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Pain perception differences by personality A in females after sport competition or controlled intervention

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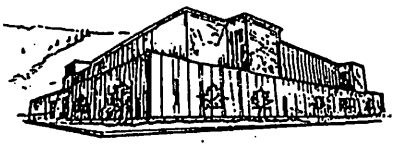

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PAIN PERCEPTION DIFFERENCES BY PERSONALITY A IN FEMALES AFTER SPORT COMPETITION OR CONTROLLED INTERVENTION

by

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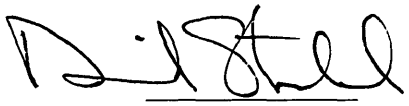

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Pain perception Difference by Personality (A or B) in Female after Sport Competition or Controlled Intervention.

Director: Lew Curry

The purpose of this research was to determine if pain perception varies across personality type and athletic competition in females. Both groups meet five days before their predetermined intervention to partake in the test that would induce pain. The cold pressor test was used to induce pain on the non-dominate arm of each subject. Temperature of the water was maintained at 1°to 2°C, and subjects rated their pain perception using visual analog pain scale while doing the test. The duration and pain rating were recorded. The intervention for the athletes was to run their event at a track meet, and for non-athletes the intervention was to walk at self-selected pace for thirty minutes. Cold pressor test and pain rating were repeated immediately following the intervention. Data was analyzed using T-test on: (1) total time for the first cold pressor test for athletes and non-athletes, (2) total time for the second cold pressor test for athletes and non-athletes, (3) first pain rating between athlete and non-athletes, and (4) second pain rating between athlete and non-athlete. No significant finds were found for the first three tests. The forth T-test showed significant difference from minute 230-300. Type A athletes have lower pain perception compared to non-athlete. Discussion focused on why athlete's second pain ratings were different compared to non-athletes.

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Chapter 1

Pain perception is a multifaceted phenomenon researchers have yet to fully understand (Anshel & Anshel, 1991; Fields, Delaney, & Hinkle, 1990; Granito, 2001; Hall & Davies, 1991; Koivula & Hassemen, 1998; Levine & De Simmone, 1991). Pain perception is often expressed in two primary terms: (1) sensory-discriminative, which describes pain intensity, duration, and locas, and (2) motivational, which is the degree of discomfort or unpleasantness associated with pain sensations (Melzach & Casey, 1968). Pain is influenced by physical, psychological, and social factors (Levine & De Simmone 1991).

Pain is often associated with sports. Athletes use the phrase no pain, no gain. However, pain is not only a guide to how intense a workout one has had, but medical professionals use it as well. Medical personal often use pain as a guide to help diagnosis injuries in athletes, which is why it is important to understand what factors alter pain in athletes. By understanding what alters pain, medical personal will know when to use different guides in evaluating injuries.

Problem

The goal of this study was to determine the effect of personality type (Type A or B) on pain perception in physical active young female adults. The purpose of the study was adjusted due all subjects personality testing as type A, and no type B. The adjusted purpose was: (1) to determine post-intervention difference between female type A

athletes and non-athletes in pain tolerance duration and pain ratings when controlling for differences in baseline measures of each. (2) To determine if there was significant difference between first pain score and Type A Self Report Inventory (TASRI). (3) To determine if there was significant difference between second pain score and TASRI. (4) To determine if there was significant difference between TASRI and the difference between first pain score and second pain score.

Significance of the study

With increasing numbers of females competing, it is vital to gain in-depth knowledge about the factors that alters pain perception in females. Medical personal can use this information to correctly identify athletes that alter pain perception and allow them to use different methods in evaluating injuries.

Rationale of the study

Title IX has opened the door for many female athletes to participate in sport, and at higher levels of play. Due to this development, study of female athletes is relatively new in the area of research. Few studies have looked at factors that alter pain perception, such as personality types in female athletes (Fields, Delaney, & Hinkle, 1990; Koivula & Hassemen, 1998).

Limitations

Limitation of this study is: Instrumentation (all instrumentation contains inherent error), using trained testers and valid tests will minimize this error. Another limitation is the use of non-randomized sample.

Delimitations

Ages of subjects available are college students between the ages of 18 to 21. This study is going to look at just females instead of both genders. The most valid, safest, and cost effective choice of instruments was selected for this study. The level of performance of the athlete is also delimitation. Another delimitation are that only type A personalities were included in the study.

Chapter 2

Influences on Pain

β-endorphin

Many studies have been conducted to identify what is the primary influence on pain perception (Feine, Bushnell, Miron, & Duncan, 1991; Hall & Davies, 1991; Hekmat & Hertel, 1994; Hellstrom & Lundberg, 2000; Levine & De Simmone, 1991; McGowan et al, 1993; Padwer & Levine, 1992; Sigurdsson & Maixner, 1994; Sternber et al, 1998; Symbaluk, Heth, Cameron, & Pierce, 1997). One area of research is why exercises reduces pain. Researchers had discovered that the body produces naturally occurring opioid peptide called β-Endorphin (McGowan et al, 1993). Many endogenous opioids exist, but ß-endorphin has been associated with reduced pain perception in athletes (Padwer & Levine 1992). ß-endorphin represents C-terminal 31 amino acid residue fragment of proopiomelanocortin (Padwer & Levine, 1992). Studies have shown an increase in ß-endorphin levels in the blood after high intensity exercise (McGowan et al, 1993), and short-term anaerobic exercise (Padwer & Levine, 1992). High intensity exercise consisted of 3 sets of 4 repetitions at 80% of 1 repetition maximum for; bench press, lat pull down, seated arm curls, and military press. Short term anaerobic was the bicycle ergometry at 70% at age predicted heart rate max for 30 minutes. According to Padwer & Levine (1992), maximum release of ß-endorphin occurs at 70% of max heart rate.

