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The Effects of Enhanced and Decreased Expectations on Balance Performance in Those with and without Parkinson's Disease

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DO THE PHYSICAL THERAPIST'S WORDS REALLY MATTER? : THE EFFECTS OF ENHANCED AND DECREASED EXPECTATIONS ON BALANCE PERFORMANCE IN THOSE WITH AND WITHOUT PARKINSON'S DISEASE

By

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A doctoral project submitted in partial fulfillment

of the requirements for the

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Joshua Ostrander, Granuaile Parrish, and Jacob Blood

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ABSTRACT

Background: It has been reported individuals typically perform well on a task when enhanced expectancy was provided prior to task performance. It has also been reported people with Parkinson's disease (PD) are especially susceptible to pre-task placebo cuing and suggestion. Evidence of this susceptibility has been previously demonstrated through brain imaging studies and with demonstration by individuals with PD improved balance performance. **Objective:** This study was designed to further previous studies' results for improved task performance with enhanced expectancy. The purpose of this study was to investigate if the pre-task verbal delivery of enhanced expectancy, decreased expectancy and no expectancy would affect the performance of individuals with PD during balance tasks. **Design:** Two groups of individuals (individuals with PD and age/gender matched healthy adults) were randomly assigned to perform three separate balance tasks. One of three randomly assigned expectancies (enhanced, decreased or neutral) was verbally delivered by a researcher to the individual prior to each balance task performance. **Methods:** Forty-nine subjects (20 females and 29 males, Age 72 ± 7 years) participated, including 24 patients with idiopathic PD (9 females, Age 73 ± 6.58; 15 males, Age 73 ± 7.21) and 25 healthy controls (11 females, Age 70.27 ± 4.69; 14 males, Age 71.86 ± 8.90) without PD. All participants were asked to perform three balance tasks while three randomly assigned verbal cues were given prior to each task. Non-parametric, repeated measures Friedman's tests were conducted to compare 1) the effects of verbal cues on balance (Limits of Stability, Maze Control and Random Control) for the PD group and the age-and-gender matched control group, and 2) the converted z scores of the three balance tasks among the three verbal conditions in combined PD and control groups. Alpha was set at 0.05. **Results:** Friedman's ANOVAs showed that the usage of enhanced expectancy, decreased expectancy and no expectancy demonstrated no significant difference on balance performance for each of three separate balance tasks or for individuals with PD or without PD ($ps \geq .05$).

Discussion and conclusion: Although the present research study did not present significant results of the main finding, different expectancy instructions prior to a balance task differently change balance performance, this study did imply for continued future research in pre-task expectancy.

Key words: Parkinson's disease; enhanced expectancy; balance

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INTRODUCTION

Postural instability, one of the four cardinal signs of Parkinson's disease (PD), is a primary concern for those with PD because it leads to an increased risk for falls.[1] Prospective research in PD found 63% of individuals with PD fell at least once over a two year span.[2] A study by Gazibara and colleagues found 38.9% of PD fallers acquired some type of injury from the fall. [3] Additionally, a study by Hely and colleagues reported 81% in their 18 year longitudinal PD study had at least 1 fall and 23% sustained a fracture of some sort. [4]

The primary treatment for postural instability and fall prevention for PD is physical therapy through balance training and resistance training.[5] Findings of a meta-analysis performed by Allen and colleagues demonstrated exercise and motor training improved general balance performance for individuals with mild to moderate PD.[5] A study by Hirsch and colleagues demonstrated improved balance performance up to 4 weeks after cessation of a balance and high-intensity resistance training program in people with idiopathic Parkinson's disease.[6] A literature review performed by Kwakkel and colleagues looking at 23 randomized clinical trials of physical therapy interventions for the cardinal signs of PD, found moderate to strong evidence that patients with PD could benefit from task specific training for improved postural control, balance, gait and physical condition.[7] Importantly, surgical intervention and pharmacotherapy for PD have been shown to be helpful in alleviating the rigidity, resting tremor, and bradykinesia of

PD, but have failed to show efficacy with improving postural instability and balance performance.[7,8]

It is theorized balance training can be improved by verbal cueing instructions. One such instruction that may improve balance is enhanced expectancy (EE) cueing which utilizes the placebo effect (absence of a treatment) to produce positive expectancy and improved motor performance. Verbal EE has been shown to improve the efficiency of movement in healthy adults.[9,10] Wulf and colleagues used verbal EE, pre-task performance (stating their peers typically perform well on that task) which improved balance performance of healthy older individuals.[11] The placebo effect has been shown to increase the amount of striatal dopamine produced in people with PD [12, 13, 14] and therefore can be hypothesized that balance performance of individuals with PD may be improved through enhanced expectation instruction given prior to performance. It has been suggested by de la Fuente-Fernandez and colleagues placebo-induced dopamine release, seen via positron emission tomography imaging, may be related to the individual with PD's expectation of clinical improvement.[13] It has been found that individuals with PD performed better on balance tasks when they were verbally instructed to focus their attention on their environment, rather than the movements themselves.[11, 14] However, it is still unclear whether the application of verbal expectations would affect the balance performance of individuals with PD.

The purpose of our study was to build on previous research supporting the use of pre-performance EE improving motor performance as well as to demonstrate new evidence related to PD balance performance. This study used enhanced or decreased expectations to examine if changing an individual's pre-task mindset will affect their balance task performance. The verbal cues were used to test three hypotheses: 1) enhanced expectancy (EE) will improve balance performance of participants with PD, 2) decreased expectancy (DE) will diminish balance performance of participants with PD, and 3) neutral expectancy (NE) will have no effect on balance performance for participants with PD. Individuals with PD were compared to an age and gender matched control group to explore differential responses to the verbal cues.

METHODS

Participants

There were 49 participants in this trial (PD=24; age 72.45±6.83, 15 male, 9 female), (healthy control=25; age 71.16±7.26, 14 male, 11 female) (Table 1) (Figure 1). The number of participants was determined based on an a priori analysis using 80% power and a small (f=0.20) to moderate (f=0.25) effect size, it was estimated that 30 to 42 participants per group and 72 participants total would be necessary to detect an effect. Participants were recruited from local and neighboring city support groups and senior centers. PD participants were included in the study if they were between the ages of 50 and 80, diagnosed by a neurologist with idiopathic PD, and were Hoehn and Yahr [15] stage 1-3. Hoehn and Yahr is regarded as a reliable and valid assessment for staging people with PD based on disease presentation.[15] PD participants were excluded from the study if they had Parkinsonism or Parkinsonian-like disorder. PD participants were excluded if they had a history of surgical intervention for PD (e.g., deep brain stimulation, thalamotomy and pallidotomy). Healthy control subjects were age and gender matched to the PD control participants. PD and control participants were excluded from the study if they could not stand without an assistive device for 10 minutes. In addition, they were excluded if they were non-ambulatory or if significant comorbidities were present (e.g., stroke, total hip/knee replacement). PD and control participants who had been diagnosed with another significant comorbidity that affected their balance were also excluded, including the following: vestibular dysfunction (e.g., dizziness, vertigo), amputations, stroke, traumatic brain injury, and/or moderate/high lower extremity osteoarthritis.

Overall study design

A healthy control group and a group with PD were given three separate expectations on three separate balance tasks (See Figure 1). These balance tasks were performed on the portable BioSway Balance System from Biodex Medical Systems (Biodex, 20 Ramsey Road, Shirley, New York, USA).[16] Each participant received one of 3 verbal cues (EE, DE, and NE) with each of three different balance tasks. That is, each participant performed 3 different balance tasks and with each of those balance tasks a pre-performance instruction was randomly assigned using a Latin square to balance the order of balance task testing and verbal cues. The experimental procedure was a mixed factorial design with the between variable being diagnosis (PD subjects and healthy control) and the within variable being three different balance tasks (limits of stability, random, and maze control).

Instrumentation

Demographic information about the stage, level, and fall risk of the PD participants was determined using the Unified Parkinson's Disease Rating scale [17], Falls Efficacy Scale [18], and the Hoehn and Yahr scale.[15] The Maze Control, Random Control, and Limits of Stability tasks on the portable BioSway Balance System were used.

Procedures

Before participants were tested on the balance tasks, we obtained demographic information about their current health status and PD if they had been diagnosed, using the tests and measures stated in the instrumentation section. We also asked all participants about their history of falls. In addition, we determined balance-related self-efficacy by using the Falls Efficacy Scale.[13]

All participants were tested on three different balance tasks using the BioSway Balance System. On all three tasks an avatar is negotiated on a computer monitor by changes in postural sway:

1. **Maze Control Task.** This task uses an avatar that is negotiated through a maze on the computer screen by shifting weight on the balance platform (Figure 2) and hitting 28 targets along the way.

2. **Random Control Task.** This task consisted of a circle that would move around the computer screen and the participants were instructed to keep the cursor within the circle by shifting their weight (Figure 3). We selected the medium sized circle and medium speed parameters for all participants.
3. **Limits of Stability Task.** This task required subjects to move a cursor by shifting their weight to 8 successive targets in all direction (front and back, side to side) on the computer screen (Figure 4). After a target was reached, the participant was required to bring the cursor back to the center target before proceeding to the next target. We used the easiest setting for this task, which places the targets at 50% of the generally accepted maximum limits of stability.

The data used to quantify performance on each of the tasks was derived from task completion accuracy values and time to complete values computed by the BioSway Balance System. The time to complete value was a record of the amount of time required (in minutes) by the participant to complete the specific task. The task completion accuracy values were displayed as a percentage and represented the participants' performance on the associated task (i.e., the participants' ability to stay within the lines for the maze control task, to stay within the circle for the random control, and ability to accurately reach the targets in the limits of stability task). These values were recorded (time converted to seconds and percentage converted to decimal) and analyzed as described in the data analysis section of this paper. A ratio of the accuracy score divided by the time to the complete the task was calculated for each of the three balance tasks. It has been reported that BioSway provides moderate test-retest reliability of score and time measurements with Intraclass Correlation Coefficient of 0.81.[16]

Participants performed all three of the aforementioned balance tasks, but had different, randomly assigned performance expectancies. For all participants, there was a practice phase that consisted of a 1-minute practice session before each task, followed by a short 1 minute break. Each of the three balance tasks took approximately 5 minutes. There was a 3-minute break in between each of the three balance tasks. The procedure in this study was adapted from a study performed by Wulf et al that linked enhanced motor performance in the elderly population with the presence of an altered mindset. [16] Before the first practice trial and, again, before the actual task, the experimenter cued participants with one of the three randomly assigned expectancies:

1. **Enhanced.** Participants with PD were cued with “People with PD usually do well on this task,” whereas the healthy control were cued with "People with your experience and health usually do well on this task.”
2. **Decreased.** Participants with PD were cued with "People with PD usually do poorly on this task," whereas as healthy controls were cued with "People with your experience and health usually do poorly on this task.”
3. **No expectancy.** Participants with PD were cued with "We are not sure how people with PD will do on this particular balance task," whereas as healthy

controls were cued with "We are not sure how people with your experience and health will do on this particular task."

Data Analysis

All data were examined for normality and because non-normal distributions were observed for all three balance tasks, non-parametric analyses were conducted. To address the study hypotheses, data were analyzed in two different ways. Firstly, a between group comparison of the three instructions (EE, DE, NE) using Kruskal-Wallis analyses were conducted for each of the three balance tasks (Maze Control, Random Control, Limits of Stability) for both the PD group and the age- and gender-matched control group. A Kruskal-Wallis test was conducted twice for each balance task, once for the overall accuracy score and once for the calculated ratio (accuracy divided by time to complete task). Secondly, for between task comparisons (within subject), data from each of the three balance tasks were converted to a z score and then analyzed using a non-parametric, repeated measures Friedman's ANOVA for both the PD and control groups. The reason a z score was created for each of the balance tasks was because the manufacturer computation of the accuracy scores were different. That is, the z scores were calculated to equilibrate the scores across the three balance tasks. All data were analyzed using SPSS 22.0 (International Business Machines Corp. New York, USA) and alpha was set at .05.

Results

For the between group comparisons, there were no statistically significant differences among the three expectancies (EE, DE, NE) for each of the three balance tasks for both the PD and the control groups:

1. **Maze Control.** There was no statistically significant difference among the three expectancies (enhanced, decreased, no expectancy) for Maze Control task for accuracy and ratio for both the PD and control groups ($ps \geq 0.054$) (Figure 6).
2. **Random Control.** There was no statistically significant difference among the three expectancies (enhanced, decreased, no expectancy) for Random Control task for accuracy and ratio for both the PD and control groups ($ps \geq 0.050$) (Table 7).
3. **Limits of Stability.** There was no statistically significant difference among the three expectancies (enhanced, decreased, no expectancy) for Limits of Stability task for accuracy and ratio for both the PD and control groups ($ps \geq 0.291$) (Table 8).

Repeated measures Friedman's ANOVAs revealed that there was no significance across the three conditions for the data that was transformed into z scores and compared across the three balance tasks, $F(2,46)=2.117$, $p=0.132$, for all participants (Figure 9).

Discussion

Our study demonstrated that expectancies (EE, DE, NE) caused no significant changes in balance performance for individuals with or without Parkinson's disease. Despite the literature suggesting that enhanced expectancy may improve motor performance, our results indicate that enhanced expectations do not improve balance performance and decreased expectations do no degrade balance performance. Although our study validated our null hypothesis, future research is indicated to expand upon the previously reported evidence supporting the effect of expectancy to influence motor performance.[9, 10, 11, 14] Future research is indicated to demonstrate the previously suggested connection of individuals with PD and their increased production of striatal dopamine, resulting in their improved motor performance from their increased susceptibility to expectancy.[9, 12, 13]

Previous research has shown enhanced expectancy may provide a significant effect on balance performance in healthy populations**.** Wulf et al demonstrated significantly better balance performance along with greater balance skill retention with the application of enhanced expectancy to healthy older individuals.[11] The results from our study are not consistent with these findings and can be suggested that our verbiage was not adequate or convincing enough for proper understanding and internalization. In the study by Wulf et al, the EE was delivered prior to the first of 10 practice trials.[11] There was more repetition than in the present study in which participants received each cue only twice. It can be theorized that this may be a reason the participants in the study by Wulf et al understood and internalized the verbiage better resulting in a greater influence on performance. Another potential source of decreased understanding could be that the participants in this study were never asked to repeat instruction back to the researchers, as there were times that participants had difficulty understanding the task, even with a practice trial and verbal instructions prior to the task. Richards et al found that repeating instruction back improves an individual's learning, understanding and retention.[19] It is possible expectancy delivered prior to performance does not have an immediate influence on motor performance and our results demonstrate the lack of significance for using expectancy as an intervention for balance performance improvement. Future research is indicated to determine the appropriate verbiage, dosage, and potential sociological pressures found to be the most influential in people with PD to optimize motor performance.

Previous research has also shown that enhanced expectations may improve motor performance in individuals with PD. Pollo et al found that a placebo effect led to increased hand speed in participants with PD.[20] Benedetti et al found a decrease in neuronal bursting in participants with a deep brain simulator after administering a placebo-suggested anti-parkinsonian drug, suggesting a general increase in dopamine.[21] This increase in dopamine correlated with patient reports and clinical data.

In this research some unanticipated findings occurred. During data collection, there were multiple responses to the expectancy verbiage provided. In some cases, participants questioned if the cues were what was being tested. It is possible the expectancy verbiage created pressure for the participant to demonstrate a specific caliber of performance resulting in a paradox of behavioral performance (reference needed). For example, some participants were skeptical of the EE. We theorize these participants may have experienced pressure to perform up to researcher expectations (a

Hawthorne effect), their peer group's reported performance, and may have performed inferior to their own abilities due to the pressure. Neiss infers positive expectancies may produce a negative effect on motor performance.[22] Several participants verbalized that they wanted to live up to either the researchers' expectations or to the standard set by their peers, but were nervous that they may fail to do so. Furthering the idea of self-comparison, some subjects saw the cues as a challenge resulting in an increase in motivation to perform superior to their peers reported performance when the DE cue was delivered. For instance, at least 5 participants verbalized their motivation by saying, in essence, "well, I can do better than that." These types of responses to the cues were not controlled and were not systematically recorded. However, researchers should consider this when designing future trials. Additionally, we believe some of the suspected misunderstanding stated above could be remedied by providing an explanation to preface the pre-performance cues (i.e., "We will be giving you three balance tasks, one of these tasks people (with PD / of your current health) do well on, one of these tasks people (with PD / of your current health) do poorly on, and one task we are unsure how people (with PD / of your current health) do"). Then similar to the current study design providing a pre-performance cue of "This is the task that people (with PD / of your current health and condition) do well on" for each respective task. This would allow the participant's to have more time to internalize the instructions and divert more focus on the tasks rather than being skeptical of the cues themselves. It is worth noting the verbiage in the present study was delivered by three different researchers, which may have affected the participants' perception of the cue. Some participants also perceived that there was a psychological component to the testing, therefore, potentially increasing the variability of the results. We also recommend in future studies that after accomplishing tasks with varied cueing that the researchers ask the participants about which cue was related to which task in order to track the internalization of the cue.

Compared to other research done in this field, our design utilized the Biosway system, which may have led to some difficulties in task performance among the participants. Our participant's had 1 minute of rest in between 1 practice trial and the formal trial to try and understand both the implications of the expectancy and how to use the video game based system to accomplish the balance task's objective. It has been documented older adults have greater difficulty with processing and require more time for processing with motor performance.[23] The average age of participants for the PD group was 72.45±6.83 and healthy control was 71.16±7.26, appropriately classified as older adults. Older adults have demonstrated the ability to understand and therefore perform novel tasks, however multiple practice attempts are required.[21] With the use of a novel task, videogame- based system for measurement of participant's balance performance, the measuring tool may have not been as reliable or valid as other evidence based measures which use tasks more familiar to the participants or are unanimously unfamiliar among all participants. It is possible the novel task may have been more reliable if it were a true novel task to all participants and if the participants were provided with more practice attempts. We believe sufficient practice and a truly novel measurement system should be used if this study were to be reproduced.

Our results suggest that enhanced expectancy may not be as robust as the previous research suggests. Based on our research findings, we suggest caution when regarding the collected body of evidence that is in support of utilizing a placebo effect while treating patients with PD.

There were limitations in this study. For example, some of the participants, especially in the PD group, the tasks were too difficult to perform, even at the easiest level available on the Biosway. For several PD participants, the forward targets requiring an anterior shift in center of gravity were too high to be accomplished. In the LOS task, this would lead to an increase in time and decrease in accuracy. In the Maze Control task, this would lead to a sharp increase in number of hits on the boundary, decreasing the score dramatically for said participants, as well as increasing the time. In these cases, the cue did not matter and was most likely forgotten as the participant would attempt to reach the forward or anterior targets. No test-retest was included in our study's overall design. Prior level of function was determined through subjective reports from participants during the researcher's screening processes. Having this may have increased the accuracy of true performance but would have also potentially limited the blinding of the design of the study.

CONCLUSION

The results with this study are inconsistent with the previous research on enhanced expectancy for improved task performance. The verbal cuing in the current study's experimental design showed no significant effect on balance performance for individuals with PD or individuals without PD.

APPENDIX

Figure 1. Flowchart to represent participants.

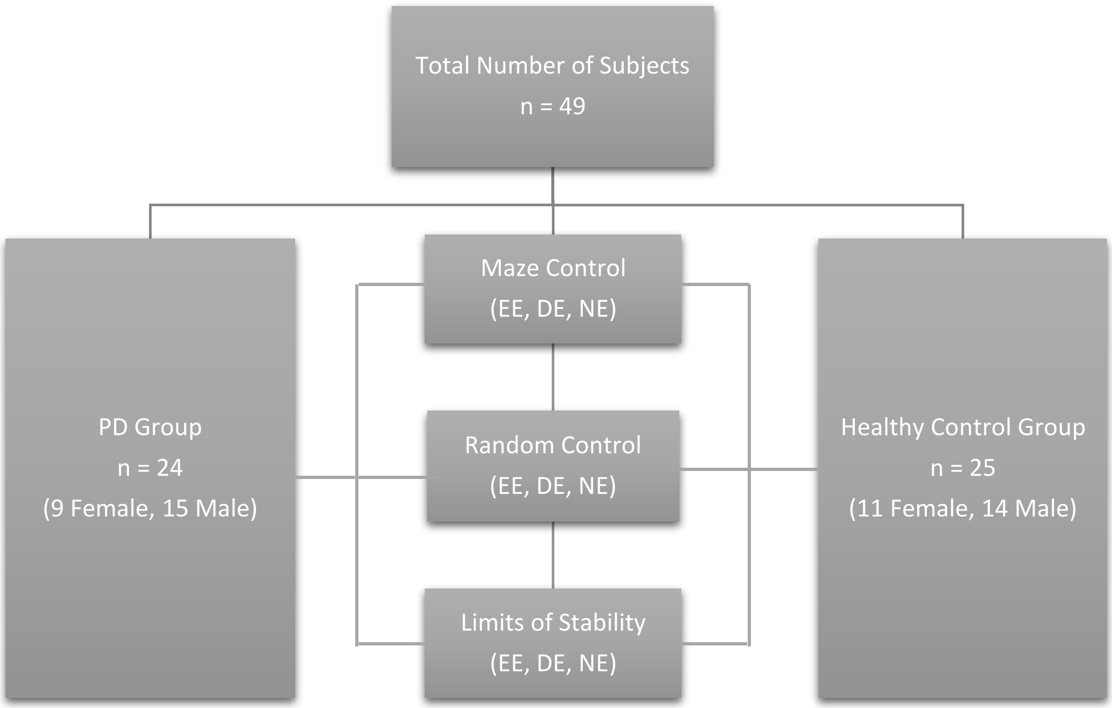


Figure 2. Schema of the research design.

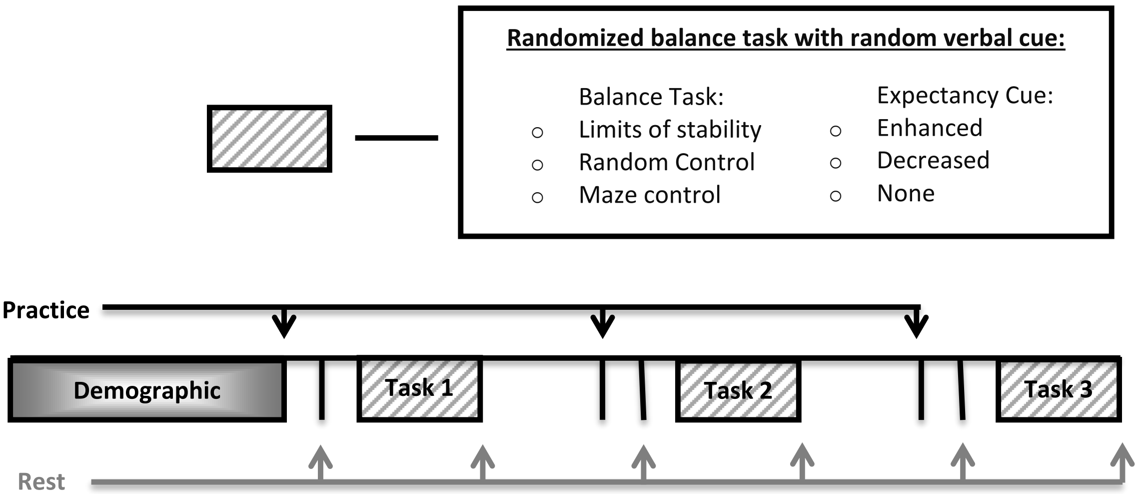


Figure 3. Photograph example of maze control task.

Figure 4. Photograph example of random control task.

Figure 5. Photograph example of limits of stability control task.

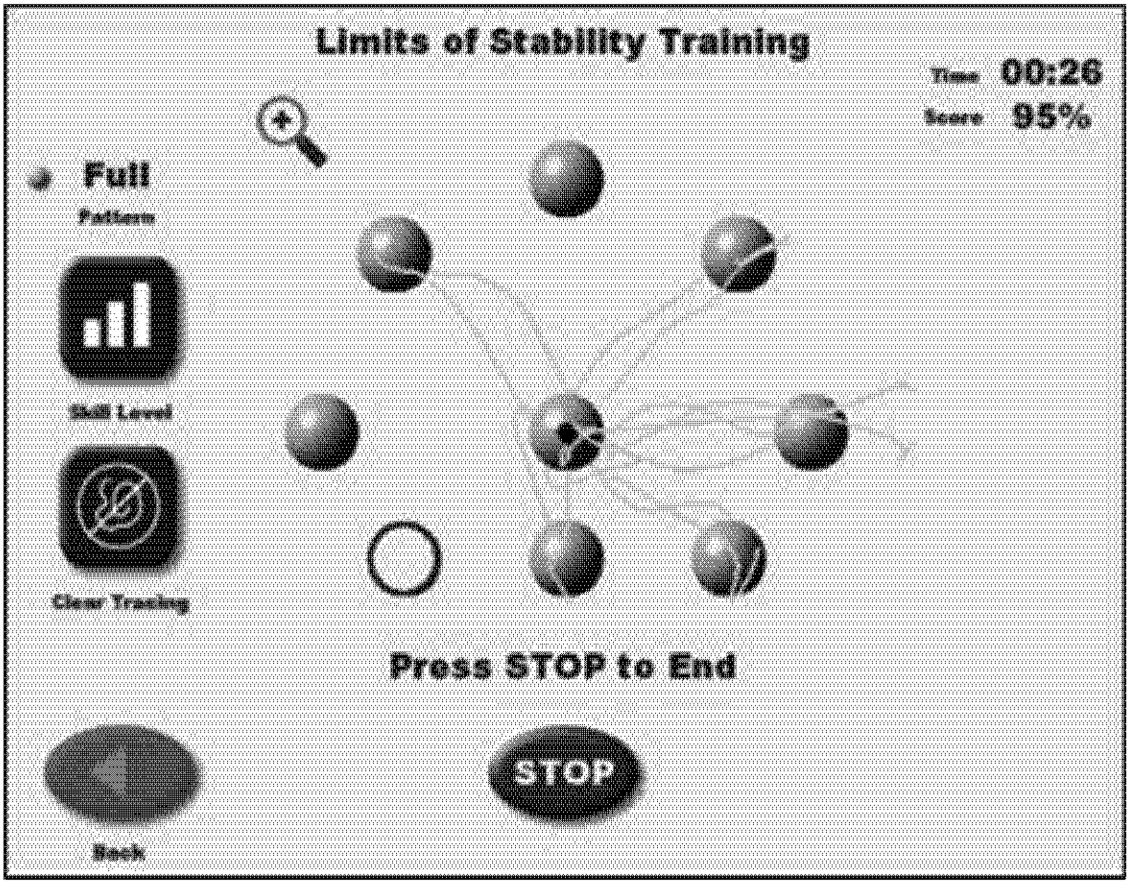
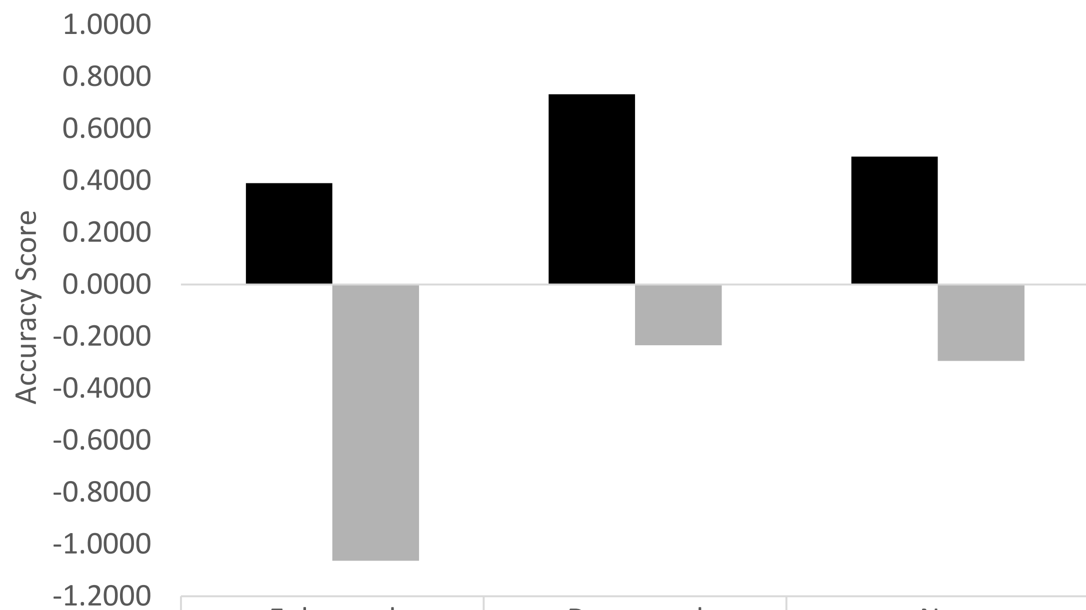
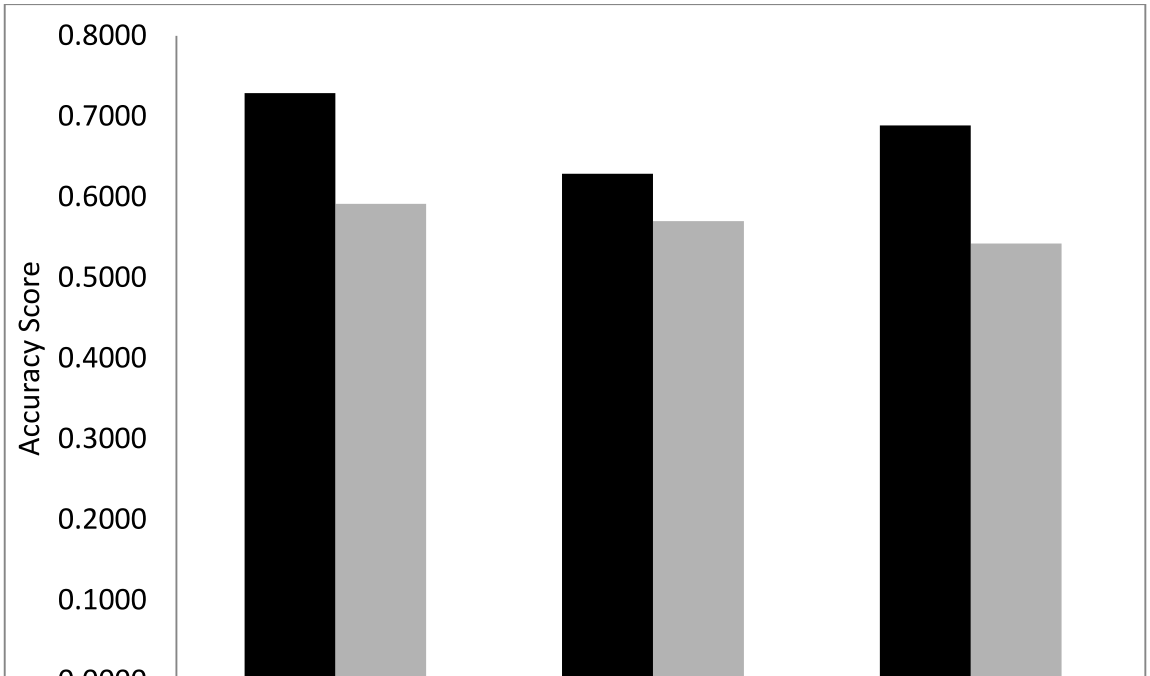


Figure 6. Between group analysis of expectancies (EE, DE, NE) and accuracy for maze control task.



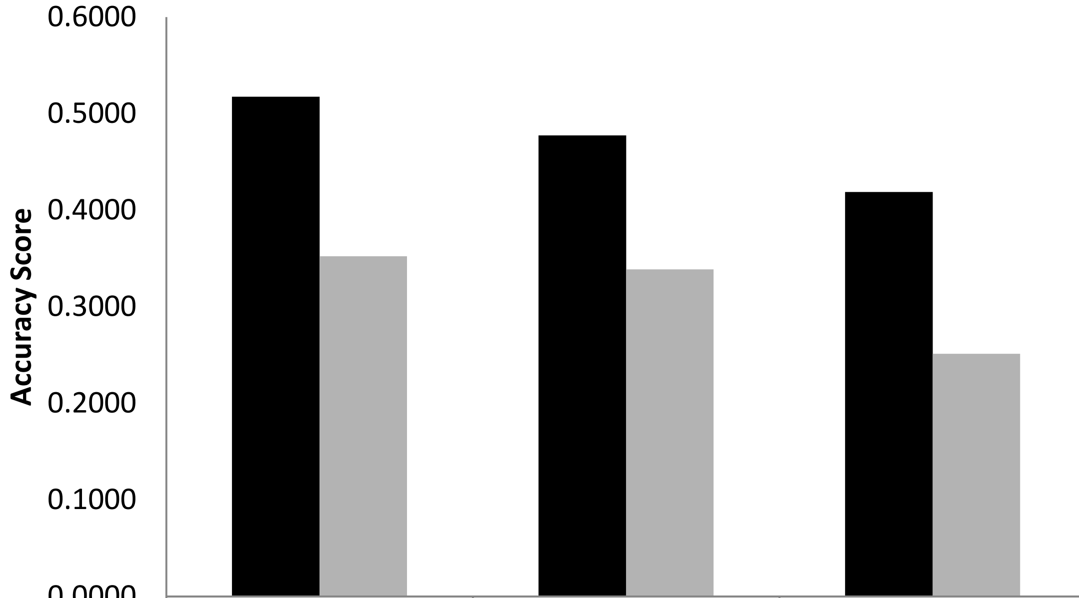
	Enhanced	Decreased	No
Control	0.3900	0.7325	0.4925
PD	-1.0638	-0.2333	-0.2943

Figure 7. Between group analysis of expectancies (EE, DE, NE) and accuracy for random control task.



	Enhanced	Decreased	No
Control	0.7288	0.6289	0.6888
PD	0.5914	0.5700	0.5422

Figure 8. Between group analysis of expectancies (EE, DE, NE) and accuracy for Limits of stability task.



	Enhanced	Decreased	No
Control	0.5175	0.4775	0.4189
PD	0.3522	0.3386	0.2513

Figure 9. Within group Z score comparison.

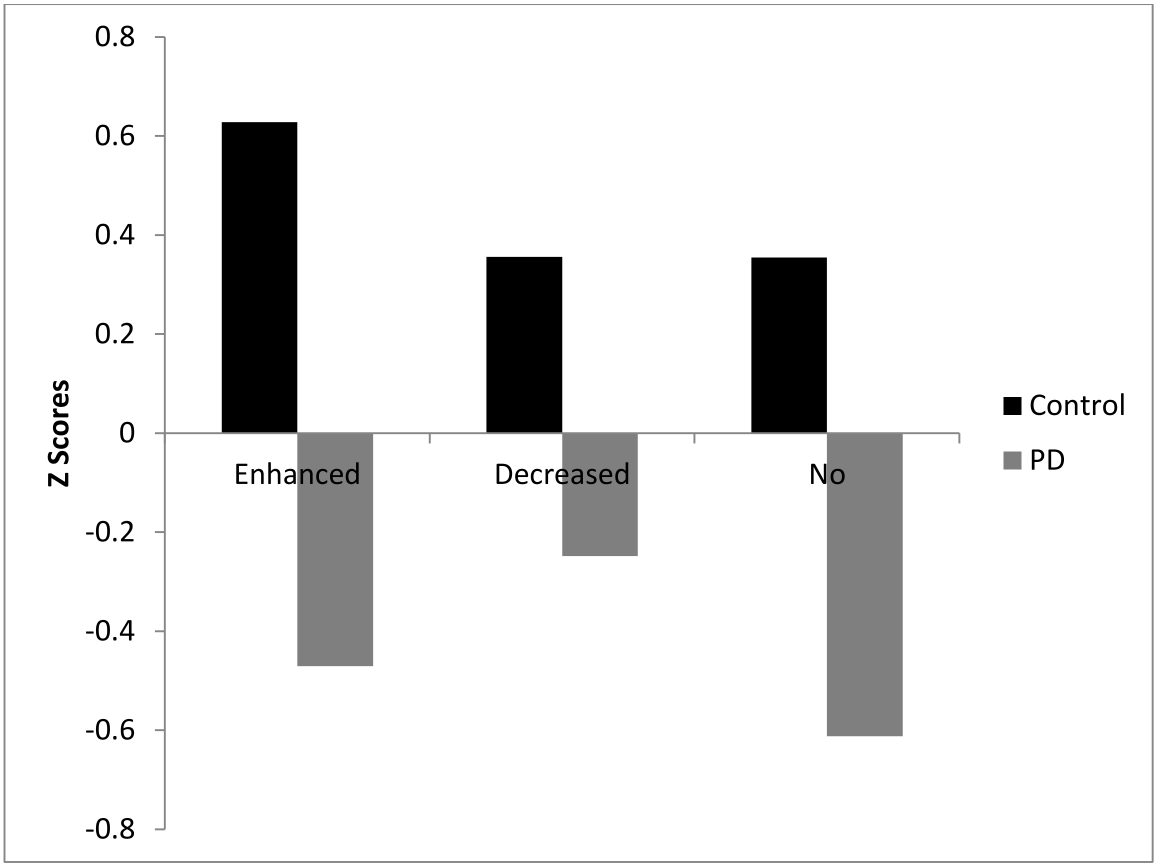


Table 1. Mean age by group and gender.

	Parkinson's disease group	Healthy control group
Age	72.45 ± 6.83	71.16 ± 7.26
Gender	9 females, 15 males	11 females, 14 males
FES	23.67 ± 15.06	14.32 ± 8.47
Fall history – last year	11.88 ± 42.99	1.8 ± 7.23
Fall history – last month	1.04 ± 3.59	0.12 ± 0.60
Fall history - injury	1.17 ± 4.21	0.48 ± 2.00

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Cardiopulmonary Resuscitation and AED certified through April 2017, American Heart Association

Employment/Professional Physical Therapy Clinical Experience

Jan 2015-Apr 2015 Clinical Internship as SPT: Sunrise Hospital, Rehab Department 3186 S Maryland Pkwy, Las Vegas, NV 89109
Oct 2014-Dec 2014 Clinical Internship as SPT: Summerlin Hospital, Acute Department 657 North Town Center Dr, Las Vegas, NV 89144
July 2014-Oct2014 Clinical Internship as SPT: American Fork Physical Therapy (outpatient) 636 East State St, American Fork, UT 84003

Peer Reviewed Publications

None

Funded Grant Activity

Blood J, Ostrander J, Parrish G, Landers MR. Do the physical therapist's words really matter?: the effects of enhanced and decreased expectations on balance performance in those with and without Parkinson's disease. UNLVPT Student Opportunity Research Grant 2014. $1850

Current/Active Research Activity

Blood J, Ostrander J, Parrish G, Landers MR. Do the physical therapist's words really matter?: the effects of enhanced and decreased expectations on balance performance in those with and without Parkinson's disease, *paper revision stage (funded)*

Membership in Scientific Professional Organizations

American Physical Therapy Association

Continuing Education Attended

Combined Sections Meeting in San Diego, CA Jan 21-24 2013
Combined Sections Meeting in Las Vegas, NV Feb 3-5, 2014

Curriculum Vitae

Joshua Ostrander, SPT, BS
Student Physical Therapist
275 Buckskin St., Henderson, NV, 89074
541-517-3107, Ostran10@unlv.nevada.edu

Education

DPT	University of Nevada, Las Vegas-Las Vegas, NV Physical Therapy	2012-2015 *Pending Graduation
BS	University of Oregon - Eugene, OR General Science	2009-2011 *Chemistry and Human Physiology Minors
AA	Lane Community College – Eugene, OR Associate in Arts	2004-2009

Licensure

State of Nevada Physical Therapy Examiners' Board — License pending (May 2015)

Certifications

American Heart Association Cardiopulmonary Resuscitation and AED Certification: Valid through April 2017. (Maintained since 2009)

Employment/Professional Physical Therapy Clinical Experience

Feb 2015-April 2015	Outpatient Student Affiliation: Affiliated Physical Therapy 2250 E Postal Dr., Pahrump, NV 89048 (6 weeks)
Jan 2015-Feb 2015	Outpatient Student Affiliation: Select Physical Therapy 8420 W Warm Springs Rd #110, Las Vegas, NV 89113 (6 weeks)
Oct 2014-Dec 2014	Inpatient Rehabilitation Student Affiliation: St. Rose Dominican Hospital – Rose de Lima Campus 102 Lake Mead Pkwy, Henderson NV 89015 (10.5 weeks)
July 2014-Sept 2014	Inpatient Acute Student Affiliation: Centennial Hills Hospital 6900 North Durango Drive, Las Vegas, NV 89149 (11 weeks)

July 2013-Aug 2013	Outpatient Student Affiliation: Anthem Physical Therapy 11201 S Eastern Ave # 220, Henderson, NV 89052 (6 weeks)
Aug 2011-May 2012	Rural Outpatient Physical Therapy Aide: Oregon Neurosport Physical Therapy 680 Pacific Hwy W, Junction City, OR 97448

Peer Reviewed Publications

None

Funded Grant Activity

- Blood J, **Ostrander J**, Parrish G, Landers MR. Do the physical therapist's words really matter?: the effects of enhanced and decreased expectations on balance performance in those with and without Parkinson's disease. UNLVPT Student Opportunity Research Grant 2014. $1850

Current/Active Research Activity

- Blood J, **Ostrander J**, Parrish G, Landers MR. Do the physical therapist's words really matter?: the effects of enhanced and decreased expectations on balance performance in those with and without Parkinson's disease, *paper revision stage (funded)*

Membership in Scientific Professional Organizations

May 2015-Current	APTA Orthopedic Section Member
May 2013-Current	APTA Section on Research Member
May 2012-Current	Nevada Chapter APTA member

Professional Development and Leadership

June 2013-2014	Committee member UNLV PT class of 2015 annual charity golf tournament
March 2013	UNLVPT Prospective Faculty Interviews
July 12th	NPTA Board Meeting

Continuing Education Attended

- NPTA District Meeting: PT interventions utilizing radiographic imaging, Dr. James M. McKivigan, DC, PT, MPA, MA. Jan 2015.

- UNLV Physical Therapy Graduate School Class of 2014 Thesis Presentations. May 2014.

- Biomechanical Risk Factors Related to ACL Injury: Implications for rehabilitation and return to sport decisions post ACL reconstruction. UNLV Distinguished Lecture Series. Led by: Christopher M. Powers, PT, PhD, FACSM, FAPTA. 04/03/2014.

- Pain Seminar: Dr. Adriaan Louw.
    - January 2014
    - February 2013

- NPTA District Meeting: "Shoulder Instability", Dr. Timothy Trainor. November 2013.

- UNLV Physical Therapy Graduate School Class of 2013 Thesis Presentations. May 2013.

- Hip Arthroscopy and Differential Diagnosis: Dr. Hanson lecture. April 2013.

- Functional Biomechanics of the Lower Quadrant: Dr. Chris Powers. January 2013.

- American Physical Therapy Association Combined Sections Meeting
    - Las Vegas, Nevada, February 8-12th, 2014
    - San Diego, California, January 21-24th, 2013

- UNLV Department of Physical Therapy Student Presentations.
    - May 15th, 2015
    - May 16th, 2014
    - May 17th, 2013

Teaching Experience

July 2010-2011	University of Oregon Anatomy and Human Physiology peer tutor/teaching assistant.

<u>Curriculum Vitae</u>

Granuaile Parrish, SPT
Student Physical Therapist
617 Wagon Way, Grand Junction, CO 81504
970-216-0743, granuaile.parrish@gmail.com

Education

DPT	University of Nevada, Las Vegas-Las Vegas, NV Physical Therapy	2012-2015 (Graduation pending)
BS	University of Northern Colorado-Greeley, CO Sports and Exercise Science *Minor Psychology	2005-2009

Licensure

Colorado Division of Professions and Occupations   License pending (May 2015)
Office of Licensing-Physical Therapy

Certifications

Cardiopulmonary Resuscitation and AED Certified: Valid through April 2017.
(Renewed biennially since 2009) American Heart Association

Cancer Exercise Specialist. Certified 2009.
Rocky Mountain Cancer Rehabilitation Institute, Greeley, Colorado

Employment/Professional Physical Therapy Clinical Experience

Jan 2015-Apr 2011	Clinical Internship Student Physical Therapist: Outpatient Geriatrics & Home Health. Infinity Rehab; The Commons at Hilltop 625 27 ½ Rd, Grand Junction, CO 81506 (12 weeks)
Oct 2014-Dec 2014	Clinical Internship Student Physical Therapist: SNF/Rehab. Eagle Ridge at Grand Valley Nursing Home 2425 Teller Avenue, Grand Junction, CO 81501 (10.5 weeks)
July 2014-Sept 2014	Clinical Internship Student Physical Therapist: Inpatient Acute. Grand Junction VA Medical Center 2121 North Ave, Grand Junction, CO 81501 (11 weeks)
July 2013-Aug 2013	Clinical Internship Student Physical Therapist: Outpatient Orthopedic. Concentra Urgent Care 3900 Paradise Rd, Las Vegas, NV 89169 (6 weeks)

July 2011-May 2012	Cancer Exercise Specialist, Physical Therapy Aide and Scheduler. Boulder Community Hospital: Neuro, Ortho and Cancer Rehab, Boulder, CO (1 year)
Jan 2009-May 2009	Capstone Internship: Cancer Exercise Specialist. Rocky Mountain Cancer Rehabilitation Institute, Greeley, CO 80631 (18 weeks)

Peer Reviewed Publications

None

Funded Grant Activity

- Blood J, Ostrander J, **Parrish G**, Landers MR. Do the physical therapist's words really matter?: the effects of enhanced and decreased expectations on balance performance in those with and without Parkinson's disease. UNLVPT Student Opportunity Research Grant 2014. $1850

Current/Active Research Activity

- Blood J, Ostrander J, **Parrish G**, Landers MR. Do the physical therapist's words really matter?: the effects of enhanced and decreased expectations on balance performance in those with and without Parkinson's disease, *paper revision stage (funded)*

Membership in Scientific Professional Organizations

<u>APTA Member since May 2012</u>

Colorado Chapter April 2015-Current

Neurologic Section Member April 2015-Current

Nevada Chapter May 2012-April 2015

Consultative and Advisory Positions

UNLV PT Prospective Faculty Interviews (March 2013)

Developer/Planning Committee/Marketing Coordinator/Grant Funding/Scheduler

Development and Implementation of Boulder Community Hospital's Cancer Exercise Program through the Neuro, Ortho and Cancer Rehabilitation Center, BCH Outpatient Therapy 311 Mapleton Ave, Boulder, CO 80304. (2011-2012)

Community Service/Volunteer Work

Jan – Apr 2015	Student Physical Therapist. Adult Neurologic and Pediatric

	Physical Therapy. Family Health West Adult & Pediatric Rehabilitation Services 576 Kokopelli, Suite F Fruita, CO 81521
Jan 2015 & Nov 2014	Aspen Seating and Ride Designs Quarterly Western Colorado Wheelchair clinic. Family Health West Adult & Pediatric Rehabilitation Services 576 Kokopelli, Suite F Fruita, CO 81521
May 2014	UNLV PT Class of 2015 Annual Charity Golf Tournament in association with KIDDOS Organization, Las Vegas, Nevada
May 2014 & Feb 2014	Backyard BBQ with line dancing and Mid-Winter Whirl Dance (Ballroom dancing).Atria Sutton Terrace, an Assisted Living Facility, Las Vegas, Nevada.
Feb 2014	Dance Away Obesity. The Jump for Joy Foundation at Marquee Nightclub & Dayclub, Las Vegas, Nevada.
Oct 2013	Heart & Stroke Walk/Run. The American Heart Association, Western States Affiliate, Las Vegas, Nevada.
Dec 2012	Children's Christmas Magical Forest. Opportunity Village, Las Vegas, Nevada.
Jan 2010-May2010	Cancer Exercise Specialist. Rocky Mountain Cancer Rehabilitation Institute, Greeley, CO 80631

Services to a University/School/Department on Committees/Councils/Commissions

UNLV Inter-professional Education Class-Test Run. University of Nevada Las Vegas, Shadow Lane Campus Clinical Simulation Center (Oct 2013-Nov 2013).

Continuing Education Attended

- More Than Meets the Eyes: Vision Symptoms of PD. The Parkinson 's disease Foundation. Led by Daniel Gold D.O., Assistant Professor of Neurology, Ophthalmology, Neurosurgery, Otolaryngology, The Johns Hopkins University School of Medicine. 03/03/2015. 1hour.

- Hip Symposium: Hip Arthroscopy and Post-Operative Rehabilitation after Hip Arthroscopy. Western Orthopedics & Sports Medicine. Led by Kennan Vance D.O., orthopedic surgeon and Matt MacAskill MSPT. 01/21/2015. 2 hours.

- Empowering Individuals with Access and Postural Assessment for Seating and Wheeled Mobility. NuMotion 2014 Wheelchair Convention Grand Junction, CO. Led by: Erib Grieb OTR, ATP, CRTS. 11/13/2014. 0.2 CEUs.

- Wheelchair Back Supports: Principles of Responsible Design and Fitting. NuMotion 2014 Wheelchair Convention Grand Junction, CO. Led by Joan Padgitt PT, ATP. 11/13/2014. 0.2 CEUs.

- American Physical Therapy Association Combined Sections Meeting
    - Las Vegas, Nevada, February 8-12th, 2014
    - San Diego, California, January 21-24th, 2013

- Biomechanical Risk Factors Related to ACL Injury: Implications for rehabilitation and return to sport decisions post ACL reconstruction. UNLV Distinguished Lecture Series. Led by: Christopher M. Powers, PT, PhD, FACSM, FAPTA. 04/03/2014. 0.15 CEUs.

- UNLV Department of Physical Therapy Student Presentations.
    - May 15th, 2015. 6 hours/0.6 CEUs.
    - May 16th, 2014. 6 hours/0.6 CEUs.
    - May 17th, 2013. 6 hours/0.6 CEUs.

- Training and Development Weekend Workshop: CancerFit Exercise Program for Cancer Survivors. Colorado Parks and Recreation Association-Cancer Fitness Institute Training Workshop. Led by: Sandy Dickman, Master Trainer. 12/01/2011.

Teaching Experience

May 2010: Rocky Mountain Cancer Rehabilitation Institute's 2010 Cancer Exercise

Workshop. Greeley, CO.