University of Nevada, Reno

A Study of Pain, Experiential Avoidance, and Emotions in Different Skill Levels of Ballet

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by

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Abstract

Relationships among pain, experiential avoidance, and emotions were examined with ballet dancers of different levels of skill. The Sports Inventory for Pain (SIP), Acceptance and Action Questionnaire-Revised (AAQ-R), and Profile of Mood States (POMS) were used to measure pain, experiential avoidance, and emotions, respectively. No statistically significant differences were found among skill groups with respect to coping with pain. Significant positive correlations were found between POMS Vigor and the AAQ-R Action and Willingness subscales. Significant differences among skill groups were found on POMS vigor and the "Iceberg" profile, with the Sacramento Ballet Company (SBC) skill group showing the highest Vigor and "Iceberg" profile scores. Additional differences are discussed.

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A Study of Pain, Experiential Avoidance, and Emotions in Different Skill Levels of Ballet

Ballet is a demanding physical activity in which aestheticism is expected to transcend the high social, psychological, and physical demands of the activity. Ballet could be considered the pinnacle of the performing arts, where perfection is the goal and the job is the process of trying to obtain the impossible. Not only is each moment supposed to be perfect, but also when dancing in a corps; everyone has to act as a unit. In *Swan Lake,* the corps is expected to be in perfect rows on the stage; the dancers' movements are in unison and provide symmetry and the corps creates a backdrop for the principal dancers (Turner and Wainwright, 2003). Female ballet dancers are supposed to be sylph-like and weightless, making every movement appear effortless. Pointe shoes were invented to assist with this illusion by extending the line of the leg (Katz Rizzo, 2015; Kolb & Kalogeroppoulou, 2012). Pointe shoes are anything but effortless – they require the use of many little muscles in the dancers feet, as well as the expectation for the feet to be in pain until they eventually go numb; blood-soaked pointe shoes and blisters are common (Hamilton & Hamilton, 1991). This drive for perfection despite the pain is an expectation of all ballet dancers who want to succeed. Even after hours of rehearsal on pointe, dancers are considered weak if they take the shoes off before the rehearsal is over. Dealing with pain is a common practice, but there are costs including the obvious potential to aggravate an injury. Dancers do not want to appear weak and risk losing their position within the dance company or studio (Noh, Morris & Andersen, 2009).

There are different methods to deal with the pain common in most sports. Where

some methods are beneficial for coping with pain, others can be seen as detrimental. When an athlete suppresses pain in a detrimental way it can result in not only physical injury but also depression and other mental health disorders—which are common in ballet dancers (Peric, Zenic, Sekulic, Kondric, & Zaletel, 2016). Many dancers struggle with eating disorders, due to the specific body that is expected of ballet dancers (Peric, Zenic, Sekulic, Kondric, & Zaletel, 2016; Toro, Guerrero, Sentis, Castro & Puertolas, 2009). The ballet aesthetic has been codified so that dancers are supposed to have long legs. They cannot be too tall, so when they stand on their toes they are still shorter than their male partners. They must have hyper flexible feet to have the right arch of the foot in pointe shoes and flexible hips so that their legs are literally able to reach their ears when they kick their legs (Pickard, 2013). They are expected be thin so that they appear weightless and feminine (Aalten, 2005; Monteiro & Correa, 2014). Classic costumes are designed to emphasize the femininity of the dancers. These costumes consist of a tutu skirt and a tight bodice. The bodice is similar to a corset, complete with boning, fitted as tightly as possible. The pressure to have a specific body type may result in eating disorders and self-disgust in many dancers (Peric, Zenic, Sekulic, Kondric & Zaletel, 2016; Ringham, Klump, Kaye, Stone, Libman, Stowe, & Marcus, 2006). While ballet does not have the traditional definition of competition as other sports, there is a constant competition every day in class and rehearsal between all of the dancers. They compete for status in the class and better roles. The intense competitiveness inherent in ballet is another reason why dancers never want to show weakness by giving in to pain (Noh et al., 2009; Mitchell, Haase, Malina & Cumming, 2016).

In this study, I compared three groups of ballet dancers: professional company

members at the Sacramento Ballet Company, the pre-professional Sacramento Ballet School students called the Sacramento Ballet Youth Ensemble, and the University of Nevada, Reno students in the Dance Department who participate in ballet dance classes. I examined the effect that the degree of skill level in ballet has on pain suppression, experiential avoidance, and emotions by administering the following surveys to each group: the Sports Inventory for Pain (SIP), Acceptance and Action Questionnaire (AAQ-R) and the Profile of Mood States (POMS). I expected that there would be variations in responses to pain, experiential avoidance and emotion within the different levels of ballet dancers because as the skill level increases, the more they are exposed to pain, suggesting they may have developed better mechanisms to cope with pain.

I also examined the effects of skill level and pain suppression on emotional health. The results could ultimately help dancers find more mindful and effective ways of dealing with pain. Because the culture in dance companies and studios may discourage admitting to pain unless it is too severe to continue to dance, an emphasis on managing pain in healthier ways could be beneficial. I had five different hypotheses about the relationship between skill levels, emotions, and coping with pain. My first hypothesis was if there is a higher score on the avoidance section of the SIP; there will be a higher score on the total mood disturbance on the POMS and a lower score on the AAQ-R. My second hypothesis was if there is higher tension score on the POMS there will be a higher score avoidance section of SIP. My third hypothesis was if there is a higher score in the vigor section of the POMS there will be a higher score on the AAQ-R and a high score on the direct coping, cognitive and body awareness sections of the SIP. My fourth hypothesis was with the increase of level and commitment of the dancers, the

higher they will score for vigor, the more participants will exhibit the "Iceberg Profile," and the lower their total mood disturbance scores will be. My fifth hypothesis was that the higher the skill level of the participants, the higher they would score on direct coping, cognitive, and body awareness.

Literature Review

Pain.

Pain is the mental or physical suffering because of something negative. Pain is the body's way of communicating that there is an adverse stimulus. There can be external pain or internal (emotional) pain. Acute pain can warn the body that something is too hot or could cause some injury. Pain sensitivity is not the same for everyone and individuals react to pain differently (Singh & Singh, 2016). In contrast, chronic pain does not signal pain in the same way but can limit people in their lives and can cause depression and lead to drug use (Melzack & Katz, 2013; Basser, 2016). Avoiding pain, either acute or chronic, will alter the behavior of people (Schrooten, Wiech & Vlaeyen, 2014; Melzack & Katz, 2013; Basser, 2016). When comparing dancers that have a history of chronic injuries to other athletes (football payers and marathon runners), the dancers are considered "overachievers" in pushing through pain because dancers constantly are challenging themselves to be the best they can be (Hamilton, Hamilton, Meltzer, Marshall & Molnar, 1989).

Pain Measurement.

Athletes often experience pain during training (Meyers, Bourgeois, Stewart & LeUnes, 1992; Paparizos, Tripp, Sullivan & Rubenstein, 2005; Encarnacion, Meyers, Ryan & Pease, 2000; Anderson & Hanraham, 2008; Batholomew, Edwards, Brewer, Van

Raalte Linder, 1998). There are different ways of dealing with the pain to be able to perform at the level that is expected. Meyers and colleagues developed a tool called the Sport Inventory for Pain (SIP) to determine beneficial and detrimental coping strategies for pain. There are five components of pain, different factors measured by the test: coping (COP), cognitive (COG), avoidance (AVD), catastrophizing (CAT), and body awareness (BOD). Coping determines the direct coping responses. Cognitive determines the use of cognitive strategies. Avoidance determines behaviors that avoid pain-producing activities. Catastrophizing determines if pain is overwhelming. Body awareness determines the physical response to pain. The composite score is called HURT and it includes all the factors except body awareness. The positive scores from coping and cognitive are added together and the negative scores from avoidance and catastrophizing are reverse scored.