Hormones

Several studies have looked at the difference of pain perception between males and females and the role of hormones (Feine, Bushnell, Miron, & Duncan, 1991; Hall &

Davies, 1991; Hellstrom & Lundberg, 2000; Levine & De Simmone, 1991; Sternber et al 1998). Studies involving gender generally show that females rate pain higher than men do, but Sternber et al (1998) results indicated no difference between female and male athletes. However, research has shown that women tolerate pain significantly higher than men during the second phase of the menstrual cycle (Hellstrom & Lundberg 2000).

Gender

Gender differences in pain perception were explored using noxious heat (Feine, Bushnell, Miron, & Duncan, 1991). In the experiment, females and males had thermal stimuli applied on section of skin above the lip, and then rated pain and magnitude. Females rated noxious heat more intense than males indicating that gender difference is probably related to sensory rather than difference in attitude or emotional response (Feine, Bushnell, Miron, & Duncan, 1991).

Personality

Altered pain perception involves neurological, biomechanical, personality, and psychophysiological aspects (Hall& Davies 1991). A personality typing system was created in the 1950's to label traits that were linked to increase heart disease (Raymond 1989). Those traits were labeled type A, B and AB personalities. Several terms have been used to describe type A, these include: time urgency, hostility, aggressiveness, ambitiousness, competitiveness, ability to ignore their body limits, impatience, accelerated pace at which they live at, and hard driven (Anshel & Anshel, 1991; Fields, Delaney, & Hinkle, 1990; Koivula & Hassemen, 1998). Type B has been described as less competitive, less aggressive, identifies their body limits, and more relaxed (Anshel &

Anshel, 1991; Elmore, Frederick, & Evan, 1985). Type AB is mixture of both type A and type B(Koivula & Hassemen, 1998).

Past research has not extensively looked at what role personality has in pain perception, but recent research has started to look at what role personality types plays in active person. Fields, Delaney, & Hinkle (1990) investigated type A, AB, and B runners. He found that type A runners sustain more injuries and lost more training time compared with AB and B personality types. Research by Koivula & Hassemen (1998) has shown that type A athletes engage more in physical exercise compared to AB and B. Several personality tests have been created to identify type A personality.

Hunter-Wolf Scale (Jackson & Levine, 1987) is a self-report questionnaire containing 24 bipolar items that reflect characteristic type A and type B differences. Each item is anchored on a 7-point scale drawn in the form of a ladder (Jackson & Levine, 1987). The individual would then mark on the ladder what their answer is. Down side of the Hunter-Wolf test is that the validity has come into question (Jackson & Levine, 1987).

Cassel is another test for personality assessment profile (Gilley & Uhlig, 1985). Cassel is computerized true/false type questionnaire that includes positive life style (self esteem, production value, involvement, assertiveness), negative life style (loneliness, anxiety, health status, depression), cardiovascular functioning (systolic blood pressure, diastolic blood pressure, pulse rate, peripheral temperature), dominant brain control, and nondominant brain control. Dominant and nondominant brain controls are calculated using Cassel Bio-Sensors. Cassel's overall accuracy of prediction is 95.5 percent (Gilley

& Uhlig, 1985). Cassel's test requires specially trained testers to administer the test and grade the test. The cost and special equipment needed are a disadvantage of the test.

Structured Interview (SI) is the most commonly used test by researchers (Blumenthal et al 1985). It is recognized as the most valid procedure for assessing type A behavior. SI measures general response to provocative situations. A shortcoming of the test is a specially trained interviewer must individually administer the test, and then spend up to half hour to grade it (Blumenthal, 1985).

Jenkins activity survey (JAS) is another questionnaire used, takes twenty minutes to complete, and half hour to grade. Jenkins Activity Survey measures rapid pace of living and competitive achievements. The test can be administered to large groups, objectively scored, and has a standardized mean of 0.0 and standard deviation of 10.0. Down side of JAS test is that the test calls for hand scoring weights and hand calculator, expense of the test, and it requires a special trained individual to give and score the test (Blumenthal et al 1985).

Blumenthal et al (1985) devolved a brief self-report measurement that would identify type A behavior to be used in research and clinical settings. Type A Self-Rating Inventory (TASRI) is based on a set of adjectives derived from the Gough Adjective checklist. Twenty researchers in the area of type A personality created a list of 300 characteristics and uncharacteristic of type A behavior. The list was then reduced to 28 adjectives by the researchers. There are 21 characteristics and 7 uncharacteristic terms. The response format is a 7-point Likert scale. TASRI has been shown to identify subjects, comparable to SI test (Blumenthal et al 1985). TASRI does not require special

trained individual to administer, or grade the test. It was used to measure personality type in this study.

