THORNTON-BROOKS, JENNIFER D. Ed.D. Why those with Chronic Low Back Pain Engage in Physical Activity. (2024)
Directed by Dr. Pam Kocher Brown. 63 pp.

Low back pain is the leading worldwide cause of years lost to disability and is a very common type of chronic pain. Exercise has been shown to be an effective treatment in the management of chronic low back pain (CLBP). While exercise has been shown to decrease acute pain perception, there are still many questions regarding why some individuals with CLBP are more active than others. The purpose of this study was to understand how and why individuals with CLBP engage in physical activity (PA). Survey responses were collected from individuals with CLBP or a history of CLBP that are currently physically active. The survey responses gauged PA level, pain and disability levels, self-efficacy for exercise, motivation for exercise, strategies to remain physically active, and a variety of open-ended questions to provide more insight and depth. Motivational data revealed the main reasons participants were motivated to remain physically active included enjoyment and decreased pain. This research study found that pain did not impact self-efficacy and motivation to be physically active in those with CLBP. Study findings indicate that those with CLBP that are motivated to exercise will find a way to exercise regardless of pain. These study findings could be used to educate individuals with CLBP or those who work with them about the importance of remaining physically active to decrease pain and increase enjoyment, and to develop educational materials about how to safely exercise despite CLBP.

WHY THOSE WITH CHRONIC LOW BACK PAIN ENGAGE IN PHYSICAL ACTIVITY

by

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A Dissertation
Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

Greensboro

2024

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TABLE OF CONTENTS

LIST OF TABLES v
LIST OF FIGURES vi
CHAPTER I: PROJECT OVERVIEW 1
Background Literature 2
Motivation 3
Self-Determination Theory. 4
Self-Efficacy. 6
Conclusion 7
Purpose and Aims 7
Methods 8
Participants 8
Survey. 8
Positionality. 10
Procedures 10
Data Analyses. 11
Results 11
Physical Activity Level 11
Pain 12
Self-Efficacy and Motivation 12
Physical Activity and Low Back Pain. 13
Strategies to Maintain Physical Activity Level 14
Conclusion 14
Future Directions 16
CHAPTER II: DISSEMINATION 18
CHAPTER III: ACTION PLAN 20
REFERENCES 22
APPENDIX A: SURVEY 26
APPENDIX B: RECRUITMENT FLYER 44

APPENDIX C: RECRUITMENT EMAIL 45
APPENDIX D: STATISTICAL TABLES 48
APPENDIX E: INFOGRAPHIC FOR DISSIMINATION 61
APPENDIX F: EMAIL TO DISTRIBUTE INFOGRAPHIC 62

LIST OF TABLES

Table 1. Motivation Question Data.. 18

LIST OF FIGURES

Figure 1. The Self-Determination Continuum 5

CHAPTER I: PROJECT OVERVIEW

Low back pain is the leading worldwide cause of years lost to disability and is an extremely common type of chronic pain (Buchbinder et al., 2018; Lucas et al., 2021). Data from the CDC indicates that 39% of adults had lower back pain in 2019, and back pain is the most prevalent site for pain in U.S. adults (Lucas et al., 2021). While much research is still needed to more fully understand how to effectively treat and prevent low back pain, exercise has been shown to be an effective treatment for chronic low back pain (CLBP). Research has shown that there is an inverse relationship between CLBP and physical activity (PA) in which medium intensity PA is associated with lower prevalence of CLBP (Alzahrani et al., 2019). While higher levels of PA are associated with lower CLBP prevalence, pain may impact PA levels and behaviors in those with CLBP.

The impact of chronic pain on physical activity level is complex, and the relationship is not simply that chronic pain results in decreases in daily physical activity level (Perruchoud et al., 2014). There are stark differences in physical activity patterns between those with chronic pain and those without (Perruchoud et al., 2014). Perruchoud et al. (2014) found that individuals with chronic pain, while matching the PA levels of their pain-free counterparts, displayed PA patterns that likely belie their pain levels throughout the day. The researchers noticed a trend that PA levels among individuals with chronic back pain were higher in the morning and lower in the evening, suggesting that pain increased as the day progressed and there was a subsequent impact on PA level (Perruchoud et al., 2014). Pain can have a profound impact on an individual's PA behaviors and motivation to participate in these behaviors, despite the individual's awareness that exercise improves CLBP.

The investigation of self-efficacy and motivation may help to reveal the nuances of the relationship between daily chronic pain level and daily physical activity level. Perception and tolerance of pain contain a large amount of individual variation (Paris-Alemany, 2019; Sari et al., 2015). This means that an individual's experience with pain, accepting that it is unique to each individual and rich with emotional and psychological implications, may be predictive of their physical activity level and subsequent pain prognosis. Research has shown that improving PA self-efficacy (the belief that one can complete a specific behavior) in those with CLBP decreases both pain perception and pain catastrophizing (Paris-Alemany, 2019). While exercise has been shown to decrease acute pain perception, there are still many questions regarding why some individuals with CLBP are more active than others. One reason is motivation. Motivation captures the reasons why an individual completes an activity or task and is critical in supporting sustained exercise (Jung & Jeong, 2016; Teixeira et al., 2012). Investigating components relating to motivation, including self-efficacy, will improve our understanding of exercise adherence in those with CLBP.

Background Literature

Research indicates that exercise is an effective treatment for reducing pain in those living with CLBP (Ambrose & Golightly, 2015; Hayden et al., 2021; Owen et al., 2020; Searle et al., 2015). While there are many mechanisms at play due to the variety of causes of CLBP, the overwhelming consensus is that exercise is greatly beneficial to the management and prevention of CLBP. Most compelling, higher levels of PA are associated with lower prevalence of CLBP (Alzahrani et al., 2019). Research has shown a lower prevalence rate of CLBP in individuals using exercise interventions as compared to other treatments (Hayden et al., 2021; Searle et al., 2015).

The type of exercise seems to be specific to the effect on CLBP. Research has shown that many improvements in pain were found in exercise modalities that apply strength and resistance exercises that concentrate on whole body and trunk muscle activation patterns, address increased fatigability of back and trunk muscles, and that support lumbar stability (Coulombe et al., 2017; Searle et al., 2015). Exercises that focus on core stability have been shown to decrease pain and increase functionality in CLBP patients through removing stress from muscles of the back by improving core and pelvic stability, meaning that the muscles of the back are not overused due to inherent weakness elsewhere (Coulombe et al., 2017). Additionally, research has shown that exercises that target multiple muscle groups show a larger improvement in pain outcomes due to the wide range of muscles trained and the improvements in muscle strength, power, and subsequent functional ability (Searle et al., 2015).

Motivation

Motivation is an important aspect of PA behavior in any individual. Motivation helps an individual initiate and maintain a behavior (Brunet & Sabiston, 2011). In individuals with CLBP, motivation has an effect on self-management and coping behaviors like exercise because it is related to the likelihood and the impetus for initiating PA (Jung & Jeong, 2016). Research has shown that, in the absence of addressing motivation, education is not enough to persuade individuals with CLBP to be physically active (Jung & Jeong, 2016). Motivation must be addressed in any patient education in order to successfully address factors that are central to the initiation and maintenance of PA in the self-management of their pain (Jung & Jeong, 2016). Motivation could be addressed by incorporating activities that are personally meaningful to the individual, which would improve adherence to PA. The section below on the Self-Determination Theory (SDT) further explains motivation. SDT posits that motivation exists on a continuum and