Research using the SIP on athletes in different sports yields different average scores. In sports that require team dependence, athletes are more likely to deal with pain because they don't want to let down the other players (Meyers, Higgs, LeUnes, Bourgeois & Laurent, 2015). Ballet dancers seem to score higher in the catastrophizing section; this is because when dancers get injured it could mean the end of their livelihood (Anderson & Hanrahan, 2008; Encaracion, Meyers, Ryan & Pease, 2000; Paparizos, Tripp, Sullivan & Rubenstein, 2005). Male dancers reacted to injuries more negatively compared to both female dancers and males in other sports such as football and soccer. The male dancers do not cope with the injury as well and have a more negative group of personality traits than the female dancers (Hamilton, Hamilton, Meltzer, Marshall & Molnar, 1989; Encarnacion, Meyers, Noel & Pease, 2000). When comparing the different levels of

ballet dancers, researchers found that there was no significant difference between the levels of ballet dancers with respect to coping with pain (Barrell & Terry, 2003; Anderson & Hanrahan, 2008; Paparizos et al., 2005). The lack of significant difference could be because the dancers who cannot cope with the specific lifestyle that is required of committed dancers have already been weeded out (Hamilton et al., 1989). This is consistent with Kroll's Personality Performance Pyramid construct and its suggestion that athletes become more similar to one another after personality modification and the attrition inherent in sport (Kroll, 1970). At any rate, the results of the SIP allow for measurement of the athletes' styles of coping with pain.

Pain Through the History of Dance.

There is a long history of the relationship of pain in ballet. Ballet started as a court dance in France in the 1600s. It became popular in the court of King Louis the 14th, known as the Sun King, because of the role he played in the court ballets. He developed a ballet school and allowed women to dance. During this time the costumes were very much in line with the traditional court attire consequently corsets and high-heal shoes were part of the women's costume (Homans, 2010; Clarke & Crisp, 1992; Lee, 1999). High-heals create a lot of pressure in the joint of the big toe which can cause bunions and blisters. Corsets compress the ribcage to accentuate the curves of the female form; this resulted in the rearrangement of internal organs and frequent passing out due to lack of oxygen (Chazin-Bennahum, 2005; Kay, 2008; Littig, 2013). Over time the skirts got shorter and shoes more flexible to allow for more movement. The characteristics of the Romantic Movement in dance are a calf length tulle skirt, corset, and soft airy movements (Bland, 1976; Lee, 1999; Homans, 2010). With the start of the Romantic

Movement in the arts during the 1800s, the ethereal quality that has become one of the main aesthetics of ballet was developed. The Romantic ballets that were created during this time, such as *La Sylphide* are still performed by schools and companies all over the world. *La Sylphide* was the first ballet to have a dancer on the tips of their toes for a few seconds at a time to achieve the weightless quality. At this time the dancer's shoes were soft, so there was no support to help with going on their toes, but she did wear shoes that were two sizes too small to compress her metatarsals to help with support (Schmid, 2016).

With the shortening of skirts to the classical tutu and more supportive shoes, legs were able to go higher creating the modern image of ballet. Ballets such as *La Bayadere, The Sleeping Beauty, Swan Lake* and *The Nutcracker* came out of this classical ballet movement in the late 1800s. The atheistic of the long legged, skinny and flexible dancer was developed by George Balanchine. Balanchine came to the United States from Russia in 1934 and was the choreographer for the New York City ballet. His choreography required fast feet and the ability to move the dancers' hips, which before this was not accepted in ballet technique (Scholl, 1994; Homans, 2010). Pointe shoes have now been developed to aid with pointe work. The box of the shoes that surrounds the toes is now made up of hard cardboard, and the shank of the shoes that goes along the sole of the shoes is made out of cardboard or wood to help support the arch of the shoes when up on pointe. Although, there are developments to help make going up on one's toes easier it is still very painful. Blisters, bruised toenails and bunions are normal when dancing on pointe.

It is expected for women to dance in pain without showing it. Historically, only

women danced on pointe because it fit in the archetypal roles of women being delicate and light on their feet, while the men are strong and heavy. Today, there are some all-male companies, such as The Tucadaro de Monte Carlo, where male dancers perform comedic ballets on pointe (Lee, 1999; Homans, 2010; Scholl, 1994).

Stress.

The majority of the studies examining the mental state of ballet dancers focus on stress and anxiety (Hamilton & Hamilton, 1991; Barrell & Terry, 2003; Hamilton, Hamilton, Meltzer, Marshal & Molnar, 1989; Noh, Morris & Anderson, 2009). The pressure that ballet dancers go through to maintain a certain physique and skill level takes a toll on the dancers. Depending on the anxiety of the individual, their coping style with injuries can become detrimental actions such as using drugs like tobacco or alcohol (Hamilton & Hamilton, 1991; Barrell & Terry, 2003; Hamilton, Hamilton, Meltzer, Marshal & Molnar, 1989; Noh, Morris & Anderson, 2009). This study used the Profile of Mood States (POMS) (McNair, Lorr, & Droppleman, 1971), a non-sport-specific measure of emotions commonly used in the field of sport psychology. The POMS measures five negative emotions and one positive emotion. The negative emotions include tension—which is related to stress—as well as depression, anger, fatigue, and confusion. Depression is characterized by fleeing hopeless, worthlessness and self-blame. Anger is characterized by feelings that range from annoyance to rage. Fatigue is characterized by mental and physical tiredness. Confusion is characterized by uncertainty and fail to control attention and emotions. The one positive emotion measured is vigor (Terry, Lane & Fogarty, 2003). Vigor is characterized by feelings of excitement and physical energy. The total mood disturbance is determined by adding tension,

depression, anger, fatigue and confusion and subtracting vigor.

Experiential Avoidance.

Experiential avoidance is actively avoiding situations that cause negative feelings. While this can be healthy at times, these avoidance behaviors can take over and limit a person's life. Most of the time when someone tries to avoid and try not to be aware of something, this results in being more focused on the negative experience. Although experiential avoidance may lead to temporary avoidances of negative emotions, thoughts, and experiences, it also results in missing positive emotions, thoughts, and experiences. (Kashdan, Barrios, Forsyth & Steger, 2006; Hayes et al., 2004; Chapman, Gratz & Brown, 2006). The opposite of experiential avoidance is mindfulness. Mindfulness is using cognitive methods to accept all experiences both negative and positive, although when using mindfulness, people tend to experience more positive emotions because they are not weighed down by the negative experiences. The Acceptance and Action Questionnaire (AAQ-R) was developed to determine the degree of experiential avoidance an individual is experiencing (Hayes et al., 2004). The higher the scores are on the AAQ-R, the higher action and willingness to participate. In this study, I also measured experiential avoidance using the AAQ-R, which few other studies have done (Zhang, Si, Chung & Gucciardi, 2016; Zhang, Chung, Si & Liu, 2014; Chang, Chi, Lin & Ye, 2017).

Method

Participants

Three different groups of dancers were examined: the Sacramento Ballet Company, the Sacramento Ballet Youth Ensemble, and the ballet dancers at the University of Nevada, Reno.

Sacramento Ballet Company. The Sacramento Ballet Company is a group of professional dancers trained in ballet. They take dance classes eight hours per day, six days per week. Dancers in the Sacramento Ballet take a ballet technique class at the beginning of every workday. Dancers take classes until the day they retire because there are always areas in their training where they can improve. They also spend time rehearsing the dances for their next show. I considered the members of the Sacramento Ballet Company to have the highest level of commitment to ballet out of the three groups because dancing ballet is their job. They have to audition and apply to be hired by the Sacramento Ballet Company. The dancers come from all over the world to be a part of the Company. The age ranges from 19 to 35, with 11 male dancers and 16 female dancers.

Sacramento Ballet Youth Ensemble. The Sacramento Ballet Youth Ensemble is the upper division of the Sacramento Ballet School. The age of these dancers range from 14 to 19 years old; they dance for four hours per day, six days per week. Some of them hope to become professional dancers in the future, while others are planning on going to college and possibly majoring or minoring in dance. I considered the dancers of the Sacramento Ballet Youth Ensemble to have the next highest level of skill and commitment. The students were required to audition and sign a contract at the beginning of the school year saying they won't miss class or rehearsal. There is a high expectation that the student will be available for any added on rehearsal and/or class. There are 14 girls and two boys. The boys did not fill out the survey due to lack of attendance the day the surveys were administered.

University of Nevada, Reno Ballet Student Dancers. The third group was the

ballet dancers in the Department of Theater and Dance at the University of Nevada, Reno. I surveyed both the intermediate and advanced dance classes. The dancers in the advanced ballet have a history of dancing ballet in high school and middle school; some started dancing ballet when they were three years old. In the intermediate ballet class, there were different dance histories, where some people had little experience in ballet but had experience in other forms of dance. The intermediate class met once a week for an hour and fifty minutes. The advanced ballet met twice a week for an hour and fifteen minutes. I considered the dance department of University of Nevada, Reno to be the lowest level of skill and commitment of the groups surveyed. The 16 dancers ages range from 19 to 21; all were female dancers.