Personality Types and Exercise

Several studies have been performed to figure out the role type A personality plays in exercise and sport (Anshel & Anshel, 1991; Chitwood et al 1997; DeVaney & Hughey, 1994; Eby & Van Gyn, 1987; Elmore, Frederick, & Evan, 1985; Fields, Delaney, & Hinkle, 1990; Hassmen, 1998; Koivula & Hassemen, 1998).

In a study conducted by Koivula & Hassemen (1998), researchers found that sports and exercise offers competition and evaluation that enhances extrinsic motivation, which is what type A's seek out (Koivula & Hassemen, 1998). One hundred and fifty-five participants completed questionnaires about attitudes toward athletic participation and their actual exercise behavior. Thirty-eight out of 155 were classified as type A, 39 were classified as type B, and 78 were classified as type AB. The study used a personality test created by Bortner. The results showed that of type A's (86%)were more active, engage in sports that were deemed to result in improved physical working capacity, and devote (to some extent) more time to exercise than type B's (66.7%) and AB's (84.6%) (Koivula & Hassemen, 1998).

Fields, Delaney, & Hinkle (1991) carried out a study that looked at type A runners and injuries related to running. The forty subjects had to train, on average, 3 days and run at least 10 miles a week. Fourteen out of forty were type A, and the remaining twenty-six participants were type B. Injuries were defined as: musculoskeletal problems that occurred during running, and interrupted training for one or more days (Fields, Delaney, & Hinkle, 1990). Type A Self-Rating Inventory (TASRI) test was used to

measure personality type in this study. The research showed as TASRI scores went up so did the injuries. Eight out of the 14 type A runners suffered multiple injuries, while only 4 out of 26 type B runners suffered multiple injuries. All type A runners who sustained one injury, experienced a second injury as well. Injured type A runners lost twice as many training days compared to type B.

There was no significant association found between running mileage and injuries. A study looking at Boston Marathon runners showed no difference in personality types and finishing times (Elmore, Frederick, & Evan, 1985). The young or more experienced runners in the Boston Marathon had better race times. Personality had no bearing on performance. In this study, four hundred Jenkins Activity Surveys were distributed to marathon runners. Eight-seven returned the test, 59 subjects were type A, and 28 subjects were type B. Two thirds of respondents were type A, which suggests that type A's are more motivated to participate in running events (Elmore, Frederick, & Evan, 1985).

What role does type A characteristics have in pain perception? Rate of perceived exertion (RPE) and physical fatigue during submaximal endurance test for personality type A and B were examined by Anshel & Anshel (1991). Subjects first had to complete an endurance task on a schwinn Cio-Dyne station bike. For the first stage, the participants had to pedal the bicycle ergometer at a constant rate of 60 rpm for 2 minutes. The workload was then increased 150 kpm every 2 minutes until fatigue or a heart rate of 160 to 180. During the trial their heart rate and RPE were recorded. Type A's completed more work trials than type B's, and type A's had lower RPE (M=10.33, SD=2.06) than type B's (M=12.04, SD=2.12). According to Anshel & Anshel (1991),

"type A individuals will, during stressful situation, attempt to maintain environment control which in turn they may suppress attention to bodily states resulting under reporting physical symptoms in order to excel". Type A's also reportedly actively suppress fatigue to gain control and optimize their performance; compared to type B's who know their limits (Anshel & Anshel, 1991). Type A participants offered lower RPE for initial phase of the trial compared with type B's. In the first three stages type B's RPE scores were not precise to their workload, but as the trial progressed, type A's RPE scores and type B's RPE scores variance grew smaller. Anshel & Anshel (1991) study did confirm their hypothesis that type A's did offer lower RPE compared to type B's. As the endurance test progressed type A's participated longer than type B's.

Athlete vs. Non-athlete

Athletes and non-athletes pain perception has also been investigated. Hall & Davies (1991) conducted a study in which athletes and non-athletes participated in the cold pressor test and thermal pain tolerance, and then rated the intensity and affect of pain. Female non-athletes rated pain more intense compared to the other three groups (male non-athletes, female athletes, and male athletes). Both female and male non-athletes reported higher pain affect than athletes (both females and males). There was no significant difference between female and male athletes in intensity and pain affect. Athletes encounter a great deal of pain during daily training and competitions that may teach athletes how to handle pain (Hall & Davies, 1991). Athletes are able to use pain tolerance strategies to continue to participate in sport, even though the two groups do not vary on pain threshold (Hall & Davies, 1991). Hall & Davies (1991) suggest that the athletes used positive self-talk, imagery, and relaxation through deep breathing as pain

tolerance strategies. Other studies also show no significant difference between female and male athletes (Sternber et al, 1998). Sternber et al (1998) found that competition induces both hyperalgesic and analgesic states that are dependant on the body region tested and pain assessment used on female and male athletes.

Cold Pressor Test

Cold pressor test is widely used to elicit pain in experiments (Westcott, Huesz, Boswell, & Herold, 1977). The cold pressor test is immersion of a body part in 1° to 2° degree water. Cold produces three or four–stage sensation. With immersion of the arm in ice water, the participant may feel uncomfortable sensation, followed by stinging, then burning or aching, and finally numbness. Each stage is related to nerve endings as they temporarily cease to function due to decreased blood flow (Prentice, 1994). Several variables are important in the use of the cold pressor test. Westcott, Huesz, Boswell, & Herold (1977) examined the effects of subjects' sex, hand dominance, and spatial summation with the cold pressor test. Forty females and forty males were randomly assigned to one of eight treatments. Subjects who immersed just a finger tolerated the cold significantly longer than those who immerse just their hand. Those immersed their hand rated more discomfort than those with just the finger, and female immersion times were significantly shorter and rated more discomfort then males in all eight treatments (Westcott, Huesz, Boswell, & Herold, 1977).

