclusions are encouraging, all that is suggested is the need for more expansive and rigorous research

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### Abstract

This study examines the relationship between structured running and mental health in female prison inmates. Twenty-five volunteers trained for 12 weeks to complete a 5k run. Prior to the training participants were given the WHOQOL-BREF survey to establish a baseline level of well being. At the conclusion of the study WHOQOL-BREF scores had significantly improved by 20.76%. Physical health, psychological, social relationship, and environment domains of the WHOQOL-BREF also saw statistically significant increases. Additionally, subjects improved their 5k times by an average of 5:01 minutes and lost a combined 46.6 pounds. The study presented the possibility of running as an effective means of prisoner rehabilitation and offered suggestions for further research.

## The Impact of a Structured Running Program on Female Prison Inmates:

### The Hiland Mountain Running Project

The genesis for this project was an article in the September 2011 issue of *Runner's World* magazine article that profiled the "Running Free" program at the Topeka Correctional Center for Women (Vigneron, 2011). This program is the only known running group for female prison inmates in the United States. The program has grown over four years to include 10% of the prison population, with 100 inmates on a wait list to get involved. Entirely run by volunteers, the group volunteers organize four races per year at distances ranging from 5k to marathon. These events are funded entirely through race fees charged to the inmates, and donations from the community. After covering expenses, the organizers have been able to donate over \$35,000 to local charities.

Anecdotal evidence from conversations I had with the organizers of the Topeka program suggests that structured running has positive impacts on prisoner behavior, rehabilitation, and recidivism. None of the group's core members has received disciplinary sanctions in the past year, and several have gone on to compete in races after being released. Additionally, several program alumni cite their introduction to running in prison as major factor in their rehabilitation.

The experience of the Topeka Program suggests a link between exercise and prisoner rehabilitation consistent with the available literature on exercise in the general population. However, to date their conclusions about the success of the program are anecdotal. This project attempts to quantify the impact of a structured running program

on the mental health of female prison inmates in way that goes beyond hearsay and conjecture. Following the Topeka model, this research represents a first step in examining running as a mediator of mental health in this specific population. If the positive outcomes can be quantified, prison administrators and policy makers will be able to use the results to justify similar programs in their institutions.

### **Literature Review**

According to Ryan (1999, as cited in Leith, 2002) Hippocrates reportedly prescribed exercise for patients suffering from mental illness. In more recent times a dualistic approach to physical and mental health has often ignored the relationship between exercise and psychological well-being. Morgan (1988) documented the methodological problems of early research examining exercise and mental health. Early studies were primarily based on correlational analysis inadequate to determine a causal relationship between mental health and exercise. Further, the majority of research was performed on adult psychiatric patients making it difficult to generalize the results to the wider population. Fortunately, more recent studies have more robustly examined the psychological impact of exercise. This has corresponded with a trend toward a more holistic approach to health and wellness.

### **Exercise and Overall Mental Health**

Donaghy (2007) analyzed population based studies published from 1970 to 2006 that included a randomized controlled exercise intervention measured at two or more time points. These studies examined the association between physical activity at baseline and the presence of symptoms of mental health disorders at follow-up. Of the 12 studies that

met the criteria, 11 reported positive outcomes supporting a link between physical activity and reduced risk of mental health problems. The approximately 33,000 people included in the studies represented a broad range of populations including men, women, adolescents, adults, and older people.

Ten Have, De Graaf, & Monshouwer (2011) examined data from the Netherlands Mental Health Survey and Incidence Study (NEMESIS) to determine the relationship between exercise and the prevalence, incidence, and course of mental disorders. NEMESIS was a longitudinal study of 7,076 Dutch residents followed from 1996 to 1999. The authors found that physical exercise of just 1-3 hours per week was associated with a lower prevalence, lower first-onset, and better outcomes of mental disorders. This was especially true of mood and anxiety disorders. Interestingly, they did not find a dose-response relationship between exercise and mental health. “Some exercise is better than none, but more physical exercise is not necessarily better than some” (p. 346).

### **Exercise and Depression**

North, McCullagh, and Tran (1990), in a meta-analysis of 80 studies published between 1969 and 1989 concluded that acute and chronic exercise significantly decreased depression symptoms across the age spectrum, in both males and females, and in clinical as well as non-clinical populations. Exercise intervention was at least as effective as traditional treatments and there was no difference in efficacy between aerobic and anaerobic workouts. Further, the anti-depressant effects were greater the longer the exercise program lasted.

Martinsen (1990) conducted a more narrow review of the literature that examined physical exercise and clinical depression. The findings showed that exercise also benefitted the clinically depressed and that this population tended to be physically sedentary and had a reduced physical work capacity. Similar to the North et al. study mentioned above, non-aerobic exercise was equally effective as aerobic programs. In addition, Martinsen found that patients were appreciative of the use of exercise in their treatment plans stating that patients ranked exercise as “the most important element in a comprehensive treatment program for depression” (p. 388).

More recently, Daley (2008) performed a review of meta-analyses of randomized controlled trials published between 1990 and 2007. Acknowledging the methodological limitations of the examined trials, Daley was still able to conclude that “exercise as treatment for depression is more effective than no treatment and is as effective as traditional interventions, at least in the short-term” (p. 145). Further, the adherence to exercise programs examined by Daley was equivalent to pharmacological intervention.

Leith (2002) proposed the following guidelines for exercise intervention in depression based on analysis of the available research:

- Aerobic and anaerobic exercise is equally effective.
- Frequency of exercise should be at least three times per week. There appears to be no advantage to greater exercise frequency.
- Exercise durations of 15-30 minutes are sufficient to improve depression.
- Exercise programs must be at least 10 weeks long for maximal benefit.
- There is no additional benefit to exercising at higher intensity.