Measures

Demographic Questionnaire. The demographic questionnaire examined basic background information about the dancers, such as their age, gender and years of dance experience.

The Sports Inventory for Pain. As previously mentioned, the Sports Inventory for Pain (SIP) was used to understand about to how the dancers respond to pain. The SIP measures direct coping (DC), cognition (COG), catastrophizing (CAT), avoidance (AVD) and body awareness (BOD). DC measures the amount of attention the person gives to the pain. COG determines whether the person uses mental imaging to deal with pain. CAT measures the reaction to pain. AVD measures the effort a person uses to avoid pain. BOD measures the sensitivity to pain. This tool has been used for different studies to see the dancers response to pain (Anderson & Hanrahan, 2008; Encarnacion, Meyers, Ryan, & Pease, 2000; Paparizos, Tripp, Sullivan & Rubenstein, 2005).

Acceptance and Action Questionnaire. The Acceptance and Action Questionnaire (AAQ-R) was used to measure participant experiential avoidance, which is now thought of as cognitive inflexibility (Wolgast, 2014). This measure consists of two subscales including willingness and action. Willingness gauges participants' ability to remain in contact with aversive experiences such as thoughts and emotions. Action gauges participants' ability to act according to values even under aversive experiences.

Profile of Mood States. The Profile of Mood States (POMS) was used to determine the overall emotions of the dancers. The POMS gauges five negative emotions and one postive emotion over the past week including tension, depression, anger, fatigue, confusion, and vigor (McNair et al., 1971). Athletes tend to score higher on vigor and lower on all five negative emotions than non-athletes, yielding an "ice berg profile" (LeUnes, 2008).

Procedure

The surveys were distributed to SBYE (N=14), the Sacramento Ballet Company (N=16 female; 10 males; N=26 total) and dance students (N=16) at the University of Nevada, Reno. The principal of the Sacramento Ballet School and the Artistic Director of the Sacramento Ballet were contacted with instructions on how to distribute the surveys and were given a description of the research. They were told to ask if the dancer wanted to participate in the study, they were told that the study was on pain in ballet and the survey would take 10-15 minutes. This process was approved by IRB at the University of Nevada, Reno.

I examined the relationships between the variables related to study hypotheses 1-5 using Pearson correlations and one-way ANOVAs for hypotheses 4-5.

Results

Demographics

Table 1

Demographics of Participants

SBYE

Age	*Frequency*	Percentage
14	2	14%
15	4	29%
16	1	7%
17	2	14%
18	4	29%
19	1	7%
Total	14	100%

Gender	*Frequency*	Percentage
Female	14	100%
Male	0	0%
Total	14	100%

SBC

Age	*Frequency*	Percentage
19	1	4%
20	3	12%
21	3	12%
22	3	12%
23	1	4%
24	1	4%
25	0	0%
26	3	12%
27	2	8%
28	1	4%
29	2	8%
30	1	4%
31	1	4%
32	2	8%
33	1	4%
34	0	0%
35	1	4%
Total	26	100%

Gender	*Frequency*	Percentage
Female	16	62%
Male	10	38%
Total	26	100%

UNR

Age	*Frequency*	Percentage
19	3	20%
20	6	38%
21	6	38%
22	1	6%
Total	16	100%

Gender	*Frequency*	Percentage
Female	16	100%
Male	0	0%
Total	16	100%

Fifty-six individuals participated in this study. Twenty six (46%) were from The Sacramento Ballet Company, 14 (25%) were from the Sacramento Ballet Youth Ensemble, and 16 (29%) were from the University of Nevada, Reno ballet class. The dancers in the Sacramento Ballet Youth Ensemble and the University of Nevada Reno all identified as female. In the Company 11 (42%) dancers identified as male and 16 (62%) dancers identified as female.

Study Hypothesis

Table 3

Study Hypotheses: Pearson Correlations

Hypothesis	Variable x	Variable y	Correlation
1a	SIP Avoidance	POMS Total Mood Disturbance	-0.203
1b	SIP Avoidance	AAQ-R Action	0.142
1c	SIP Avoidance	AAQ-R Willingness	0.036
2	SIP Avoidance	POMS Tension	-0.233
3a	POMS Vigor	AAQ-R Action	0.357**
3b	POMS Vigor	AAQ-R Willingness	0.264*
3c	POMS Vigor	SIP Direct Coping	-0.101
3d	POMS Vigor	SIP Cognitive	-0.109
3e	POMS Vigor	SIP Body Awareness	0.107
4	POMS Vigor	Skill Level	-0.047
5a	Skill Level	SIP Direct Coping	-0.079
5b	Skill Level	SIP Cognitive	0.009
5c	Skill Level	SIP Body Awareness	-0.073

*$p < .05$, **$p < .01$, ***$p < .001$

Hypothesis 1 was if there is a higher score on the avoidance section of the SIP; there will be a higher score on the total mood disturbance on the POMS and a low score on the AAQ-R. This hypothesis was not supported by the data (See Table 3). Hypothesis 2 was if there is higher tension score on the POMS there will be a higher score avoidance section of SIP. This hypothesis was not supported by the data (See Table 3). The third hypothesis was if there is a higher score in the vigor section of the POMS there will be a higher score on the AAQ-R and a high score on the direct coping, cognitive and body awareness sections of the SIP. This hypothesis was not supported by the data (See Table 3) in fact the opposite was found. My fourth hypothesis was with the increase of skill level of the dancers, they with score higher on vigor section of the POMS, and will exhibit the "Iceberg Profile" on the POMS and have a lower their total mood disturbance scores. This hypothesis was supported by the data (see Table 5; Figures 2-4). My fifth hypothesis was with an increase in skill level of the participants the higher they will score on the direct coping, cognitive and body awareness in the SIP. This hypothesis was not supported by the data (see Table 4).

Table 5

Between Group Differences in Vigor, "Iceberg" Profile, & AAQ-R: One-Way ANOVAs

Measure	*df*	*F*	*p*
"Iceberg" Profile	2	15.61	0.000005***
Vigor	2	10.26	0.0002***
Total Mood Disturbance	2	13.10	0.00002***
AAQ-R Action	2	6.26	0.004**
AAQ-R Willingness	2	2.09	0.13
SIP Direct Coping	2	2.35	0.11
SIP Cognitive	2	1.93	0.16
SIP Avoidance	2	1.21	0.31
SIP Body Awareness	2	0.44	0.65

*$p < .05$, **$p < .01$, ***$p < .001$

Discussion

Table 2

Descriptive Statistics by Skill Group

Measure	*Skill Group*	*N*	*M*	*SD*
SIP Avoidance	SBYE	14	13.66	1.51
	Company	26	14.23	1.88
	UNR	16	13.31	2.24
SIP Direct Coping	SBYE	14	28.36	5.14
	Company	26	24.69	5.79
	UNR	16	27.00	4.69
SIP Cognitive	SBYE	14	14.71	2.79
	Company	26	13.07	3.13
	UNR	16	14.69	3.30
SIP Body Awareness	SBYE	14	11.43	2.44
	Company	26	11.77	3.34
	UNR	16	10.88	2.90
POMS Total Mood Disturbance	SBYE	14	75.57	35.51
	Company	26	27.48	19.39
	UNR	16	60.63	39.11
POMS Iceberg Profile	SBYE	14	-5.51	9.60
	Company	26	8.16	6.67
	UNR	16	-2.78	9.34
POMS Vigor	SBYE	14	12.00	4.80
	Company	26	17.07	4.33
	UNR	16	11.69	3.81
AAQ-R Action	SBYE	14	36.71	8.98
	Company	26	41.08	7.00
	UNR	16	37.38	6.38
AAQ-R Willingness	SBYE	14	22.64	5.93
	Company	26	29.04	5.06
	UNR	16	24.63	6.87

Hypothesis 1

My first hypothesis was if there is a higher score on the avoidance section of the SIP; there would be a higher score on the total mood disturbance on the POMS and a lower score on the AAQ-R. When looking at the correlation between avoidance, total mood disturbance, willingness and action there was not a significant relationship between the variables (see Table 2).

Hypothesis 2

My second hypothesis was if there is higher tension score on the POMS there would be a higher score avoidance section of SIP. When looking at the correlation between tension and avoidance, there was not a significant relationship between the variables (see Table 2).

Hypothesis 3

My third hypothesis was if there is a higher score in the vigor section of the POMS there would be a higher score on the AAQ-R and a higher score on the direct coping, cognitive and body awareness sections of the SIP. When looking at the correlation between vigor, direct coping, cognitive and body awareness there was not a significant relationship between the variables, although there was a significant correlation between vigor, action and willingness (see table 2). This means while the dancers have excitement they did not report experiential avoidance. This means they do not appear to suppress the negative feelings they experience while dancing. Instead, as dancers scored higher in vigor, they scored higher in action and willingness, thereby reporting lower experiential avoidance. This suggests they may be more mindful, cognitively flexible, and open to experiencing thoughts, emotions, and other experiences related to their

activity when also experiencing vigor.

Hypothesis 4

My fourth hypothesis was with the increase of skill level of the dancers, they would score higher on vigor section of the POMS, would exhibit the "Iceberg Profile" on the POMS, and would have a lower their total mood disturbance scores. When looking at the correlation between level of commitment, vigor and total mood disturbance there was not a significant relationship between the variables (see Table 2). There was, however, a significant difference between the groups with respect to vigor, the "Iceberg Profile," and POMS total mood disturbance, in the expected direction (see Table 4), with the most competitive athletes showing the highest vigor, the data the "Iceberg Profile," and the lowest POMS total mood disturbance (Figures 2-4). Thus this hypothesis was supported by the data.

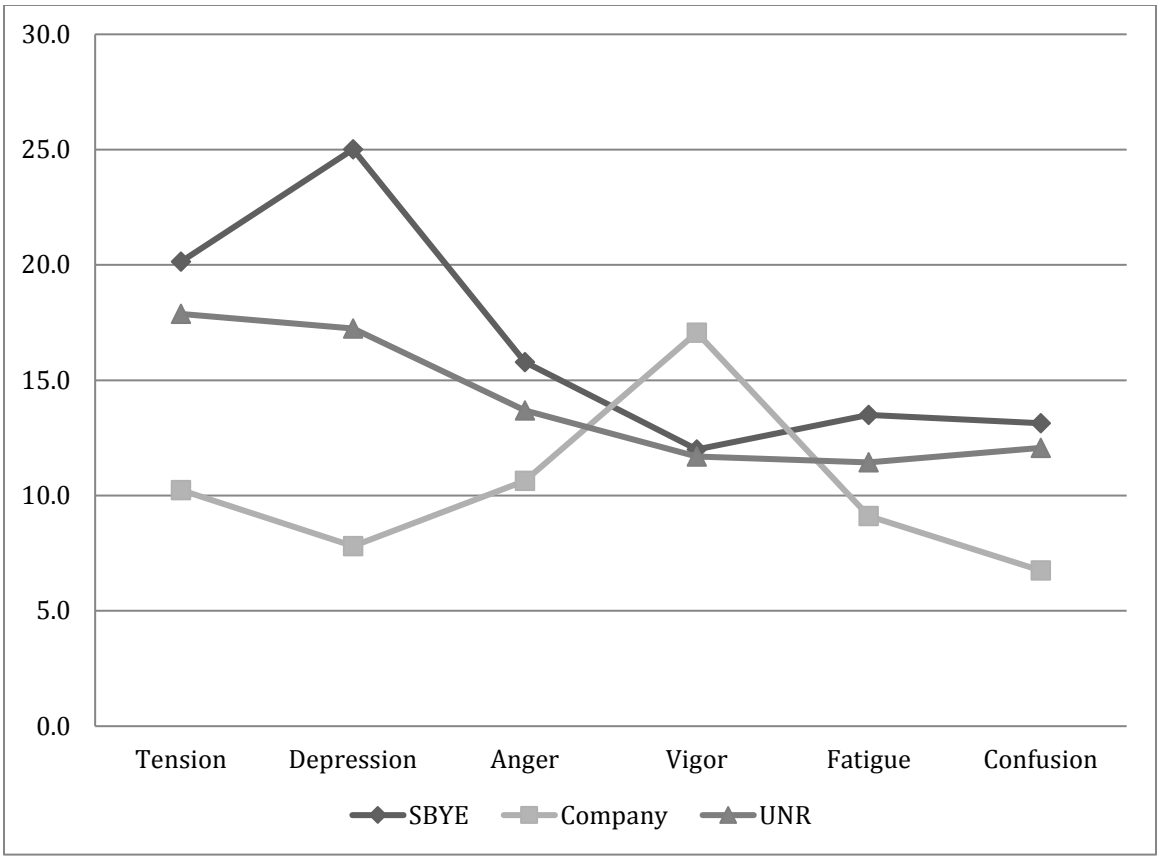

Figure 1. Profile of Mood States. The profile of the Company reflects the typical athlete iceberge profile. SYBE and UNR do not.

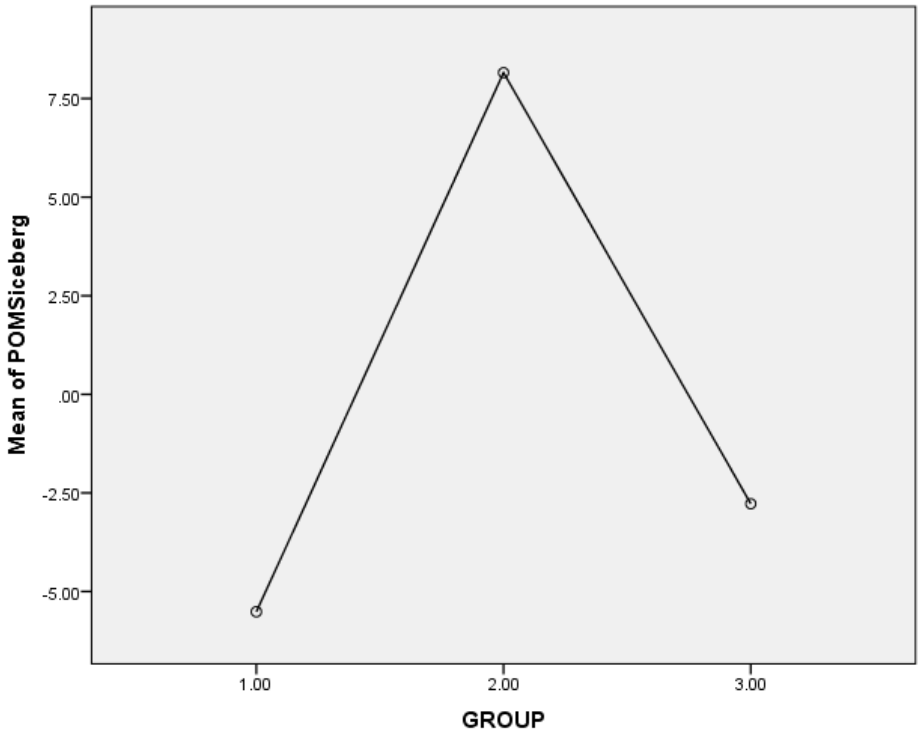

Figure 2. Profile of Mood States Iceberg Profile by Skill Group (1=SBYE, 2=SBC, 3=UNR)

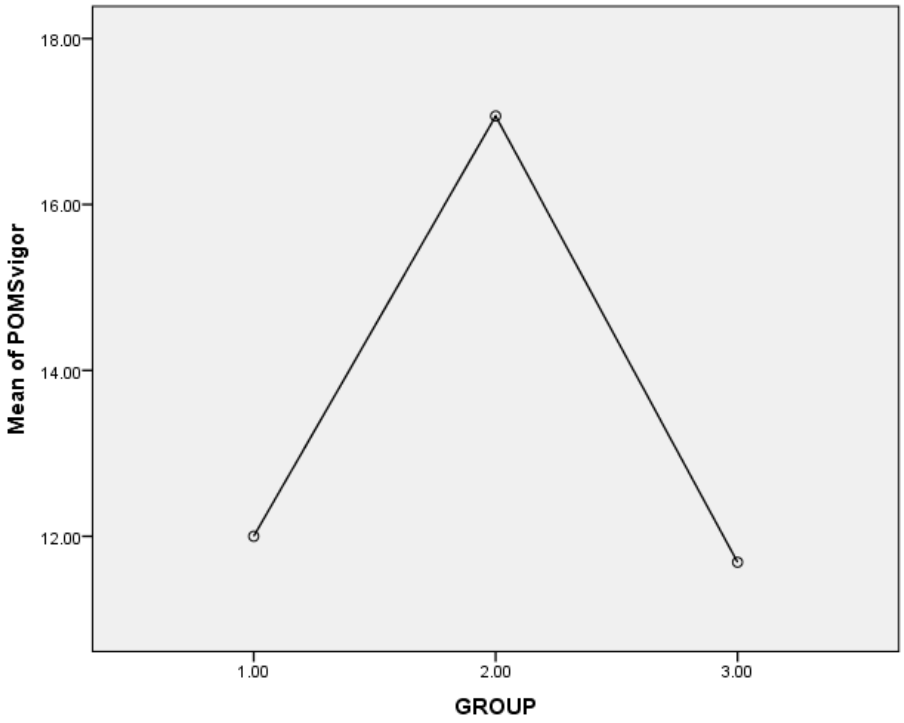

Figure 3. Profile of Mood States Vigor by Skill Group (1=SBYE, 2=SBC, 3=UNR)