Testers

Levine and De Simmone (1991) investigated the effects of gender on pain ratings. Thirty-five females and thirty-five males participated in the cold pressor test. The participants rated their pain while doing the cold pressor test, in front of male or female

testers. The results showed that males with female testers rated pain lower compared with male testers. Females did rate pain higher with male testers, but not at a significant level.

Chapter 3

Methodology

Methodology approved in proposal failed to yield any type B personality in the athletic and student populations sampled. With approval of the chair, the following methods were adapted.

Research setting

The Rhinehart Athletic Training Center was the testing site for both experimental (athletes) and control (non-athletes) groups for the first part of the study. Second half testing took place at The University of Montana Training Center located at Dormblazer field for athletes, and Rhinehart Athletic Training Center for non-athletes.

Subjects

Subjects were female students (non-athlete) or student-athletes ages 18-24. Non-athletes were recruited through classes in the Health and Human Performance Department at The University of Montana and were limited to those who were active, but not participating in club sports. With the approval of the head coach, a meeting was arranged with The University of Montana Track and Field team to recruit female student-athletes subjects. All subjects volunteered to participated in this study, and signed The University of Montana Human Subject Committee-approved informed consent form prior to any testing (Appendix A).

Instrumentation

Medical History

All subjects filled out a medical history form to see if they were eligible to participate (Appendix B). If they were sensitive to cold, and/or had no previous exposure

to cold therapy, and/or had any circulation problems, they were eliminated from this study. The medical history form used has been proven valid (Balady, 1997), and is used by the American Heart Association, American College of Sports Medicine, and the USDA Forest Service. Once the medical history form had been completed, it was reviewed by certified athletic trainers to ensure that only healthy participants participated in this study.

TASRI

To measure type A and type B personality, a self-report questionnaire called type A Self-Rating Inventory (TASRI) was used (Appendix C). Blumenthal et al (1985) developed TASRI for a brief self-report that measures type A behavior pattern. The TASRI consists of a 28-item adjective checklist that is rated on a 7 point Likert scale. The test required ten minutes for the participants to complete, and ten minutes to calculate the score. Score of 120 or greater was used to determine type A personality, and score of 119 and below were type B. The cut off score of 120 was based on the original validation of the TASRI by Blumenthal et al (1985).

Cold Pressor Test

In order to measure pain perception a noxious stimulus must be applied. The cold pressor test, a valid apparatus previously utilized safely in several studies, was selected because it is noninvasive (Hall & Davies, 1991; Hekmat & Hertel, 1994; Hellstrom & Lundberg, 2000; Levine & De Simmone, 1991; Padwer & Levine, 1992; Sigurdsson & Maixner, 1994; Sternber et al, 1998; Westcott, Huesz, Boswell, & Herold, 1977; Worthington, 1972). The cold pressor test was administered simultaneously with combined numerical-analog pain scale. On the subjects non-dominate arm, three inches

below the olecranon process a line was drawn around the arm. Testers then read instructions for cold pressor test and how to rate pain to the subjects in monotone voice (Appendix E). After removing jewelry and restricted clothing from their non-dominant arm, the subjects placed their arm (up to the line drawn on the arm) in a five-gallon bucket filled with cold water and ice. The temperature was maintained at 1 to 2 C° (33.8°F to 35.6°F). The temperature was checked with Acurite digital 8'' stainless steel probe thermometer before each test. To minimize frostbite a 6 mm wire circular mesh was placed inside the bucket to keep the ice away from the skin. Polyethylene tubing (1/4 inches) was placed on top of the circular mesh to prevent the wire mesh from cutting the subject's arm if touched or brushed against. The maximum time the arm was allowed submerge in the ice water was five minutes. This time limit was used to meet standards set by the Internal Review Board at The University of Montana. Every ten seconds the subject was asked to rate the pain level on a scale of 0 to 10. Zero is no pain, with ten being severe, to unbearable pain. The subject could withdraw her arm at any time during the test when pain became unbearable, number 10. The duration the arm was left in the ice water was measured using stopwatch (2Xs, China). During the test, all participants were separated from each other, and no clock was visible to the participants to prevent competition. The subjects were also asked not to discuss the test or results until the study was completed.

Apparatus.

Visual analog pain scale (Missoula Demonstration Project) was used to assess pain levels. The scale consisted of a 10 cm vertical line with verbal anchors of no pain

on the right bottom and worst pain possible/unbearable on the top right. Cartoon faces depicting level of pain are on the left hand side (Appendix D).