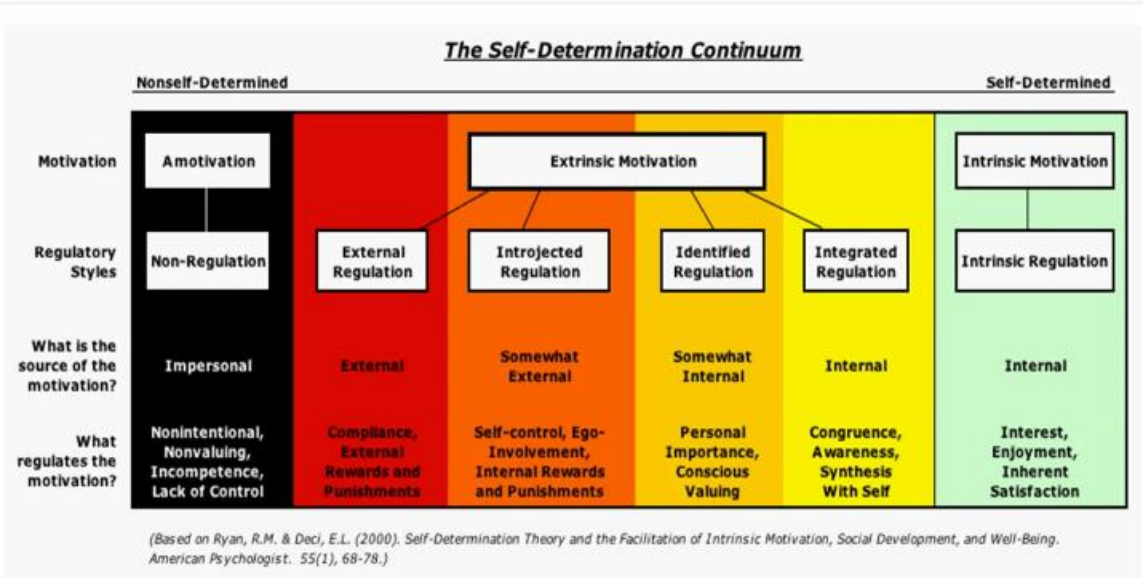
the purpose of motivational approaches must be to move the individual further up the continuum (Deci & Ryan, 1980). This motivational continuum represents the personal and environmental factors that are foundational to why an individual completes a behavior, such as being physically active (Deci & Ryan, 1980). One end of the spectrum represents the external reasons an individual completes PA, such as an actual reward or punishment, while the other end of the spectrum represents the self-determined (or internal) reasons an individual completes PA, such as personal enjoyment (Deci & Ryan, 1980). In moving individuals from the external end of the spectrum towards the self-determined end of the motivational spectrum, research has shown that these individuals are more likely to maintain the behavior in question (Deci & Ryan, 1980). Therefore, incorporating activities that are personally enjoyable to the individual and targeted at physical rehabilitation of pain and functional limitations can be more helpful than a punishment/reward system with shifting motivation towards the self-determined end of the continuum for completing PA. Research has found that motivation is a driving factor, more so than pain level, in those with CLBP (Jung & Jeong, 2016). Actual or anticipated pain exacerbation will negatively affect an individual's motivation to be physically active, and as pain exacerbation is an understandably important consideration for those with CLBP, it is important to address how this concern may impact motivation to be physically active in such individuals. Interventions to increase PA participation in those with CLBP show the most success when motivational aspects are incorporated into an exercise program for those with CLBP (Christiansen et al., 2010).

Self-Determination Theory

Self-determination theory (SDT) is central to motivation because it explains that behaviors are motivated by personal and environmental factors, and it is the interplay between

these two variables that results in a specific behavior (Deci & Ryan, 1980). According to SDT motivation exists on a continuum that spans from amotivation (no motivation) to intrinsic motivation that focuses on enjoyment, interest, and satisfaction (Deci & Ryan, 1980). Across the continuum are other types of motivation that help to explain why people are engaging in a certain specific behavior, which in this case is engaging in physical activity despite CLBP. These levels of regulation include external (motivated by external rewards/punishments), introjected (motivated by guilt/obligation), identified (motivated by gains/outcomes), integrated (motivated by personal identification/awareness), and intrinsic (motivated by enjoyment). Understanding the levels of regulation and what motivates someone can help with targeting how to support them in completing a specific behavior, which again is being physically active despite CLBP. To be self-determined, the individual consciously chooses to complete a behavior (Deci & Ryan, 1980). This continuum is found in the following diagram:

Figure 1. The Self-Determination Continuum



Examining the self-determined motivational end of the continuum, in the context of PA, intrinsic motivation explains that an individual completes an activity due to inherent satisfaction

or pleasure derived from the activity (Deci & Ryan, 1980). This means that a person would be physically active because they ultimately enjoy it. On the other end of the continuum, extrinsic motivation means that an individual would engage in PA because of some reward outside of the enjoyment of the activity (Deci & Ryan, 1980). This could be that a doctor ordered a patient to complete a rehabilitation program. SDT is important in the context of PA and CLBP because there are clearly reasons that some individuals with CLBP engage in PA, and thus it is important to consider the motivational tendencies in identifying what drives those with CLBP to be physically active. Understanding why people with CLBP continue to be physically active can help others with CLBP to potentially be physically active or to create interventions that support the specific types of motivations that will get people with CLBP physically active.

Self-Efficacy. Self-efficacy is central to motivation because self-efficacy is the belief that one feels they can successfully complete a specific behavior, such as engaging in physical activity (Williams & Rhodes, 2016). Individuals with high self-efficacy are more likely to set higher goals be more committed to the goals, and accomplish these goals, using strategies they create to accomplish the goals (Dishman et al., 2019). Strategies to improve self-efficacy and increase motivation include focusing on small successes in being PA, noticing symptom reduction, exercising with other patients who successfully adhere to PA programs, provide patient education on techniques to improve motivation, and providing verbal encouragement (Ambrose & Golightly, 2015). Additionally, self-efficacy is a strong predictor of a health behavior and thus is predictive of subsequent health benefit. In patients with CLBP, PA self-efficacy could serve as an important predictor of the likelihood of participating in and completing a PA program. Self-efficacy can be improved through showing the individual the changes that have occurred because of their increase in activity, by offering alternatives,

promoting awareness of movement and of pleasurable sensations, and by encouraging them to prevent overactivity that leads to setbacks (Singh et al., 2014). This is applicable to understanding PA levels in those with CLBP because, when viewed as a setback, pain could be a major impediment to accomplishing PA goals. However, with conviction that PA goals can be completed despite pain, an individual can sustain their coping self-efficacy and therefore pain levels will not affect PA level as significantly. Together with the SDT, self-efficacy helps to explain the overall motivation an individual has towards PA behaviors.

Conclusion

Chronic low back pain has a high global burden, affects virtually all dimensions of physical, psychological, and social functioning, and is most frequently attributed to an unknown etiology. While exercise and physical activity are commonly prescribed in the management and treatment of CLBP, there is still poor understanding of what motivates some individuals with CLBP to be physically active. There are several gaps in knowledge that could be influential in addressing the pervasive problem of CLBP and indicate areas for future research. First, identifying individual variations in self-efficacy and PA level could reveal important information about the PA patterns and behaviors that exist in this population. Second, investigating motivational factors that influence PA behaviors and patterns in this population could improve understanding of the impact that motivation has on PA behaviors in individuals with CLBP. Finally, improving understanding of the relationship between PA and CLBP may reveal important directions for future research and the potential for developing a behavioral model.

Purpose and Aims

The purpose of this research is to understand how and why individuals with chronic low back pain (CLBP) engage in physical activity (PA).

Aim 1: To identify what types of activities those with CLBP engage in and how these activities are affected by or affect pain.

Aim 2: To determine what strategies those with CLBP use to maintain PA levels.

Methods

An anonymous survey was used with validated measures and open-ended questions to explore why people with CLBP participate in physical activity.

Participants. The target population for this study were individuals with current CLBP (consisting of pain >3 months in duration) or a history of CLBP, currently physically active, and over the age of 18 years old. There was a total of 73 survey responses. Of the respondents, 51 were female, 21 were male, and one indicated non-binary as their gender. Respondent ages were primarily under the age of 44 years old, with the most common age group of 35-44.

Survey. The survey consisted of 27 questions and took approximately 20 minutes to complete. The survey was developed from the following validated measures: the International Physical Activity Questionnaire (Hagstromer, Oja, &, & Sjostrom, 2006), the Graded Chronic Pain Scale (Sharma, Kallen, & Ohrbach, 2022), the Self-Efficacy for Exercise Scale (Resnick, & Jenkins, 2000), and the Motivation for Physical Activity Questionnaire (Uimonen, 2021).

The International Physical Activity Questionnaire assesses the types of intensity of physical activity and sitting time that people do as part of their daily lives (Hagstromer, Oja, &, & Sjostrom, 2006). Questions from the International Physical Activity Questionnaire (short form) were used to measure frequency and time spent doing vigorous PA, moderate PA, and walking in the past seven days. The scale also collected information on time spent sitting in the last seven days. The scale consists of seven multiple choice questions. All seven questions were assessed.

The Graded Chronic Pain Scale assesses pain intensity and pain-related disability (Sharma, Kallen, & Ohrbach, 2022). The Graded Chronic Pain Scale was used to measure typical pain level, and days in the last 6 months that pain prevented the following: usual activities, daily activities, ability to participate in social, family, and recreational activities, and the ability to work. The Graded Chronic Pain Scale consists of seven items that are measured on a scale from 0-10. From this measure, five questions were used in the study survey.

The Self-Efficacy for Exercise Scale is used to assess SE for Exercise (Resnick, & Jenkins, 2000). This scale consists of nine questions gauging confidence that the individual could exercise given a certain condition. The survey items were measured on a scale from 0-10, 0 meaning 'not confident' and 10 meaning 'very confident'. All items from this scale were used in this study survey to compile a total SE score.

The Motivation for Physical Activity Questionnaire is used to assess the motives for participating in PA (Uimonen, 2021). This questionnaire consists of 28 questions. This survey used the second set of 12 questions from this questionnaire. These questions gauge reasons to exercise (or reasons the individual would like to exercise). The responses were collected using a Likert scale (a scale of 1-7, 1 meaning 'not at all true' and 7 meaning 'very true'). This questionnaire contains individual items that reflect the varied parts of the motivation continuum.

Six multiple-choice questions were also asked to collect data on the following: types of PA people engage in, age and gender, effect of PA on CLBP, and strategies to maintain PA level. Six open-ended questions were used to collect data on the following: reasons for not being physically active and how CLBP affects PA level, advice people would give to someone with CLBP on how to remain physically active, what motivates people to stay physically active when experiencing CLBP, how CLBP affects daily life, and an option to share anything else about

their experience with CLBP. The open-ended questions were designed to supplement validated measures and multiple-choice questions and provide greater depth to data. In the last question on the Qualtrics survey, subjects were thanked for their participation in the study and asked if they would like to receive information about the results of the study. If they said yes, they were taken to a Google form to provide their email address - this was not connected in any way to their Qualtrics responses. A Google form was used to collect email addresses for the purpose of sharing study results with those that selected this option.

Positionality. My background as a yoga instructor gave me a large amount of experience working with populations with chronic low back pain. This lends to my role as researcher because I have personally observed the ability of individuals living in chronic pain to persevere and remain physically active even though they were sometimes in a large amount of pain.

Additionally, as a cyclist, I have encountered many individuals who remain consistent cyclists, sometimes at an elite level, that live with a large amount of pain yet are still extremely engaged in sport. This contributed to my interest in this population because I found it intriguing as to how and why these individuals remained so physically active despite pain.

Procedures. Following IRB approval, recruitment took place between September 12, 2023 and December 11, 2023. Participants gave informed consent before completing the Qualtrics survey (see Appendix A). Individuals that currently have or have ever had CLBP, consisting of low back pain lasting longer than 3 months AND that are currently physically active were recruited. Participants were recruited from the western North Carolina area and nationwide online via social media posts and flyers posted locally. Permission to post the survey flyers was obtained prior to posting at these locations and sites. In order to recruit currently physically active individuals, flyers were posted locally at a mid-sized university located in

western North Carolina, a Pilates Studio in a small western NC city, and a yoga studio in central NC as these locations targeted active individuals. Social media was important to recruitment as it allowed for a larger number of people to be targeted for participation. Survey flyers were distributed with a QR code that linked to the Qualtrics survey (see Appendix A). The survey was shared online via Facebook and Instagram. The survey flyer was posted to local cycling group ride pages, as well as Facebook, Strava, and Instagram pages.

Data Analyses. Following data collection, descriptive statistics including mean, standard deviation, and frequencies were calculated for the closed-ended survey questions. Analyses were conducted using SPSS (version 29; IBM Corp, Armonk, NY).

Open-ended responses were reviewed to look for commonalities. Responses were organized into categories and labeled. The number of responses falling in each category were tallied and frequencies were reported. Representative quotes from participants were identified for each question.

Results

This research investigated the motivational and behavioral aspects of physical activity among those with CLBP.

Physical Activity Level. The majority of respondents engaged in more than 20 minutes of vigorous physical activity in one bout of exercise within a seven-day period (n=54, 74%). The majority of respondents spent greater than 20 minutes walking in a single bout within a seven day period (n=46, 49.3%). Response to the open-ended questions was limited but yielded information about common physical activities and reasons for not being active. Open-ended questions indicated that the most common reasons cited for not engaging in more physical activity were lack of motivation (n=4, 36% of completed open-ended responses) and time

constraints (n=2, 18% of completed open-ended responses). Open ended responses indicated popular activities commonly engaged in were walking and hiking (n=10, 76.9% of completed open-ended responses).

Pain. The majority of respondents (n=48, 68.6%) stated that their typical pain level was 3 out of 10 or below. Pain data was divided into two separate categories: low to moderate (0-5 on typical pain level scale) and moderate to high (6-10 on typical pain level scale). The majority of respondents fell into the low to moderate pain group (n=51, 84%). Those in the moderate to high pain group constituted much less of the respondent pool (n=22, 15.7%). There were no statistical differences between the groups in self-efficacy or motivation so all values are reported for the entire sample.

Self-Efficacy and Motivation. The mean self-efficacy score (scale 0-10) was 6.01 ± 1.83. In the table below, mean and SD from each of the questions can be found. The motivation results are listed in order of the SDT continuum, beginning with intrinsic regulation progressing towards external regulation. The scores on based on a Likert Scale, with 1 meaning "not true at all" and 7 meaning "very true".

Table 1. Motivation Question Data

Motivation Question "I exercise/work out because" **(Relation to SDT continuum)**	**Mean ± SD**
I simply enjoy working out (Intrinsic Motivation)	5.83 ± 1.494
It is fun and interesting (Intrinsic Motivation)	5.52 ± 1.575
I find pleasure in discovering and mastering new training techniques (Intrinsic Motivation)	4.80 ± 1.870

Working out is important and beneficial to my health and lifestyle (Identified Regulation)	6.44 ± 0.982
It helps my image (Identified Regulation)	5.06 ± 1.744
It is personally important to me to work out (Identified Regulation)	5.91 ± 1.567
I have a strong value for being active and healthy (Identified Regulation)	5.87 ± 1.623
I want others to see me as physically fit (Identified Regulation)	5.11 ± 1.741
I would feel bad about myself if I didn't do it (Introjected Regulation)	5.35 ± 1.722
I'd be afraid of falling too far out of shape if I didn't (Introjected Regulation)	5.34 ± 1.614
I feel pressured to work out (Introjected Regulation)	3.24 ± 1.748
Others like me better when I am in shape (External Regulation)	3.61 ± 1.776

Physical Activity and Low Back Pain. Of the respondents, the majority (n=46, 63%) reported that their low back pain was either improved or somewhat improved through physical activity. When asked how they maintain PA levels while having CLBP, open-ended questions indicated that respondents recommended "Stretching" (n=14, 21.2%), "persevere" (n=10, 15.2%, "strengthen" (n=7, 10.6%), "know your limits" (n=7, 10.6%), and "follow a routine" (n=5, 7.6%). When asked how participants were motivated to stay physically active even when in pain,

participants responded: “[t]he overall good feeling of completing physical activity,” and “I just feel better after I have been physically active regardless of my pain. The activity is mentally and psychologically beneficial to me.”

Strategies to Maintain Physical Activity Level. Respondents were able to select more than one strategy. The majority of respondents indicated that they exercised outdoors as a strategy to maintain PA (n=44, 60.3%). The next common strategy employed was exercising at the same day and time (n=34, 46.6%). Working out with a friend was also indicated as a common strategy (n=23, 31.5%). Incorporating exercise into chores was also indicated (n=22, 30.1%). Group exercise was also indicated as a means of maintaining PA levels (n=16, 21.9%).

Conclusion

The findings of this study provided some insight into how and why individuals with chronic low back pain (CLBP) engage in physical activity (PA). It also helped to identify how pain affects PA in this population along with strategies for those with CLBP to maintain PA.

This study found that the participants, who are both physically active and have CLBP, primarily display identified regulation in relation to the SDT motivation continuum. Identified regulation means that these individuals are physically active because it is personally important to them (Jung & Jeong, 2016). Strategies that improve personal enjoyment of PA, such as aligning personal interests with PA mode and environment, could be helpful in improving motivation in people with CLBP regardless of pain levels. This aligns with the literature on motivation because it explains that motivation to be PA may help to prevent the loss of functionality that often accompanies CLBP (Jung & Jeong, 2016). This same research found that motivation was more important in maintaining PA level than pain (Jung & Jeong, 2016). This is consistent with the study findings because it was motivation rather than pain that predicted physical activity level in

those with CLBP. These findings suggest that motivation to be physically active may outweigh the discomfort of pain in a manner that allows individuals with pain to be able to maintain some level of PA.

The open-ended responses supported the survey findings. Participants noted that what motivated them to be physically active was both the satisfaction of completing the PA and the decrease in pain. One participant stated that they were motivated to stay physically active even when in pain due to "[t]he overall good feeling of completing physical activity," while another reported "I just feel better after I have been physically active regardless of my pain. The activity is mentally and psychologically beneficial to me." Sharing these quotes with individuals with CLBP may help them to see the perceived value of PA from others with CLBP and, therefore, they may be more motivated to engage in PA and experience the same benefits.

Survey data indicated that self-efficacy (SE) for exercise was also high in this sample. Like motivation, this means that SE to complete PA was supportive of maintaining PA. This also aligns with the literature because those with higher SE set PA goals, accomplish them, and also create strategies of maintaining and initiating PA (Dishman et al., 2019). This population clearly demonstrates that this is the case because, despite pain, they are able to maintain PA levels. The literature also suggests that improving PA self-efficacy decreases the overall experience of pain, which could also help explain how individuals with CLBP are able to maintain PA level (Jung & Jeong, 2016).

Essentially, this group of people were physically active regardless of their pain level. In this study, pain did not seem to affect PA level. It is clear that these participants demonstrate a certain level of tenacity in regards to maintaining functionality and PA level. The high level of identified regulation motivation in this sample suggests that pain does not interfere with PA level

as much as one would think because personal importance of PA motivates the individual to be PA and, therefore, they do not allow pain to be a barrier to PA.

My study findings indicate that those with CLBP that are motivated to exercise will find a way to exercise regardless of pain. One respondent said: "I think the important thing is in regards to back pain and pain in general is to keep moving. Do what you can without causing more pain, but you have to keep moving." This research study shows how important maintaining PA level is to this population, and how important motivation and SE are in maintaining PA levels in those with CLBP.

Future Directions

To learn more about the influence of motivation and self-efficacy on PA in individuals with CLBP, it will be important to get additional information from study participants. This can be done by finding ways to get more study participants to respond to open-ended questions, potentially interviewing people with CLBP who are active, or conducting focus group interviews. This can help explain more about the "why" behind their PA and the influence of SDT and self-efficacy.

Future research could also include the recruitment of different pain groups in order to compare SE, motivation, effect of PA on CLBP, and different strategies to maintain PA level between the groups. Comparing active to inactive individuals with CLBP could be another option that could provide further insight on the types of PA, how it impacts pain, and the strategies being used to be PA. This could be accomplished through recruiting from a larger variety of locations. Recruiting through churches, community centers, educational centers, and places that support recreational activity could enhance the respondent pool.

These future interests can add to the knowledge and understanding of CLBP and help with the application of this information so that people with CLBP can be motivated to be PA regardless of pain due to its many benefits.

CHAPTER II: DISSEMINATION

Study participants were given the option to request an overview of the study findings. Interested participants provided their name and email through a form that was separate from the other survey responses. Results and key takeaways were shared through email that included an infographic (see Appendix E) to potentially help participants gain additional insight and ideas to help them remain active with CLBP.

A total of ten participants were sent the study results. The results were summarized in an infographic to make it easy and simple to understand. The email also provided some additional explanation of the usefulness of the findings. The intention of this is to provide a meaningful connection between my study and real-world application.

This will serve an important role in sharing the findings with the communities that could benefit from an increased understanding of how CLBP affects and is affected by PA.

The following email script will deliver the infographic to the participants that wish to receive study results:

"Thank you for your participating in this study to help understand the how and why people with CLBP remain physically active. The primary findings of this study revealed that people with CLBP are motivated to exercise for enjoyment and to relieve pain. Depending on your own physical activity motivation, these findings may not be surprising. Enjoyment seems to be a key to engaging in continued physical activity and needs to be considered as you are selecting your own physical activity. If you don't feel enjoyment with the activities you are currently doing, it may help to find some other activities that like and find enjoyable. Finding ways to exercise safely and minimize pain will be important to being able to continue and maintain your physical activity which has the potential to further minimize your pain.

As someone with chronic low back pain, notice the changes that have occurred because of your increase in activity, develop alternatives to the activities that exacerbate your pain level, focus your awareness on the movement and of pleasurable sensations, and be mindful of preventing overactivity that leads to setbacks.

In the future, I hope to explore more about physical activity and CLBP, including the motivational aspects of those with chronic low back pain that are NOT physically active, and the collection of data from a wider array of individuals. This would contribute to better understanding of the complexity of how motivation affects physical activity in those with chronic low back pain.

Again, thank you for your interest and participation!

Jenny

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CHAPTER III: ACTION PLAN

Discovering the motivational factors that compel those with CLBP to be physically active was the main purpose of this study. With this intent in mind, educating students bound for health-related fields on how those with chronic pain approach physical activity and dispelling stigma surrounding chronic pain in general serve an important function in the follow up of this study. As reviewed in the literature found in chapter one, chronic pain is a prolific problem that can often be addressed through PA, yet those that encounter clientele with chronic pain must be sensitive to the different approaches and strategies employed by those with CLBP when it comes to PA. With this in mind, a module for undergraduate and graduate students in Exercise Science at Appalachian State University could be developed to increase the understanding of how those with chronic pain approach physical activity, given that so many of these students are bound for professional programs such as Physical Therapy, and thus will encounter populations that experience chronic pain.

As outlined in chapter two, a simple infographic outlining the results of this study will be disseminated. This infographic will also be shared with faculty at Appalachian State University that teach in the departments of Exercise Science and Public because these faculty are educating future of health care providers who would benefit from understanding the implications of chronic pain on PA. This will also be shared with the 'Human Behavior in Physical Activity' laboratory at Appalachian State University, which conducts behavioral and motivational research on PA.

Additionally, another action plan item is to share my study findings with the local Pilates study where survey flyers were posted for recruitment. These findings will be shared via the infographic (see Appendix E). The infographic will also be promoted on the Pilates studio's social media platforms and my own personal social media platforms.

The next step will be more long term. This will involve submitting the dissertation to an appropriate journal for publication. Appropriate journals for my current research include Psychology of sport and exercise, the International Journal of Sports Psychology, and the Journal of Applied Sports Psychology. My current research interests in motivation make any journal that publishes articles relating to motivational aspects of physical activity an appropriate avenue for potential publication. Since rejection rates to journals are high, it will be important to submit to a variety of journals.

Cycling coaching, an eventual personal goal, could also benefit from the findings from this study. In coaching cyclists, given that CLBP is a pervasive problem in this population, the results from this study could be immensely useful in such an active population. In better understanding the determinants of motivation, cycling athletes of any type (regardless of CLBP) could benefit from having a coach that understands the interplay of environmental and personal factors on motivation to be PA. These factors could be incorporated into coaching approaches, especially with athletes facing motivational deficits or obstacles to their success like chronic pain.

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APPENDIX A: SURVEY

Physical Activity and Chronic Low Back Pain

Start of Block: Informed Consent

Consent Project Title: Physical Activity and Chronic Low Back Pain
Principal Investigator: Jennifer Thornton-Brooks
Faculty Advisor: Dr. Pam Kocher Brown

What is this all about? I am asking you to participate in this research study because I hope to improve understanding of how and why individuals with chronic low back pain engage in physical activity, to identify what types of activities those with low back pain engage in, and how these activities are affected by or affect pain. I hope to determine what strategies those with low back pain use to maintain physical activity levels. This research project will only take about 20 minutes and will involve you completing a simple online survey. Your participation in this research project is voluntary.

How will this negatively affect me? Other than the time you spend on this project, there are no know or foreseeable risks involved with this study.

What do I get out of this research project? You and/or society will or might benefit from increased understanding of the factors that affect physical activity levels in those with chronic low back pain through improvement of interventional strategies to increase physical activity level in this population. Participants may become more aware of physical activity habits.

Will I get paid for participating? There is no compensation for participating in this research study.

What about my confidentiality? We will do everything possible to make sure that your information is kept confidential. All information obtained in this study is strictly confidential unless disclosure is required by law. Absolute confidentiality of data provided through the Internet cannot be guaranteed due

to the limited protections of Internet access. Please be sure to close your browser when finished so no one will be able to see what you have been doing. All data will be collected anonymously through Qualtrics. No identifying personal information will be attached to the data. Participants will be given the opportunity to provide an email address to receive study results. This email address will be collected via an external Google form. These email addresses will be kept private and will only be available to the principle investigator and will not be able to be linked to any data. No master list will be maintained. All information shared through the Qualtrics digital surveys will be protected and kept confidential. Qualtrics uses Transport Layer Security Encryption, and all surveys will be password protected. We will store all data in UNCG approved data storage locations as outlined in the UNCG Data classification policy. Currently, UNCG requires that data be stored for five years following closure of the study.

What if I do not want to be in this research study? You do not have to be part of this project. This project is voluntary and it is up to you to decide to participate in this research project. If you agree to participate at any time in this project you may stop participating without penalty.

What if I have questions? You can ask Jennifer Thornton-Brooks at jdthorntonb@uncg.edu or Dr. Pam Kocher Brown at plkocher@uncg.edu anything about the study. If you have concerns about how you have been treated in this study call the Office of Research Integrity Director at 1-855-251-2351.

By clicking “I Consent” on the first question, you are consenting to taking this survey. By clicking “I Do Not Consent” you will not have to answer any questions and will be directed away from this survey. Do you consent to taking this survey?

- ○ I consent (1)
- ○ I do not consent (2)

Demographic Question What is your gender?

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / third gender (3)
- ○ Prefer not to say (4)

Demographic Question How old are you?

- ○ 18 - 24 (1)
- ○ 25 - 34 (2)
- ○ 35 - 44 (3)
- ○ 45 - 54 (4)
- ○ 55 - 64 (5)
- ○ 65 - 74 (6)
- ○ 75 - 84 (7)
- ○ 85 or older (8)

PA Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

- ○ 0 days (1)
- ○ 1-2 days (2)
- ○ 3-4 days (3)
- ○ 5+ days (4)

PA How much time did you usually spend doing vigorous physical activities on one of those days?

- ○ 10 minutes (1)
- ○ 10-15 minutes (2)
- ○ 15-20 minutes (3)
- ○ 20+ minutes (4)

PA Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

- ○ 0 days (1)
- ○ 1-2 days (2)
- ○ 3-4 days (3)
- ○ 5+ days (4)

PA How much time did you usually spend doing moderate physical activities on one of those days?

- ○ 10 minutes (1)
- ○ 10-15 minutes (2)
- ○ 15-20 minutes (3)

○ 20+ minutes (4)

PA Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

○ 0 days (1)

○ 1-2 days (2)

○ 3-4 days (3)

○ 5+ days (4)

PA How much time did you usually spend walking on one of those days?

○ 10 minutes (1)

○ 10-15 minutes (2)

○ 15-20 minutes (3)

○ 20+ minutes (4)

PA The last question in this block is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

During the last 7 days, how much time did you spend sitting on a week day?

○ (1)

○ 1-3 hours (2)

○ 3-6 hours (3)

○ 6-10 hours (4)

○ >10 hours (5)

Q32 If you are NOT physically active, why don't you engage in physical activity?

_____

Pain How would you rate your typical pain level on a 0-10 scale, where 0 is 'no pain' and 10 is 'pain as bad as it could be'?

0 1 2 3 4 5 6 7 8 9 10

Click to write Choice 1 ()	

Pain About how many days in the last 6 months have you been kept from your usual activities (work, school, housework) because of pain?

0 1 2 3 4 5 6 7 8 9 10

Click to write Choice 1 ()	

Pain In the past 6 months, how much has this pain interfered with your daily activities on a 0-10 scale where 0 is 'no interference' and 10 is 'extreme change'?

None at all A little A moderate amount A lot A great deal

0 1 2 3 4 5 6 7 8 9 10

Click to write Choice 1 ()

Pain In the past 6 months, how much has this pain changed your ability to take part in recreational, social, and family activities where 0 is 'no change' and 10 is 'extreme change'?

None at all A little A moderate amount A lot A great deal

0 1 2 3 4 5 6 7 8 9 10

Click to write Choice 1 ()	

Pain In the past 6 months, how has this pain changed your ability to work (including housework) where 0 is 'no change' and 10 is 'extreme change'?

0 1 2 3 4 5 6 7 8 9 10

Click to write Choice 1 ()	

Self-Efficacy How confident are you right now (or when you were experiencing back pain) that you could exercise 3 times a week for 20 minutes if:

	Strongly disagree (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Strongly agree (10)

The weather was bothering you (1)	○	○	○	○	○	○	○	○	○	○
You were bored by the program or activity (2)	○	○	○	○	○	○	○	○	○	○
You felt pain when exercising (3)	○	○	○	○	○	○	○	○	○	○
You had to exercise alone (4)	○	○	○	○	○	○	○	○	○	○
You did not enjoy it (5)	○	○	○	○	○	○	○	○	○	○

You were too busy with other activities (6)	○	○	○	○	○	○	○	○	○	○
You felt tired (7)	○	○	○	○	○	○	○	○	○	○
You felt stressed (8)	○	○	○	○	○	○	○	○	○	○
You felt depressed (9)	○	○	○	○	○	○	○	○	○	○

Motivation I exercise/work out because:

	Definitely false (1)	(2)	(3)	(4)	(5)	(6)	Definitely true (7)
I simply enjoy working out (1)	○	○	○	○	○	○	○
Working out is important and beneficial to my health and lifestyle (2)	○	○	○	○	○	○	○
I would feel bad about myself if I didn't do it (3)	○	○	○	○	○	○	○
It is fun and interesting (4)	○	○	○	○	○	○	○
Others like me better when I am in shape (5)	○	○	○	○	○	○	○

I'd be afraid of falling too far out of shape if I didn't (6)	○	○	○	○	○	○	○
It helps my image (7)	○	○	○	○	○	○	○
It is personally important to me to work out (8)	○	○	○	○	○	○	○
I feel pressured to work out (9)	○	○	○	○	○	○	○
I have a strong value for being active and healthy (10)	○	○	○	○	○	○	○
I find pleasure in discovering and mastering new training techniques (11)	○	○	○	○	○	○	○

I want others to see me as physically fit (12)	○	○	○	○	○	○	○

PA What type of physical activity do you PRIMARILY participate in?

- ○ Biking/Cycling (1)
- ○ Running/Jogging (2)
- ○ Swimming (3)
- ○ Weight Training (4)
- ○ Group exercise class (5)
- ○ Other (6)

_____

Q41 What other activities do you participate in? (select all that apply)

- ☐ Biking/Cycling (1)

- [ ] Running/Jogging (2)
- [ ] Swimming (3)
- [ ] Weight Training (4)
- [ ] Group exercise class (5)
- [ ] Other (6)

_____

PA How does physical activity affect your low back pain?

- ○ Physical activity improves my low back pain (1)
- ○ Physical activity somewhat improves my low back pain (2)
- ○ Physical activity makes my low back pain somewhat worse (3)
- ○ Physical activity makes my low back pain much worse (4)

PA What strategies do you use to maintain your physical activity level? Please select all that apply.

- [ ] Attend group exercise classes (1)

- [ ] Workout with a friend (2)
- [ ] Exercise at the same day/time (3)
- [ ] Exercise outdoors (4)
- [ ] Incorporate exercise into chores (gardening, etc) (5)
- [ ] Other(s): (6)

_____

Q33 How does your back pain affect your ability to be physically active?

_____

Q32 What advice would you give to someone with chronic low back pain about how to remain physically active?

_____

PA What motivates you to stay active when experiencing low back pain?

_____

Back Pain Question How does your back pain affect your daily life?

_____

Q37 Is there anything else that you wish to share regarding your current or past chronic low back pain?

_____

End of Block: Informed Consent

APPENDIX B: RECRUITMENT FLIER

DO YOU HAVE LOW BACK PAIN?

If so, we need you for a research study!

The University of North Carolina at Greensboro is seeking to learn more about physical activity in those with chronic low back pain. If you (a) currently have low back pain OR have a history of low back pain, (b) are physically active, and (c) are over the age of 18, we'd love hear from you!

Follow the QR code to complete our short survey here:

For more information, please contact:
Jennifer Thornton-Brooks, MA
EdD Candidate: UNC Greensboro
jdthorntonb@uncg.edu

There is no compensation for participating in this research study. This research project will only take about 20 minutes and will involve you completing a simple online survey. The purpose of this research is to improve understanding of how and why individuals with chronic low back pain engage in physical activity, to identify what types of activities those with low back pain engage in, how these activities are affected by or affect pain, and to determine what strategies those with low back pain use to maintain physical activity levels

UNC GREENSBORO

APPENDIX C: RECRUITMENT EMAIL

Study Title: Why do those with Chronic Low Back Pain engage in Physical Activity?

Recruitment Script

My name is Jennifer Thornton-Brooks, and I'm a doctoral student at the University of North Carolina at Greensboro. I'm reaching out to you because I'm conducting a study on chronic low back pain and physical activity. I'd greatly appreciate your input.

My background working as a yoga teacher with individuals with chronic low back pain inspired me to investigate this issue so that I can help others. As a doctoral student, I hope to contribute to a better understanding of how those with chronic low back pain use physical activity. The purpose of this study is to improve understanding of how and why individuals with chronic low back pain engage in physical activity. I am looking at strategies individuals use to maintain physical activity levels. By collecting survey responses, I hope to gain a better understanding of the experiences with physical activity among those with chronic low back pain. The insights gained from this study can inform the development of interventions and strategies to improve physical activity levels in those with chronic low back pain.

I am specifically looking for responses from individuals that currently have or have ever had chronic low back pain, consisting of low back pain lasting longer than 3 months, AND that are currently physically active. We are interested in a hearing from a diverse range of individuals, so your unique insight will contribute enormously to our study. Participants must be 18 years of age or older.

Participation in this study involves one simple survey that will take approximately 10-15 minutes to complete and will ask about different factors that relate to physical activity and low back pain.

Please note that your identity will remain anonymous throughout the study, and your responses will be used solely for research purposes.

By participating in this study, you will contribute to advancing the knowledge and understanding of chronic low back pain as it relates to physical activity. Additionally, upon completion of the study, you will have the option to receive a summary of the study findings if you are interested.

Participation in this study is entirely voluntary, and you have the right to withdraw at any time without providing a reason. Your decision to participate or decline will not have any impact on your current or future relationship with UNCG or any affiliated organizations.

You may access the survey here:

https://uncg.qualtrics.com/jfe/form/SV_cGCASWdY3V8w6gK

If you have any further questions, please feel free to reach out to me via jdthorntonb@uncg.edu.

Thank you for considering being a part of this study. We look forward to hearing from you!

Jenny

Jennifer Thornton-Brooks

UNCG

jdthorntonb@uncg.edu

Reminder Email:

This is a reminder that you are invited to participate in a study on chronic low back pain and physical activity. I'd greatly appreciate your input! Participation in this study is entirely voluntary. You may access the survey here: https://uncg.qualtrics.com/jfe/form/SV_cGCASWdY3V8w6gK

Study Title: Why do those with Chronic Low Back Pain engage in Physical Activity?

Recruitment Script

My name is Jennifer Thornton-Brooks, and I'm a doctoral student at the University of North Carolina at Greensboro. I'm reaching out to you because I'm conducting a study on chronic low back pain and physical activity. I'd greatly appreciate your input.

My background working as a yoga teacher with individuals with chronic low back pain inspired me to investigate this issue so that I can help others. As a doctoral student, I hope to contribute to a better understanding of how those with chronic low back pain use physical activity. The purpose of this study is to improve understanding of how and why individuals with chronic low back pain engage in physical activity. I am looking at strategies individuals use to maintain physical activity levels. By collecting survey responses, I hope to gain a better understanding of the experiences with physical activity among those with chronic low back pain. The insights gained from this study can inform the development of interventions and strategies to improve physical activity levels in those with chronic low back pain.

I am specifically looking for responses from individuals that currently have or have ever had chronic low back pain, consisting of low back pain lasting longer than 3 months, AND that are currently physically active. We are interested in a hearing from a diverse range of individuals, so your unique insight will contribute enormously to our study.

Participation in this study involves one simple survey that will take approximately 10-15 minutes to complete and will ask about different factors that relate to physical activity and low back pain.

Please note that your identity will remain anonymous throughout the study, and your responses will be used solely for research purposes.

By participating in this study, you will contribute to advancing the knowledge and understanding of chronic low back pain as it relates to physical activity. Additionally, upon completion of the study, you will have the option to receive a summary of the study findings if you are interested.

Participation in this study is entirely voluntary, and you have the right to withdraw at any time without providing a reason. Your decision to participate or decline will not have any impact on your current or future relationship with UNCG or any affiliated organizations.

You may access the survey here:
https://uncg.qualtrics.com/jfe/form/SV_cGCASWdY3V8w6gK

If you have any further questions, please feel free to reach out to me via jdthorntonb@uncg.edu.

Thank you for considering being a part of this study. We look forward to hearing from you!

Jenny

Jennifer Thornton-Brooks

UNCG

jdthorntonb@uncg.edu

APPENDIX D: STATISTICAL TABLES

How much time did you usually spend doing vigorous physical activities on one of those days?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10 minutes	5	6.8	7.5	7.5
	10-15 minutes	4	5.5	6.0	13.4
	15-20 minutes	4	5.5	6.0	19.4
	20+ minutes	54	74.0	80.6	100.0
	Total	67	91.8	100.0	
Missing	System	6	8.2		
Total		73	100.0		

Statistics

		How much time did you usually spend doing vigorous physical activities on one of those days?	Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did	How much time did you usually spend doing moderate physical activities on one of those days?	Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure. During the last 7 days, on how many days did you walk for at least 10 minutes at a ...	How much time did you usually spend walking on one of those days?	The last question in this block is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends
N	Valid	67	73	67	73	73	73
	Missing	6	0	6	0	0	0

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 days	6	8.2	8.2	8.2
	1-2 days	28	38.4	38.4	46.6
	3-4 days	18	24.7	24.7	71.2
	5+ days	21	28.8	28.8	100.0
	Total	73	100.0	100.0	

How much time did you usually spend doing moderate physical activities on one of those days?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10 minutes	1	1.4	1.5	1.5
	10-15 minutes	11	15.1	16.4	17.9
	15-20 minutes	6	8.2	9.0	26.9
	20+ minutes	49	67.1	73.1	100.0
	Total	67	91.8	100.0	
Missing	System	6	8.2		
Total		73	100.0		

Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

During the last 7 days, on how many days did you walk for at ...

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-2 days	16	21.9	21.9	21.9
	3-4 days	9	12.3	12.3	34.2
	5+ days	48	65.8	65.8	100.0
	Total	73	100.0	100.0	

How much time did you usually spend walking on one of those days?

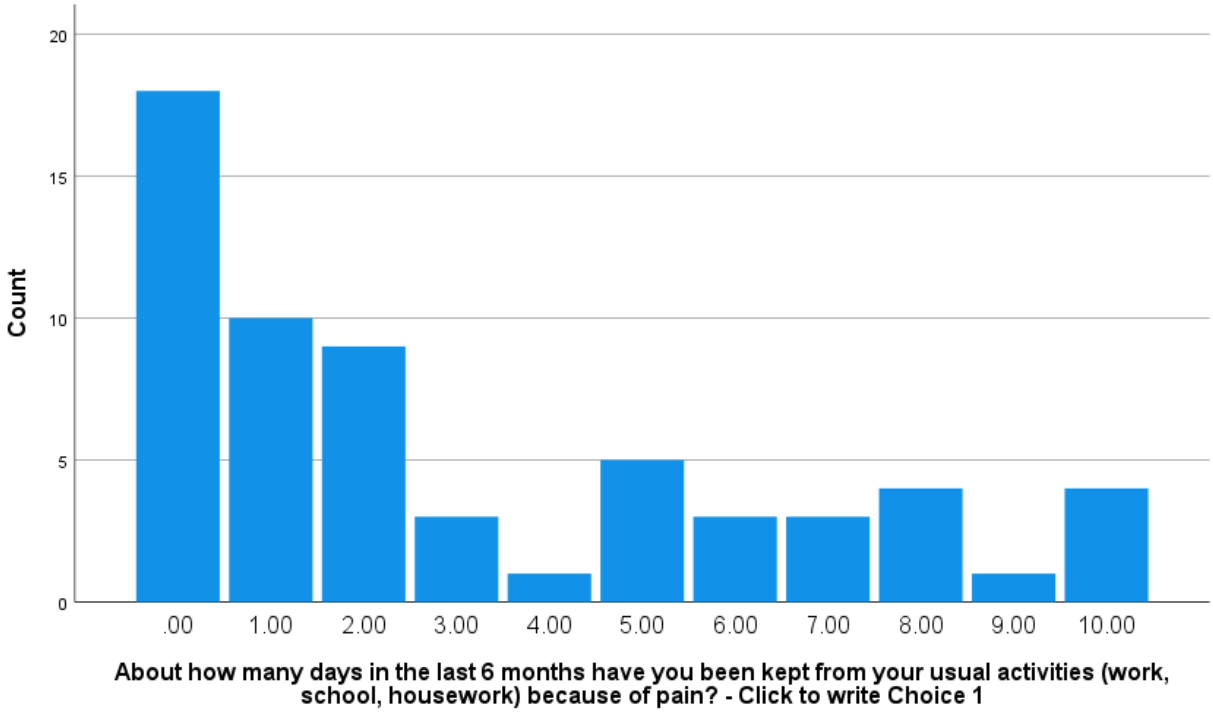
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10 minutes	4	5.5	5.5	5.5
	10-15 minutes	11	15.1	15.1	20.5
	15-20 minutes	22	30.1	30.1	50.7
	20+ minutes	36	49.3	49.3	100.0
	Total	73	100.0	100.0	

The last question in this block is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1 hour	2	2.7	2.7	2.7
	1-3 hours	8	11.0	11.0	13.7
	3-6 hours	30	41.1	41.1	54.8
	6-10 hours	25	34.2	34.2	89.0
	>10 hours	8	11.0	11.0	100.0
	Total	73	100.0	100.0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
About how many days in the last 6 months have you been kept from your usual activities (work, school, housework) because of pain? - Click to write Choice 1	61	.00	10.00	3.0492	3.26306
In the past 6 months, how much has this pain interfered with your daily activities on a 0-10 scale where 0 is 'no interference' and 10 is 'extreme change'? - Click to write Choice 1	63	.00	10.00	2.8413	2.27331
In the past 6 months, how much has this pain changed your ability to take part in recreational, social, and family activities where 0 is 'no change' and 10 is 'extreme change'? - Click to write Choice 1	55	.00	10.00	2.5636	2.46279
In the past 6 months, how has this pain changed your ability to work (including housework) where 0 is 'no change' and 10 is 'extreme change'? - Click to write Choice 1	55	.00	7.00	2.0000	2.00000
Valid N (listwise)	49				



Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 days	6	8.2	8.2	8.2
	1-2 days	28	38.4	38.4	46.6
	3-4 days	18	24.7	24.7	71.2
	5+ days	21	28.8	28.8	100.0
	Total	73	100.0	100.0	

About how many days in the last 6 months have you been kept from your usual activities (work, school, housework) because of pain? - Click to write Choice 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	18	24.7	29.5	29.5
	1.00	10	13.7	16.4	45.9
	2.00	9	12.3	14.8	60.7
	3.00	3	4.1	4.9	65.6
	4.00	1	1.4	1.6	67.2
	5.00	5	6.8	8.2	75.4
	6.00	3	4.1	4.9	80.3
	7.00	3	4.1	4.9	85.2
	8.00	4	5.5	6.6	91.8
	9.00	1	1.4	1.6	93.4
	10.00	4	5.5	6.6	100.0
	Total	61	83.6	100.0	
Missing	System	12	16.4		
Total		73	100.0		

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
SE_Overall_Score	65	1.89	10.00	6.0103	1.82951
Valid N (listwise)	65				

Statistics

		How much time did you usually spend doing vigorous physical activities on one of those days?	What other activities do you participate in? (select all that apply) - Selected Choice Biking/Cycling	What other activities do you participate in? (select all that apply) - Selected Choice Running/Jogging	What other activities do you participate in? (select all that apply) - Selected Choice Swimming	What other activities do you participate in? (select all that apply) - Selected Choice Weight Training	What other activities do you participate in? (select all that apply) - Selected Choice Group exercise class	What other activities do you participate in? (select all that apply) - Selected Choice Other
N	Valid	67	13	18	12	27	9	20
	Missing	6	60	55	61	46	64	53

How much time did you usually spend doing vigorous physical activities on one of those days?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10 minutes	5	6.8	7.5	7.5
	10-15 minutes	4	5.5	6.0	13.4
	15-20 minutes	4	5.5	6.0	19.4
	20+ minutes	54	74.0	80.6	100.0
	Total	67	91.8	100.0	
Missing	System	6	8.2		
Total		73	100.0		

What other activities do you participate in? (select all that apply) - Selected Choice Biking/Cycling

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Biking/Cycling	13	17.8	100.0	100.0
Missing	System	60	82.2		
Total		73	100.0		

What other activities do you participate in? (select all that apply) - Selected Choice Running/Jogging

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Running/Jogging	18	24.7	100.0	100.0
Missing	System	55	75.3		
Total		73	100.0		

What other activities do you participate in? (select all that apply) - Selected Choice Swimming

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Swimming	12	16.4	100.0	100.0
Missing	System	61	83.6		
Total		73	100.0		

What other activities do you participate in? (select all that apply) - Selected Choice Weight Training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Weight Training	27	37.0	100.0	100.0
Missing	System	46	63.0		
Total		73	100.0		

What other activities do you participate in? (select all that apply) - Selected Choice Group exercise class

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Group exercise class	9	12.3	100.0	100.0
Missing	System	64	87.7		
Total		73	100.0		

What other activities do you participate in? (select all that apply) - Selected Choice Other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Other	20	27.4	100.0	100.0
Missing	System	53	72.6		
Total		73	100.0		

How does physical activity affect your low back pain?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Physical activity improves my low back pain	19	26.0	26.0	26.0
	Physical activity somewhat improves my low back pain	27	37.0	37.0	63.0
	Physical activity makes my low back pain somewhat worse	24	32.9	32.9	95.9
	Physical activity makes my low back pain much worse	3	4.1	4.1	100.0
	Total	73	100.0	100.0	

Statistics

		What strategies do you use to maintain your physical activity level? Please select all that apply. - Selected Choice Attend group exercise classes	What strategies do you use to maintain your physical activity level? Please select all that apply. - Selected Choice Workout with a friend	What strategies do you use to maintain your physical activity level? Please select all that apply. - Selected Choice Exercise at the same day/time	What strategies do you use to maintain your physical activity level? Please select all that apply. - Selected Choice Exercise outdoors	What strategies do you use to maintain your physical activity level? Please select all that apply. - Selected Choice Incorporate exercise into chores (gardening, etc)	What strategies do you use to maintain your physical activity level? Please select all that apply. - Selected Choice Other (s):
N	Valid	16	23	34	44	22	16
	Missing	57	50	39	29	51	57

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	21	28.8	28.8	28.8
	Female	51	69.9	69.9	98.6
	Non-binary / third gender	1	1.4	1.4	100.0
	Total	73	100.0	100.0	

How old are you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 - 24	16	21.9	21.9	21.9
	25 - 34	8	11.0	11.0	32.9
	35 - 44	19	26.0	26.0	58.9
	45 - 54	10	13.7	13.7	72.6
	55 - 64	10	13.7	13.7	86.3
	65 - 74	5	6.8	6.8	93.2
	75 - 84	3	4.1	4.1	97.3
	85 or older	2	2.7	2.7	100.0
	Total	73	100.0	100.0	

How would you rate your typical pain level on a 0-10 scale, where 0 is 'no pain' and 10 is 'pain as bad as it could be'? - Click to write Choice 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	8.2	8.6	8.6
	1.00	4	5.5	5.7	14.3
	2.00	18	24.7	25.7	40.0
	3.00	20	27.4	28.6	68.6
	4.00	7	9.6	10.0	78.6
	5.00	4	5.5	5.7	84.3
	6.00	7	9.6	10.0	94.3
	7.00	2	2.7	2.9	97.1
	8.00	1	1.4	1.4	98.6
	10.00	1	1.4	1.4	100.0
	Total	70	95.9	100.0	
Missing	System	3	4.1		
Total		73	100.0		

Group Statistics

	Pain_cat	N	Mean	Std. Deviation	Std. Error Mean
SE_Overall_Score	low to moderate	51	6.1373	1.76504	.24715
	moderate to high	11	5.4444	2.30351	.69454

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
SE_Overall_Score	Equal variances assumed	1.180	.282	1.117	60	.134	.268	.69281	.62020	-.54778	1.93340
	Equal variances not assumed			.940	12.652	.182	.365	.69281	.73720	-.90427	2.28989

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
SE_Overall_Score	Cohen's d	1.86561	.371	-.285	1.025
	Hedges' correction	1.88934	.367	-.282	1.012
	Glass's delta	2.30351	.301	-.371	.958

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control group.

Pain_cat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low to moderate	59	80.8	84.3	84.3
	moderate to high	11	15.1	15.7	100.0
	Total	70	95.9	100.0	
Missing	System	3	4.1		
Total		73	100.0		

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
I exercise/work out because: - I simply enjoy working out	Cohen's d	1.508	-.062	-.733	.611
	Hedges' correction	1.525	-.061	-.725	.604
	Glass's delta	1.969	-.047	-.718	.626
I exercise/work out because: - Working out is important and beneficial to my health and lifestyle	Cohen's d	.960	-.111	-.757	.535
	Hedges' correction	.971	-.110	-.748	.529
	Glass's delta	.934	-.114	-.759	.536
I exercise/work out because: - I would feel bad about myself if I didn't do it	Cohen's d	1.742	.031	-.616	.679
	Hedges' correction	1.763	.031	-.609	.671
	Glass's delta	2.240	.024	-.624	.671
I exercise/work out because: - It is fun and interesting	Cohen's d	1.597	-.159	-.804	.488
	Hedges' correction	1.616	-.157	-.795	.482
	Glass's delta	2.005	-.127	-.771	.524
I exercise/work out because: - Others like me better when I am in shape	Cohen's d	1.775	.041	-.607	.688
	Hedges' correction	1.796	.040	-.599	.680
	Glass's delta	2.067	.035	-.613	.682
I exercise/work out because: - I'd be afraid of falling too far out of shape if I didn't	Cohen's d	1.638	.107	-.540	.753
	Hedges' correction	1.658	.106	-.534	.745
	Glass's delta	1.662	.105	-.545	.751
I exercise/work out because: - It helps my image	Cohen's d	1.735	.543	-.112	1.194
	Hedges' correction	1.755	.536	-.111	1.180
	Glass's delta	2.195	.429	-.253	1.092
I exercise/work out because: - It is personally important to me to work out	Cohen's d	1.586	.001	-.645	.647
	Hedges' correction	1.604	.001	-.638	.640
	Glass's delta	1.921	.001	-.646	.647
I exercise/work out because: - I feel pressured to work out	Cohen's d	1.777	-.003	-.649	.644
	Hedges' correction	1.797	-.003	-.642	.636
	Glass's delta	1.902	-.003	-.649	.644
I exercise/work out because: - I have a strong value for being active and healthy	Cohen's d	1.643	-.098	-.744	.549
	Hedges' correction	1.663	-.097	-.735	.543
	Glass's delta	1.897	-.085	-.730	.565
I exercise/work out because: - I find pleasure in discovering and mastering new training techniques	Cohen's d	1.884	-.239	-.886	.410
	Hedges' correction	1.906	-.236	-.875	.405
	Glass's delta	1.991	-.226	-.874	.433
I exercise/work out because: - I want others to see me as physically fit	Cohen's d	1.748	.445	-.208	1.094
	Hedges' correction	1.769	.440	-.205	1.081
	Glass's delta	2.382	.326	-.343	.980

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control group.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p			Lower	Upper
I exercise/work out because: - I simply enjoy working out	Equal variances assumed	.306	.582	-.180	65	.429	.858	-.093	.517	-1.125	.939
	Equal variances not assumed			-.143	10.702	.444	.889	-.093	.650	-1.530	1.344
I exercise/work out because: - Working out is important and beneficial to my health and lifestyle	Equal variances assumed	.193	.661	-.338	66	.368	.736	-.107	.316	-.738	.524
	Equal variances not assumed			-.346	14.423	.367	.735	-.107	.309	-.768	.555
I exercise/work out because: - I would feel bad about myself if I didn't do it	Equal variances assumed	.661	.419	.095	64	.462	.925	.055	.575	-1.095	1.204
	Equal variances not assumed			.077	12.215	.470	.940	.055	.710	-1.490	1.599
I exercise/work out because: - It is fun and interesting	Equal variances assumed	1.704	.196	-.482	66	.316	.631	-.254	.526	-1.304	.797
	Equal variances not assumed			-.398	12.294	.349	.697	-.254	.637	-1.637	1.130
I exercise/work out because: - Others like me better when I am in shape	Equal variances assumed	.313	.578	.124	64	.451	.902	.073	.586	-1.099	1.244
	Equal variances not assumed			.109	12.901	.457	.915	.073	.665	-1.365	1.510
I exercise/work out because: - I'd be afraid of falling too far out of shape if I didn't	Equal variances assumed	.331	.567	.324	65	.373	.747	.175	.540	-.904	1.254
	Equal variances not assumed			.321	14.064	.377	.753	.175	.547	-.997	1.347
I exercise/work out because: - It helps my image	Equal variances assumed	1.845	.179	1.646	65	.052	.105	.942	.572	-.201	2.084
	Equal variances not assumed			1.351	12.278	.101	.201	.942	.697	-.573	2.456
I exercise/work out because: - It is personally important to me to work out	Equal variances assumed	.641	.426	.003	65	.499	.998	.002	.523	-1.043	1.046
	Equal variances not assumed			.003	12.565	.499	.998	.002	.614	-1.329	1.332
I exercise/work out because: - I feel pressured to work out	Equal variances assumed	.096	.757	-.008	65	.497	.993	-.005	.586	-1.175	1.165
	Equal variances not assumed			-.008	13.546	.497	.994	-.005	.620	-1.338	1.328
I exercise/work out because: - I have a strong value for being active and healthy	Equal variances assumed	.000	.983	-.297	65	.384	.768	-.161	.542	-1.243	.922
	Equal variances not assumed			-.263	12.916	.398	.796	-.161	.610	-1.480	1.159
I exercise/work out because: - I find pleasure in discovering and mastering new training techniques	Equal variances assumed	.072	.790	-.724	65	.236	.472	-.450	.621	-1.690	.791
	Equal variances not assumed			-.692	13.664	.250	.501	-.450	.650	-1.847	.947
I exercise/work out because: - I want others to see me as physically fit	Equal variances assumed	5.938	.018	1.349	65	.091	.182	.778	.577	-.374	1.929
	Equal variances not assumed			1.037	11.850	.160	.320	.778	.750	-.858	2.413

APPENDIX E: INFOGRAPHIC FOR DISSEMINATION

Why Those with Chronic Low Back Pain (CLBP) Engage in Physical Activity (PA)

Background

Low back pain is the leading worldwide cause of years lost to disability

Research shows that PA is effective in the treatment of CLBP

Pain can affect motivation to be physically active

Project

Survey responses from those with CLBP or a history of CLBP that are currently physically active

Results

♀ 51 ♂ 21 ⚧ 1

Pain did NOT impact motivation to be physically active

People with CLBP are motivated to exercise for enjoyment and to relieve pain

What Does it Mean?

Those with CLBP that are motivated to exercise will find a way to exercise regardless of pain mostly due to the ENJOYMENT aspect of being physically active

UNC GREENSBORO Department of Kinesiology

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Committee Members:
Drs. Brown, Gill, Schmitz, and Fasczewski

APPENDIX F: EMAIL TO DISTRIBUTE INFOGRAPHIC

"Thank you for your participating in this study to help understand the how and why people with CLBP remain physically active. The primary findings of this study revealed that people with CLBP are motivated to exercise for enjoyment and to relieve pain. Depending on your own physical activity motivation, these findings may not be surprising. Enjoyment seems to be a key to engaging in continued physical activity and needs to be considered as you are selecting your own physical activity. If you don't feel enjoyment with the activities you are currently doing, it may help to find some other activities that like and find enjoyable. Finding ways to exercise safely and minimize pain will be important to being able to continue and maintain your physical activity which has the potential to further minimize your pain.

As someone with chronic low back pain, notice the changes that have occurred because of your increase in activity, develop alternatives to the activities that exacerbate your pain level, focus your awareness on the movement and of pleasurable sensations, and be mindful of preventing overactivity that leads to setbacks.

In the future, I hope to explore more about physical activity and CLBP, including the motivational aspects of those with chronic low back pain that are NOT physically active, and the collection of data from a wider array of individuals.

Again, thank you for your interest and participation!

Jenny

Jennifer Thornton-Brooks

UNCG

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[Infographic attached- see appendix E]