## **Exercise and Anxiety**

Compared to the wide range of research on the positive effects of exercise in depression, anxiety disorders have been less frequently studied. Further, Strohle (2009) points out that the range of anxiety disorders makes it difficult to apply conclusions in studies of one type of disorder across the entire spectrum. Changes in diagnostic criteria further complicate the interpretation of studies of anxiety and exercise. Nevertheless, several meta-analytic reviews have summarized the association between exercise and the reduction of anxiety symptoms.

Landers and Petruzello (1994) performed meta-analysis on 30 articles examining the anti-anxiety effects of exercise and physical activity. They concluded that regardless of the anxiety measures taken, or exercise regime invoked (acute v. chronic), the results point to a consistent link between exercise and anxiety reduction.

More recently Herring, O'Connor and Dishman (2010) analyzed 40 articles examining anxiety and exercise intervention published between 1995 and 2007. They concluded that exercise training significantly reduced anxiety symptoms. Training programs lasting no more than 12 weeks, using session durations of at least 30 minutes resulted in the largest anxiety improvements. Additionally, they theorized that exercise is especially helpful for patients who express a preference for non-pharmacological treatments, "because such preferences may influence the magnitude of the treatment outcomes" (p.329).



### **Exercise and Mental Health in Women**

The relationship between exercise and mental health in women has been less rigorously studied. Of the studies mentioned so far, four (Donaghy, 2007; Landers & Petruzello; 1994, Martinsen, 1990; North, McCullagh, & Tran, 1990) examined their findings for gender differences. All four found no differences between men and women in their experience of exercise as a mediator of mental health.

In one of the few studies that examined gender differences, Farmer et al. (1988) found that women who had engaged in little or no recreational activity were twice as likely to develop depression when compared with women who had engaged in moderate or high levels of activity. The same protective effect for men was not evident in the study.

A recent study by Balkin, Tietjen-Smith, Caldwell, and Shen (2007) enrolled only female subjects and examined the impact of exercise on depression in 110 undergraduates. After 6 weeks of aerobic exercise scores on Beck's Depression Inventory were significantly lower than pre-treatment baseline in comparison with score differences of a sedentary control group.

### **Exercise and Mental Health in the Prison Population**

Castellano and Soderstrom (1997) documented the higher levels of emotional distress present in prison inmates relative to the outside population. Utilizing common instruments for measuring depression, self-esteem, and anxiety; the authors found inmates scored significantly higher on every single measure compared to normative

samples. Additionally, scores on depression and anxiety scales were consistent with suggested cut offs for clinical psychopathology.

Considering these findings, there is surprisingly little research on the relationship between physical exercise and prisoner mental health. Buckaloo, Krug, and Nelson (2009) examined the impact of exercise on measures of depression, stress, and anxiety in 60 male inmates incarcerated in Oklahoma. They found significantly lower levels of psychopathology in inmates who exercised compared to those who did not. The score differences between the groups were noticeable despite similarities in age, racial background, current charges and time served.

Cashin, Potter, and Butler (2008) explored the relationship between levels of self-reported physical exercise and mental well-being using the Beck Hopelessness Scale. The study included 914 male and female prison inmates incarcerated in New South Wales, Australia. A weak but significant correlation was found between increased self-reported exercise and decreased hopelessness.

## **Methods**

### **Hypothesis**

It was anticipated that this project would demonstrate that participation in a structured running program would have a positive impact on dimensions of physical and mental health for female prison inmates.

### **Design**

The project used a mixed methods design with both quantitative and qualitative elements. For the quantitative analysis a one-group pretest-posttest pre-experimental

design was used. This population represents a new focus for research on the connection between exercise and mental health. As such, this design serves as a good first step in our understanding of female prison inmates' response to exercise programs. Additionally, this design allowed flexibility to design a project that could be successful in the restrictive institutional environment of the Department of Corrections.

While this project was primarily a quantitative examination of the research question, some qualitative techniques were used to color the analysis of the data. The purpose was to gain more insight into the individual experience of the study participants beyond the raw numbers of the quantitative measures.

### **Participants**

The study was performed at Hiland Mountain Correction Center in Eagle River, Alaska. This is a minimum-maximum security institution housing female inmates convicted of felony and misdemeanor crimes. There are approximately 450 inmates at the institution. In addition to the general prison population, Hiland houses acute and sub-acute mental health facilities. Volunteers were subject to the following criteria for entry into the study:

**Length of incarceration.** Inmates had to be sentenced or have entered a plea that would at minimum extend their incarceration six months beyond the completion of the study. This requirement was added so that any changes in their mental health status from the study treatment would not be confounded by anticipation of their impending release. An exception could be made for inmates whose cases were still pending if the status of their court proceedings allowed for corrections officials to reasonably assume that the

inmate would remain incarcerated within the above guidelines. Additionally, inmates must have been incarcerated for at least three months prior to study entry to control for any effects of adjusting to prison life.

**Disciplinary action.** Inmates must not have had any disciplinary actions in the previous six months. One exception was made for an inmate whose infraction was deemed by the author and the Hiland mental health staff to be administrative in nature and not indicative of a disciplinary risk to the completion of the study.

**Axis II disorders.** Inmates with Axis II disorders were excluded. Additionally, the Hiland Mountain mental health staff had the discretion to exclude any inmate whose mental health status they deemed inappropriate for inclusion in the study.

**Physical fitness.** Inmates had to be physically able to participate. As a minimum, they were required to complete the 5 kilometer pre-test in under one hour and 10 minutes. Additionally, all participants were given pre-entry physical exams by the Hiland Mountain medical staff. No one was excluded based on their medical screening. However, the medical staff did restrict some inmates to only walking during the first weeks of the study.