Experimenters

Experimenter's role also had guidelines. Levine and De Simmone (1991) has shown that females who test males using the cold pressor test, showed males reporting significantly lower rating on pain scale. The same study showed female subjects reporting higher rating of pain when they had male testers. The experiment showed no difference in pain when males and females reported their level of pain to members of their own gender. This study used female testers to test females. By having the same sex test the subject, this will reduce the possibility of experimenter's gender influencing pain tolerance during experimentation. Each tester was trained on how to give the tests, so each tester does the procedure the same each time. Chitwood et al (1997) has shown that verbal encouragement during testing will alter the test scores on type B personalities. To prevent alteration in scores each tester read in monotone voice concise instructions directing the participants (Appendix E). The testers did not give any feedback to the participant's before, during, or after the test.

Procedures

All volunteers filled out an informed consent form (Appendix A) and a medical history form (Appendix B) to see if they were eligible to participate. Once the medical history had been completed, it was reviewed by certified athletic trainers to ensure that only healthy participants partake in this study. Once medically cleared, the participants took a personality test (TASRI) to determine their personality type. The first half of the data collection consisted of having the selected female athletes and female non-athletes

meet at The Rhinehart Athletic Training Center five days before their predetermined intervention to partake in the cold pressor test. For both athletes and the non-athletes, the cold pressor test consisted of putting their non dominate arm, three inches below their elbow, in a circular mesh located in the 5 gallon bucket filled with ice and water. The temperature of the water was maintained at 1°C to 2°C (33.8°F to 35.6°F). The duration the participant left their arm in the ice water was until pain became too great (number 10 on pain scale) or five minutes, which ever came first. While their arm was in the ice water, they verbally rated how much pain they felt using the numbered pain scale (Appendix D) that a female tester was holding in front of the participant.

The second half of the data collection was where the cold pressor test was repeated following the intervention. The intervention was: (a) for the athletes to participate in their event at the track meet, and (b) for the non-athletes to walk at a self-selected pace for thirty minutes around campus. Immediately following the intervention, both athletes and non-athletes repeated the cold pressor test and rating of pain perception (same as before).

Chapter 4

Results

Twenty female athletes from The University of Montana track team volunteered to participate in the study. Four athletes dropped out before completing paper work, one athlete refused to participate after bad performance during the track meet, and one athlete did not run at the meet. That left fourteen athletes (N=14) for the experimental group. All sixteen athletes who took the personality were type A personality.

Forty-three female non-athletes were recruited to participate. Thirteen dropped out before completing paper work, four dropped out after completing paper work, six were medically disqualified, four dropped out after completing the first cold pressor test, which left sixteen participants (N=16) for the controlled group. Thirty non-athletes who took the personality test were type A personality.

Analysis

Prior to analysis, all variables were examined for accuracy of data entry and missing values. T-test was then performed on total time for the first cold pressor test for both athletes (N=14, $\underline{M}$=4.39, $\underline{SD}$=1.55), and non-athletes (N=16,$\underline{M}$=4.25, $\underline{SD}$=1.47). No significant differences were found (p=0.794). T-test was then performed on the total time for the second cold pressor test for athletes (N=14, $\underline{M}$=4.72, $\underline{SD}$=1.04), and non-athletes (N=16, $\underline{M}$=4.76, $\underline{SD}$=0.98) were no significant differences were found (p=0.925). T-test on the first pain rating between athlete and non-athlete showed no significant difference. T-test on the second pain rating (post intervention comparison) between athlete and non-athlete showed no significant difference until three minutes and fifty seconds (see table 1).

Table 1

Study One: Pain Perception Differences by Personality (A or B) in Females after Sport Competition or Controlled Intervention

	Post-intervention	Independent t-test
Time (seconds)	t	p
0-230	ns	ns
230	-2.093	.046*
240	-2.112	.044*
250	-2.019	.054*
260	-2.393	.024*
270	-2.448	.021*
280	-2.745	.011*
290	-2.607	.015*
300	-2.680	.013*

Note: * $p < .05$

Pearson correlations was then done between; TASRI scores and first pain scores (N=30, Sig.= .436, Correlation= -0.148), TARSI and second pain scores (N=30, Sig.= .685, Correlation= 0.077), and TARSI and the difference between the first pain score and second pain score. No significant differences were found.

Discussion

This study sought to examine what role personality type A or B plays in pain perception. The surprise finding of this study was all 46 subjects were type A

personality. Reason for all participants being type A is unknown. Previous studies have shown that type A's participation in sports was higher than type B's, but type B's do participate in sports (Eby & Van Gyn, 1987; Koivula & Hassemen, 1998). Having only type A personalities severely limited this study. This study was designed to look at the differences between type A and type B personality response to pain. TASRI scores for athletes ranged from low of 133 to high of 183 with a mean of 156.88. The non-athletes TASRI score ranged form low of 123 to high of 178 with a mean of 157.70. TASRI grouped scores range from 133.0 to 183.0 with mean of 159.3667 and standard deviation of 13.5964.

Biological

The body has biological ability, such as hormones, to assist with pain. McGowan et al (1993) points out that exercise signals the body to release hormones that reduced pain perception. To reduce the role of hormones, the controlled grouped walked for thirty minutes before doing their second cold pressor test. To reduce other biological adaptations exercise provides, the non-athletes had to be physical active (exercise at least three times a week). By having the non-athletes be physical fit and walk for thirty minutes, helps reduce the role of biological adaptation in pain perception.