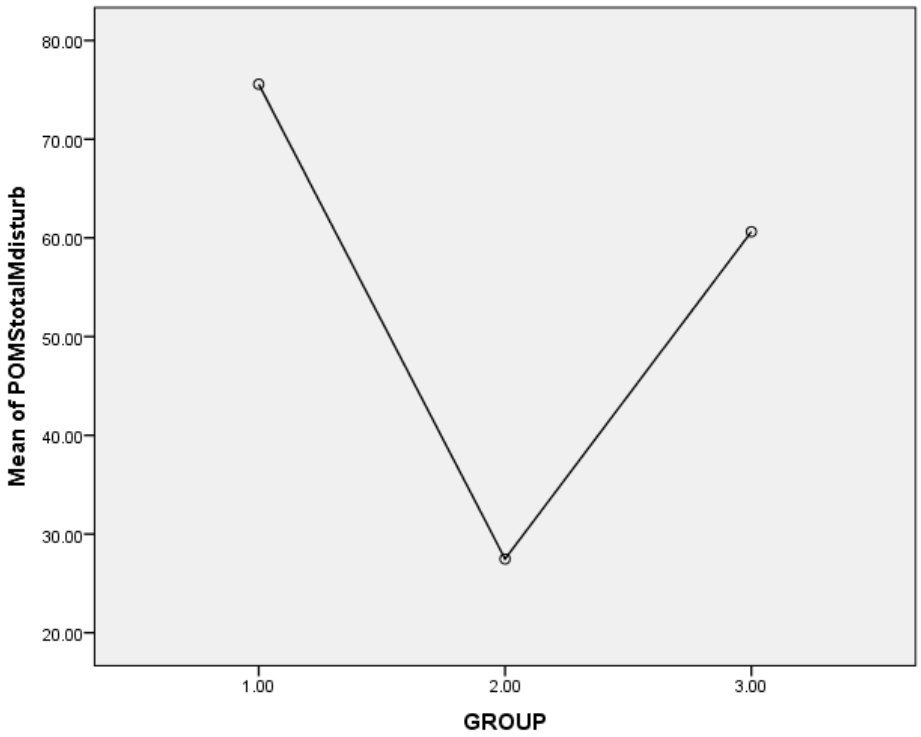

Figure 4. Profile of Mood States Total Mood Disturbance by Skill Group 1=SBYE, 2=SBC, 3=UNR)

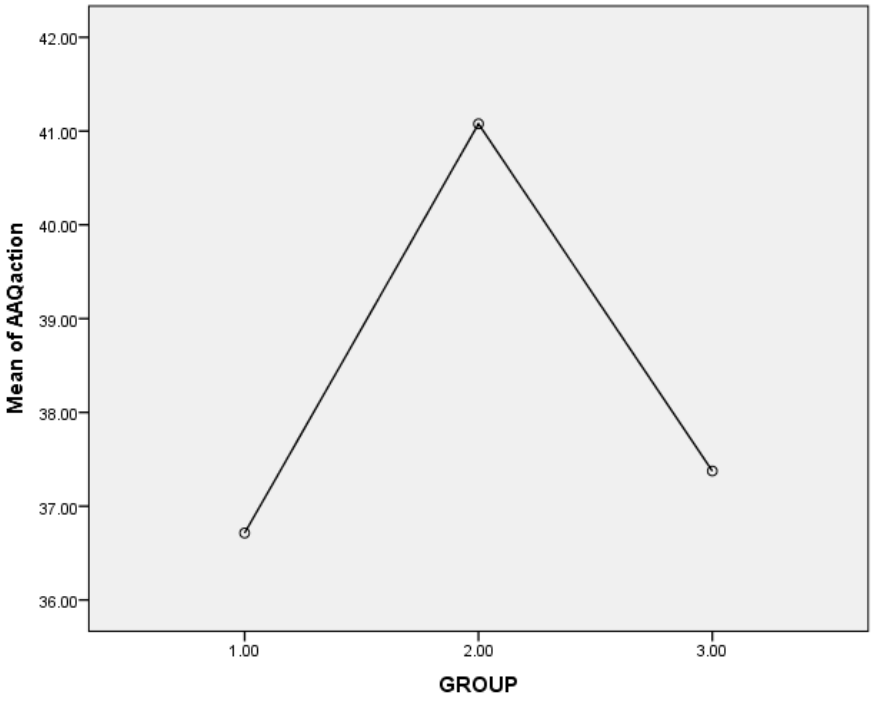

Figure 5. AAQ-R Action by Skill Group (1=SBYE, 2=SBC, 3=UNR)

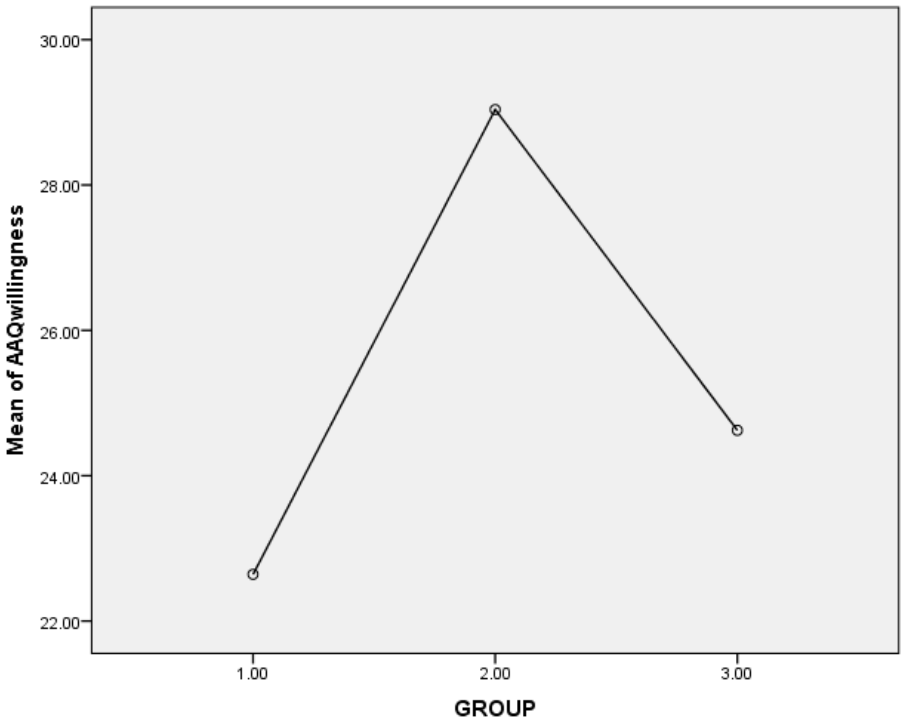

Figure 6. AAQ-R Willingness by Skill Group (1=SBYE, 2=SBC, 3=UNR)

Hypothesis 5

My fifth hypothesis was with an increase in skill level of the participants, the higher they would score on the direct coping, cognitive and body awareness in the SIP. When looking at the correlation between levels of commitment, direct coping, cognitive and body awareness there was not a significant relationship between the variables (see Table 2; Table 4).

General Discussion

The hypotheses that the dancers express experiential avoidance were not supported. Instead, dancers who experience more vigor may show less experiential avoidance. The Sports Inventory for Pain did not detect any difference between the skill levels but the Acceptance and Action Questionnaire and the Profile of Mood States did.

High skilled dancers appear to have higher vigor and lower mood disturbance. In previous research the only tool that was used was the Sports Inventory for Pain; they too did not detect any differences between groups (Barrell & Terry, 2003; Anderson & Hanrahan, 2008; Paparizos et al., 2005). This suggests that the Sports Inventory for Pain is not the proper tool to compare the levels. It would be interesting to see if the differences in the profiles would be reflected across all sports by comparing three different skill levels in basketball, football or another sport, by comparing high school, college and professional players.

A future direction for this study would be to add another group of non-athletes and compare their responses to those of the dancers. Comparing the Sports Inventory for Pain of the dancers to those of non-athletes may reveal the experiential avoidance in the three groups of ballet dancers.

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Tables

Table 1

Demographics of Participants

SBYE

Age	*Frequency*	Percentage
14	2	14%
15	4	29%
16	1	7%
17	2	14%
18	4	29%
19	1	7%
Total	14	100%

Gender	*Frequency*	Percentage
Female	14	100%
Male	0	0%
Total	14	100%

SBC

Age	*Frequency*	Percentage
19	1	4%
20	3	12%
21	3	12%
22	3	12%
23	1	4%
24	1	4%
25	0	0%
26	3	12%
27	2	8%
28	1	4%
29	2	8%
30	1	4%
31	1	4%
32	2	8%
33	1	4%
34	0	0%
35	1	4%
Total	26	100%

Gender	*Frequency*	Percentage
Female	16	62%
Male	10	38%
Total	26	100%

UNR

Age	*Frequency*	Percentage
19	3	20%
20	6	38%
21	6	38%
22	1	6%
Total	16	100%

Gender	*Frequency*	Percentage
Female	16	100%
Male	0	0%
Total	16	100%

Table 2

Descriptive Statistics by Skill Group

Measure	*Skill Group*	*N*	*M*	*SD*
SIP Avoidance	SBYE	14	13.66	1.51
	Company	26	14.23	1.88
	UNR	16	13.31	2.24
SIP Direct Coping	SBYE	14	28.36	5.14
	Company	26	24.69	5.79
	UNR	16	27.00	4.69
SIP Cognitive	SBYE	14	14.71	2.79
	Company	26	13.07	3.13
	UNR	16	14.69	3.30
SIP Body Awareness	SBYE	14	11.43	2.44
	Company	26	11.77	3.34
	UNR	16	10.88	2.90
POMS Total Mood Disturbance	SBYE	14	75.57	35.51
	Company	26	27.48	19.39
	UNR	16	60.63	39.11
POMS Iceberg Profile	SBYE	14	-5.51	9.60
	Company	26	8.16	6.67
	UNR	16	-2.78	9.34
POMS Vigor	SBYE	14	12.00	4.80
	Company	26	17.07	4.33
	UNR	16	11.69	3.81
AAQ-R Action	SBYE	14	36.71	8.98
	Company	26	41.08	7.00
	UNR	16	37.38	6.38
AAQ-R Willingness	SBYE	14	22.64	5.93
	Company	26	29.04	5.06
	UNR	16	24.63	6.87

Table 3

Study Hypotheses: Pearson Correlations

Hypothesis	Variable x	Variable y	Correlation
1a	SIP Avoidance	POMS Total Mood Disturbance	-0.203
1b	SIP Avoidance	AAQ-R Action	0.142
1c	SIP Avoidance	AAQ-R Willingness	0.036
2	SIP Avoidance	POMS Tension	-0.233
3a	POMS Vigor	AAQ-R Action	0.357**
3b	POMS Vigor	AAQ-R Willingness	0.264*
3c	POMS Vigor	SIP Direct Coping	-0.101
3d	POMS Vigor	SIP Cognitive	-0.109
3e	POMS Vigor	SIP Body Awareness	0.107
4	POMS Vigor	Skill Level	-0.047
5a	Skill Level	SIP Direct Coping	-0.079
5b	Skill Level	SIP Cognitive	0.009
5c	Skill Level	SIP Body Awareness	-0.073

*$p < .05$, **$p < .01$, ***$p < .001$

Table 4

Vigor & the "Iceberg" Profile by Skill Groups

Measure	*Skill Group*	*N*	*M*	*SD*
Vigor	SBYE	14	12.00	4.80
	Company	26	17.07	4.33
	UNR	16	11.69	3.81
"Iceberg" Profile	SBYE	14	-5.51	9.60
	Company	26	8.16	6.67
	UNR	16	-2.78	9.34
Total Mood Disturb.	SBYE	14	75.57	35.51
	Company	26	27.48	19.39
	UNR	16	60.63	39.11
AAQ-R Action	SBYE	14	36.71	8.98
	Company	26	41.08	7.00
	UNR	16	37.38	6.38

Table 5

Between Group Differences in Vigor, "Iceberg" Profile, & AAQ-R: One-Way ANOVAs

Measure	*df*	*F*	*p*
"Iceberg" Profile	2	15.61	0.000005***
Vigor	2	10.26	0.0002***
Total Mood Disturbance	2	13.10	0.00002***
AAQ-R Action	2	6.26	0.004**
AAQ-R Willingness	2	2.09	0.13
SIP Direct Coping	2	2.35	0.11
SIP Cognitive	2	1.93	0.16
SIP Avoidance	2	1.21	0.31
SIP Body Awareness	2	0.44	0.65

*$p < .05$, **$p < .01$, ***$p < .001$

Appendix A: IRB Form

University of Nevada, Reno

Research Integrity Office
218 Ross Hall / 331, Reno, Nevada 89557
775.327.2368 / 775.327.2369 fax
www.unr.edu/research-integrity

Exempt 2: Tests, Surveys, Interviews, or Observation of Public Behavior

A Part I Cover sheet is required for each project submitted in IRBNet; see Locating the Cover Sheet.	
Assessment of Criteria for Exemption	
1. Will any information from this study activity be submitted to FDA or held for inspection by the FDA?	X No __ Yes, STOP! Fail criteria for this exemption; complete relevant Part II application
2. Will any research activities pose risks to participants that are greater than minimal?	X No __ Yes, STOP! Fail criteria for this exemption, complete relevant Part II application
3. Will any research activities involve prisoners as participants?	X No __ Yes, STOP! Fail criteria for this exemption, complete relevant Part II application
4. Will any participants be younger than 18 years old?	__ No X Yes STOP! Fail criteria for this exemption, complete relevant Part II application (UNLESS the research activities are limited to passive observation*)
**Passive observation occurs when the researchers do not participate in the activities being observed.*	
5. Will information be recorded in such a manner that individual participants can be identified, directly or through linked *Protected Personally Identifiable Information* (PPII) (see Policy Manual Definitions) AND could the information damage a participant's reputation, employability, financial standing or place her/him at risk for criminal or civil liability?	X No __ Yes STOP! Fail criteria for this exemption; complete relevant Part II application
Study Purpose and Narrative Summary	
6. State the study purpose:	Study the mental health implications of pain suppression in ballet dancers
7. Provide a narrative, lay-summary of the project:	Participants will take a survey that measure pain perception and mood state.
Study Sites	
8. List or describe the study sites:	__ N/A, Internet or telephone survey Study sites: University of Nevada Reno, The Sacramento Ballet
9. Is approval from an external entity required for this research (e.g., TMCC, school district, oversight committee or board)?	X No __ Yes, specify: Add documentation of approval, or submit via subsequent amendment package if site requires prior IRB approval. *Note: IRB program staff will coordinate WCSD Accountability Office approval.*

Participants	
10. How many participants will be enrolled or observed for this research?	80
11. Describe the populations that will be involved in this research:	Dancers in The Sacramento Ballet Company Dancers in the dance department at UNR Dancers in the school of The Sacramento Ballet
12. Will this research involve passive observation of children?	__ No _X_ Yes, specify the age ranges and explain why it is necessary to observe children: Pre-professional high school ballet dancers that have a higher commitment to ballet than college dancers but less time commitment than professional ballet dancers
Recruitment and Informed Consent	
13. Will prospective participants be invited to consider participation in the research? **Add** recruitment scripts/flyers.	_X_ N/A, recruitment combined with consent __ N/A, records review or covert observation only __ No, explain why not: __ Yes, describe the invitation process:
14. Will potential participants be told about the research and be given the opportunity to agree to participate? **Add** information scripts, sheets, or letters.	__ N/A, covert observation only __ No, explain why not: _X_ Yes, describe the process: Possible participants will be given a information and consent sheet
15. Will incentives be provided to enhance enrollment?	_X_ No __ Yes, specify the incentives (including dollar value and odds of winning):
16. When, how, and by whom will incentives be distributed?	_X_ N/A, no incentives __ N/A, using SONA; standard procedures apply Description:
Research Activities/Study Procedures	
17. Indicate the types of research activities that will be used:	*Select all that apply:* __ Tests (cognitive, diagnostic, aptitude) _X_ Survey, paper/pencil (including via mail) __ Survey, telephone __ Survey, Internet __ Interviews, including focus group interviews __ Observations of public behavior, covert __ Observations of public behavior, overt __ Other, describe:
18. Describe in detail and in chronological order what participants will be asked to do:	Participants will be told about the study Given a consent form after being told about the study Participants will fill out survey
19. Will participants be video-recorded or photographed? **Add** the video/photo release form participants will sign.	_X_ No __ Yes, explain why videos or photos are necessary for the research:

20. List all study materials/research instruments (e.g., surveys, questionnaires, interview guides, data collection logs). **Add** all study materials	Sports Inventory of Pain Acceptance and Action Questionnaire Profile of Mood States
21. List the data that will be collected for this study:	Answers from the survey
22. How will the data be analyzed?	Answers from surveys will be scored
Participant Privacy and Data Confidentiality	
23. Will *Protected Personally Identifiable Information* (PPII) (see Policy Manual Definitions) about participants be recorded?	_X_ No __ Yes, list the PPII that will be recorded and explain why it's necessary to record PPII:
24. How will participants' privacy rights be protected?	Will be anonymous
25. How will research records be handled and stored to ensure confidentiality?	Each person will be assigned a number
26. If a master list will be used to link participant research IDs with PPII, when will the code list be destroyed?	_X_ N/A, PPII not recorded or not linked Specify:
External Funding	
27. Is this research externally funded, including UNR as subrecipient? For federally funded research only, **Add** grant application, contract or statement of work as *Protocol*.	__ No __ Yes, federal sponsor Name of sponsoring agency: _X_ Yes, commercial sponsor or foundation: Sponsor name: UNR HURA __ Other, specify:
Add completed form to the project as document type: *Application*.	
Obtain electronic signature of the Principal Investigator. RO signature not required for exemptions. Yani L. Dickens, Ph.D. Principal Investigator	
Principal Investigator Assurance My electronic signature certifies that I have read and agree to comply with the PI responsibilities in the IRB Policy Manual (click on the link or visit the RIO website). NOTE: Requirements for consent waivers do not apply to exempt research.	
Confirm project/package is complete and *Submit* for Exempt Review.	

Appendix B: Letter to Artistic Directors of The Sacramento Ballet

Corinne Locke
2139 Rockwood Drive
Sacramento, CA 95864
(916) 949-4097
clocke@Nevada.unr.edu

Dear Ron Cunningham and Carinne Binda, January 14, 2017

I am currently a senior in the Honors program at University of Nevada, Reno. You might remember that I am majoring in Biology and minoring in Dance. Honors students are required to write an Honors thesis prior to graduating. My research combines my areas of study by examining ballet dancers' coping strategies for pain. I am interested in comparing coping strategies in pre-professional and professional dancers. My research project has been approved by the University of Nevada, Reno Institutional Review Board. During my review of past research, I found similar studies done at The American Ballet Theater and New York City Ballet, but the researchers did not compare the professionals in the company to the students in the school. I would like to survey the dancers in the Sacramento Ballet Company and in the Sacramento Ballet Youth Ensemble (SBYE). The written survey takes about 10-15 minutes to complete and is anonymous.

I was looking at the seminars that the school of the Sacramento Ballet is putting on for the month of January and I noticed that the fourth one is called "Managing an Injury and Knowing when not to Dance". This concept is related to my research so if I am going to survey the dancers in SBYE, I would prefer to do administer the survey prior to this seminar because it may influence the dancers' responses to some of the questions.

Thank you,

Cori Locke

CC: Melanie Haller

Appendix C: Letter to the Principle of the Sacramento Ballet School

Corinne Locke
2139 Rockwood Drive
Sacramento, CA 95864
(916) 949-4097
clocke@Nevada.unr.edu

Dear Melanie Haller, January 14, 2017

I am currently a senior in the Honors program at University of Nevada, Reno. You might remember that I am majoring in Biology and minoring in Dance. Honors students are required to write an Honors thesis prior to graduating. My research combines my areas of study by examining ballet dancers' coping strategies for pain. I am interested in comparing coping strategies in pre-professional and professional dancers. My research project has been approved by the University of Nevada, Reno Institutional Review Board. During my review of past research, I found similar studies done at The American Ballet Theater and New York City Ballet, but the researchers did not compare the professionals in the company to the students in the school. I would like to survey the dancers in the Sacramento Ballet Company and in the Sacramento Ballet Youth Ensemble (SBYE). The written survey takes about 10-15 minutes to complete and is anonymous.

I was looking at the seminars that the school of the Sacramento Ballet is putting on for the month of January and I noticed that the fourth one is called "Managing an Injury and Knowing when not to Dance". This concept is related to my research so if I am going to survey the dancers in SBYE, I would prefer to do administer the survey prior to this seminar because it may influence the dancers' responses to some of the questions.

Thank you,

Cori Locke

CC: Ron Cunningham and Carinne Binda

Appendix D: Demographic Questionnaire

Participant ID #:____ Participant Group #: ____

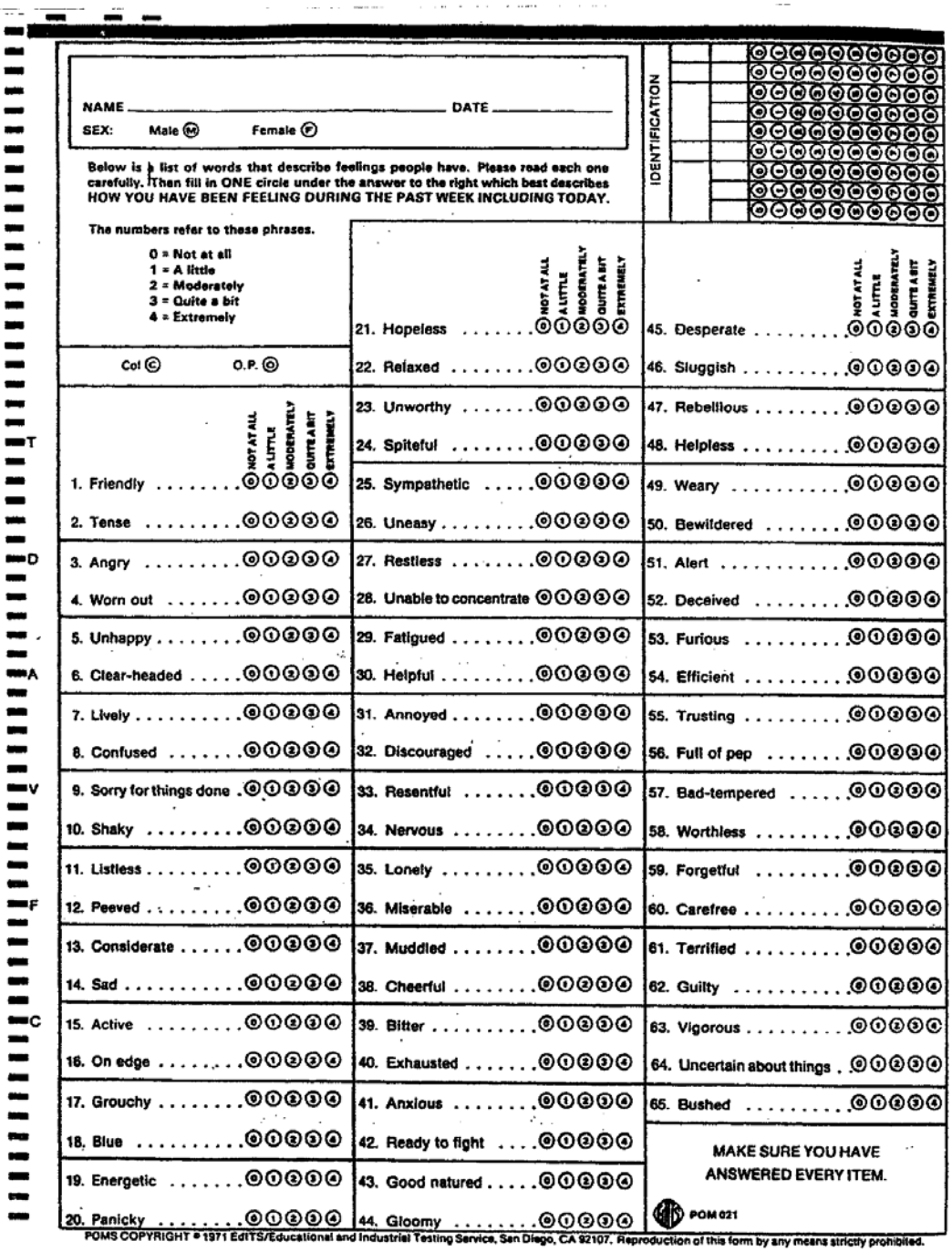
Demographic Questionnaire for Dancers

Directions:

Please answer the following questions. When appropriate, fill in the blank spaces. When a blank space is not provided, circle the number that represents your answer.

1. Age: _____
2. Gender
    1. Female
    2. Male
3. ONLY IF you are a student at University of Nevada, Reno, please indicate the years you have done ballet and whether or not you have danced on pointe (otherwise leave blank):
    1. Years: _____
    2. Pointe:
        1. No
        2. Yes
            1. Years on pointe: _____
4. ONLY IF you are a member of the Sacramento Ballet Company, please indicate your status with the company (otherwise leave blank):
    1. Company
    2. Apprentice
    3. Trainee

Appendix E: Profile of Mood States



NAME _____ DATE _____

SEX: Male (M) Female (F)

IDENTIFICATION

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE circle under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY.

The numbers refer to these phrases.

0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

Col (C) O.P. (O)

	NOT AT ALL	A LITTLE	MODERATELY	QUITE A BIT	EXTREMELY
1. Friendly	0	1	2	3	4
2. Tense	0	1	2	3	4
3. Angry	0	1	2	3	4
4. Worn out	0	1	2	3	4
5. Unhappy	0	1	2	3	4
6. Clear-headed	0	1	2	3	4
7. Lively	0	1	2	3	4
8. Confused	0	1	2	3	4
9. Sorry for things done	0	1	2	3	4
10. Shaky	0	1	2	3	4
11. Listless	0	1	2	3	4
12. Peeved	0	1	2	3	4
13. Considerate	0	1	2	3	4
14. Sad	0	1	2	3	4
15. Active	0	1	2	3	4
16. On edge	0	1	2	3	4
17. Grouchy	0	1	2	3	4
18. Blue	0	1	2	3	4
19. Energetic	0	1	2	3	4
20. Panicky	0	1	2	3	4
21. Hopeless	0	1	2	3	4
22. Relaxed	0	1	2	3	4
23. Unworthy	0	1	2	3	4
24. Spiteful	0	1	2	3	4
25. Sympathetic	0	1	2	3	4
26. Uneasy	0	1	2	3	4
27. Restless	0	1	2	3	4
28. Unable to concentrate	0	1	2	3	4
29. Fatigued	0	1	2	3	4
30. Helpful	0	1	2	3	4
31. Annoyed	0	1	2	3	4
32. Discouraged	0	1	2	3	4
33. Resentful	0	1	2	3	4
34. Nervous	0	1	2	3	4
35. Lonely	0	1	2	3	4
36. Miserable	0	1	2	3	4
37. Muddled	0	1	2	3	4
38. Cheerful	0	1	2	3	4
39. Bitter	0	1	2	3	4
40. Exhausted	0	1	2	3	4
41. Anxious	0	1	2	3	4
42. Ready to fight	0	1	2	3	4
43. Good natured	0	1	2	3	4
44. Gloomy	0	1	2	3	4
45. Desperate	0	1	2	3	4
46. Sluggish	0	1	2	3	4
47. Rebellious	0	1	2	3	4
48. Helpless	0	1	2	3	4
49. Weary	0	1	2	3	4
50. Bewildered	0	1	2	3	4
51. Alert	0	1	2	3	4
52. Deceived	0	1	2	3	4
53. Furious	0	1	2	3	4
54. Efficient	0	1	2	3	4
55. Trusting	0	1	2	3	4
56. Full of pep	0	1	2	3	4
57. Bad-tempered	0	1	2	3	4
58. Worthless	0	1	2	3	4
59. Forgetful	0	1	2	3	4
60. Carefree	0	1	2	3	4
61. Terrified	0	1	2	3	4
62. Guilty	0	1	2	3	4
63. Vigorous	0	1	2	3	4
64. Uncertain about things	0	1	2	3	4
65. Bushed	0	1	2	3	4

MAKE SURE YOU HAVE ANSWERED EVERY ITEM.

POM 021

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Appendix F: Acceptance and Action-Revised Questionnaire

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The Acceptance and Action Questionnaire – Revised (AAQ-R)

Below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following scale to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

_____ 1. I am able to take action on a problem even if I am uncertain what is the right thing to do.

_____ 2. When I feel depressed or anxious, I am unable to take care of my responsibilities.

_____ 3. I try to suppress thoughts and feelings that I don't like by just not thinking about them.

_____ 4. It's OK to feel depressed or anxious.

_____ 5. I rarely worry about getting my anxieties, worries, and feelings under control.

_____ 6. In order for me to do something important, I have to have all my doubts worked out.

_____ 7. I'm not afraid of my feelings.

_____ 8. I try hard to avoid feeling depressed or anxious.

_____ 9. Anxiety is bad.

_____ 10. Despite doubts, I feel as though I can set a course in my life and then stick to it.

_____ 11. If I could magically remove all the painful experiences I've had in my life, I would do so.

_____ 12. I am in control of my life.

_____ 13. If I get bored of a task, I can still complete it.

_____ 14. Worries can get in the way of my success.

_____ 15. I should act according to my feelings at the time.

_____ 16. If I promised to do something, I'll do it, even if I later don't feel like it.

_____ 17. I often catch myself daydreaming about things I've done and what I would do differently next time.

_____ 18. When I evaluate something negatively, I usually recognize that this is just a reaction, not an objective fact.

_____ 19. When I compare myself to other people, it seems that most of them are handling their lives better than I do.

Revised date (4 October 2006)

Appendix G: Sports Inventory for Pain

SPORTS INVENTORY FOR PAIN

Name:_____ (Please Print)

Michael C. Meyers, Ph.D., FACSM, Anthony Bourgeois, PhD
Arnold LaUnea, EdD

COP	COG	CAT	AVD	BOD

Below is a list of statements that describe the way athletes often feel about pain and it's influence on performance. Please take your time and read each statement carefully, so that we may find out how you feel toward pain. Then fill in one circle to the right of each statement that describes your feelings at this time. Please answer honestly. There are no right or wrong answers.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I see pain as a challenge and don't let it bother me.	O	O	O	O	O
2.	I owe it to myself and those around me to perform even when my pain is bad.	O	O	O	O	O
3.	When in pain, I tell myself it doesn't hurt.	O	O	O	O	O
4.	When injured, I pray for the pain to stop.	O	O	O	O	O
5.	If I feel pain during a game, it's probably a sign that I'm doing damage to my body.	O	O	O	O	O
6.	I have little or no trouble with my muscles twitching or jumping.	O	O	O	O	O
7.	At this point, I am more interested in returning to my sport than in trying to stop any pain.	O	O	O	O	O
8.	When in pain, I imagine that the pain is outside my body.	O	O	O	O	O
9.	When injured, I feel pain is terrible and that it's never going to get better.	O	O	O	O	O
10.	When injured, I could perform as well as ever if my pain would go away.	O	O	O	O	O
11.	I do not worry about being injured.	O	O	O	O	O
12.	Pain is just a part of the game.	O	O	O	O	O
13.	When hurt, I play mental games with myself to keep my mind off the pain.	O	O	O	O	O
14.	When in pain, I worry all the time about whether it will end.	O	O	O	O	O
15.	When in pain, I have to be careful not to make it worse.	O	O	O	O	O
16.	I seldom or never have dizzy spells or headaches.	O	O	O	O	O
17.	When I am hurt, I just go on as if nothing happened.	O	O	O	O	O
18.	When in pain, I replay in my mind pleasant performances from my past.	O	O	O	O	O
19.	If in pain, I often feel I can't stand it anymore.	O	O	O	O	O
20.	The worse thing that could happen to me is to injure/reinjure myself.	O	O	O	O	O
21.	I seldom notice minor injuries.	O	O	O	O	O
22.	When injured, I tell myself to be tough and carry on despite the pain.	O	O	O	O	O
23.	When hurt, I do anything to get my mind off the pain.	O	O	O	O	O
24.	When hurt, I tell myself I can't let the pain stand in the way of what I want to do.	O	O	O	O	O
25.	No matter how bad the pain gets, I know I can handle it.	O	O	O	O	O

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