**Demographics.** Twenty-five inmates met the entry criteria for the study from a pool of 57 volunteers. Disciplinary actions and length of remaining incarceration were the most often cited reasons for a volunteer not to be included. Table 1 summarizes other demographic characteristics of the study sample.

**Mental Health.** Sixty-five percent of the study volunteers were on the case load of the Hiland Mountain mental health staff. Additionally, 22 volunteers self reported a

mental health diagnosis during pre-treatment interviews. All of the study volunteers self-reported struggles with substance use including street drugs, prescription pain killers, and alcohol.

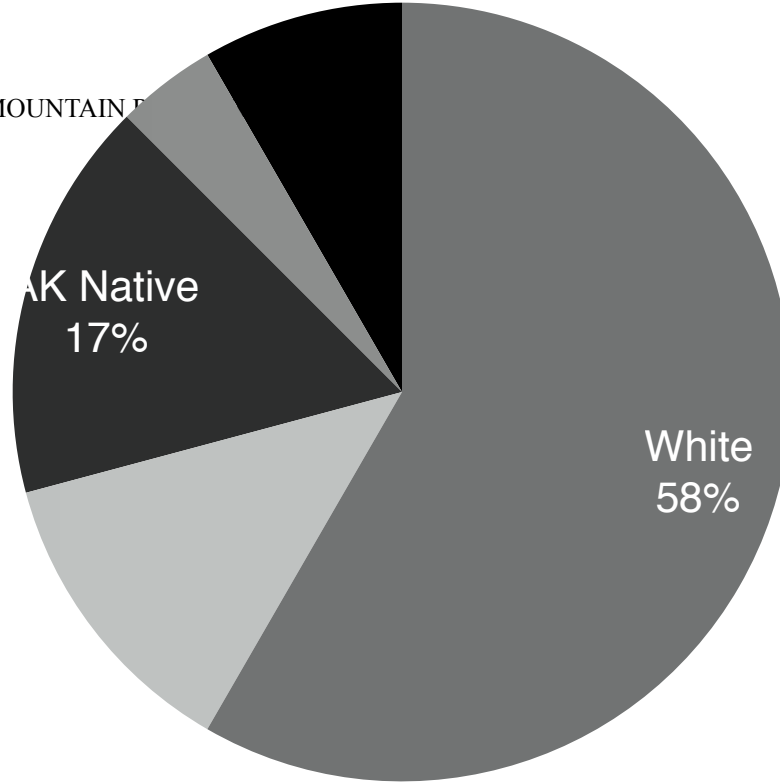
Table 1		
<i>Sample Demographics at</i>		
Demographic	Mean	Range
Age	34.86	21 - 58
Previous Incarcerations	6.2	0 - 18
Months In Prison	26.6	3 - 166
Months to Serve <sup>a</sup>	70.3	6 - 468
Entry 5k time	44:06	27:25 - 57:48
Body Weight (lbs.)	177.9	134.6 - 272.0
WHOQOL-BREF	76.2	44 - 98

Note.  $N = 25$

<sup>a</sup>  $N = 20$  because 5 inmates had not been sentenced at the time of study entry

**RSAT.** Of the 25 inmates accepted in to the study, 12 were concurrently enrolled in an intensive residential substance abuse treatment program known by its acronym RSAT. This program is run by an independent contractor and is based on the Therapeutic Community modality. Inmates in this program participate in programming 10-12 hours per day for 6-9 months. No special effort what was made to recruit from this population by the researcher.

**Racial stratification.** The racial make-up of the study sample included 42% from minority groups. Ethnic background was recorded if it made up at least 50% of an inmates' heredity. Figure 1 illustrates the racial stratification of the study sample. Recent



statistics compiled by Department of Corrections indicate that minority groups represent about 53% of prison inmates (Alaska Department of Corrections, 2010). The study sample skewed more toward white inmates, which is likely explained by the higher participation by whites in running in the general population. One recent survey of 11,000 runners found that whites make up 90% of the runners hitting the streets today.

Figure 1. Racial stratification of study sample.  $N = 25$

### **Materials**

**Informed consent.** The letter of consent was developed from the standard template used by Alaska Pacific University (see Appendix A). In addition, inmates were required to sign a media release to be videotaped as part of the study (see appendix B).

This release is a standardized form required by the Alaska Department of Corrections (DOC). The media release specifies all video is subject to review by DOC and can be used in future judicial proceedings. Inmates had the option to withdraw their consent and quit the study at any time.

**Quantitative measures.** The World Health Organization Quality of Life Survey Brief Form [WHOQOL-BREF] (WHOQOL Group, 1998, see Appendix C) was used as the pre/post test assessment instrument. The test was selected because the questions correspond to the aspects of quality of life that the treatment protocol is believed to modify including physical health, psychological health, social relationships, and environmental factors. By including questions related to each of these domains the WHOQOL-BREF represents a holistic approach to assessment of the human condition. Availability in the public domain was also a consideration.

The WHOQOL-BREF includes questions relating to 24 facets of quality of life. In addition, two questions pertain to overall quality of life and general health. The questions are organized into four domains: physical health, psychological health, social relationships, and environment. It is possible to calculate a score for each domain to further understand what dimensions of quality of life have been modified.

Responses to the questions are recorded on a 1-5 Likert scale, with higher scores corresponding with positive feelings about the subject matter covered in the question. Table C1 describes the facets incorporated within the WHOQOL-BREF domains. Questions 21 and 25 of the WHOQOL-BREF were not used for this research because their content is inappropriate to the prison population.

In addition to scores on the WHOQOL-BREF, change in the participants time for 5 kilometers (5k) was used as a measure for evaluating their change in overall fitness. Change in body weight was also recorded for all participant's and served as a safety measure. Although many of the participants reported volunteering for the study to lose weight, this was not one of the primary objectives of the intervention. In fact, weight loss was intentionally deemphasized as a component of the program because of the presence of the known eating disorders among the sample group.