Personality Traits

Personality traits also reduce pain perception. One of type A's trait is they ignore their body limits and keep pushing themselves. In order to do this they learn how to override pain (Anshel & Anshel, 1991). Anshel and Anshel (1991) stated that type A's suppress or denial of fatigue symptoms serves to alleviate frustration. Competition has also been shown to reduce pain perception. Sternber et al (1998) found that competition

induces both hyperalgesic and analgesic states. It should not come as a surprise that pain perception decreased after the intervention.

Type A's are competitive and strive for greater achievement. They might have been trying to increase the duration, and decrease the pain compared from previous cold therapy. Both athletes and non-athletes strive to do better than their previous experience. There was significant difference starting at three minutes and fifty seconds of the pain perception scores; this could be due the inability of the non-athlete to decease pain after a point of time. Daily practice of sport teaches the athlete pain tolerance strategies.

Athletes

Second pain scores showed difference, which is what previous research has shown (Hall & Davies, 1991, Sternber et al, 1998). Athlete's pain perception scores were lower than non-athletes (Hall & Davies, 1991). An important reason may be that collegiate athletes are exposed daily to pain due to training, and injuries. Fields, Delaney, & Hinkle, (1990) point out that type A athletes had frequent injuries, and lost more training time due to their injuries. This leads them to develop mental skills that allow them to deal with pain, which enables the athlete to override pain longer than a non-athlete who exercises at least three times a week. By participating in sports, athletes are able to perceive pain lower than non-athletes. College athletes have been found to consistently use cognitive behavioral strategies to manage emotions (Ryska, 1998). Some cognitive behavioral strategies are mental imagery(restructuring negative thoughts), arousal control (relaxation techniques), and behavioral preparation (performance goals)(Ryska, 1998).

Non-Athletes

Some non-athletes did rate pain lower than other non-athletes, and had longer time duration after the intervention. Four non-athletes, while doing the first cold pressor test, withdrew their arm before five minutes. However, after the intervention only two could not do the cold pressor test for the full five minutes. This could be due to the hormones released during exercise, but it also could be due to the natural competition within. The subjects did not receive their scores, no clocks were visible, nor could they see the timers, but they could have stayed in until they were asked to remove their arm after five minutes. Some of the non-athletes complained it was tougher to do the cold pressor test a second time. That could be due to them remembering the pain from the first cold pressor test, and not have mental skills to control pain. Athletes may have learned those mental skills because they are exposed to cold therapy more often then non-athletes. The significant difference in pain rating in the last thirty seconds from the second cold pressor test could be due to inability of the non-athletes to decease pain perception over time. They may have some mental skills to reduce pain perception for a limited time, but those skills might not be modified. Sport may modify the mental skills required to handle pain perception for duration of time. Daily practice, and during the season, weekly track meets allow athletes to enhance and perfect mental techniques such as restructuring negative thoughts. Athletics allow the athletes to use several different cognitive behavioral strategies and find out which one(s) work the best for them. Non-athletes do not have opportunities such as track meets to use and perfect mental techniques. Anshel, Williams, & Williams (2000) found that developing effective coping skills enhance performance. Coping skills have been defined as any conscious effort to

deal with stressful demands, consisting of learned behavioral responses that successfully lower stress by limiting the importance of a dangerous or unpleasant condition (Ansehel, 2000).

Athletes vs. Non-Athletes

Both groups were very competitive. The participants wanted to know what their scores were, what the scores mean, and what was the position of their scores compared to others. The athlete group wanted to know what the other group (non-athletes) scores were, and vise versa. The participants would even try to find out who else was participating in the study. Measures were taken not to let participants know their scores until after the study, but participants would talk to their friends and try to figure out how they compared to others. It was difficult to diminish the competition between participants. In future studies, the researcher will have to try to control the competition between the two groups.

Importance

Importance of this study is it can be used to bring awareness to medical personal and athletes, that athletes have the ability to reduce pain perception for a time. This may help explain why athletes may be injured during an event, but not feel pain for hours or days. Females have acquired, from participating in sports, mental abilities to decrease pain over time. With female participation in sports increasing, it is important to understand female pain so pain can be understood by athletes and sports personal. Medical personal and athletes need to be careful when using pain as a guide to injuries. Athletes may rate pain low, but a serious injury may exist. This also could help to identify athletes who can suppress pain for long periods of time. These same athletes are

probably the one's who are injured, but continue to play when they should not. By having more knowledge about female pain, the better chance there is to decrease injuries and decrease lost training time.

Conclusion

This study showed that athletes rate pain lower than non-athletes do. This is due to the mental skills sport teaches. Daily training and injuries teach the athlete to decrease pain over a period of time. This study did not include moods, or mental skill used to decrease time. Implications of this study suggest that type A athletes should be educated about their traits, and the harm that can come from the ability to decrease pain perception.

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Pain Perception Differences by Personality (A or B) in Females after Sport Competition or Controlled Intervention.

SUBJECT INFORMATION AND CONSENT FORM

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406-542-7409

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McGill Hall
Health and Human Performance
The University of Montana
Missoula, MT 59812
406-243-5242

Special Instructions:

The Department of Health and Human Performance at The University of Montana supports the practice of protection of human subjects participating in research. The following information is provided so that you can decide whether or not you wish to participate in the present study.

If you would like additional information concerning this study before, during, or after it is completed, please feel free to contact Debby Anderson or Lew Curry by phone or mail. A copy of this consent form will be given to you.

This consent form may contain words that are new to you. If you read any words that are not clear to you, please ask the person who gave you this form to explain them to you.

Purpose:

This study is concerned with female non-athletes and female athletes, and how they feel pain. The study will look to see if pain perception differs by personality types, and exposure to athletic competition.

Procedure:

You will be asked to fill out a medical history form to see if you are eligible to participate. If you are sensitive to cold, or have any circulation problems, you should not participate in this study. If medically cleared, you will then take a written personality questionnaire to determine your personality type. This test should take about 15 minutes to complete. Female athletes will go to Rhinehart Athletic Treatment Center five days before a predetermined track meet, and to a predetermined site at the track meet immediately after the meet. On both visits you will be asked to immerse put your arm, up to your elbow, in a 5 gallon bucket filled with ice and water. The temperature will be maintained at 1°C to 2°C (33.8°F to 35.6°F). You will be asked to leave your arm in the ice water will be until pain becomes unbearable or five minutes, which ever comes first.

While your arm is in the ice water, you will rate how much pain you feel using a numbered pain scale that someone will be holding in front of you.

Female Health and Human Performance non-athletes will meet at Rhinehart Athletic Treatment Center on a Monday morning where you be asked to do the same procedure immersing your arm to the elbow in ice-water as the athletes were asked to perform. Five days later, you will return to Adams Event Center and walk at a self-selected pace for thirty minutes. Immediately following the walk, you will repeat the cold pressor test.

Risk/Discomforts:

You will feel some discomfort when your arm is in the ice water, but when the discomfort becomes to great, you may take your arm out of the ice water. Having your arm immersed in ice water will produce different sensations including uncomfortable sensation of cold followed by a stinging, then a burning or aching feeling, and finally numbness. Towels will be available to dry your arm off, and help warm your arm up. After a short period, your arm will feel normal again. There are no long-term illness or injuries associated with this procedure. Every precaution will be taken to prevent harm.

Benefits:

Although you may not personally benefit, your response to ice water will help us determine if female's feel pain differently based on personality and exposure to competition.

Confidentiality

Only the researcher, research team, and her faculty supervisor will have access to the data files. You will be given your scores, and nobody else's, at the end of the study. After the study has been completed, names will be deleted from the database so you cannot be identified.

Compensation of Injury:

Although we do not foresee any risk in taking part in this study, the following liability statement is required in all University of Montana consent forms. In the event that you are injured as a result of this research, you should individually seek appropriate medical treatment. If the injury is caused by the negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under the authority of M.C.A., Title2, Chapter 9. In the event of a claim for such injury, further information may be obtained from the University's Claims representative or University Legal Counsel.

Voluntary Participation/Withdrawal:

Your participation is solicited, but strictly voluntary. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

Participation or non-participation in the study will have no bearing on student-athlete's status on the track team or at the University of Montana and will have no bearing on non-student athlete's status at the University of Montana.

Questions:

If you have any questions about the research now or during the study contact: Debby Anderson at 542-7409 or Dr. Lew Curry at 243-5242. When the research has been completed, you will receive an explanation of this study.

Subjects Statement of Consent:

I have read the above description of this research study. I have been informed of the risks and benefits involved, and all my questions have been answered to my satisfaction. Furthermore, I have been assured that any future questions I may have will also be answered by a member of the research team. I voluntarily agree to take part in this study. I understand I will receive a copy of this consent form.

_____

Name (Please Print)

_____ _____

Signature of Subject (must be over 18 years old) Date

American Heart Association and American College of Sport Medicine
PREPARTICIPATION HEALTH SCREENING QUESTIONNAIRE
(HSQ)

Assess your health needs by marking all true statements.

HISTORY

You have had:

__ A heart attack
__ Heart surgery
__ Cardiac catheterization
__ Coronary angioplasty (PTCA)
__ Pacemaker/implantable cardiac defibrillator/rhythm disturbance
__ Heart valve disease
__ Heart failure
__ No exposure to cold therapy (such as slush bucket, ice water, ice packet)
__ Heart transplantation
__ Congenital heart disease

SYMPTOMS

__ you experience chest discomfort with exertion.
__ you experience unreasonable breathlessness
__ you experience dizziness, fainting, blackouts
__ you take heart medications

Other Health Issues

__ you have musculoskeletal problems.
__ you have concerns about the safety of exercise.
__ you take prescription medication(s).
__ you are pregnant

CARDIOVASCULAR RISK FACTORS

__ you are a woman older than 55 years or you have had a hysterectomy or you are postmenopausal
__ you smoke.
__ your blood pressure is >140/90
__ you don't know your blood pressure.
__ you take blood pressure medication
__ your blood cholesterol level is >240 mg/dL.
__ you don't know your cholesterol level.
__ you have a close blood relative who had a heart attack before age 55 (father or brother) or age 65 (mother or sister)
__ you are diabetic or take medicine to control your blood sugar.

__ you are physically inactive (i.e., you get <30 minutes of physical activity on at least 3 days per week).
__ you are >20 pounds overweight.

AHA/ACSM indicates American Heart Association/American College of Sports Medicine

TASRI

Introduction

You will be shown a number of adjectives. We would like you to use these words to describe yourself by indicating, on a scale of 1 to 7, how true of you these various characteristics are. Please give your own opinion of yourself. If you are not sure, put down the number that comes closest to what you think best describes you. Do not leave any blank spaces if you can avoid it.

