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UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

BALANCING INCREASED PHYSICAL DEMANDS: AN ANALYSIS OF CROSS-TRAINING PRACTICES IN YOUNG ADULT BALLET DANCERS

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree
of Master of Arts

Brooke Ashley Yuspeh

College of Performing and Visual Arts
School of Theatre and Dance
Dance Education

December 2021

This Thesis by: Brooke Ashley Yuspeh

Entitled: *Balancing Increased Physical Demands: An Analysis of Cross-Training Practices in Young Adult Ballet Dancers*

has been approved as meeting the requirements for the Degree of Master of Arts in the College of Performing and Visual Arts in the School of Theatre Arts and Dance, Program of Dance Education

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ABSTRACT

Yuspeh, Brooke Ashley. *Balancing Increased Physical Demands: An Analysis of Cross-Training Practices in Young Adult Ballet Dancers.* Unpublished Master of Arts thesis, University of Northern Colorado, 2021.

The purpose of this study was to see what young adult ballet dancers knew about cross-training and if they found cross-training methods they practiced effective in supporting their dance technique and helping to prevent injuries. To uncover this information, the researcher used the following essential questions to guide this project:

Q1 How do young adult ballet dancers practice cross-training?

Q2 Which of these cross-training modalities are considered most effective?

The research instruments used in this study included a survey consisting of multiple-choice, multiple-selection, and open-ended questions and an optional journal reflection consisting of open-ended questions. There were a total of four participants from different regions of the United States who completed the survey, and two of these four participants completed the optional journal reflection.

There were several limitations to this study, most notably the small sample size of participants. Furthermore, the gender diversity of the population was limited, preventing generalization of the outcome to a greater population. Finally, the validity and reliability of the research instruments were not tested prior to the dissemination of research materials.

The outcome of this study showed that all participants were aware of cross-training, and most of these dancers practiced multiple forms of cross-training and found benefits that varied based on which method they practiced.

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To all of the dance educators and dancers I have learned from in my dance journey, particularly the dance faculty at Tulane University, thank you for inspiring me to push outside of my comfort zone and making me more curious about all things dance.

To the UNC Dance Education Cohort of 2021, we did it! As a cohort that had to complete this program entirely online due to COVID-19, I am proud of all of us for pushing past the stress and making the best of our time. Thank you all for your inspiration, and I wish all of you the best.

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CHAPTER I

INTRODUCTION

Goal of Thesis

The National Dance Education Organization (NDEO) lists many benefits of enrolling children in dance classes including physical development targeting coordination and kinesthetic memory, growth in emotional maturity through creative movement, greater social awareness because of interactions with classmates and instructors, and cognitive development that occurs when children spontaneously create movement in response to a prompt ("Philosophy Underlying the Standards for Dance in Early Childhood"). Those who continue to study dance throughout their lives continue to reap these benefits, but the goal of dance classes and demands on the body increase in all genres, but most notably in ballet.

As dancers studying ballet progress in their training, the demands on their bodies become similar to the physical stresses experienced in sports like soccer and tennis in which dancers need to move in a skilled and precise way mixed with bursts of explosive movement (Twitchett et al. 2732). Because of the increased physical demands on dancers as they progress in their training, dancers must explore other forms of fitness that will benefit them and enhance their physical well-being.

Cross-training, or physical fitness training in modalities aside from an athlete's main practice, has become more known in the dance community as a method of staying fit as a dancer while strengthening areas of the body that are less targeted in the dance technique class. Methods of cross-training practiced by dancers usually include Pilates, yoga, swimming, strength training,

running, and more; for all cross-training methods, dancers are encouraged to work in moderation and practice methods that complement their main style of dance ("The Dos and Don'ts of Cross-Training"). For example, ballet dancers are encouraged to cross-train in methods that mainly work in parallel positions since they focus on turnout heavily in the studio.

Studies have been performed regarding cross-training in the dance community, but many of these studies focused on one cross-training modality like Pilates (Ahearn et al.) or focused solely on one movement element, such as aerobic fitness that can be improved by cross-training (Bronner et al.). For example, adding two Pilates classes per week (one mat and one apparatus class) for three and a half months was significant enough to improve young adult dancers' posture, strength, and flexibility; notably, these classes had the most impact on dancers with more years of dance training (Ahearn et al. 201). Ahearn and her colleagues' work showed that small changes of adding two Pilates sessions per week to their training allowed for significant physical gains that positively impacted future practice in the studio.

Furthermore, despite the growth in research and other reputable sources in recent years that focus on dancers and cross-training, many dancers and dance educators are still learning where to find this research or that this research even exists. This issue seriously impacts ballet dancers' technical training and the level of fitness even at the professional level. Thus, dancers at the height of their professional careers still experience serious injuries because they are selected by dance companies primarily for their visual appearance and movement quality rather than being chosen based on whether they dance using safe and efficient practices; as a result, these professionals become injured because they often have levels of muscular balance and strength, bone and joint health, and aerobic power resembling those of sedentary individuals due to their lack of cross-training (Koutedakis and Jamurtas 658).

The goal of this study was to determine effective cross-training modalities for young adult dancers, particularly those who focus on ballet. The researcher also aimed to see if there were a significant number of dancers who do not practice cross-training and help these dancers discover which cross-training options are available. Through this thesis, the researcher sought to answer the questions below. Thus, the essential questions addressed in this study were:

Q1 How do young adult ballet dancers practice cross-training?

Q2 Which of these cross-training modalities are considered most effective?

Purpose of Study

As they grow older and add more time and depth to their training, dancers begin feeling more strain on their bodies as they push their instruments to work in new and challenging ways. Cross-training is one of several tools that can aid dancers' wellness by helping them strengthen their bodies in ways that cannot be practiced in technique classes or rehearsals. Despite its importance, cross-training has not been heavily promoted as a tool which can prevent injuries because dancer wellness as a whole has not always been addressed at training and pre-professional levels; it has only been a practice during the last two decades for colleges and universities in the United States to start and promote formal dance wellness programs, including education regarding cross-training (Cardinal et al.). In fact, it was only from 1990 to 2008, that the number of college courses in dance science or wellness increased from 40% of schools to 68.5% (Cardinal 34-35).

Dance science programs in colleges and universities have been growing in recent decades and provide dancers with useful information beyond dance technique training. These programs allow students to dance and take additional theory and science courses that are applied to dance (Rivers 102). Some schools offer these programs as a specific major in the dance department or

concentration with a dance major while others offer these courses as a concentration under a kinesiology or biology major. No matter what the program is called, students who study dance science have earned a degree that gives them knowledge that prepares them to pursue graduate degrees and potentially pursue careers in physical therapy, dance therapy, and medicine in addition to a career in dance. The knowledge these students learn not only could aid them in determining a potential career option outside of performing, but these programs also could help them apply this knowledge to their own dance practice.

The purpose of this study was to learn about the cross-training practices of young adult dancers in various dance settings (private studio, high school, collegiate, and professional) who mainly study or perform ballet and what impact these practices have on the dancers' technique and performance abilities. In this project, the researcher proposed to survey dancers ages 16-25 years old about their knowledge and practice of cross-training. In addition, this content would be researched by having participants complete one journal entry to further describe their cross-training practices in response to specific questions.

Significance of Study

As more scientific research is performed throughout the dance community, it is clear that dancers need to cross-train in order to prevent injuries and improve their fitness levels for better performance in the studio and onstage. Sonia Ramsey stated,

> To ignore the physiological needs in the training of today's dancers is to deny development of the art form. It is the responsibility of dance teachers and educators to continually develop their knowledge and understanding of the physiological demands of dance and of the options for either integrating physical fitness training into the technique class itself or providing it through supplementation. (48)

Ramsey's belief that physiological development through cross-training is necessary to further the artistry in dance is valid because of the increased physical demands in dance, but not all dance educators understand or want to understand this belief. This is one reason why dancers themselves need to become more educated on how to find the best cross-training methods to benefit their dance technique, especially ballet dancers.

Young adult ballet dancers especially need to be aware of effective cross-training methods because they are often at a turning point in their dance experience. As dancers train through early adolescence into their late teens, they must decide if they plan to dance professionally, study in a collegiate program, dance recreationally, or choose to stop dancing. In a study of pre-professional dancers ages 15-19, researchers found that the injury rate was 76% over the course of the one-year study with overuse injuries more common than traumatic injuries (Ekegren et al. 271). Furthermore, these researchers found that injury rates were highest in the most advanced students who were in their third year of training and significantly dropped between the third year of training and the second and first years of instruction (272). Clearly, young adult ballet dancers training at a higher level need to find effective cross-training methods to work other areas of the body that are not significantly developed in their ballet training as this would create a greater balance in muscular strength and endurance that could help prevent overuse injuries that could impact a dancer's future career.

Researchers have also found that ballet dancers as young as ten years old experience injuries that could impact these dancers' future careers. In a study of dancers from the Royal Swedish Ballet School, researchers followed the injuries of dancers ages 10-21 and found dancers as young as ten were experiencing overuse injuries, primarily in their lower extremities (Leanderson et al. 1533). Furthermore, as young dancers progressed in their training and grew

older, they were more likely to experience injury (overuse or traumatic), although these were primarily overuse injuries of the lower extremities. This growth in the number of overuse injuries revealed that dancers need to cross-train earlier in their dance training in order to prevent an imbalance of muscular strength in the body, which can lead to injuries.

The advantage to cross-training is it allows dancers to improve their fitness levels while not overworking the areas of the body that are most frequently used in their dance technique classes. Ballet dancers have a great risk of overuse injuries primarily because of their use of turnout. Turnout at the hip is one significant cause of overuse injuries in ballet training because this is not a natural position for most bodies, especially when turnout is used frequently throughout classes, rehearsals, and performances. Recent research found that movements as common as grand plié, développé devant, and développé à la seconde, which are performed using outward rotation, cause impingement of the hip joint, which leads to extreme compression of local cartilage and a greater potential for developing early hip osteoarthritis (Charbonnier et al. 557 & 564).

This study was designed to learn what young adult ballet dancers ages 16-25 of varying ability and training know about cross-training in order to see whether knowledge gaps exist in this population. The researcher also wanted to learn which cross-training practices are effective and complement ballet technique. Cross-training is not a quick fix to improve ballet technique or prevent injuries, but it could be a major step in creating a well-rounded, healthy dancer.

CHAPTER II

LITERATURE REVIEW

This study was designed to reveal young adult ballet dancers' knowledge regarding cross-training and its benefits for ballet technique. The subsequent literature review demonstrates pre-existing information and research related to this topic.

What is Cross-Training?

Dance is now commonly seen not only as an art but also as a physical activity with physical demands similar to traditional sports and athletic activities. Dancers experience various physical demands depending on the dance genre or genres that they study and perform; these demands require that dancers take care of themselves outside of the studio in numerous ways. One notable way that dancers can care for their bodies outside of classes and rehearsals is through cross-training.

Cross-training is defined as engaging "... in various sports or exercises especially for well-rounded health and muscular development" ("Cross-train"). In other words, cross-training involves fitness training outside of a person's main sport or physical practice that will fill in the gaps to increase overall physical fitness and strength. For dancers, this means that cross-training includes physical practices outside of dance technique classes, rehearsals, and performances.

For dancers, different cross-training methods are recommended based on the dance styles they study and which they perform in order to find the most complementary method that will not overwork muscle groups used while dancing ("The Dos and Don'ts of Cross-Training"). The cross-training methods most commonly suggested for dancers include Pilates, yoga, swimming,

and strength training. For dancers, the goals of any cross-training method for dancers include increasing strength in underused areas of the body to create an overall well-trained instrument, increasing flexibility, and improving body alignment to refine dance technique.

Why Should Ballet Dancers Cross-Train?

Dance is not only a significant art form, but it also can be as intensive as other sports. Koutemakis and Jamurtas stated that "...[w]hile aesthetic goals are of the utmost importance, dancers remain subject to the same unyielding physical laws as athletes" (658). Koutemakis, Jamurtas, and other researchers have found that dancers can still experience the same challenges and injuries as other athletes. With such great physical demands, most noted in ballet, dancers need to strengthen all areas of the body to prepare for the physical challenges and artistry demanded from them.

Physical Demands of Ballet and Resulting Injuries

Ballet is widely viewed as a challenging dance form that requires rigorous training of the body using movements and positions that are not natural to everyday activities and which often lead to injuries. One significant contributing factor to these physical demands is the artistry required at advanced levels, which often includes higher leg extensions and jumps performed with a light landing. These movements are difficult for those who are learning and performing them for the first time and are motions that place the body in unnatural positions or need to be performed carefully, which is why some aspects of advanced artistry can cause injury.

In regard to the need for balance between the artistic and physical demands of dance performance, Matthew Wyon explained, "... unless the 'physiological dancer' is honed to the same extent as the 'artistic dancer,' the limiting factor within their performance capabilities will

potentially be their physical conditioning" (10). Wyon's view that dancers need to physically train outside of the studio to support the physical demands of dance as well as the artistic demands has been growing in popularity in the dance community as more professionals see and understand this need.

In ballet, the leg is a significant area of dance-related injuries for several reasons. Ballet movements performed in the lower body often utilize external rotation of the leg, primarily at the hip joint, which is a major component of turnout; the ideal turnout involves a 90-degree external rotation in both hips to form a 180-degree angle, which is the aim in ballet (Negus et al. 307). Dancers' attempts to increase their turnout, potentially forcing perfect turnout, can lead to many problems in the legs. Additionally, the dancer's legs are moved through countless, and sometimes extreme, positions that, while aesthetically pleasing, may lead to injury if performed improperly due to a dancer's lack of technique and strength or external factors. Furthermore, dancers who reported any lower-extremity injury were at higher risk of further injury than those who did not report a lower-extremity injury (Wiesler et al. 757).

In one study of twenty-nine pre-professional ballet dancers, the most common non-traumatic injuries reported involved hip impingement and tendonitis, shin splints or fractures, and ankle impingement and tendinitis (Negus et al. 315). In another study, researchers found similar results regarding hip impingement, or painful and abnormal contact between the ball and socket of the hip joint, from typical movements performed in ballet class and performances including grand plié and développé in multiple positions (Charbonnier et al. 565). Both of these studies found serious issues with hip impingement which, if occurring frequently over long periods, can lead to hypercompression of hip cartilage and the development of early hip osteoarthritis (Charbonnier et al. 565). An additional study performed over the course of five

years found that dancers with the Boston Ballet had the highest percentage of reported injuries in the lower extremities with these injuries accounting for more than 65% of those reported (Solomon et al. 166).

Additionally, age appeared not to impact overall injury reports but did impact some specific dance injuries. In study of adolescent dancers and gymnasts ages 12-18, 94% of the ballet dancers had experienced at least one dance-related injury (Krasnow et al. 53). The number of injuries in these young dancers was similar to reports of injuries in adult dancers over 18, but hip injuries were more prevalent in young ballet dancers than adult ballet dancers (Krasnow et al. 54-55).

Injury Prevention

Cross-training can be seen as one tool to help prevent injuries because dancers who solely focus on dance training and performance to ensure their physical fitness do not usually have excellent overall physical fitness and strength. One significant issue is a lack of aerobic fitness, which is measured through the ability of the cardiorespiratory system to supply oxygen to the circulatory and respiratory systems during extended physical activity. Professional dancers and upper-level dance students have demonstrated lower maximal oxygen uptake (VO_2 max) than athletes practicing other sports, and ballet dancers have shown lower VO_2 max measurements than modern dancers (as cited in Koutedakis and Jamurtas 652). This indicates that the dancers in these studies have a lower aerobic fitness level than other athletes, making it more difficult for dancers to complete tasks that are taxing on the cardiorespiratory system.

Another factor that leads to injuries in dancers and other active individuals is unbalanced muscular strength, particularly differences in antagonistic muscles that work against each other in the same limb (as cited in Koutedakis and Jamurtas 655). One antagonistic muscle group

involves the hamstrings in the back of the thigh and the quadriceps in the front. One notable example of injury in this part of the body was found in a study looking at the knee flexors-to-extensors ratio, which compared the strength of the hamstrings compared to the quadriceps; researchers found that the smaller the ratio, which meant the hamstrings were weaker compared to the quadriceps, the worse the degree of injury in physically active individuals. This study demonstrated one clear example of how muscular imbalance can cause serious injury, which can be decreased by cross-training to strengthen weaker muscles.

Overtraining, including increased activity from cross-training, is a concern for dancers, especially at the end of performance seasons, but it is considered a low overtraining-incident activity with a similar energy requirement (measured in kcal/kg/min) as badminton and basketball (Koutemakis and Jamurtas 657). A study performed with the Boston Ballet also supported the idea of increased activity creating a higher chance of injury. Researchers found that the number of dancers' reported injuries was highest in the season's opening months, declined through January, peaked in February and March, and declined again through the end of the season in May (Solomon et al. 166). This study revealed that dancers were more likely to become injured when coming back to a full schedule after having time off due to the end of holiday performances or the end of the performance season. While overtraining is a concern for all dancers, a safe practice could include cross-training during all seasons with less cross-training practice during performance weeks.

Cross-Training Methods and Dance

Since cross-training includes any physical practice that is not an athlete's main activity, dancers have many options for cross-training. However, dancers do need to be knowledgeable

about the methods they choose to practice and each method's impact on dance technique in order to choose the most effective cross-training method for their needs.

Pilates and Its Impact

Pilates is a physical practice created by Joseph Pilates as an art of control which "... develops the body uniformly, corrects wrong postures, restores physical vitality, invigorates the mind, and elevates the spirit" (as cited in Adams et al. 124). Pilates is considered a mind-body practice that builds body awareness, strength, breath control, and flexibility, making it a clear choice for dancers to practice outside of the dance studio to support their dance training. In several studies, researchers have found Pilates to have a positive effect on dancers.

In one study, researchers tested the impact of Pilates training on the posture, strength, and flexibility of young adult dancers. They initially measured anatomical features that would contribute to motor control and poor alignment of the pelvis through multiple tests (Ahearn et al. 193). Following a control period in which participants continued their normal dance training, the study required the participants to take one Pilates mat and one apparatus class per week for fourteen weeks alongside their dance training (Ahearn et al. 201). These researchers found that participants' postural alignment improved when adding Pilates classes into their routine (Ahearn et al. 199). In particular, flexibility of the iliotibial band and hamstring muscles also increased after supplementing dance training with Pilates classes (Ahearn et al. 199-200). In this study, Ahearn and her colleagues found that practicing Pilates could improve posture and flexibility when practiced alongside dance training.

In another study, researchers analyzed the impact of Pilates training on ballet dancers' dynamic posture and alignment. Proper alignment has been found to help prevent injuries in addition to helping strengthen technique and performance abilities based on studies showing a

significant number of back and hip injuries (Quin et al. 179). In a study by McMillan and colleagues, participants took 20-25 hours of ballet per week for at least four years prior to the study; the control group continued their normal dance training while the experimental group took a total of twenty-three one-hour Pilates lessons over the course of fourteen weeks (102). In addition to their lessons that involved using a Reformer, rotational disks, and mat exercises, the experimental group also practiced mat exercises at home daily. Researchers measured the dancers' alignment by measuring the placement of the head, shoulders, and pelvis in a grand plié and found that the experimental group's alignment significantly improved after the fourteen-week period (107). This clear difference of improvements in alignment between the experimental and control group demonstrates how Pilates can be an important tool in improving alignment and, ultimately, dance technique.

Yoga and Its Impact

Yoga is a significant form of cross-training for dancers for multiple reasons. In general, yoga practitioners experience numerous health benefits including increased fitness levels, greater flexibility, improved mood, and preventing or managing chronic illnesses (Hawks et al. 68). Based on these benefits, dancers can experience multiple improvements to their technique and fitness with different forms of yoga.

Different forms of yoga have distinct benefits that demonstrate the efficacy of yoga as a cross-training method. For example, Hatha yoga, which includes all forms of yoga that incorporate physical postures or poses, is the primary yoga form practiced in the United States (Hawks et al. 68). As a yoga style that aims to move through poses slowly and focus on breath, Hatha yoga is a practice that helps dancers not only stretch and work on flexibility but also could aid in relaxation and alleviating stress. Vinyasa yoga is a different yoga style that focuses on

moving through different postures at a faster pace than Hatha yoga, including a warm-up series known as sun salutations which allow yoga participants to begin feeling the flow of traditional Vinyasa practice (Innes). Furthermore, dancers also report that practicing vinyasa yoga helps them "…find a feeling of fullness to [their] movement…." that they could not find in their dance technique classes and were able to transfer into their technique classes once familiar with this sensation (Stahl). Both Hatha and Vinyasa yoga act as cross-training forms which help dancers sustain their technique and work on fitness out of the studio.

In various yoga styles, there are exercises known as pranayama, which focus on deep breathing (Innes). These exercises not only help in relaxing those who practice them, but pranayama can also help dancers learn how to control their breath and support all their physical practices, including dance. Based on the health and physical benefits that have been reported, it is clear that yoga is a beneficial form of cross-training for dancers.

Furthermore, yoga is a cross-training method that also prevents injuries in many populations, including dancers. A researcher found that employees working in a traditional office setting were prone to various injuries including back pain, shoulder and neck tension, and carpal tunnel syndrome (Gura 3). In multiple studies Gura found, employees at workplaces that implement yoga classes (generally Hatha yoga) either during lunch breaks or immediately after work take less days off due to illness or chronic physical issues and experience less physical tension and stress, including decreased musculo-skeletal pain when measuring their pain levels before and after a yoga class at work (5). Based on these results, it is probable that dancers enjoy these positive impacts as well considering that many dancers experience similar injuries and pain from a different source. Additionally, Thomas and Tarr surveyed over two hundred dance students, professionals, and former dancers (including 87% having ballet training and 52%

training in ballet when they took the survey) to gauge their understanding of pain and injury by asking them about dance techniques they practice, recent pain sites, previous or current injury, and other somatic techniques they may practice (51-53). Through this survey, the researchers found that 71% of respondents had regularly practiced yoga at some point when dancing, with those in their twenties and early thirties most likely to be in this group (54). Over 90% of respondents reported being injured at some point, making it a logical conclusion that many of those who reported experiencing injury also identify as yoga practitioners (54). Since these studies both found positive impacts of yoga on participants, it can be assumed that yoga can benefit dancers in their technique and as an injury prevention tool.

Swimming and Its Impact

Swimming is an important form of cross-training for ballet dancers due to its low-impact and aerobic nature. Swimming is recommended as a cross-training method because one can move through water without the harsh effects of gravity ("The Dos and Don'ts of Cross-Training"). Additionally, swimming works various areas of the whole body depending on which stroke one swims and can allow for intense cardio work like running or treading in the deep end of a pool without major stress on the joints. Allen reported that research into fitness levels required for dancers need to be high enough to sustain bursts of high-intensity work sandwiched between periods of long, low-intensity work (56). This is seen when dancers must participate in performances or long rehearsals that last for hours yet only perform at their highest intensity for minutes at a time. As related to swimming, Koutedakis and Jamurtas reported that swimming requires a greater maximal oxygen intake (VO_2max) than average dance activity (652). Since activity that necessitates a greater VO_2max level involves greater physical intensity, swimming acts as a useful cross-training form for dancers who need to increase their aerobic fitness levels

to have an easier experience managing their breath during physical intense dance sprints. Furthermore, when training with progressive overload increasing duration with each session, swimming promotes growth in muscular endurance, which is the ability of muscle to perform work (as cited in McLaine 17). Increases in muscular endurance are a positive aspect to swimming as a form of cross-training because dancers with greater muscular endurance should take class or perform with less strain or chance of injury for greater periods of time. Based on the benefits for breathing and muscular endurance, swimming is a positive cross-training method for dancers.

Cardiovascular and Strength Training and Their Impact

Cardiovascular and strength training are also significant methods of cross-training for dancers. Cardiovascular training helps with aerobic endurance, allowing dancers to breathe more easily during and after performing fast-paced movement. Strength training can improve muscular strength, provide more balanced strength between antagonistic muscles, and help dancers perform lifts more easily.

In a study of college-aged modern dance students, the participants took part in a three-month cardiovascular and strength training program to see its potential impacts on specific dance performance and fitness-related criteria (Koutedakis et al. 808). The program allowed for two to three sessions of swimming, jogging, or cycling per week for cardiovascular training and up to three sessions of strength training with free weights per week (810). Participants were found to have increased VO_2 max (making it easier to breathe through difficult or fast movements), flexibility, and leg strength when compared to the control group. Although this was a study of modern dance students, ballet dancers would likely experience the same gains since they are often measured as being less aerobically fit than modern dancers.

In another study, researchers aimed to see if there was an impact of plyometric training and traditional weight training on collegiate female dancers' lower body strength, power, and aesthetic jumping ability (Brown et al. 38). These dancers took intermediate or advanced level classes in ballet or modern and were separated into a control group who continued their normal dance training, one experimental group who added plyometric training twice per week into their normal dance training, and another experimental group who added traditional weight training focused on the lower body twice per week into their normal dance training. Once the training programs were implemented for six weeks, both experimental groups experienced increases in strength- and power-related variables that impact jumping ability (44). The plyometric training group improved leg press strength and standing vertical jump height, and the traditional weight training group improved leg press and leg curl strength as well as mean anaerobic power (44). The control group experienced no notable changes in strength, power, or jumping ability, demonstrating that solely taking dance classes is not enough to improve these elements of dance for intermediate and advanced dancers.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this study was identifying the cross-training methods that young adult ballet dancers practice and determining which methods are effective for these dancers. This methodology chapter will contain information about the research instruments used to address the researcher's essential questions, the participants who contributed to this research, the procedures involved for collecting this data, and the process for analyzing these data.

Research Instruments

For this project, the researcher chose to use two instruments that would address the essential questions. The online survey and journal reflection were chosen as ways to easily disseminate the study and involve participants as this project took place during the COVID-19 pandemic. The researcher created the instruments with the following essential questions in mind:

Q1 How do young adult ballet dancers practice cross-training?

Q2 Which of these cross-training modalities are considered most effective?

Before sending the survey to participants, the researcher sent out a call for participants by having those interested fill out an initial contact form to determine if they were eligible and to confidentially collect their email addresses that would be used to communicate information relating to this project.

Survey

The survey used in this study was created using Qualtrics and was designed to collect various data from participants that would give their demographic information as well as information about their dance training and cross-training practices. This survey was designed with ten questions, and the first three questions allowed participants to share their age, location, and gender identity through a multiple-choice format. It was a requirement that participants were between the ages of 16-25 years old, live in the United States, and identify as ballet dancers to be eligible for this study.

The rest of this survey focused on dance training, asking about general and ballet-focused information, and personal cross-training experiences. Question four allowed participants, through a multiple-selection option, to share which other styles of dance they train in or perform aside from ballet. Questions five, six, and seven focused on ballet-specific information in a multiple-choice form by asking the participants about their primary role as student, teacher, or performer, if they have studied ballet at the collegiate level, and if they have studied ballet professionally, respectively. The final three questions focused on cross-training through multiple-choice questions and an open-ended question. Question eight asked participants if they cross-train, and question nine asked participants how they cross-train with the option to write in a description if their method was not already listed. Question ten was the only open-ended question for ease in completing the survey and asked participants to share if they believe that cross-training aids their dance technique and why they believe this.

Journal Reflection

The journal reflection was created as an optional second research instrument. It consisted of four open-ended questions that allowed participants to share their cross-training practices on a

specific day of their choice and how that specific method could impact their technique. This reflection was sent to participants upon completion of the survey and was administered through a Google form for ease and timeliness of completion.

Participants

Participants were found by posting a call for participants to National Dance Education Organization's (NDEO) online forums as well as in private Facebook groups with members who were likely participants including Science for Dance Educators and Kathryn Morgan's Ballet Community.

The participants in this study were limited to people who identify as practicing ballet in some context and are between 16-25 years old. They could identify primarily as a student, teacher, or performer. The participants' ages are displayed in Table 1 below.

Table 1

Participant Age

Age	Number of participants	Percentage of participants
16-19	2	50
20-22	2	50
23-25	0	0
Total	4	100

As shown in Table 1, two of the participants (50%) belonged to the 16-19 year old age range, and the other two participants (50%) belonged to the 20-22 year old age range. These data, as well as the data in Tables 2 and 3, were collected in the Qualtrics survey.

Table 2

Participant Location

Location by region	Number of participants	Percentage of participants
Northeast (CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VT)	1	25
Southeast (AR, FL, KY, NC, TN, VA, WV)	1	25
South (AL, GA, LA, MS, SC)	0	0
Midwest (IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI)	0	0
Southwest (AZ, NM, OK, TX)	0	0
West (AK, CA, CO, HI, NV, UT)	1	25
Northwest (ID, MT, OR, WA, WY)	1	25
Total	4	100

The information in Table 2 revealed that each participant lives in a different region of the United States. The participants live across the Northeast, Southeast, West, and Northwest regions.

Table 3

Participant Gender

Gender identity	Number of participants	Percentage of participants
Female	4	100
Male	0	0
Non-binary	0	0
Transgender	0	0
Total	4	100

Based on the data in Table 3, all participants in this study identified as female. No ballet dancers identifying as male, non-binary, or transgender volunteered to participate in the study.

Data Collection Procedures

Data collection began when participants initially completed a contact form through Google Forms to confidentially share their email address and age to connect with the researcher and determine eligibility for this project. After the researcher deemed potential participants eligible, these subjects received a consent form to complete alone or with the consent of a parent if under the age of 18. Once consent forms were completed, participants completed the aforementioned ten-question Qualtrics survey sent via email to demonstrate their knowledge of cross-training in relation to their dance training. Some participants completed the optional four-question Google Forms journal reflection sent via email to share specific data about one day of cross-training.

Data Analysis Procedures

The researcher analyzed data from this study using qualitative and quantitative methods. The participants answered ten questions in the survey and four questions in the journal reflection,

if they chose to complete the reflection. Quantitative data from the survey was analyzed in Qualtrics and exported into a Google Sheets document before the researcher organized this data into figures and tables displayed above and in later chapters. Open-ended questions in both the survey and journal reflection contributed data that was analyzed qualitatively.

The researcher initially analyzed data from the Qualtrics survey by studying the results in the Google Sheets document and calculated the percentages of each response for the multiple-choice and multiple-selection questions. She then looked at the percentages of each response to see information about the participants and their dance training and cross-training practices. The researcher then read through the responses to each open-ended question and coded them. All participants responded to survey question ten regarding their belief in the helpfulness of cross-training on their dance technique, so these responses were coded as positive if the participant saw a positive impact on their technique or negative if the participant saw no benefit of cross-training. Only two of the four participants completed the optional journal reflection, leaving less data to analyze. The researcher read through these responses and coded overall responses as positive or negative like she did with question ten of the Qualtrics survey. The researcher also analyzed the participants' reflections qualitatively for themes that emerged, including reasons for finding one method of cross-training effective.

Summary

In this chapter, the researcher discussed the instruments used to perform this study, the participants involved, and the collection and analysis of data. The next chapter will explain the findings of this research project.

CHAPTER IV

DISCUSSION

Introduction

For this study, the research sought to discover what knowledge young adult ballet dancers had about cross-training, these dancers' cross-training practices at the time they participated in the study, and what these dancers considered effective in complementing their ballet training. As mentioned in previous chapters, this research was performed to address the following essential questions:

Q1 How do young adult ballet dancers practice cross-training?

Q2 Which of these cross-training modalities are considered most effective?

This chapter addresses the responses to the survey and journal reflection, from which the researcher extrapolated qualitative and quantitative data. The survey and journal reflection questions sent to participants can be found in Appendix B.

Participant Cross-Training Methods

The researcher sought to answer her first essential question regarding cross-training practices by asking if participants cross-train and by which methods they cross-train. Three out of four participants answered that they do practice at least one method of cross-training. The following question regarding which methods were practiced allowed multiple selections by participants and included yoga, Pilates, swimming, Gyrokinesis, weight training, and other methods, which allowed participants to name any other cross-training method they practice, as displayed in Figure 1:

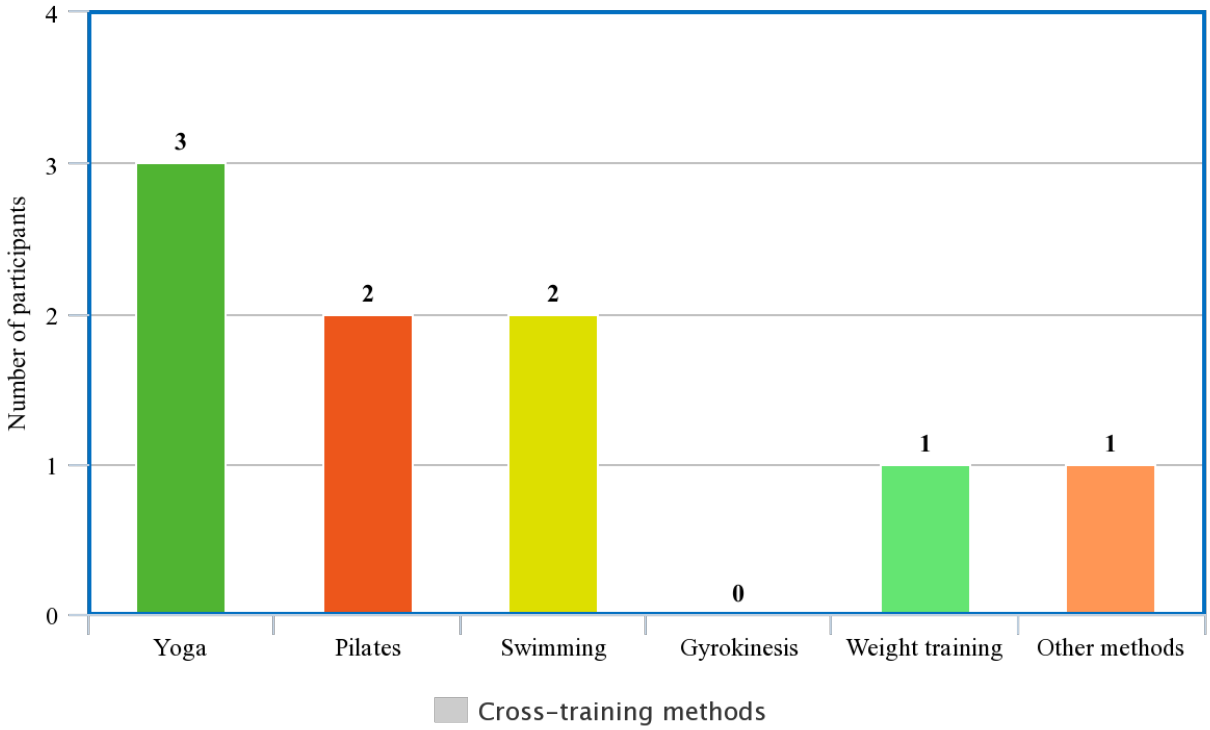

Figure 1: Cross-training methods practiced by participants

Figure 1 displays the different cross-training methods that participants reported practicing. The total number of training methods reported is greater than the number of participants because participants were allowed to report more than one cross-training method. If participants chose the "other methods" option, then they had to specify what those methods were. Only one participant chose other methods and reported rowing as one of her cross-training methods. The participant who reported not cross-training answered "other methods" and specified "N/A" in the text box provided as this was a required question; her response was not factored into this figure.

When looking at the responses to this survey question, one can see that most participants practiced multiple forms of cross-training. The three participants who cross-train all practiced yoga with one participant commenting in her journal reflection, "Yoga helps me to release all the tension while strengthening my arms, core, and those in between spots…." Two of the

participants cross-trained by participating in Pilates with one participant stating, “When I take [P]ilates, I can feel my weaker areas being targeted and strengthening, those small muscles that get missed in ballet….” Two of the participants reported swimming as a form of cross-training, and one participant wrote, “From swimming, I have gained more arm and back muscle, helping me with balancing and turning....” In sum, these participants found value and positive effects in multiple forms of cross-training.

Participant Beliefs about Cross-Training Efficacy

The majority of participants reported feeling that cross-training helped their ballet technique and overall fitness. One participant stated,

> I truly believe that cross-training practices improve my dance technique. First things first, I control my body much more than ever before. Also, I exercise and strengthen muscles that improve my balance and my coordination in a way. One other thing is that I observed that I have less injuries since I started cross-training. Lastly, I can manage somehow to indicate [the] ‘root’ of the movement, for example which muscles to activate and how to activate them for a better turnout. I find myself indicating my muscles, by knowing where they are and why to use them.

Another participant described specific benefits she has seen based on specific cross-training methods such as gains in muscle strength from swimming and improved balance and flexibility from yoga. One participant commented, “Cross training not only helps me stay in shape, but it works other muscles I don't use in ballet. I also teach dance and encourage all my students to cross train by taking different styles and doing different workouts outside of class. It's so good for our bodies to do different things.”

Only one participant had truly negative beliefs about the efficacy of cross-training. This participant wrote, “For me, I avoid cross training as I am already ‘too strong’ as a ballet dancer and body. Cross training would only exemplify my already too bulky musculature.” This dancer’s opinions about cross-training causing a bulky look may be closely tied into her dance background. She reported training in ballet and modern as seen in Figure 2 below along with the dance training backgrounds of the other three participants:

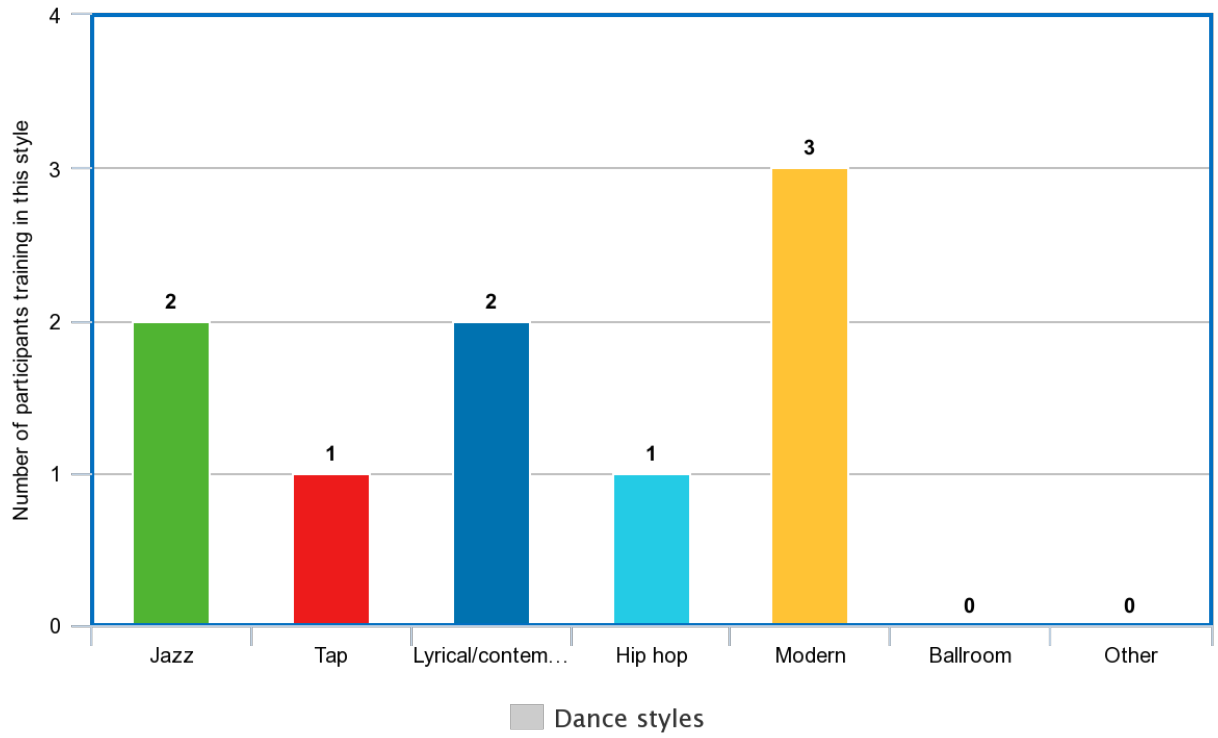

Figure 2: Dance styles that participants study and perform

Figure 2 reveals the dance training background of all participants outside of ballet. Similar to Figure 1, this chart also shows a higher total number of dance styles that participants trained in because participants were allowed to report more than one dance style. The participant who reported that she did not cross-train was the only participant who trained in only one style outside of ballet; all other participants reported training in two or three additional dance styles. This information about the participants’ training in other dance styles reveals interesting data that

the participants who train in more than two dance styles (including ballet) all cross-train in various methods.

Furthermore, the responses to the survey questions about dance training revealed information that supports some of the previous research about dancers and cross-training. All participants reported primarily practicing ballet as students rather than primarily as a teacher or performer, and two of the four participants responded ~~t~~raining in ballet at the collegiate level. Additionally, only one participant identified as having trained with a professional ballet company as a company member. The one participant who responded that she does not cross-train was one of the two participants who has ballet training at the collegiate level and was the only participant to train with a professional ballet company. One can infer that since this participant has studied ballet in more formal and professional spaces of collegiate and company-based dance, she has likely been exposed to more pressure to have the traditional ballerina body that is thin and waif-like.

Summary

The responses to the survey and journal reflections revealed information about dancers' cross-training practices and beliefs in efficacy of cross-training. Three out of four participants reported actively cross-training and explained how they all practice multiple methods to produce different effects on their ballet training. There was one participant who reported abstaining from cross-training and chose to do so to prevent visibly bulky muscles. Overall, these results were anticipated and revealed that while traditional views of what a dancer's physique should be are still being taught, more dancers are finding that cross-training has significant benefits.

CHAPTER V

CONCLUSION

Research Questions and Goals

As explained in previous chapters, this research was intended to show what young adult ballet dancers knew about cross-training, what these dancers thought about cross-training overall, and the specific methods they practice. To facilitate this study, the researcher used the following essential questions to guide the research:

Q1 How do young adult ballet dancers practice cross-training?

Q2 Which of these cross-training modalities are considered most effective?

The researcher aimed to find answers to these questions through multiple research instruments provided to a diverse pool of participants.

Review of the Methodology

As described in the third chapter of this thesis, the researcher aimed to reach a wide pool of participants by conducting the research through online methods. To answer the previously discussed essential questions, the research instruments used for this study included a survey and an optional journal reflection. The survey consisted of ten questions in varied formats in which the participants were asked to share information about their ballet training and cross-training practices as well as basic demographic data. The optional journal reflection allowed participants to share what one day of cross-training was like for them and how they felt it would impact their dancing. Participants included four young adult female ballet dancers from various regions of the United States. Finally, the researcher extracted quantitative data from the survey through

responses to the multiple-choice and multiple-selection questions, and qualitative data were found primarily in the responses to open-ended questions in the survey and journal reflection.

Outcome and Limitations of this Project

The outcome of this research revealed that the majority of the dancers surveyed do practice some form of cross-training and find these methods to positively impact their dancing in different ways. Three out of four participants reported regularly cross-training, primarily with methods the researcher anticipated, including yoga (all three participants), Pilates (two of these three participants), and swimming (two of these three participants). This outcome aligned with the responses that the researcher had anticipated receiving, but there were several limitations that impacted the outcome of this project.

The researcher anticipated this outcome based on research she found regarding dancers and cross-training, with most studies focusing on one cross-training method. Both studies from Ahearn et al. and Quin et al. found that Pilates made a positive impact on their participants' posture and alignment, which participants in this study also noted as they found that they had better control over smaller muscles and greater balance when practicing Pilates that they could take into their studio classes. Additionally, yoga was found in studies by Gura and Thomas & Tarr to help prevent injuries and release stress in the general public and dancers, respectively, which multiple participants in this study also reported.

One significant limitation of this research was the size of the group of participants. While the researcher recruited participants from multiple online sources, only twenty-one dancers completed the initial contact form, with one being ineligible due to the age restriction. Additionally, only four interested dancers completed the consent form and the survey. Furthermore, only two of the four participants completed the journal reflection after taking the

survey. Finally, all four participants identified as female, leading to a lack of data from a variety of gender identities. This small number of respondents was likely impacted by the COVID-19 pandemic as people across the world were less able to practice their regular fitness or cross-training routines. This small group of participants resulted in a lack of adequate data to better generalize the results to a wider population.

Another limitation of this project was the research instruments that were used. Although carefully constructed to answer the essential questions of this study, the survey and journal reflection were not tested for reliability or validity. The questions appeared to be reliable as there were consistent answers overall, but validity is a concern as the questions could have been worded differently to elicit better responses.

Recommendations for Further Research

The research conducted in this study could be expanded upon and verified through further study. One potential change that could help further this research would be directly approaching potential participants through a studio or company setting depending on the desired population; this could lead to more responses and a more diverse group of respondents. Researchers could look at dancers training only or primarily in one dance genre or those who train in multiple genres equally. Furthermore, it would be valuable to see if cross-training impacts dancers in different ways at different ages than those who participated in this study. Finally, researchers could look more closely at dancers' knowledge about cross-training by honing in on the practice overall rather than looking at specific, pre-determined cross-training methods.

Summary

In summary, the researcher did find that young adult ballet dancers know about multiple forms of cross-training and find value in these practices. These dancers practice multiple cross-training methods as they find that each method has its own unique benefits. Some dancers choose to forgo cross-training as they feel that it may negatively impact their physical appearance. Overall, these dancers are knowledgeable about different forms of cross-training, but some may need guidance or more information to learn the positive benefits of different methods.

WORKS CITED

Adams, Marianne, et al. “Pilates and Mindfulness: A Qualitative Study.” *Journal of Dance Education*, vol. 12, no. 4, Nov. 2012, pp. 123–130., doi:10.1080/15290824.2012.636222.

Ahearn, Elizabeth Lowe, et al. “Some Effects of Supplemental Pilates Training on the Posture, Strength, and Flexibility of Dancers 17 to 22 Years of Age.” *Journal of Dance Medicine & Science*, vol. 22, no. 4, Dec. 2018, pp. 192–202., doi:https://doi.org/10.12678/1089-313X.22.4.192.

Allen, Nick. *Injury Prevention and Management for Dancers*. The Crowood Press, 2019.

Bronner, Shaw, et al. “Differences in Preseason Aerobic Fitness Screening in Professional and Pre-Professional Modern Dancers.” *Journal of Dance Medicine & Science*, vol. 20, no. 1, Mar. 2016, pp. 11–22., doi:https://doi.org/10.12678/1089-313X.20.1.11.

Brown, Andrea C., et al. “Effects of Plyometric Training Versus Traditional Weight Training on Strength, Power, and Aesthetic Jumping Ability in Female Collegiate Dancers.” *Journal of Dance Medicine & Science*, vol. 11, no. 2, June 2007, pp. 38–44.

Cardinal, Marita K., et al. “Inclusion of Dancer Wellness Education Programs in U.S. Colleges and Universities: A 20-Year Update.” *Journal of Dance Medicine & Science*, vol. 24, no. 2, June 2020, pp. 73–87., doi:10.12678/1089-313x.24.2.73.

———. “Wellness Education for Dancers.” *Journal of Physical Education, Recreation & Dance*, vol. 80, no. 5, 2009, pp. 29–39., doi:10.1080/07303084.2009.10598323.

Charbonnier, Caecilia, et al. “Assessment of Congruence and Impingement of the Hip Joint in Professional Ballet Dancers.” *The American Journal of Sports Medicine*, vol. 39, no. 3, 15 Dec. 2010, pp. 557–566., doi:10.1177/0363546510386002.

“Cross-train.” *Merriam-Webster.com Dictionary*, Merriam-Webster, https://www.merriam-webster.com/dictionary/cross-train. Accessed 29 Nov. 2020.

Ekegren, Christina L., et al. “Injuries in Pre-Professional Ballet Dancers: Incidence, Characteristics and Consequences.” *Journal of Science and Medicine in Sport*, vol. 17, no. 3, May 2014, pp. 271–275., doi:10.1016/j.jsams.2013.07.013.

Gura, Shira T. “Yoga for Stress Reduction and Injury Prevention at Work.” *Work (Reading, Mass.)*, vol. 19, no. 1, 2002, pp. 3-7.

Hawks, Steven R., et al. “Harnessing the Health Promoting Benefits of Yoga: A Promising Opportunity for Health Educators.” *American Journal of Health Education*, vol. 52, no. 2, 9 Feb. 2021, pp. 68–71., doi:10.1080/19325037.2021.1877224.

Innes, Jessica. “Yoga for Dancers.” *Dance Informa Magazine*, Dance Informa, 5 Sept. 2011, www.danceinforma.com/2011/09/02/yoga-for-dancers/.

Koutedakis, Yiannis, and Athanasios Jamurtas. “The Dancer as a Performing Athlete.” *Sports Medicine*, vol. 34, no. 10, Aug. 2004, pp. 651–661., doi:10.2165/00007256-200434100-00003.

Koutedakis, Yiannis, et al. “The Effects Of Three Months Of Aerobic And Strength Training On Selected Performance-And Fitness-Related Parameters In Modern Dance Students.” *Journal of Strength and Conditioning Research*, vol. 21, no. 3, Aug. 2007, pp. 808–812., doi:10.1519/00124278-200708000-00026.

Krasnow, Donna, et al. “Injury, Stress, and Perfectionism in Young Dancers and Gymnasts.” *Journal of Dance Medicine & Science*, vol. 3, no. 2, June 1999, pp. 51–58.

Leanderson, Charlotte, et al. “Musculoskeletal Injuries in Young Ballet Dancers.” *Knee Surgery, Sports Traumatology, Arthroscopy*, vol. 19, 22 Feb. 2011, pp. 1531–1535., doi:10.1007/s00167-011-1445-9.

McLaine, Gretchen Schroeder. “The Application of Cross and Supplemental Training in Dance.” *The American University*, 1999.

McMillan, Ann, et al. “The Effect of Pilates-Based Training on Dancers’ Dynamic Posture.” *Journal of Dance Medicine & Science*, vol. 2, no. 3, Sept. 1998, pp. 101–107.

Negus, Vicki, et al. “Associations Between Turnout and Lower Extremity Injuries in Classical Ballet Dancers.” *Journal of Orthopaedic and Sports Physical Therapy*, vol. 35, no. 5, May 2005, pp. 307–318., doi:10.2519/jospt.2005.1600.

“Philosophy Underlying the Standards for Dance in Early Childhood.” *NDEO*, The National Dance Education Organization, www.ndeo.org/content.aspx?page_id=22&club_id=893257&module_id=55419.

Quin, Edel, et al. *Safe Dance Practice*. Human Kinetics, 2015.

Rivers, Ashley. “Getting Dance Down to a Science.” *Dance Teacher*, Oct. 2015, pp. 102.

Solomon, Ruth, et al. “The ‘Cost’ of Injuries in a Professional Ballet Company: A Five-Year Study.” *Medical Problems of Performing Artists*, vol. 14, no. 4, Dec. 1999, pp. 164–170.

Stahl, Jennifer. “Yoga for Dancers.” *Pointe Magazine*, Dance Media, 28 Nov. 2001, pointemagazine.com/yoga-for-dancers/.

“The Dos and Don'ts of Cross-Training.” *Dance Spirit*, 23 Mar. 2017, www.dancespirit.com/the-dos-and-donts-of-cross-training-2326090203.html.

Thomas, Helen, and Jennifer Tarr. “Dancers' Perceptions of Pain and Injury: Positive and Negative Effects.” *Journal of Dance Medicine & Science*, vol. 13, no. 2, 2009, pp. 51-59.

Twitchett, Emily A, et al. “Physiological Fitness and Professional Classical Ballet Performance: A Brief Review.” *Journal of Strength and Conditioning Research*, vol. 23, no. 9, Dec. 2009, pp. 2732–2740., doi:10.1519/jsc.0b013e3181bc1749.

Wiesler, Ethan R., et al. “Ankle Flexibility and Injury Patterns in Dancers.” *The American Journal of Sports Medicine*, vol. 24, no. 6, Nov. 1996, pp. 754–757., doi:10.1177/036354659602400609.

Wyon, Matthew. “Cardiorespiratory Training for Dancers.” *Journal of Dance Medicine & Science*, vol. 9, no. 1, Mar. 2005, pp. 7–12.

APPENDIX A

INSTITUTIONAL REVIEW BOARD FORMS

UNIVERSITY OF
NORTHERN COLORADO

Institutional Review Board

Date:	02/05/2021
Principal Investigator:	Brooke Yuspeh
Committee Action:	**Expedited Approval - New Protocol**
Action Date:	02/05/2021
Protocol Number:	2010011813
Protocol Title:	Balancing Increased Physical Demands: An Analysis of the Cross-Training Practices of Young Adult Ballet Dancers
Expiration Date:	

The University of Northern Colorado Institutional Review Board has granted approval for the above referenced protocol. Your protocol was approved under expedited category (7) as outlined below:

Category 7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.)

All research must be conducted in accordance with the procedures outlined in your approved protocol.

If continuing review is required for your research, your project is approved until the expiration date listed above. The investigator will need to submit a request for Continuing Review at least 30 days prior to the expiration date. If the study's approval expires, investigators must stop all research activities immediately (including data analysis) and contact the Office of Research and Sponsored Programs for guidance.

If your study has not been assigned an expiration date, continuing review is not required for your research.

For the duration of the research, the investigator(s) must:

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NORTHERN COLORADO

Institutional Review Board

- Submit any change in the research design, investigators, and any new or revised study documents (including consent forms, questionnaires, advertisements, etc.) to the UNC IRB and receive approval before implementing the changes.
- Use only a copy of the UNC IRB approved consent and/or assent forms. The investigator bears the responsibility for obtaining informed consent from all subjects prior to the start of the study procedures.
- Inform the UNC IRB immediately of an Unanticipated Problems involving risks to subjects or others and serious and unexpected adverse events.
- Report all Non-Compliance issues or complaints regarding the project promptly to the UNC IRB.

As principal investigator of this research project, you are responsible to:

- Conduct the research in a manner consistent with the requirements of the IRB and federal regulations 45 CFR 46.
- Obtain informed consent and research privacy authorizations using the currently approved forms and retain all original, signed forms, if applicable.
- Request approval from the IRB prior to implementing any/all modifications.
- Promptly report to the IRB any unanticipated problems involving risks to subjects or others and serious and unexpected adverse events.
- Maintain accurate and complete study records.
- Report all Non-Compliance issues or complaints regarding the project promptly to the IRB.

Please note that all research records must be retained for a minimum of three (3) years after the conclusion of the project. Once your project is complete, please submit the Closing Report Form.

If you have any questions, please contact Nicole Morse, Research Compliance Manager, at 970-351-1910 or nicole.morse@unco.edu. Please include your Protocol Number in all future correspondence. Best of luck with your research!

Sincerely,

Michael D. Aldridge

Michael Aldridge
IRB Co-Chair, University of Northern Colorado: FWA00000784

Carter Hall 2008 | Campus Box 143 | Greeley, CO 80639 | Office 970-351-1910

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Institutional Review Board

Silvia Correa-Torres
IRB Co-Chair, University of Northern Colorado: FWA00000784

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Institutional Review Board

Date:	05/18/2021
Principal Investigator:	Brooke Yuspeh
Committee Action:	**APPROVED – Amendment**
Action Date:	05/18/2021
Protocol Number:	2010011813A001
Protocol Title:	Balancing Increased Physical Demands: An Analysis of the Cross-Training Practices of Young Adult Ballet Dancers
Expiration Date:	

The University of Northern Colorado Institutional Review Board (IRB) for the protection of human subjects has reviewed and approved the following amendments to your protocol:

To get more participants in this study, I would like to add two more places of recruitment directly reaching ballet dancers - one Facebook group entitled The Whole Dancer - Ballet Dancer Health and another entitled Kathryn Morgan's Ballet Community.

- Subjects
- Protocol Permissions
- Questionnaire

As a reminder, all research must be conducted in accordance with the procedures outlined in your approved protocol.

If you have any questions, please contact Nicole Morse, Research Compliance Manager, at 970-351-1910 or nicole.morse@unco.edu.

Sincerely,

Michael Aldridge
IRB Co-Chair, University of Northern Colorado: FWA00000784

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Institutional Review Board

Silvia Correa-Torres
IRB Co-Chair, University of Northern Colorado: FWA00000784

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CONSENT FORM FOR PARTICIPANTS IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO
YOUNG ADULT, FOR PARTICIPANTS OVER 18

Participant Code ___

Project Title: Balancing Increased Physical Demands: An Analysis of Cross-Training Practices in Young Adult Ballet Dancers
Researcher: Brooke Yuspeh, M.A. Candidate, Dance Education, School of Theatre Arts and Dance
Research Advisor: Sandra Minton, sandra.minton@unco.edu
Phone: 504-382-0529 E-mail: yusp6127@bears.unco.edu

Purpose and description: The purpose of this study is to discover the current cross-training practices of ballet dancers ages 16-25 years old. Cross-training, or athletic/physical training outside of one's main physical practice such as dance, has become an important topic in dance because more dancers have recognized the value of physical training outside of the studio. However, most of the information available about cross-training for dancers cannot be found in academic research, with the majority of information coming from magazines or independent websites.

The first part of this study asks you to complete an online survey that will ask about your demographic information as well as information about dance training and cross-training that you practice in addition to your dance classes. This survey should take no more than 5-10 minutes to complete.

The second part of this study is an optional journal reflection in which you will answer questions relating to your cross-training activity for a specific date and how these activities impact your day and your overall dance training. The journal reflections will be completed on a volunteer basis only. This journal reflection will aid in giving more clear and specific data about cross- training in this population and should take no more than 5-10 minutes to complete.

There are no foreseeable risks. The risks inherent in this study are no greater than those normally encountered during your daily use of technology nor greater than those normally encountered in your everyday physical activities.

Once completed, the signed consent forms will be stored in a locked cabinet in the researcher's home before being brought to Crabbe Hall, room 308, the office of Christy O'Connell-Black, Dance Education MA co-coordinator in summer 2021 where they will be held in a locked file cabinet. Data collected and analyzed for this study will be stored on the lead researcher's password protected computer, Google Drive, and locked external hard drive. Only the researcher will have access to the raw data from this study. All data and consent forms will be destroyed after 3 years.

All information gathered in the survey and journal reflection are private, and there will be no possibility of identifying you as all information will have your name replaced by letters of the

alphabet. Thus, the names of participants will not be included in any report or presentation based on this project.

Participation is voluntary. You may decide not to participate in this study, and if you begin participation, you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions, please sign below if you would like to participate in this research. A copy of this form will be given to you to retain for future reference. If you have any concerns about your selection or treatment as a research participant, please contact Nicole Morse, Office of Research, Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-1910.

Subject's Full Name (please print)	Participant's Birth Date (month/day/year)
_____	_____
Subject's Signature	Date (month/day/year)
_____	_____
Researcher's Signature	Date (month/day/year)
_____	_____
Printed Name of Researcher Obtaining Consent	Date (month/day/year)
_____	_____

UNIVERSITY OF NORTHERN COLORADO

CONSENT FORM FOR PARTICIPANTS IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO
PARENT CONSENT FOR PARTICIPANTS AGES 16-18

Participant Code ___

Project Title: Balancing Increased Physical Demands: An Analysis of Cross-Training Practices in Young Adult Ballet Dancers
Researcher: Brooke Yuspeh, M.A. Candidate, Dance Education, School of Theatre Arts and Dance
Research Advisor: Sandra Minton, sandra.minton@unco.edu
Phone: 504-382-0529 E-mail: yusp6127@bears.unco.edu

In this study, I aim to better understand the cross-training practices of ballet dancers 16-25 years old. Cross-training, or athletic/physical training outside of one's main physical practice such as dance, has become an important topic in dance because more dancers have recognized the value of physical training outside of the studio. However, most of the information available about cross-training for dancers cannot be found in academic research, with the majority of information coming from magazines or independent websites.

If you grant permission and your child also agrees to participate, he or she will complete an online survey answering questions about his or her demographic information, dance training, and cross-training practices that will take about 5-10 minutes to complete.

If your child chooses to participate, the next part of this project is an optional journal reflection in which he or she will answer questions relating to his or her cross-training activity for a specific date and how these activities impact his or her day and overall dance training. The journal reflections will be completed on a volunteer basis only. This journal reflection will aid in giving more clear and specific data about cross-training in the target population and should take no more than 5-10 minutes to complete.

There are no foreseeable risks. The risks inherent in this study are no greater than those normally encountered during daily use of technology, nor greater than those normally encountered in your child's everyday physical activities.

All information gathered in the survey and journal reflection are private, and there will be no possibility of identifying your child as all information will have your child's name replaced by letters of the alphabet. Thus, the names of participants will not be included in any report or presentation based on this project. Only the lead researcher will know the name connected with a subject letter.

Once completed, these signed consent forms will be stored in a locked cabinet in the researcher's home before being brought to Crabbe Hall, room 308, the office of Christy O'Connell-Black, Dance Education MA co-coordinator in summer 2021 where they will be held in a locked file cabinet. Data collected and analyzed for this study will be stored on the lead researcher's password protected computer, Google Drive, and locked external hard drive. Only the researcher

will have access to the raw data from this study. All data and consent forms will be destroyed after 3 years.

Participation is voluntary. You may decide not to participate in this study, and if you begin participation, you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions, please sign below if you would like to participate in this research. A copy of this form will be given to you to retain for future reference. If you have any concerns about your selection or treatment as a research participant, please contact Nicole Morse, Office of Research, Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-1910.

Child's Full Name (please print)	Child's Birth Date (month/day/year)
_____	_____
Parent/Guardian's Signature	Date
_____	_____
Researcher's Signature	Date
_____	_____

APPENDIX B

RESEARCH INSTRUMENTS

UNIVERSITY OF
NORTHERN COLORADO

How old are you?

16-19

20-22

23-25

In which area of the US do you live currently?

Northeast (CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VT)

Southeast (AR, FL, KY, NC, TN, VA, WV)

South (AL, GA, LA, MS, SC)

Midwest (IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI)

Southwest (AZ, NM, OK, TX)

West (AK, CA, CO, HI, NV, UT)

Northwest (ID, MT, OR, WA, WY)

What gender do you identify with?

- Female
- Male
- Non-binary
- Transgender

What dance styles do you study or perform besides ballet?

- Jazz
- Tap
- Lyrical/contemporary
- Hip hop
- Modern
- Ballroom
- Other (please specify)

What is your primary role in terms of how you practice ballet?

- Student
- Teacher
- Performer

Have you studied ballet at the collegiate level?

- Yes
- No

Have you studied ballet with a professional company?

- Yes, during a summer intensive or year-round program
- Yes, as a company member
- No

Do you cross-train?

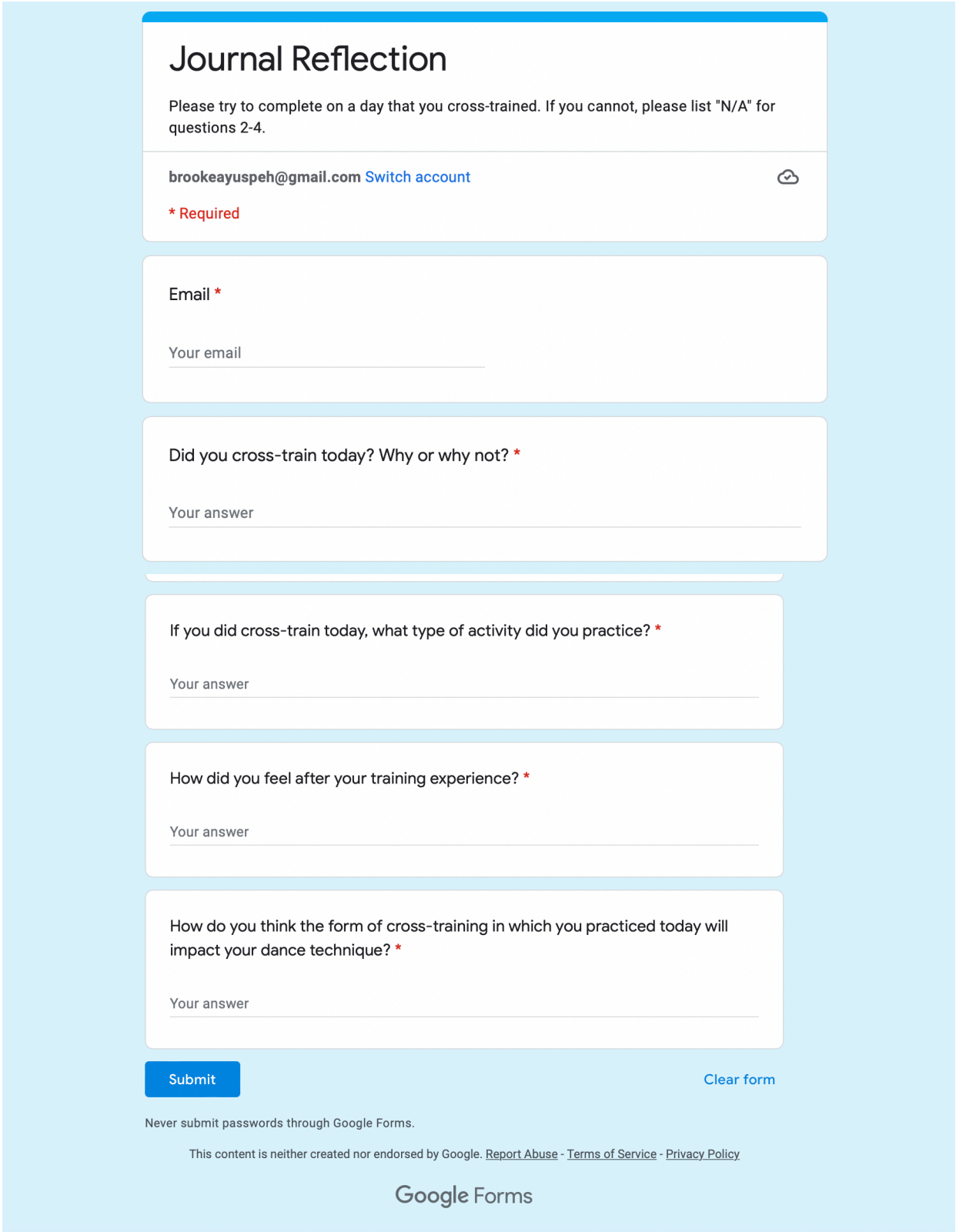
- Yes
- No

What cross-training methods do you practice?

- Yoga
- Pilates
- Swimming
- Gyrokinesis
- Weight training
- Other methods (please specify)

Do you believe that your cross-training practices improve your dance technique? Why or why not?

→



Journal Reflection

Please try to complete on a day that you cross-trained. If you cannot, please list "N/A" for questions 2-4.

brookeayuspeh@gmail.com Switch account

* Required

Email *

Your email

Did you cross-train today? Why or why not? *

Your answer

If you did cross-train today, what type of activity did you practice? *

Your answer

How did you feel after your training experience? *

Your answer

How do you think the form of cross-training in which you practiced today will impact your dance technique? *

Your answer

Submit

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