**Qualitative Measures.** Interviews (see Appendix D) were videotaped with each inmate before and after completing the training program. The purpose of these interviews was to provide insight into the individual experiences of the study participants and to provide greater depth and color to the results of the quantitative measures described above. Additionally, interviews were used to create a multimedia presentation that documents the findings of the study and the experience of the participants. The use of video was explained to the participants as part of the informed consent. The resulting multimedia presentation does not identify the participants by name and they had the option to opt out of having their interviews used in the documentary.

**Shoes.** Standard issue prison footwear is not appropriate for training and racing as a runner. Through a donation from Skinny Raven Sports all of the participants in the study were outfitted with new running shoes. The shoes were not given to the inmates until they completed the first four weeks of the training regimen. In this regard they were used as a retention and motivational tool. Inmates who dropped out of the study prior to



completion were required to forfeit their shoes. During the first four weeks participants without basic athletic shoes were asked to only walk during the workouts.

### **Procedures**

**Pre-treatment (2 weeks).** A series of informational meetings were held on the Hiland campus to recruit volunteers into the program. Volunteers who met the entry criteria were given a pre-treatment fitness test of 5 kilometers. Based on the results of this test and in consultation with the author participants were slotted into either novice or intermediate training protocols.

In addition to the 5k fitness test, the WHOQOL-BREF survey was administered during this time. Participants were also measured for baseline body weight. Finally, all participants sat for videotaped interviews that lasted on average about 10 minutes

**Training program (12 weeks).** Because the sample had a wide range of fitness ability at baseline, two different running programs were used. The training protocols were developed by Pierce, Murr, and Moss (2007) at the Furman University Institute of Running and Scientific Training and were used with permission. The novice program was designed to gradually move the inactive individual from walker to runner. Alternately, the intermediate program was designed for more experienced athletes who could already complete a 5k at baseline.

The intermediate program was designed by the authors to use pace times as a way to gauge the intensity of the workouts. However, the subjects of this study did not have access to timing equipment due to prison regulations. Consequently, the program was modified slightly to use the Borg Scale of Perceived Exertion (Borg, 1982) as a gauge of

intensity for each workout. This had the added benefit of simplifying the workout regime to make it more accessible to our sample, which had little experience with exercise or fitness.

The workouts took place three days per week over a 12 week period. Participants were required to attend at least 80% of the supervised sessions. Exceptions were made for conflicts with prison jobs, court appearances, or illnesses. Workouts were posted publicly and missed training was to be made up individually.

Most training took place inside the prison gymnasium due to the extreme cold and poor conditions on the outdoor track. For six sessions (out of 36) conditions allowed the project participants to train outside.

As noted earlier, inmates did not receive appropriate running shoes until week four of the training program. This was used as a motivation and retention tool to get inmates through the difficult adjustment phase of starting a training program. In most cases inmates had purchased basic athletic shoes on their own that could be used during the first four weeks before the mileage increased to the point where this was not practical. In cases where inmates had nothing better than the standard slip-on prison shoes, or where the medical team deemed it unsafe, inmates were asked to walk during workouts.

**Education.** This population had virtually no previous experience with training for running or physical fitness in general. As an adjunct to the training program a classroom series was included that took place over five sessions. Local experts were brought in to speak on topics related to training, racing, and nutrition. Speakers included:

- Lisa Keller - Owner of Multi-Sport Training of Alaska and level 1 coach for USA Track and Field, USA Triathlon, and Road Runners Club of America
- Rikki Keen, MS, RD, CSSD, CSCS - Specialist in Sports Dietetics and professor at the University of Alaska, Anchorage, Director of UAA Human Performance Lab
- Shannon Donley - Nationally ranked triathlete and 7-time winner of the Gold Nugget Triathlon
- Ellyn Brown - Elite master's level triathlete
- Nora Miller - Nationally recognized adventure athlete and Instructor of Psychology at Alaska Pacific University

**Race day.** At the culmination of the 12 week training period the remaining participants competed in a 5k race. Logistics for the race were handled by Up and Running Event Management. Their participation allowed us to replicate the atmosphere of a typical race experience outside the prison walls. In addition to professional timing services inmates were given race numbers and t-shirts to commemorate the event. One of the inmates in the program did the graphic design for the t-shirts (see Appendix E).

The race took place in the gymnasium to enable time comparisons with the pre-treatment 5k that was also performed inside. Inmates from the general prison population were allowed to spectate for the event. It was estimated that about 100 inmates were there to cheer on the study participants. One inmate was not able to compete in the race because she had a visit with her children scheduled during the race time. In this case she completed her post-test 5k two days later.

**Follow-up (1 week).** Within three days of completion of the post training 5k all inmates were re-administered the WHOQOL-BREF. Additionally, all inmates were measured for body weight. Within one week of the race all inmates were also given a post treatment interview that was videotaped.

**Data analysis and completion of the report (1 week).** Once all the follow up data had been collected it was analyzed in line with the pre-determined study design. Scores on the WHOQOL-BREF were analyzed using a dependent (or paired) *t* test to investigate differences between pre and post test overall and component domain scores. In addition, independent (unpaired) *t* test analysis was done comparing the participants in RSAT with the general prison population. An alpha level of .05 was used to determine if the differences between groups were statistically significant. Graph Pad Software online calculators were used to analyze the results.

## **Findings**

### **Quantitative Findings**

Of the 25 volunteers selected for the study, 21 (84%) completed the entire study protocol. Of the four who dropped out, two were released from prison unexpectedly through early furloughs. The other two were removed from the study for positive random drug screens at six weeks in to the study for one and 11 weeks in for the other. For those completing the study, attendance over the 36 workouts was 89.9%. The most common reason reported for absence was “sick,” accounting for 47% of missed workouts. The next most common reasons for absence were “scheduling conflict,” “injured,” and “court” accounting for 28%, 19%, and 7% respectively.

Of the 21 participants who completed the training, 17 improved their 5k time from baseline. The average improvement was -5:01 minutes (11%) from a baseline mean of 44:03 minutes. The range of improvement in times spanned from a high of -14:58 minutes to a low of -1:11 minutes.

Four inmates saw their times for 5k increase slightly over the 12 weeks ranging from +0:35 to +2:45 minutes. However, it should be noted that of the inmates whose times increased, two were given instructions by the Hiland medical team to only walk during the race due to injury. Additionally, one other inmate who increased her time was recovering from a severe sinus infection just prior to the race that required antibiotics.

Runners in the program lost a combined total of 46.4 pounds or 2.21 pounds per runner. The most weight lost was 10.1 pounds. There were four runners who gained weight with the largest gain being 7.1 pounds. As mentioned above, weight loss was intentionally de-emphasized throughout the study due to the participation of several inmates with a history of eating disorders.

**WHOQOL-BREF scores.** Structured running resulted in an increase in mean WHOQOL-BREF scores ( $M = 16.10$ ,  $SD = 13.1$ ). This increase was statistically significant,  $t(20) = 5.62$ ,  $p < .001$ ,  $d = 1.23$ . Additionally, there was a 95% probability that the difference between the pre and post test means would fall between 10.12 and 22.07. WHOQOL-BREF overall and domain scores from the study are summarized in Table 2.

**Physical health domain.** Structured running resulted in an increase in mean physical health domain WHOQOL-BREF scores ( $M = 3.00$ ,  $SD = 4.49$ ). This increase

was statistically significant,  $t(20) = 3.06$ ,  $p = .006$ ,  $d = .67$ . Additionally, there was a 95% probability that the difference between the pre and post test means would fall between .95 and 5.05.

Table 2

*Summary of Results of WHOQOL-BREF*

	# of Questions	Index Range	Pre-test Mean	Post-test Mean	Change	<i>p</i> value
WHOQOL-BREF	24	24-120	77.52	93.62	16.10	< 0.0001
<i>Domains</i>						
Physical Health	7	7-35	26.62	29.62	3.00	0.0062
Psychological	6	6-30	19.71	23.19	3.48	< 0.0001
Social Relationships	2	2-10	6.33	7.52	1.19	0.0014
Environment	7	7-35	22.10	24.90	2.81	0.0005

$N = 21$

***Psychological health domain.*** Structured running resulted in an increase in mean psychological health domain WHOQOL-BREF scores ( $M = 3.48$ ,  $SD = 2.66$ ). This increase was statistically significant,  $t(20) = 5.995$ ,  $p < .001$ ,  $d = 1.31$ . Additionally, there was a 95% probability that the difference between the pre and post test means would fall between 2.27 and 4.69.

***Social relationships domain.*** Structured running resulted in an increase in mean social relationship domain WHOQOL-BREF scores ( $M = 1.19$ ,  $SD = 1.47$ ). This increase was statistically significant,  $t(20) = 3.71$ ,  $p = .001$ ,  $d = .81$ . Additionally, there was a 95% probability that the difference between the pre and post test means would fall between .52

and 1.86. It should be noted that there were only two questions included for the social relationships domain. One related to sexual activity was omitted due to it being inappropriate for this population.

**Environmental domain.** Structured running resulted in an increase in mean environmental domain WHOQOL-BREF scores ( $M = 2.81$ ,  $SD = 3.09$ ). This increase was statistically significant,  $t(20) = 4.16$ ,  $p = .001$ ,  $d = .91$ . Additionally, there was a 95% probability that the difference between the pre and post test means would fall between 1.40 and 4.22.

**RSAT vs. open population.** As noted earlier, the sampling for this study resulted in almost half of the participants being concurrently enrolled in residential substance abuse treatment. Although not part of the original study design, an analysis was made to determine if there were any differences between these two groups. Table 3 summarizes the WHOQOL-BREF scores of the two groups.

Table 3

Comparison of Open Population Participants Versus RSAT Participants

	Open Population	RSAT	Difference	<i>p</i> value
WHOQOL-BREF Pre-Test	76.11	78.58	2.47	0.7065
WHOQOL-BREF Post-Test	90.11	96.25	6.14	0.3926

At baseline the RSAT group scored higher on the WHOQOL-BREF ( $M = 78.58$ ,  $SD = 14.57$ ) than the group from open population ( $M = 76.11$ ,  $SD = 14.80$ ). This difference was not statistically significant,  $t(19) = .38$ ,  $p = .71$ ,  $d = .17$ .

In follow up testing after completing the running treatment the RSAT group again scored higher on the WHOQOL-BREF ( $M = 96.25$ ,  $SD = 17.12$ ) than the group from open population ( $M = 90.11$ ,  $SD = 14.08$ ). This difference was not statistically significant,  $t(19) = .87$ ,  $p = .393$ ,  $d = .39$ .

### **Qualitative Findings**

**Physical health.** Inmates in their interviews reported near universal praise for the improvement in their physical well-being. Frequently repeated themes were increased stamina, better sleep, and weight loss. The following quotes characterize participants attitudes about their physical health post-treatment:

“I’m more flexible and my breathing is much better”

“My legs are muscley [sic] now and I lost weight. I feel really great”

“I care about my fitness a lot more after finishing this program and I make better choices”

“Taking \_\_ minutes (time omitted to protect confidentiality) off my 5k made me realize I can do more than I gave myself credit for, so I look at everything differently now.”

**Psychological health.** Interviews offered further support for the improved mental health of the study participants as a result of completing the running protocol. Themes from the discussions included improved mood, less anxiety, and better concentration. Additionally, four inmates self-reported discontinuation from their mental health medication that they attributed to their participation in the study. A synopsis of interview responses is below:



“I’m sleeping much better, and I am much less anxious, which I think has helped my skin clear up.”

“I’m more balanced. My moods are more stable. I feel pretty happy.”

“Running gave me a safe place to release the frustration and anger that I have with my mental illness.”

**Environmental.** There was a much greater range to the responses regarding the environmental aspects of incarceration at Hiland Mountain relative to the other domains covered by this study. At baseline about half of the participants were generally complimentary of the physical plant and of the programming offered for their rehabilitation. In contrast, the remaining participants expressed disdain for the facility and programming offerings with one saying, “this place is a joke. They treat us like dirt and no one cares if we live or die.”

At follow-up the responses were more positive, characterized by themes of safety, and a sense of caring by at least some of the staff. The following are reflective of participant attitudes about their environment from follow-up interviews:

“I can’t believe they let us do this project here.”

“It has made such a huge difference in the whole facility and not just the inmates that were running.”

“It really makes me think we can start some more programs.”

The other half regarded the facility and DOC staff and programs with disdain. By conclusion of the study the same inmate said,

**Social Relationships.** Universally inmates reported a lack of close personal relationship during the pre-treatment interviews. Themes of mistrust, criminal thinking, and fear were frequently cited as reasons for not forming close bonds with other inmates. In contrast, follow up interviews repeatedly mentioned teamwork, accountability, and fun when participant described their attitudes about their fellow runners.

“It was amazing to see all of us come together the way that we did. I will share that with these ladies forever”

“Teamwork. We all joined hands together and finished together, regardless of who the fastest woman was”

“It was all about getting it done together and accomplishing something we thought we could never do”

“We got closer and closer as time went on and we motivated each other to get better each and every day”

In addition to connecting socially with other inmates, several participants reported that the program brought them closer to their friends and family on the outside. Five inmates said that the program allowed them to form a closer connection with their children. Remarkd one inmate, “It gives me something I can talk about with my kids, and I can relate with them because they are getting into sports right now. It also makes them proud of me, which makes me feel good.” Another inmate described how it influenced her relationship with her mother. “My Mom has gotten in to running because of me. I am really hoping we can do races together when I get out.”

## **Discussion**

## **Overall Findings and the WHOQOL-BREF**

The findings from this study suggests a very strong connection between the running intervention and improvements in prisoner mental health that is consistent with the findings of Deslandes et al. (2009) and Donagy (2007). When you analyze the changes in WHOQOL-BREF scores coupled with comments by inmates during the interview sessions you get a full picture of the scope of this intervention. This project is a good first step toward understanding running as a mediator for rehabilitation of prison inmates.

Improvements in physical health were noted by decreases in 5k time, coupled with increases in physical health domain scores on the WHOQOL-BREF. For DOC, the potential cost savings from associated decreases in diabetes, high cholesterol, and hypertension, could have far reaching implications. Similarly, improvements in psychological health can have financial benefits to the prison system. As noted in the findings, four inmates self-reported discontinuation of their psychotropic medications. Additionally, using running to improve mental health in large block of the inmate population could go a long way to easing the burden on the two full-time clinicians responsible for the mental health of 450 inmates at Hiland.

It is somewhat surprising that running had a positive impact on prisoner attitudes about their environment and on the efforts made to rehabilitate them by the Department of Corrections. These findings suggest that there may be a threshold level of environmental amenities and security features that are necessary for successful rehabilitation. This conclusion may play a role as DOC reconciles the punitive mandate

of the judicial system and the desire to rehabilitate prisoners in to contributing members of society.

WHOQOL-BREF domain scores for social relationships have to be interpreted with skepticism as there were only two questions that contributed to scores in this domain. Nevertheless, when coupled with the interview responses there is the strong suggestion that structure and camaraderie of the running group allowed inmates to perform better interpersonally then they did prior to entering the program.

### **RSAT vs Open Population**

As mentioned in an earlier section above, it was never the intent of the study to examine differences between inmates enrolled in RSAT versus the general prisoner population. The skewing of the sample toward inclusion of RSAT volunteers was probably due to the entry criteria that required volunteers to be incarcerated for three months and to have been free from disciplinary actions for six months. This proved a very difficult threshold to meet from the general prison population. RSAT enrollees had already met these criteria to get in to the RSAT program.

It is surprising that there was not a significant difference between the RSAT runners and the general population runners on WHOQOL-BREF scores at either baseline or follow-up (see Table 3, page 22). It would have been expected that inmates who were receiving intensive treatment 12 hours per day would have incurred some benefit on the facets measured by WHOQOL-BREF beyond the benefit that was experienced through running alone.

The sample sizes in this case were very small and there was no control group in RSAT to serve as a basis for comparison. Additionally, one has to wonder if the study continued if the numeric difference between groups seen at follow-up would have continued to diverge until it reached statistical significance. At a minimum this represents a possibility for analysis in future research.

### **Weight Loss**

Although the running program was not designed as a weight loss program, it is surprising that more weight wasn't lost by the inmates, especially when you consider that many of the volunteers cited weight loss as a reason for wanting to join the study. There are several possible explanations for this.

First, the investigator intentionally, downplayed weight loss as part of the program to not exacerbate several participants who struggled with body image and eating disorders. Additionally, it was apparent that most of the inmates had never attempted such a structured exercise program and had little background in basic principles of training and nutrition. Finally, the prison food offerings represent the lowest common denominator in nutrition. Inmates are served approximately 4000 calories per day of food that is largely processed, high in fat, and lacking in fresh fruits and vegetables.

### **Limitations**

The ultimate goal of any program targeted to prison inmates is to make it possible for inmates to return to society as a functioning and contributing member. A reasonable criticism of the study is that it only measures surrogates of prisoner relapse and recidivism. While improvement on the domains covered by the WHOQOL-BREF are

generally associated with good outcomes (WHOQOL Group, 1998), a long term study that follows runners after they have been released is needed to make any firm conclusions about the effectiveness of a running program in the prison environment.

Additional criticism can be put on the study sample that is not representative of the larger prison population both racially and by the inclusion of a large number of inmates enrolled in RSAT. Additionally, the strict entry criteria make it plausible that only the best and most motivated inmates achieved entry in to the study. Any future research on this topic should attempt to alter the inclusion criteria to get a more representative sample of the prison population. A control group would also be a reasonable inclusion going forward.

While the study design was very straightforward, in hindsight a better job could have been done linking the qualitative interviews with the quantitative data. A more thoughtful approach to the interview questions that more closely lined up with each domain of the WHOQOL-BREF would have made possible a more thorough assessment of the overriding themes experienced by the participants. In retrospect, the review could also have been improved by being organized around the component domains of the WHOQOL-BREF.

There were two confounding variables that should be considered when examining the findings for this study. First, the treatment protocol coincided with seasonal weather changes that are associated with improvements in mental health. Record snowfall may have increased the impact of these changes. Second, the relationship between the sample cohort and investigator should also be considered. A program of this type puts the

investigator in the role of coach and mentor to the study participants. This relationship might bias to the responses from inmates in the study assessments.

### **Implications**

Reflecting on my work on this project I am reminded of “Occam’s razor,” first proposed by the 14th century nominalist William of Ockham. The razor is loosely translated from the Latin *lex parsimoniae* to read “all things being equal, the simplest choice is best”. The beauty of the Hiland Mountain Running Project lies in its lack of complexity. As a therapist, it is humbling to think how little my skills and education mattered in the improvement made by the inmates at Hiland Mountain. The success of this project is a testament to the body and mind’s own ability to heal.

The complexities of the rehabilitation modalities in use in modern corrections are overwhelming to me. In spite of the supposed sophistication of the methods, our record for success is dismal. With nominal training and almost no cash outlay, this program can be added to the treatment milieu in all types of settings. The larger challenge now becomes how to overcome the institutional inertia inherent in our government bureaucracy to entice policy makers to attack these problems in new ways.

I have been unable to reconcile the horrible crimes committed by the inmates of the Hiland Mountain Running Project with the humanity I saw on display every day. As a community we have failed this population in so many ways and yet our first instinct is for them to only suffer in payment for their crimes. While I would never excuse their

transgressions, real progress will only be possible when as a society we have an honest discussion about criminal rehabilitation that goes beyond simple castigation.

### **Conclusions**

This project is a good first step toward understanding running as a mediator for rehabilitation of prison inmates. Further, it is one of the few studies that concentrates specifically on the female prison population. The strong statistical relationships shown by this research lend credence to further exploration of this topic. Perhaps one day research in this vein might change the way corrections departments view the role of exercise programs and running in particular as part of their rehabilitation efforts.

Prior to the study it was expected that certain domains would have played a larger role in the changes seen in the study subjects. However, what is apparent on reflection is that all the domains worked in concert to produce the improved result. Physical, psychological, environmental, and social factors all contributed to the success of the intervention and all four should be considered when testing the merits of any program targeting the prison population.



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## Appendix A

### LETTER OF CONSENT TO PARTICIPATE

#### Hiland Mountain Running Project

I am a student at Alaska Pacific University (APU) conducting research as part of the requirements for my masters degree in counseling psychology. I am requesting your voluntary participation in my research. You may choose to stop your participation at any time without penalty. I expect that your participation will take approximately 3 hours per week for 15 weeks.

This project will attempt to quantify the impact of a structured running program on multiple dimensions of prisoner mental health. Approximately 25 study volunteers will be divided into two groups based on their performance on a pre-treatment fitness test of 5 kilometers. The groups will follow a 12 week running protocol developed by the Furman University Institute of Running and Scientific Training. Group A will be a novice program designed to move inactive individuals from walker to runner. Group B is for experienced athletes who can already complete a 5k. The groups will meet for approximately one hour three days per week. All participants will be given a quality of life survey developed by the World Health Organization before and after completing the training program. This survey assesses psychological, social, and environmental aspects of personal well being.

In addition to the surveys mentioned above, interviews will be videotaped pre and post training to add an additional dimension to the analysis of the data. Candid video of the training process will also be collected. Anecdotes from the video interviews will be used to supplement the final report. Additionally, a documentary style video will be produced to summarize the findings to the academic community at APU. This video may also be used as a promotional piece for other Department of Corrections (DOC) institutions. Participants should note that a separate media release will be required for videotaping by the DOC and all contents of the videos will be subject to DOC scrutiny.

Personal information about the study participants will be used solely for the purposes of collecting data and for establishing the demographic characteristics of the group as a whole. No personally identifiable information will be used in completion of the final report and all study materials will be destroyed upon completion of the study. Inmates will have the right to revoke their consent and withdraw from this study at any time. Additionally, the study is has been approved by the Alaska Pacific University Institutional Review Board as well as the DOC. It should be noted that there is some inherent risk to participating in an exercise program like the one proposed for this study. Participants should be in reasonable health and notify the investigator immediately if they experience an injury or physical pain. The Hiland Mountain medical and mental health staff will monitor the study and reserve the right to remove anyone they deem is at risk for injury.

A copy of this letter is yours to keep. If you have any questions about how this investigation is to be conducted please contact me at: Tim Alderson, 907-301-6512, [tjalderson@mac.com](mailto:tjalderson@mac.com), 11250 Trails End Road. Inmates without access to phone or email may contact me through the Hiland Mountain Mental Health Unit. You may also contact my Faculty Advisor: Robert Lane, 907-564-8319, or [rlane@alaskapacific.edu](mailto:rlane@alaskapacific.edu).

\_\_\_\_\_  
Investigator (print and sign)

\_\_\_\_\_  
Date

I agree to participate in the project as described above.

\_\_\_\_\_  
Participant (print and sign)

\_\_\_\_\_  
Date

Appendix B

**Alaska Department of Corrections**  
**Release and Permission for News Media Contact**

I, \_\_\_\_\_, a prisoner in \_\_\_\_\_,  
hereby grant \_\_\_\_\_ permission to (initial item(s))  
 Interview,  Photograph,  Electronically Record with regard to the  
following subject matter: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I grant this permission freely and voluntarily. I understand that I have the right to decline being interviewed, recorded, or photographed. Further, I fully understand that anything I say during the interview is subject to being printed or broadcast in the news media and may be used against me in court, at a future time. Finally, I reserve the right to end the interview at any time.

\_\_\_\_\_  
Signature of Prisoner

\_\_\_\_\_                  \_\_\_\_\_  
Date                                  Time

\_\_\_\_\_  
Signature of Witness (Superintendent or Designee)

\_\_\_\_\_                  \_\_\_\_\_  
Date                                  Time

This contact was initiated by: \_\_\_\_\_  
Name of Interviewer                  News Media Represented



### WHOQOL-BREF

The following questions ask how you feel about your quality of life, health, or other areas of your life. I will read out each question to you, along with the response options. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last four weeks.**

		Very poor	Poor	Neither poor nor good	Good	Very good
1.	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2.	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last four weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3.	To what extent do you feel that physical pain prevents you from doing what you need to do?	5	4	3	2	1
4.	How much do you need any medical treatment to function in your daily life?	5	4	3	2	1
5.	How much do you enjoy life?	1	2	3	4	5
6.	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7.	How well are you able to concentrate?	1	2	3	4	5
8.	How safe do you feel in your daily life?	1	2	3	4	5
9.	How healthy is your physical environment?	1	2	3	4	5





The following questions ask about how completely you experience or were able to do certain things in the last four weeks.

		Not at all	A little	Moderately	Mostly	Completely
10.	Do you have enough energy for everyday life?	1	2	3	4	5
11.	Are you able to accept your bodily appearance?	1	2	3	4	5
12.	Have you enough money to meet your needs?	1	2	3	4	5
13.	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14.	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very poor	Poor	Neither poor nor good	Good	Very good
15.	How well are you able to get around?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16.	How satisfied are you with your sleep?	1	2	3	4	5
17.	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18.	How satisfied are you with your capacity for work?	1	2	3	4	5
19.	How satisfied are you with yourself?	1	2	3	4	5



20.	How satisfied are you with your personal relationships?	1	2	3	4	5
21.	How satisfied are you with your sex life?	1	2	3	4	5
22.	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23.	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24.	How satisfied are you with your access to health services?	1	2	3	4	5
25.	How satisfied are you with your transport?	1	2	3	4	5

The following question refers to how often you have felt or experienced certain things in the last four weeks.

		Never	Seldom	Quite often	Very often	Always
26.	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	5	4	3	2	1

**Do you have any comments about the assessment?**

---



---

*[The following table should be completed after the interview is finished]*

	Equations for computing domain scores	Raw score	Transformed scores*	
			4-20	0-100
27. <b>Domain 1</b>	$(6-Q3) + (6-Q4) + Q10 + Q15 + Q16 + Q17 + Q18$ $\square + \square + \square + \square + \square + \square + \square$	a. =	b:	c:
28. <b>Domain 2</b>	$Q5 + Q6 + Q7 + Q11 + Q19 + (6-Q26)$ $\square + \square + \square + \square + \square + \square$	a. =	b:	c:
29. <b>Domain 3</b>	$Q20 + Q21 + Q22$ $\square + \square + \square$	a. =	b:	c:
30. <b>Domain 4</b>	$Q8 + Q9 + Q12 + Q13 + Q14 + Q23 + Q24 + Q25$ $\square + \square + \square + \square + \square + \square + \square + \square$	a. =	b:	c:

\* See Procedures Manual, pages 13-15



Table C1

## WHOQOL-BREF Domains

Domain	Facets incorporated within domains
Physical Health	Activities of daily living
	Dependence on medicinal substances and aids
	Energy and fatigue
	Mobility
	Pain and discomfort
	Sleep and rest
	Work capacity
	Psychological
	Negative feelings
	Positive feelings
	Self-esteem
	Spirituality/Religion/Personal beliefs
	Thinking, learning, memory, and concentration
Social relationships	Personal relationships
	Social support
	Sexual activity*
Environment	Financial resources
	Freedom, physical safety, and security
	Health and social care: accessibility and quality
	Home environment
	Opportunities for acquiring new information and skills
	Participation in and opportunities for recreation
	Physical environment (pollution, noise, traffic, climate)
	Transport*

\* Questions relating to sexual activity and transport were omitted because they were inappropriate for this population.

## Appendix D

## Interview Questions

How do you feel about your life in general?

How would you describe your physical health?

How would you say your mental health is?

Why do you want to be a part of this program? (pre study question)

How did this program match up with your expectations? (post study)

How successful have you been incorporating exercise in to your daily life? (pre study)

How likely are you to continue a running program or exercise in general? What role did the study play in your answer to this question? (post study)

In what ways have other areas of your life been impacted by exercise?

In what ways does exercise contribute to your rehabilitation in prison?

What concerns do you have about your physical and mental health?

How would you describe your mood?

Do you have close personal relationships with other inmates? Describe them?

Any other comments or experiences with this project that you would like to share?

Appendix E