Example: Tactful

Mark a 1 if it is NEVER OR ALMOST NEVER TRUE that you are tactful.
Mark a 2 if it is USUALLY NOT TRUE that you are tactful.
Mark a 3 if it is SOMETIMES BUT INFREQUENTLY TRUE that you are tactful.
Mark a 4 if it is OCCASIONALLY TRUE that you are tactful.
Mark a 5 if it is OFTEN TRUE that you are tactful.
Mark a 6 if it is USUALLY TRUE that you are tactful.
Mark a 7 if it is ALWAYS OR ALMOST ALWAYS TRUE that you are tactful.

Thus, if you feel it is occasionally true that you are "tactful," usually true that you are "healthy," always or almost always true that you are "poised," and often true that you are "wise" then you would rate these characteristics as follows

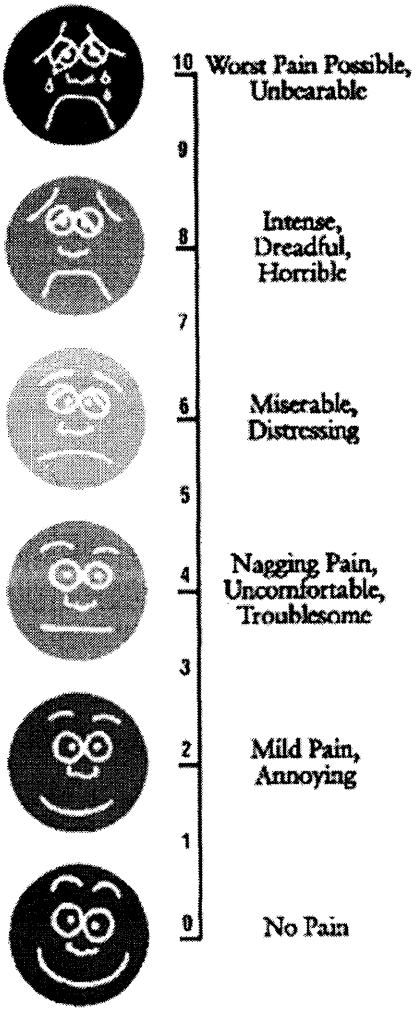
Tactful 4
Healthy 5
Poised 7
Wise 5

1	2	3	4	5	6	7
Never Or True Almost Never True	Usually Not True	Sometimes But Infrequently True	Occasionally True	Often True	Usually True	Always or Almost Always True

1	2	3	4	5	6	7
Never Or True Almost Never True	Usually Not True	Sometimes But Infrequently True	Occasionally True	Often True	Usually True	Always or Almost Always True

1. ENERGETIC	1.
2. IDEALISTIC	2.
3. QUIET	3.
4. OUTSPOKEN	4.
5. SELF-CONFIDENT	5.
6. COOPERATIVE	6.
7. PEACEABLE	7.
8. AGGRESSIVE	8.
9. QUICK	9.
10. HELPFUL	10.
11. CALM	11.
12. FORCEFUL	12.
13. ENTERPRISING	13.
14. UNREALISTIC	14.
15. RELATED	15.
16. HEADSTRONG	16.
17. TENSE	17.
18. UNSTABLE	18.
19. ENTHUSIASTIC	19.
20. IRRITABLE	20.
21. INFORMAL	21.
22. AMBITIOUS	22.
23. DOMINANT	23.
24. ASSERTIVE	24.
25. SLY	25.
26. ARGUMENTATIVE	26.
27. EXCITABLE	27.
28. SNOBBISH	28.
29. MILD	29.
30. LOUD	30.
31. INDIVIDUALISTIC	31.
32. STINGY	32.
33. EASY-GOING	33.
34. TALKATIVE	34.
35. OUTGOING	35.
36. ORIGINAL	36.
37. CAUTIOUS	37.
38. STRONG	38.

Pain Assessment Scale



St. Patrick Hospital and Health Sciences Center

Testers please read the following steps in monotone voice to the subject being tested. DO NOT GIVE ANY FEEDBACK, AND DO NOT ENCOURAGE THE SUBJECT. Please make sure the subjects are seated in the floor with you in front of them.

MAKE sure No jewelry

Non-dominate arm goes in the water
Make sure line on arm does not go below water
They CANNOT touch the wire mesh
And no clocks are visible

Step one: On your non-dominate arm please make sure any jewelry, and clothing has been removed.
Step two: When I tell you to start, place your non-dominate arm inside the circular mesh inside the bucket up to the line drawn on your arm. Do not immerse your elbow. Please maintain this position until the pain has become worst pain possible/unbearable Number 10 on the pain chart that is held in front of you. When you have reach this stage remove your arm from the ice water. Every ten seconds you will be asked to rate the pain you are feeling. Please say the number from the pain scale that is held in front of you that corresponds to the pain you are feeling. When finished take the towel beside you and dry off your arm. Do you understand?
Make sure they understand before you begin

Begin test☺

Testers please read the following steps in monotone voice to the subject being tested. DO NOT GIVE ANY FEEDBACK, AND DO NOT ENCOURAGE THE SUBJECT. Please make sure the subjects are seated in the floor with you in front of them.

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