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Full Issue: PURE Insights, Volume 2 Issue 1

Abstract
The full contents of Volume 2, Issue 1.

Keywords
undergraduate research
Editor’s Notes and Acknowledgements

Camila Gabadón Western Oregon University

It is my great pleasure to again be introducing an issue of PURE Insights. The tremendous effort of Western Oregon University faculty, students, and even alumni came together for this issue and all can be proud of the final product. I am particularly excited to include our first creative writing piece in this issue, which appears along side the more factual submissions. The collaborative work of WOU students under the guidance of faculty sponsors continues to be excellent and the thought and effort put into each of the included pieces is evident as you read through them. I am pleased to have been a part of the production.

Each issue of PURE Insights has only come together through a team effort. The diligent work of the section editors, reviewers, sponsors, authors, and many others are the only reason this peer-reviewed publication is possible. The production of this particular issue has been a bit of a "roller coaster ride," especially for the section editors. Again, I can not thank Ethan McMahan, Kate Ristau, Debi Brannan, Misty Weitzel, Ava Howard, Mike Ward, Diane Tarter, and Marie LeJuene enough for their continued dedication and the many hours of hard work they put in to working with the contributors to ensure the quality of the work that ultimately wound up in the journal.

As this issue wraps up, I am excited to view the presentations at WOU’s Academic Excellence Showcase and look forward to the contributions that will emerge from that and other sources that we will see in future issues.
EXTEND

Ruoshi Zhang

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EXTEND

Abstract
This design is part of a mural design proposed for the APSC entrance foyer as a part of A320 Graphic Design: Process & Theory, Fall 2012. It is a mural about WOU culture, a journey, pointing to the future and storing the hope. The whole campus is a natural environment, covered by flowers and plants, so a rose was selected for the center of the design. The main red line represents intention and guidance, the grid represents a web and connects the icons together, illustrating a rigorous attitude toward education. A butterfly is used as a metaphor for the beauty of the campus, our colorful lives, freedom, and hope. The wolf is a part of WOU culture, symbolic of power and sports. A tree and plant remind us of the natural environment, fresh air of campus and the growth of WOU students.

Keywords
mural, poster, red, vector, plaid, logo, Gothic, Illustrator
Comparing the Cognitive Screening Tools: MMSE and SLUMS

Devan N. Buckingham
Katie M. Mackor
Ryan M. Miller
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See next page for additional authors

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Comparing the Cognitive Screening Tools: MMSE and SLUMS

Abstract
Practitioners have long relied upon the Mini Mental Status Exam (MMSE) to quickly assess cognitive functioning in older adults. The Saint Louis University Mental Status (SLUMS) exam possesses many potential psychometric advantages, however data on the relationship between scores on the SLUMS and MMSE has yet to be established. Therefore, the purpose of this study was to establish comparative norms between the MMSE and the SLUMS examinations. The current study hypothesized that participants would score lower on the SLUMS than the MMSE, with adults exhibiting higher levels of cognitive reserve, as measured by educational attainment, having a greater difference between the test scores. A total of 118 individuals (96 female, 21 male) with an age range from 41 to 96 (M=80.03, SD=8.71) with an average educational attainment of 14.97 years (SD=2.68), completed both tests. Results indicate a significant difference between the mean SLUMS and MMSE scores (p<.001), as well as a significant difference between those in assisted and independent living environments (p<.001). The evidence did not support the cognitive reserve hypothesis. Implications and suggestions for future research will be discussed.

Keywords
MMSE, SLUMS, Dementia, Dementia screening, Cognitive impairment, Older adults

Authors
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Comparing the Cognitive Screening Tools: MMSE and SLUMS

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Practitioners have long relied upon the Mini Mental Status Exam (MMSE) to quickly assess cognitive functioning in older adults. The Saint Louis University Mental Status (SLUMS) exam possesses many potential psychometric advantages, however data on the relationship between scores on the SLUMS and MMSE has yet to be established. Therefore, the purpose of this study was to establish comparative norms between the MMSE and the SLUMS examinations. The current study hypothesized that participants would score lower on the SLUMS than the MMSE, with adults exhibiting higher levels of cognitive reserve, as measured by educational attainment, having a greater difference between the test scores. A total of 118 individuals (96 female, 21 male) with an age range from 41 to 96 (Mean = 80.03, Standard Deviation = 8.71) with an average educational attainment of 14.97 years (Mean = 14.97, Standard Deviation = 2.68), completed both tests. Results indicate a significant difference between the mean SLUMS and MMSE scores (p < 0.001), as well as a significant difference between those in assisted and independent living environments (p < 0.001). The evidence did not support the cognitive reserve hypothesis. Implications and suggestions for future research will be discussed.

Keywords: MMSE, SLUMS, Dementia, Dementia screening, Cognitive impairment, Older adults

Much of the world, including the United States, is preparing for the repercussions of a dramatic increase in older adult populations. For example, the percentage of people age 65 and older will increase from 13% to 16% by the year 2020 (Karel, Gatz, & Smyer, 2012). Health care professionals must also prepare for an increased number of patients presenting dementia-like symptoms or mild cognitive impairment (Tariq, Tumosa, Chibnall, Perry, & Morley, 2006). Due to a significantly increased older adult population, a quick screening tool to determine cognitive impairment may be beneficial to healthcare professionals.

Currently the rates of dementia in those age 65 and older are between 3%-11%, depending on how the disease is defined, while dementia is seen in 25%-47% of people older than 85 (Tariq et al., 2006). A sensitive screening tool can allow older adults experiencing cognitive impairment and their families to begin doing what they can to delay the symptoms and begin planning for the future. There is a growing need for a cognitive test that is quick, reliable, and easy to administer in order to assist in determining age-related cognitive impairment (Tariq et al., 2006).

Over 30 years ago, two physicians created what is one of today’s most commonly used screening tools for cognitive impairment. The Mini Mental Status Exam (MMSE) consists of 11 questions that are divided into two sections: the first section addresses orientation, attention, and memory, while the second addressing verbal and written skills. An overall score between zero and 30 is possible. A score of, or close to, 30 is indicative of normal cognitive function. The lower the score the higher the level of impairment. The MMSE was originally developed by Marshall and Susan Folstein as a tool to quickly assess cognitive function in the elderly hospitalized population. The MMSE only assesses certain aspects of cognitive function, while dismissing other important factors, such as mood and a more complete assessment of executive function. Originally, the MMSE was tested on a mere 206 patients before Folstein declared that this exam could accurately determine one’s cognitive abilities. Folstein created the MMSE with the intention of determining whether an elderly patient was getting “better” or “worse,” not as the sole test to determine if one had dementia (Nieuwenhuis-Mark, 2010).

Today the MMSE is commonly used when attempting to assess dementia. Practitioners also use the MMSE to determine cognitive abilities in patients suffering from depression, stroke, Parkinson’s disease dementia,
delirium, and Multiple Sclerosis (Nieuwenhuis-Mark, 2010). Unfortunately, some doctors use only the MMSE scores to determine a patient’s need for medication as well cognitive ability (Zarit, Blazer, Orrell, & Woods, 2008). In addition, recent research designed to determine the optimal time to begin a so-called memory drug, such as an acetylcholine esterase inhibitor, to manage the symptoms associated with dementia, was based only on the individual’s MMSE score (i.e., Molinuevo, Berthier, & Rami, 2010).

While the MMSE may seem convenient, it has been to be biased in assessing non-English speakers by consistently providing lower scores to those who are not Caucasian. In a study that compared the relationship between levels of education among Mexican Americans, the Mexican American participants who were screened with the MMSE repeatedly scored lower on the MMSE when compared to non-Hispanic Caucasians. These differences may arise from cultural differences, such as the levels and quality of education received (Matallana, de Santacruz, Cano, Reyes, Samper-Terment, Markides, & Reyes-Ortiz, 2011).

Since the MMSE does not take a patient’s mood into consideration, a low score may not necessarily imply the level of cognitive ability when there is a possibility that the patient was distracted by an unaccounted for variable such as mood. This can be the case when depression or anxiety is present. The Rosenberg Self Esteem Scale would be an appropriate solution to this issue when added preliminary to the MMSE or the Saint Louis University Mental Status (SLUMS). This scale is a ten item questionnaire based upon a Likert response scale ranging from 1 to 4. Using the Rosenberg Self Esteem Scale would control for mood based criticisms in both the MMSE and the SLUMS. The MMSE also fails to differentiate between a mild cognitive impairment (MCI) and any early stage of dementia, regardless of the form (Nieuwenhuis-Mark, 2010). It is important to make the distinction between MCI and early stages of dementia. MCI is not the same as dementia; however individuals suffering from MCI are at greater risk of developing dementia. While experts are still refining the clinical guidelines that define MCI, they can agree that it can be defined as a notable deficit in cognition that is unusual for a person’s age or education and the severity of which is insufficient to constitute a diagnosis of dementia. MCI can also be characterized by cognitive deficits broadly classified as amnestic (memory) and/or nonamnestic (e.g., executive function, abstract reasoning, language, or perceptual speed), which, in turn, may reflect multiple and often comorbid pathologies of neurodegenerative, vascular, metabolic, or traumatic origin (Wadley et al., 2007).

Mild cognitive impairments should be thought of as a state on a continuum of cognitive changes between normal aging and impairments that are recognized as defining features of early dementia. Early dementia is the official first stage of dementia where physical changes are starting to occur in the brain and as a result multiple areas of cognitive and functional abilities see significant decreases. The major difference between these two conditions are that MCI is insufficient in severity to warrant a diagnosis of dementia where as early stages of dementia have recognizable and defining symptoms that warrant a diagnosis of dementia (Wadley et al., 2007). Both conditions should be approached differently making it important to have an evaluation that reflects a distinction in diagnosis between these two conditions.

The Saint Louis University Mental Status (SLUMS) is another 30-point test that was designed to measure one’s ability in the domains of orientation, executive function, memory, and attention. We believe the SLUMS deals with many of the shortcomings in the MMSE, and may in fact be psychometrically superior to the MMSE. An additional cause for concern when using the MMSE is its heavy reliance on orientation questions which can be problematic when considering the prevalence of moving or relocating that many older adults undergo, especially as their need for assistance becomes greater. This lack of awareness could lead to a lower score on the questions that address orientation. The MMSE’s great reliance on orientation bases 10 of the possible 30 points on that general area, whereas the SLUMS bases only three of 30 points based on orientation. Another example of potential psychometric superiority are the five words that a participant is asked to remember on the SLUMS, compared to only three words on the MMSE. The SLUMS therefore provides a greater range in possible scores and potentially greater discrimination in measuring one’s ability to remember information after a short delay. The SLUMS may also be able to better detect aphasia (i.e., language impairment) than the MMSE by providing a possible score of three (zero, one, two, or three points), whereas the MMSE only asks a participant to identify two simple objects, such as a paperclip or pencil (Tariq, Tumosa, Chibnall, Perry, & Morley, 2006). It is very rare for someone to miss the aphasia questions on the MMSE. The SLUMS uses a well-established test, in which people are asked to report as many animals as they can in 60 seconds. The animal test yields a consistent distribution of scores between zero and three.

The differences in scores seen between people that have a higher level of formal education verses those who have received less formal education is thought to be the result of some form of reserve mechanisms taking place within one’s brain. This “cognitive reserve” hypothesis suggests that a myriad of circumstances influence mental abilities. These circumstances can include level of education, amount of mental stimulation, occupation, social activities/engagements, and hobbies (Liberati, Raffone, & Belardinelli, 2012). Those with more cognitive reserve may have a better aptitude to “fool” a test, such as the MMSE, by providing more effective cognitive strategies to answer questions. An example of the cognitive reserve...
hypothetical hypothesis can be seen in those who earn a perfect score of 30 on the MMSE, yet still exhibit symptoms of dementia. One study found that people with dementia could obtain perfect scores on the MMSE; presumably this potentially dangerous outcome (i.e., failing to accurately diagnose dementia case that could benefit from intervention) would be less likely with a more difficult test (Shiroky, Schipper, Bergman, Chertkow, 2007). Practitioners need a way to convert and compare MMSE and SLUMS test scores to track people who have had different tests and to use the studies that have based treatment recommendations (e.g., Molinuevo et al., 2010) on MMSE scores.

The purpose of this article is to provide health care practitioners with a simple conversion that can be used to compare the scores of the MMSE to the scores on the SLUMS. We predicted that scores on the SLUMS would be lower than scores on the MMSE, making it less likely that the SLUMS would miss a potential dementia case.

Method

Participants

Participants were recruited from independent living, assisted living, and skilled nursing facilities throughout Oregon. Convenience sampling was used and participation was open, with a majority of participants recruited by activities directors. Researchers collected data from 150 participants. Of those 150 participants, 118 (96 female, 21 male) completed the study and ranged from age 41 to 96 (M=80.03, SD=8.71). Additionally, each participant had an average educational attainment of 14.97 years (SD=2.68). Four individuals did not complete testing and 26 were dropped due to sensory impairments. Participants determined to be incompetent to make medical or financial decisions by a court were not included. Several items on the demographics questionnaire specifically assessed this item. Additionally, researchers communicated participant competence to the administration when collecting data at a particular facility (e.g., assisted living or skilled nursing).

Materials

The primary measurement tools used in this study were the MMSE and SLUMS. The MMSE is an 11 question cognitive measure that evaluates five areas of functioning: orientation, registration, attention and calculation, language and praxis, and recall. The SLUMS examination has 11 questions, a majority of which have multiple parts. Both of the tests have a total possible score of 30. Informed consent forms, demographics questionnaires, and post-evaluation debriefings were also utilized. The demographics questionnaire included questions addressing uncorrected sensory impairments (i.e., hearing and/or visual impairment), age, educational level, and living environment.

Procedure

Participants who had significant uncorrected sensory impairments did not continue. Examples of uncorrected sensory impairments would include participants’ inability to read large font, hear questions, speak, or write. Individuals were subsequently given the MMSE and SLUMS cognitive screening tests. Researchers counterbalanced the order of presentation such that half of the participants were administered the MMSE first followed by the SLUMS. The other half of the participants were administered the SLUMS first followed by the MMSE. Evaluations were kept confidential for the safety and privacy of all participants involved, including those who were excluded from the study.

Results

As predicted, the mean score on the SLUMS (M = 22.68, SD = 5.55) was lower than the mean score on the MMSE (M = 27.24, SD = 3.37). Researchers observed an average participant score difference of 4.56 (SD = 4.03), with the SLUMS being the lower score. Results from a paired samples t-test showed this difference was significant; t (117) = 12.31, p < .001. (see Figure 1).

Figure 1 Mean MMSE and SLUMS test scores across all participants. Participant score (M = 4.56, SD = 4.03) difference between the MMSE (M = 27.24, SD = 3.37) and the SLUMS (M = 22.68, SD = 5.55) was significant; t (117) = 12.31, p <.001.

This study examined the average MMSE and SLUMS scores as a function of living environment (see Table 1). The assisted living group showed the highest difference score between the two averages, whereas the independent living group showed the lowest. To further explore these differences, an independent samples t-test comparing the mean difference in test scores between those residing in assisted living (M = 8.23, SD = 4.61) and independent living (M = 3.63, SD = 3.38) environments was ran. Results from this test were also significant; t
(111) = 5.32, p < .001 (see Figure 2). This evidence suggests these two groups are significantly different from one another in terms of score disparity.

<table>
<thead>
<tr>
<th>Living Environment</th>
<th>MMSE</th>
<th>SLUMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assisted Living</td>
<td>23.55</td>
<td>15.32</td>
</tr>
<tr>
<td>Independent Living</td>
<td>28.03</td>
<td>24.41</td>
</tr>
<tr>
<td>Skilled Nursing</td>
<td>29.00</td>
<td>24.00</td>
</tr>
</tbody>
</table>

**Table 1. Average MMSE and SLUMS as a Function of Living Environment**

This study predicted participants with higher education attainment, and thus more cognitive reserve, would show a greater mean difference score. Upon examining our results, no evidence was found to support this cognitive reserve hypothesis. Results from an independent samples t-test comparing the mean difference in test scores between participants in the top quartile (years > 16.25) (M = 3.86, SD = 3.69) and bottom (years < 13) quartile (M = 4.85, SD = 4.70) of educational attainment were not significantly different, t (53) = .87, p = .39 (see Figure 3).

**Discussion**

The results supported our prediction that, in general, participants would score lower on the SLUMS than the MMSE. This finding appears to substantiate previous research suggesting the SLUMS may be psychometrically superior to the MMSE, and therefore less likely to miss a possible case of dementia because it would be more challenging to have a very high score on the SLUMS even though one had significant impairment, which is a serious flaw with the MMSE (Shiroky, Schipper, Bergman, & Chertkow, 2007).

**Figure 2** Mean difference in test score by living environment. Score difference between assisted living (M = 8.23, SD = 4.61) and independent living (M = 3.63, SD = 3.38) environment groups was significant; t (111) = 5.32, p < .001.

Participants’ SLUMS and MMSE scores were significantly different. This finding remained consistent when examining the average SLUMS and MMSE scores of participants residing in assisted, independent living, skilled nursing, and “other” living environments. When the mean difference in scores between the assisted living and independent living environments were compared, evidence was found suggesting these groups significantly differed in their difference scores. This provides compelling evidence that the SLUMS may be more sensitive at detecting cognitive impairments when individuals are in the mild cognitive impairment range, as seen in the non-independent living participants’ difference scores.

Contrary to what was expected, no evidence to support our cognitive reserve hypothesis was found. We did not find that cognitive reserve, operationally defined as the number of years of education, was not associated with greater difference scores between the MMSE and the SLUMS. This contradicts current research that suggests higher levels of cognitive reserve may leave one more apt at “fooling” a test (e.g., MMSE) despite the presence of dementia symptoms. However, two limitations may have impacted these results. First, the education levels of the participants may have been higher than average, therefore decreasing the likelihood of a significant result when comparing the top and bottom educational attainment quartiles. Second, a selection bias may have been introduced due to convenience sampling. It is possible that individuals who chose to participate in a study were highly educated, or more interested in scientific research. Likewise, individuals who did not choose to volunteer may be aware of their cognitive impairments and did not wish to risk embarrassment. These same individuals could have been of a lower educational attainment.

It is likely that the SLUMS is a more sensitive test, and is therefore more apt at accurately identifying possible dementia, where the MMSE might miss it. Consequently, a need to establish norms for converting scores between

**Figure 3** Comparison of bottom and top quartiles of educational attainment. Difference in score between the bottom (years < 13) and top (years > 16.25) quartiles was not significant; t (53) = .87, p = .39.
the two tests exists when treatment recommendations have been based solely on MMSE scores (e.g., Molinuevo et al., 2010). The purpose of our study was to establish these norms. Practitioners can now convert SLUMS and MMSE scores with our observation that there is an average difference of 4.56, with the SLUMS being the lower score. With the conversion this study developed, practitioners can now use the SLUMS scoring guild, which distinguishes between educational attainment, to better diagnose the difference between normal cognitive functioning, mild neurocognitive disorder, and dementia. This conversion also allows for the MMSE to be seamlessly replaced by the MMSE by converting old MMSE evaluations into still usable and relevant SLUMS scores.

Our study was not to advocate the use of one test over the other, but to merely show evidence that the MMSE scores may not be as sensitive to dementia and cognitive impairments as the SLUMS. At this point, we cannot suggest that one test be used more often or in place of the other, more extensive research must be conducted before that determination can be made. More research comparing the MMSE and SLUMS must be conducted. In the future, studies comparing the two scores should include participants from a broader range of education levels in order to more accurately assess the cognitive reserve hypothesis. In general, our study was lacking in terms of a representative sample of relevant demographic variables. Future research should also attempt to address the concern mood concerns by having participants take a preliminary evaluation on mood such as the Rosenberg self esteem scale to increase the validity of the study. Future studies should include larger samples with greater ethnic diversity from higher levels of assistive care to further assess the test differences between differing living environments.

References
Complete Change: A Short Fiction

Aaron Dull
Complete Change: A Short Fiction

Abstract
Nolan, a 28-year old barista, stuck in a world of incomplete moments, finds a new beginning in Brodie. Though a new friendship easily develops between the two, they find a much closer companionship when an accident turns into passion. Nolan is thrilled about the prospect of moving forward in life, but a serious question causes him to think. He may still be stuck in the past. Change is a short story that explores the idea that one small act can both prohibit and enable a person to move forward in life.

Keywords
Romance, Collections, Stuck in the Past, Fiction, short stories
Complete Change: A Short Fiction

Aaron Dull, Western Oregon University

Faculty Sponsor: Dr. Katherine Schmidt

“I’ve got a Grande-sized Caramel Light Frap hold the whipped cream, two kid-size raspberry Italian sodas, and a slice of coffee cake for Julian Delores!” For the Starbucks Café on the corner of Mariposa and Bryant, it was a busy, bustling morning. A man with brown hair and a name tag that read “Nolan” held the drink and tried to call the order over the loud, excited chatter of coffee enthusiasts.

Nolan Griffith had been working at Starbucks for nearly five years. He knew every drink order like the back of his hand. Though most 28-year olds with an accounting degree would probably have not found this job satisfying, Nolan loved it. He enjoyed the strong smell of the Italian roast coffee bean, the laughter of couples enjoying their freshly prepped Cinnamon Dolces, the satisfaction he received when someone thanked him for getting their drink just right, but what pleased him the most about his job was the routine. Every day he waited for each of his regular customers to come by the shop and order. He also liked when new customers came and became regular customers. He loved collections, and this was an abstract collection of customers.

After a few more times of calling the order, Nolan watched Julian Delores in her business suit with her two boys exit the bathroom. Almost immediately, the children ran, laughing as they began to play on the nearby chairs.

“Settle down.” She took a deep breath trying not to let the obvious vein explode in her forehead. Before she had time to yell, she picked up her drink from the nearby counter, and took a sip. Calmness and warmth instantly spread across her face.

That bit of satisfaction was exactly what gave Nolan a sense of purpose. Afterward, she thanked him, scolded her children, picked up her slice of coffee cake, and left to presumably drop them off at daycare before a long day of work. Once the door had shut, Nolan took out his tiny, pre-typed sheet of paper and checked her name off of the list of regular customers. It was his way of keeping track of who had come and who hadn’t.

A few hours later, the place calmed down and his coworkers went on their breaks, leaving him to clean up before the next rush began. As he went to finish washing the blender in the nearby sink, the smells of sweet raspberry and dark, savory chocolate mixing in the warm, rushing water, he heard the familiar chime of the door opening.

“Hello there! Can I help—oh, hey, Brodie!” Nolan waved, instantly recognizing the customer. Brodie was several inches shorter than Nolan, wore thick-framed black glasses, and had dark brown hair which was nicely combed. In Brodie’s right chest pocket several items protruded: a large pencil, an X-acto knife, and a fleshing tool which looked like an upside down metal teardrop.

He was completely Nolan’s type of guy, but a recent break up had caused Nolan to be apathetic to the idea of relationships for the foreseeable future. Instead, he put on a “Starbucks smile” and prepared to greet his regular customer.

“How’s it going, Nolan?” Brodie gave a slight smile. His lips parted just enough that his pale, white teeth gleamed against the store lights.

“I’m having a great day.” Nolan began to prepare the usual caramel macchiato for Brodie.
“Good to hear! What’s so great about it?” Brodie asked.

“Oh, nothing in particular.” Nolan pulled his paper out and put a check mark next to Brodie’s name. Just as he was about to put his list away, he noticed a name that was unchecked, Suri Gomez. She hadn’t come in. She always came in. He sighed and put the list away.

Incomplete.

“You know, I’ve been coming here for a few weeks now. That’s what you tell me every time,” Brodie said. The way Brodie looked at him reminded Nolan of his parents who would check in periodically asking how he was. Of course, they’d keep asking him and he’d keep responding the same way over and over until they would leave him alone. “Don’t you have any friends you hang out with? Maybe special interests? How about family?”

Nolan cringed as the steamer hissed with a high pitch. He pulled the milk pitcher off the steam wand and poured the milk over two freshly pressed espresso shots. “I have an ex that I still talk to, but no one else really.” He picked up the caramel drizzler and slowly made a checkerboard pattern along the foam that coated the top of the warm concoction. “I don’t have any siblings, and I don’t really get along with my parents.”

“I see,” Brodie appeared to pick up on Nolan’s hint to change the topic. “Well, I’m new to the city and you seem nice. Would you like to join me for lunch sometime? I’ve been having a hard time making friends here. The people at the studio are pretty boring.”

“What do you have in mind?” Nolan was hesitant. He always made a sandwich that he would eat alone in the break room. He couldn’t remember a time since starting the job that this routine had changed.

“There’s this pizzeria about twenty blocks away called Marcello’s,” Brodie suggested.

Nolan was a little nervous about changing his routine, but the look on Brodie’s face practically begged him to say yes.

“Let me think.” As Nolan handed him the drink, his fingers brushed against Brodie’s and he noticed his weathered hands. They were rough, yet somehow still soft. He felt his breath catch and realized his fingers had lingered just a little too long for comfort. He retracted his hand and laughed nervously. “Sorry.”

“No problem,” Brodie took a sip of his drink. He proceeded to take a deep breath, close his eyes, and let out a sound of satisfaction. Nolan felt good, receiving the subtle indication that the drink had been made just right. In that moment, Nolan couldn’t think of a good reason to decline the offer.

“Let’s do lunch,” Nolan blurted without any more thinking.

“Yeah?” Brodie grinned. “Great! I’ll see you there tomorrow then?”

“Sure,” Nolan returned the smile and waved as Brodie grabbed a drink sleeve and left the café.

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Nolan arrived at his apartment just after seven that night. The shop had gotten a large afternoon rush and his legs were killing him from having to run back and forth to wash dishes and keep up. He kicked his shoes off and began his routine of preparing a can of tomato soup for dinner, followed by an hour of television. Glee was on that night, and unlike the week prior, it wasn’t a rerun. Though he prided himself in avoiding clichés, his recent ex, Adam, had raved about it and gotten him hooked. It became a permanent part of his weekly television routine, even after Adam had left him.
Eventually, Nolan ambled to the bathroom. While he was brushing, he took a few moments to look around and reflect on his collection of license plates decorating the bathroom walls. He noticed his Oregon license plate with the tree in the middle. Something was off and he couldn’t quite tell what it was. He used the sink to support his leg as he boosted himself up for a closer look. There was a dirt spot near the top of the tree. Nolan couldn’t imagine how it got there.

After middle school, Nolan’s family had left Oregon for California. As a going away present, his friend, Ivan, gave him a license plate from Oregon to remember him by. Ivan’s father worked for a car company. Ivan had stolen this license plate from his father’s office for Nolan, which read “4 EVR” to represent being friends regardless of where they were.

Just past the border, his family had stopped in a gift shop that was full of license plates from all over the country. He was so moved by them that he ran to the pay phone. After dropping the required amount of change into the slot, he dialed his friend’s number.

“Ivan … I … I love you … ” Nolan’s palms dripped in sweat.

“Me too, Nolan.”

They started a long distance relationship. For a while, Nolan was happy. He began a collection of license plates from nearly every state. Every plate somehow made him feel closer to his long distance boyfriend and the moment he realized he loved him.

Nolan doused a washcloth with water from the sink and began to scrub the Oregon License plate which now dangled on the wall in front of him. He scrubbed so hard that he could feel his knuckles scraping against the metal of the plate. He put his whole being into cleaning the plate, feeling that it wouldn’t become clean until he could remove the filth. Eventually he realized the spot was rust and wasn’t going to be removed, regardless of how hard he scrubbed. He sighed and gave up.

“The distance is too much Nolan, I can’t do this,” had been the last text that the two former friends had shared, ending his drive to want to complete the collection; he was still missing twenty-two states.

*Incomplete.*

Nolan finished his normal preparations for the night and then crawled into his bed, setting his alarm. His eyes fell upon his collection of U.S. Dollar Coins. It was the closest he had ever come to completing a collection: only one coin absent. The empty spot in the collection was a reminder of that fateful day.

It was the morning of Nolan’s 16th birthday as he waited to purchase the limited edition 1804 Silver Dollar. Eagerly, he stood outside of Bart’s Antique Shop, clutching his birthday money. For the last three weeks, he had been saving up for the coin. It was the first time he had seen this particular dollar, and before the chance encounter at Bart’s, it had been nothing more than a coin myth. It was rumored that only fifteen of them were in existence.

The thought of finally finishing a collection made him anxious. His hands were clammy and warm despite the harsh cold of the chilled autumn morning. His heart beat like a drum that resonated and droned out all of the passing cars around him.

Just a week prior, he had asked his boyfriend, Steve, to be his life partner. He hadn’t told a single soul about this in fear of not being understood. After the fallout with Ivan, Nolan felt Steve’s presence in his life was nothing short of a miracle. Unlike his failed license plate collection, Nolan couldn’t wait to finish his silver dollar collection. It felt perfect; a complete collection for the completeness he felt with Steve.
The sun emerged from the horizon as the sky lightened. Nolan could tell it was going to be a good day.

The shop owner pushed the door open and smiled to see Nolan again. "We're open now—" he was interrupted and chuckled as Nolan whizzed past him.

Nothing else mattered. His hands slammed on the familiar glass case, sweating palms leaving a greasy residue as he searched along the rows of antique coins. After a few minutes of the fruitless inspection, he felt frustrated, stood up, and looked at the shop owner.

"Excuse me, where's the 1804 Silver Dollar you had a few weeks ago?"

"Sorry, son. I sold it yesterday," the shop owner frowned in sympathy.

Nolan couldn't believe it; he had been so close. To him, not completing the collection was the equivalent of failing. He hated failing. It reminded him of not living up to his parents’ expectations. Every time he failed a test, or made a decision that disappointed his parents, he would be scolded or told how much of a disappointment he was.

His phone vibrated—a text from Steve. "I'm sorry Nolan, I can't do this." With a heavy sigh, and on the verge of tears, Nolan bowed his head.

"I guess there's nothing here for me."

Nolan slowly walked away from the store. Despite the fully risen sun, he felt more cold and alone in that moment than ever.

Incomplete.

As Nolan lay in bed, staring at the empty spot in his coin collection, his stomach turned; he felt instantly sick. He took the collection and stuck it face down in the drawer, shutting it tightly. It was just another failure in his long list of failures. He let the thought simmer and turned off the light, eyes wide in the darkness.

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Nolan exited the taxi. Next to a rainbow-striped flag, the restaurant’s sign had a cartoonish drawing of the Earth with a map-like banner that read “Marcello’s.” He casually strolled into the shop, noticing Brodie sitting at one of the tables just inside. As their eyes met, Nolan thought he could see Brodie's blue eyes light up. In that instant, Nolan realized this may be more than just lunch with a friend, which both scared and excited him in a way he couldn’t fully comprehend.

"I was worried you weren't going to come," Brodie let out a huge breath.

"Sorry about that," Nolan replied nervously. "We got slammed right before the lunch set, and I needed to stay a little longer, and you know how hard it is to grab a taxi during lunch hour." He smiled. There was a small awkward pause as Nolan extended his hand to shake. Before Nolan could blink, Brodie leapt out of his seat and instead wrapped his arms around him. Nolan was shocked. He was never touchy-feely with his family, or with his friends. However, it didn't feel wrong with Brodie in that moment.

"Hope that was okay," Brodie smiled again letting go after a few seconds. "I've always been particularly fond of hugs."

"N-no, it was fine." Nolan sat down and began to look at the menu, trying to change the topic. Nolan noticed that Brodie’s usual pocket full of artist tools was empty. "What's good to eat here?"

"Well, I usually have the 'Ellen Degrilleres' sub." Brodie sat down again. "I know it says this place is known for its pizza, but there is something about the roma tomatoes in that sandwich that is splendid."
“Sounds good to me.” Nolan sighed in relief discretely. He didn’t want Brodie to realize how much eating pizza would throw off his usual lunch routine. A sandwich, however, would work perfectly.

“You aren’t even going to look at the rest of the menu?” Brodie looked confused.

“You made it sound delicious. Plus I’m not really in the mood for an entire pizza, large or small,” Nolan shrugged.

A waiter soon came to their table. Nolan winced; he was painfully gay. His shrill high-pitched voice and overly flamboyant gestures made everything in this restaurant, on the menu, and the clothing Nolan wore seem “Faaaaaabulous!” It made Nolan uncomfortable, much like the notion of PDA.

Once the skinny, overly pierced waiter had taken their order, he put his pen and pad away. “That’ll be right up in a few moments you two,” he winked and walked away.

“That was weird,” Nolan said, raising his eyebrow.

“Yeah,” Brodie snorted and jokingly winked. The two looked at each other again and laughed hard. They were just two guys, sitting together for lunch in the middle of the notoriously gay-friendly Castro District.

It was nice to actually have a conversation with someone. As social as it was to be a barista, he hadn’t made any real connections at work. True, some of his female coworkers constantly tried to invite him to “girls’ night out” at a karaoke bar or to see a chick flick. He habitually turned them down because the activities often interrupted his usual nightly routine. Conversations he usually had with customers would entail a greeting, a drink order, and thanking someone for their patronage. It was safe for him and didn’t interfere with his daily schedule.

“Tell me more about yourself,” Nolan said.

“Well, for starters I’m 25 and moved here recently from Los Angeles to start taking sculpting classes at the Academy over on Townsend.” Brodie took a sip of water from the cup the waiter had set in front of him.

“I noticed.” Nolan playfully pointed to Brodie’s weathered hands.

“It began as a hobby, but after two years in business school, it became my passion. Can’t say my parents were ecstatic about it.”

“Sounds similar to me. After getting my degree, I started full time at Starbucks. My parents weren’t super thrilled about it either.” Nolan rolled his eyes.

“Well, here’s to disappointing the folks and developing new friendships!” Brodie raised his water glass.

“Here, here!” Nolan tapped his plastic cup against Brodie’s.

They settled into small talk. Nolan learned that Brodie was short for Broderick Holmberg. They both had common interests including rock climbing, watching television, and taking walks along the pier, which made Nolan laugh because it sounded like the perfect dating ad. He learned that Brodie was gay, which hadn’t completely shocked him due to the location of their lunch, and because most artists he knew in this city were gay.

“Man, I’m full … we should do this again sometime,” