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Comparison of Blindfolded vs. Non Blindfolded Vertical Jump Tests

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Table of Contents

Abstract

The purpose of this study was to compare test results between blindfolded and non-blindfolded male and female participants during the vertical jump test. We hypothesized that non-blindfolded participants will score higher than blindfolded participants, and males will have higher test scores than females, though no research currently exists comparing these conditions. The study population consisted of 40 apparently healthy individuals ages 18-45, lacking any physical limitations that prevented them from being able to perform a vertical jump test. Participants were recruited from The University of Akron campus by word of mouth in the classes held in InfoCision Stadium. Each participant was instructed to perform a total of four vertical jump tests: two non-blindfolded and then two blindfolded. We concluded that a blindfolded vertical jump is statistically significant from a standard vertical jump. The average for both male and female vertical jumps decreased once the participant was blindfolded and shows statistical significance, $p \leq 0.001$. When comparing only males, blindfolded vs non blindfolded, $p \leq 0.001$ and only females blindfolded vs non blindfolded, $p \leq 0.001$. Having a visual target for the vertical jump made a significant difference in each participants' ability to complete the task at a peak level. Whereas, a lack of a visual target consistently yielded lower scores. Males average vertical jump height (non-blindfolded) was 32.5% greater than female vertical jump heights (non-blindfolded).

Introduction

Vertical jumping is a kind of movement often seen in sports and exercise skill tests. In most situations, before the push off movement begins, vertical jumping is carried out by the rapid extension of the hip, knee, and ankle joints. Vertical jumping height is often demanded in the performance of sports and is an ability usually used in the test for basic capability to engage in sports or exercise. There is significant variance in the degree to which all people can complete a vertical jump (Davis, Briscoe, Markowski, Saville, and Taylor 2003, Huang, Hsieh, Lu, and Su 2011). Adding to this variance is a person's ability to see. Extensive research has been conducted regarding the relationship between vision and the ability to ambulate. Many of these studies have concluded that a positive correlation exists between vision and the ability to mobilize oneself (Marron & Bailey 1982, Kuyk, Elliott and Fuhr 1998, Brown, Brabyn, Welch, Haegerstrom-Portnoy, and Colenbrander 1986, West et al. 2002). However, no research has been conducted regarding vision and the ability to complete a vertical jump. In this study, a hindered visual field will be simulated by blindfolding research participants. In accomplishing this, we look to observe what effect this variable has on vertical jump heights. Further knowledge of the relationship between mobility and vision can contribute to a better understanding of how low visual acuity affects people in everyday life as well as their interests in engaging in physical activity.

Research has shown that visual acuity, visual field and contrast sensitivity correlate with mobility performance; however, visual field and contrast sensitivity are stronger predictors than visual acuity as shown by Marron & Bailey (1982). Kuyk, Elliott and Fuhr (1998) investigated mobility performance (time to complete a course and the number of mobility incidents) of a large sample of visually impaired adults (n = 156) using measures of visual sensory and perceptual functions. They found that visual field, scanning reaction time and contrast sensitivity together accounted for 45% and 48% of the variance in total time and total errors, respectively. Using patients with age-related macular degeneration, Brown, Brabyn, Welch, Haegerstrom-Portnoy, and Colenbrander (1986) demonstrated that visual acuity was a significant predictor accounting for more than 70% of the variance in each mobility measure. Thus, if there are deficits in these visual functions, one's navigational skills would be negatively affected, and as a result, one may not be able to travel independently. Bibby, Maslin, McIlraith, and Soong (2007) conducted a study looking at the correlation between vision and self-reported mobility performance. They found that participants with reduced visual acuity, visual field, contrast sensitivity and/or scanning ability were likely to report difficulty with independent mobility. These findings agree with West et al. (2002), who found significant associations between self-reported mobility limitations and high and low contrast visual acuity, contrast sensitivity and visual field in a large population-based study. Szlyk et al. (1997) also showed that self-reported mobility was significantly correlated with visual field and high contrast visual acuity in a group of patients with retinitis pigmentosa (RP). Similarly, in a group of participants with RP, Turano, Geruschat, Stahl, and Massof (1999) showed that perceived visual ability for independent mobility was covariant with contrast sensitivity and visual field but not with high contrast visual acuity. In another study, Turano, Massof and Quigley (2002) found that visual acuity was significantly correlated with perceived visual ability in a group of participants with glaucoma. Therefore, based on the consistent findings of many studies involving one's capability to be mobile and low visual acuity, a broad conclusion can be drawn that one's self-efficacy in the ability to ambulate is strongly associated with the ability to see.

A study conducted by Houwen, Hartman, and Visscher (2010) concluded that visually impaired children completed the standing broad jump to a lesser degree than their sighted counterparts. These findings suggest that children with visual impairment have more difficulty performing tasks that require speed and accuracy. This may be explained by the findings of Lieberman, Byrne, Mattern, Watt, and Fernandez-Vivo (2010) who demonstrated that children with vision impairments have reduced upper and lower limb strength as compared to normal sighted children. Mohanty, Purohit, Ranjita, Pradhan, and Hankey (2016) concluded that visually impaired children have diminished muscular fitness compared to those that are not visually impaired. The visually impaired students were shown to have statistically significant weaker abdominal, psoas, upper back, lower back, and hamstring muscles. Another study led by Aslan, Kitis, Aslan, and Calik (2004) involved 49 visually impaired children and their physical activity levels throughout the week. The researchers concluded that light activities were usually done on weekdays, moderate activities were on the weekend, and vigorous activities were never done. Similarly, Aslan, Calik, and Kitis (2012) found low vision, blind children, and adolescents participated in light and moderate activities and there was little or no participation in vigorous activities. Houwen, Hartman, and Visscher (2009) compared participation in moderate and vigorous physical activities between healthy and visually impaired elementary school children and adolescents. They found the activity level of visually impaired children and adolescents to be lower than that of healthy counterparts. A decrease in participation in physical activity leads to diminished physical fitness levels of visually impaired children and adolescents and insufficiency in motor skills development (Ponchillia, Strause, and Ponchilli 2002, Ponchillia, Armbruster, and Wiebold 2005). In previous studies, motor skills, physical abilities and physical fitness levels of children and adolescents with visual impairment were shown to be lower than those of healthy counterparts (Brambing, 2001; Gronmo & Augestad, 2000). A study conducted by Skaggs and Hopper (1996) determined that physical fitness levels and physical fitness subparameters, such as flexibility, cardiorespiratory endurance and muscular endurance, muscle strength and velocity of visually impaired individuals were low. Hakkinen, Holopainen, Kautiainen, Sillanpaa, and Hakkinen (2006) concluded that muscle thickness tended to be significantly different in sighted vs blind boys in the rectus femoris muscle and vastus medialis muscles.

Our study sought to determine if there is a relationship between vertical jump performance and vision. By extrapolating the ideas researched by the previously mentioned studies, we hypothesize that non-blindfolded participants will achieve higher vertical jump test scores than blindfolded participants, and males will have higher test scores than females. With participants' vision capabilities taken away, their self-efficacy in being able to successfully complete a vertical jump test to their fullest potential will be diminished. An observational study was conducted in order to reveal the relationship between the two variables discussed. Therefore, this study seeks seeks to explore the relationship between peak vertical jump height and vision by posing following research questions:

1. Does peak vertical jump results change with visual impairment?
2. Will non-blindfolded trials produce greater peak vertical jump results than blindfolded?
3. Is there a difference between male and female peak vertical jump results using non-blind folded trials?

Methodology

Participants

The study population consisted of a total of 40 healthy college students (22 males, 18 females) aged 18-45. None of the participants reported any current or ongoing neuromuscular diseases or musculoskeletal injuries specific to the hip, knee or ankle joints. The researcher recruited participants using word of mouth among students taking college courses in InfoCision Stadium located at the University of Akron. Due to researcher convenience, recruitment and testing were conducted on the same day. Each participant completed an informed consent form explaining the study and the participants' ability to discontinue at any time from the testing protocols. Ample time was provided for the participants to read and sign the consent form. This study was approved by the university's Institutional Review Board for human subject research.

Experimental Design

Upon agreeing to participate in the study, the participants were taken to the testing location. Participants were familiarized with the informed consent form and educated briefly on the study. Potential risks associated with vertical jump include possible low back pain and lower extremity leg or ankle orthopedic injuries. To minimize this risk, participants were instructed on how to properly execute each phase of the vertical jump test. Participants were first led in a two-minute dynamic stretching warm up period to reduce risk of musculoskeletal injury. Dynamic stretches performed included a walking high knee lift (hip flexion), walking hamstring curl (knee flexion), high knee skip, as well as forward and lateral lunges. McHugh & Cosgrave (2009), found that for activities requiring large ranges of motion in various joints, participants need to perform some type of pre-participation activity to achieve the required range of motion for their performances. Next, the participants approached the Vertec vertical jump device (Gill Athletics, Champaign, Illinois) with their dominant shoulder fully flexed above their head to determine their full body height. This number was recorded in inches and the Vertec was reset. Participants completed a total of four vertical jumps. The first two jumps were completed normally (without the blindfold) to the best of the participants' ability. They were instructed to jump straight up without taking any additional steps. Each of the first jumps were recorded. Next, the participants performed an additional two jumps but this time blindfolded. A blindfold in the form of pre-wrap athletic gauze was wrapped around the participants' heads two times. Pre-wrap is a gauze that is placed on the skin before athletic tape to protect the area being bandaged. It is slightly transparent so the gauze was wrapped around participants' heads more than once. The participants were then led to the Vertec in order to perform the jump, and began their third jump. A "spotter" was standing closely to the participants in order to help them keep their balance upon landing. The participants were instructed to keep the blindfold in place while results were being recorded and the Vertec was then reset for the participants to complete their final jump. Once their final jump was completed, the participants were informed of their results and were free to leave.

A one tailed t-test was used to analyze the difference in vertical jump height of blindfolded and non- blindfold trials. A one tailed test was used as it was hypothesized that non blindfolded participants would have a higher vertical jump than blindfolded participants; thus the hypothesis was directional. Each participant took part in both conditions implying this was a repeated measures design and therefore, is a type 1 test. Additionally, the average male and average female non-blindfolded vertical jump height was used for comparison with one another. An alpha level was set at $p \leq 0.05$ to determine statistical significance.

Results

Table 1: Displays average vertical jump heights (in) for both males and female across 2 trials of being blindfolded and without the blindfold. A statistical analysis of male and female averages as well as standard deviations, and 95% confidence interval for each group is listed also.

	Male Non-Blindfolded AVG (in)	Male Blindfolded AVG (in)	Female Non-Blindfolded AVG (in)	Female Blindfolded AVG (in)
	22.25	16.75	15.75	15.00
	36.75	33.50	16.75	14.50
	18.75	15.25	16.25	15.75
	21.00	20.50	20.75	20.75
	21.50	15.75	21.00	17.75
	22.00	16.50	18.00	14.25
	17.75	13.50	12.75	11.50
	24.75	20.00	16.00	15.75
	24.00	24.00	16.75	11.25
	28.75	23.25	11.75	8.25
	21.75	19.25	15.75	14.50
	20.25	17.00	16.25	12.25
	27.25	27.25	14.00	13.25
	29.75	25.00	12.75	6.50
	22.25	16.75	17.75	15.25
	25.50	25.25	12.50	8.50
	29.75	27.25	12.50	9.25
	13.75	11.25	20.75	17.50
	24.25	23.25		
	28.75	25.25		
	28.25	24.25		
	12.75	10.75		
Average	23.72	20.52	16.00	13.43
ST DEV.	5.55	5.79	2.93	3.72
95% CI	2.46	2.57	1.46	1.85

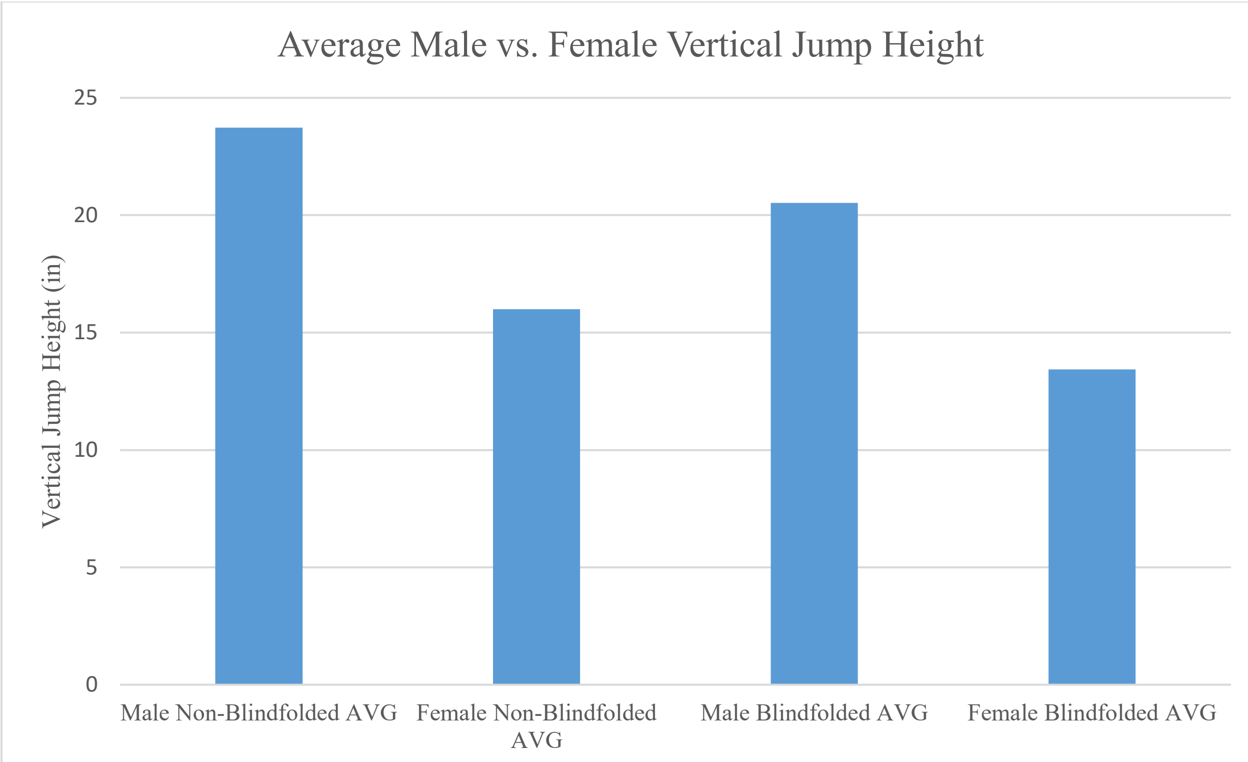

Figure 1: Chart displays a column graph of the average vertical jump height of both males and females while under testing conditions.

Table 2: Descriptive statistics table with variable 1 being male and female two trial average non blindfolded vertical jump results and variable 2 being male and female two trial average blindfolded vertical jump results. The one tailed t-test value was used.

t-Test: Paired Two Sample for Means (Male and Female)	*Males*	*Females*
Mean	20.24375 in.	17.33125 in.
Variance	35.43425481	36.86342147
Observations	40	40
Pearson Correlation	0.950952491	
Hypothesized Mean Difference	0	
df	39	
t Stat	9.763469378	
p(T<=t) one-tail	≤ 0.001	
t Critical one-tail	1.684875122	

Table 3: Descriptive statistics table for males non blindfolded and blindfolded vertical jump tests. The one tailed t-test value was used.

t-Test: Paired Two Sample for Means (Males)	*Non-Blindfolded*	*Blindfolded*
Mean	23.7159090 in.	20.5227272 in.
Variance	30.77556818	33.56493506
Observations	22	22
Pearson Correlation	0.942701482	
Hypothesized Mean Difference	0	
df	21	
t Stat	7.740835631	
p(T<=t) one-tail	≤ 0.001	
t Critical one-tail	1.720742903	

Table 4: Descriptive statistics table for females non blindfolded and blindfolded vertical jump tests. The one tailed t-test value was used.

t-Test: Paired Two Sample for Means (Females)	*Non-Blindfolded*	*Blindfolded*
Mean	16 in.	13.4305555 in.
Variance	8.602941176	13.81474673
Observations	18	18
Pearson Correlation	0.876143619	
Hypothesized Mean Difference	0	
df	17	
t Stat	5.987565936	
p(T<=t) one-tail	≤ 0.001	
t Critical one-tail	1.739606726	

One of the research questions this study sought to answer, "does peak vertical jump results change with visual field?", can be answered by examining figure 1. A visible trend can be appreciated depicting a decrease in vertical jump height amongst males and females once they were blindfolded. The one tailed t-test, as shown in table 2, depicts statistical significance, $p \leq 0.001$, for blindfolded and non-blindfolded vertical jump heights of all male and female participants. This implies that all participants jumped significantly higher when not blindfolded than when blindfolded. Within gender, blindfolded vs non-blindfolded trials for males only, $p \leq 0.001$ (table 3) and females only $p \leq 0.001$ (table 4) were also statistically significant. Each group jumped significantly higher without being blindfolded compared to when blindfolded. The study also sought to answer "is there a difference between male and female peak vertical jump results using non-blindfolded trials?". The males average vertical jump height (non-blindfolded) was 32.5% greater than female vertical jump heights (non-blindfolded).

Discussion

All participants successfully completed the allotted number of vertical jumps under both conditions without complications. As seen in figure 1, the average for both male and female vertical jumps decreased once the participant was blindfolded. Previous studies have suggested that blindfolded testing conditions may limit muscle power production and dynamic balance detection. A study conducted by Killebrew, Hensarling, Jung, and Petrella. (2009) identified a significant decrease in power when participants performing a leg press were blindfolded. Another study by Piper, Radlo, Smith, and Woodward (2012) found that blindfolded participants were unable to detect minor weight differences between two sides of a barbell during a bench press. Similar to these findings, participants of the current study performed to a lesser degree once their visual field was limited.

Within gender, both male and female participants' performance declined once they were blindfolded. By removing vision from the participants' arsenal of senses, their proprioception was appreciably hindered. Having a visual target for the vertical jump made a significant difference in each participants' ability to complete the task at a peak level. Whereas, a lack of a visual target consistently yielded lower scores. Therefore, the decrease in vertical jump performance may be attributed to a decreased visual field.

This research is supported by Quatman, Ford, Meye, and Hewett (2006) who conducted a study looking at male and female vertical jump tests through the maturation process. They concluded that pubertal boys experienced longitudinal increases in vertical jump height during maturation, whereas girls did not. Male athletes generate greater lower extremity muscular power coincident with maturation, whereas female athletes do not. Similar to their results, males average vertical jump height (non-blindfolded) was 32.5% greater than female vertical jump heights (non-blindfolded). It is known that males have higher levels of fat free mass than females and females have higher levels of fat mass than males. The results of this study may be accredited to this fact. Higher levels of muscle tissue in the legs of males will be able to generate more power than those of females with the final outcome of males jumping higher.

Limitations

There were several limitations observed throughout this study. Primarily, the physical space used for data collection was not ideal. Due to the nature of the task participants were asked to complete, a room with high ceilings was needed. There were not many locations available in InfoCision stadium that met this criterion so testing was conducted in the north stairwell. As a result of this, testing conditions consisted of very dim lighting and a less than ideal space. It was relatively small, with a large stair opening behind the participants. This may have negatively impacted performance in several ways. The dim lighting may affect vision for the control trial in which participants were not blindfolded. The small area may have negatively affected the participants' ability to perform the jump as it occasionally was cluttered with objects and other participants. The stair case close by may have made the participants hesitant to fully engage in the task in fear of injury. An investigator was placed in front of the stair case to block any participants from going near it and avoid any type of injury involving it.

Additionally, the participants placed pre wrap around their heads. This is a relatively light material that can be seen through when held close to the eyes. To reduce visibility, it was wrapped around the participant's head two times. As such, participants' vision was not completely obstructed. While it did hinder the participant's vision significantly when properly applied, it would shift on occasion between the first and second blindfolded jump which could potentially change the participant's confidence in being able to complete the task. The pre wrap was very effective when lying flat on the face and covering most of the nose, but often was folded over itself, allowing more light in and a gap for the participant to see clearly. At one point, while testing many participants in succession, the participants applied the pre wrap to themselves which created significant inconsistences in the application.

Another variable that was not controlled for that is a limitation is the clothing of participants. Since they were recruited between classes on a given day, they were not always dressed properly to engage in activity that required explosiveness and full range of motion for maximum execution of the test. Some participants were not wearing proper athletic footwear so they decided to jump barefoot. Others were in restrictive clothing that did not allow the participant to fully engage their extremities for maximal upward motion and reach. Therefore, the inability to prepare for the study by the participants was a limitation that hindered nearly all participants. The females primarily were affected by this as opposed to the males.

To improve this study in the future, several changes are necessary. This physical location should have proper lighting, a tall ceiling, and an open floor plan clear of any obstructions on the floor or anywhere near the space of vertical jump testing. Next, a uniform blindfold should be used on all participants providing full coverage of the eyes to reduce inconsistencies in the application or areas where participants are able to visualize the Vertec. Future participants should be recruited and given a day in advance for which they will perform their testing with appropriate instructions for how to dress and be prepared to perform the test.

Future areas of study include a debriefing process with each participant. In the debriefing, participants could be asked a series of questions to gauge their self efficacy and confidence in preforming the tasks while being blindfolded. Self-efficacy refers to an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments. From this debriefing, it could be gathered how a lack of vision affects participant’s self-efficacy, willingness to try, and fear of outcome. The potential results could significantly impact how the findings of the current study are interpreted. Additionally, the sample size of the study should be increased. An appropriate sample size can be found by utilizing a variety of different sample size formulas. By obtaining a 95% confidence interval, the formula will then determine an appropriate sample size. Studies of small sample sizes have the potential to produce inaccurate results. Final conclusions may be skewed in either finding statistical significance when the alternative hypothesis should be accepted, or not finding statistical significance when the null hypothesis should be accepted. By increasing the sample size, the results will be more accurate to truly establish a relationship between variables.

These findings contribute to the field of exercise science by furthering our knowledge of athletic performance in relation to vision. Those with impaired vision experience a decreased ability to perform explosive movements and therefore, will not benefit from them to the extent that the general population will. This study provides insight regarding the importance of vision to our proprioception. Knowing where our body is in space is crucial to obtaining the best possible results. The key take away point from this study is that decreased visual field significantly hinders vertical jump performance. While males demonstrated higher vertical jumps than females, both experienced statistically significant decreases in performance once they were blindfolded.

The honors research project has been very beneficial to my growth as a student at The University of Akron. Overall, I enjoyed the process of conducting this research as it allowed me meet new people, gain new insights, and give myself power over my education. By working closely with those involved I was able to draw my own conclusions from the testing I conducted which was very rewarding. As I prepare for physical therapy school beginning the fall semester of 2019, this research provided me with invaluable experience that I will carry into the future.

Special thanks to Dr. Rachele Kappler, Dr. Ronald Otterstetter, Dr. Laura Richardson, and Dr. Judith Heltzel-Juvancic for their assistance and support of myself and this study.

Appendices

PROTOCOL TITLE: Comparison of Blindfolded Versus Non-Blindfolded Vertical Jump Tests

Informed Consent Form
For Prospective Collection of Data/Information

DESCRIPTION: You are invited to participate in a research study that will compare test results between blindfolded and non-blindfolded male and female participants during the Vertical Jump test.

PROCEDURES: A completed informed consent form will be obtained from each participant by the Principal and Co Investigators prior to participation. Participants are instructed to wear proper clothing during the tests, such as sweatpants or athletic shorts and a t-shirt. Each participant will perform a total of four vertical jump tests: two blindfolded and two non-blindfolded. The order of the tests will be randomized. Height (in) and gender will be self-reported by all participants. The vertical jump measure will be placed away from any obstructions in open space. Participants will stand underneath the measuring device and when ready, jump to their fullest ability and reach as high as possible up the measuring device. At this point, blindfolds will be placed on the participants who are performing the blindfolded trials. Participants will be helped to align their bodies and from this position perform their second jump when ready. Each trial will be recorded by the researchers as well as which test was administered first. This process should go by relatively quick with participants only needing to be in the lab for about 5 minutes to complete both blindfolded and non blindfolded jumps.

RISKS: Potential risks associated with vertical jump tests are those involving muscle strain to the hamstrings or lower back. Because participants will be instructed on how to safely perform the tests and a period of dynamic stretching will be implemented prior to testing, the likelihood for a muscle strain to occur is minor.

BENEFITS: The participants will benefit from this study by acquiring knowledge of the effects of blindfolding on a sit-and-reach test.

If you have any questions about your rights as a research subject, you may contact the University of Akron's Institutional Review Board at 330-972-7666.

This information was explained to me by Principal Investigator:

Christian Evans

I understand that he will answer any questions I may have concerning the procedures of this investigation at any time by contacting them via the information listed below. I also understand that my participation in this study is entirely voluntary, that I must be 18 years of age or older, and that I may decline to enter this study or withdraw from it at any time without consequences. I understand that the investigators may terminate my participation in the study at any time.

Contact information about the study:

Christian Evans (330) 754-5249 cte5@zips.uakron.edu

I understand that I am not receiving any compensation for participating in this study, other than the individual data from the testing procedures.

____ ______________

Signature of Research Subject Date

____ ______________

Signature of Witness Date

IRB Criterion for Exemption 1

1a. The purpose of this study will be to compare test results between blindfolded and non-blindfolded male and female participants during the vertical jump test. To our knowledge, no research has been conducted on blindfolded versus non-blindfolded vertical jump tests. This study will provide insight on whether or not individuals are more capable of accomplishing a task to a higher degree when they are aware of their surroundings. We hypothesize that non-blindfolded participants will score higher than blindfolded participants, and males will have higher test scores than females, though there is no research to base this hypothesis off of. Participants will be instructed to wear proper clothing, such as sweatpants or athletic shorts and a t-shirt, prior to the tests. Each participant will perform a total of four vertical jump tests: two blindfolded and two non-blindfolded. The order of the tests will be randomized. Height (in) and gender will be self-reported by all participants. The vertical jump measure will be placed away from any obstructions in open space. Participants will stand underneath the measuring device and when ready, jump to their fullest ability and reach as high as possible up the measuring device. At this point, blindfolds will be placed on the participants who are performing the blindfolded trials. Participants will be helped to align their bodies and from this position perform their second jump when ready. Each trial will be recorded by the researchers as well as which test was administered first. This process should go by relatively quick with participants only needing to be in the lab for about 5 minutes to complete both blindfolded and non blindfolded jumps.

1b. The study population will consist of 40 healthy individuals ages 18-65, who lack any physical limitations that prevent them from being able to perform a vertical jump test. Participants will be recruited from the University of Akron campus by word of mouth in the classes held in Infocision Stadium. During this time, participants will be given a consent form that will inform them of their role in the study, their ability to discontinue at any time, testing protocols, and all other appropriate information. The Principle Investigator will ensure that participants have ample time to read and sign the consent form.

1c. Collection of data will take place at the University of Akron in the exercise lab of on the 4th floor of Infocision Stadium. The Principle Investigator, Christian Evans, will be in charge of data collection.

1d. Potential risk associated with vertical jump include possible low back pain and potentially rolling an ankle upon landing. To minimize this risk, participants will be instructed prior to their attempts how to accomplish each phase of vertical jump test. Additionally, there will be people around the jump site available to aid participants with balance and to catch them should them lose their balance.

1e. Participants will benefit from the following study by acquiring knowledge of the effects of blindfolding the vertical jump test.

1f. Individual privacy will be maintained by keeping self reported information kept safe and only accessible by Christian Evans. There will be no additional interviewing necessary.

1g. All subjects will be assigned a code number, and names and code sheets will be stored separately from the data sheets in which all data will be recorded. Code sheets and data sheets will be stored in a locked cabinet being accessible only by Christian Evans until the study has been fully completed.

1h. An informed consent document will be provided to all that agree to participate

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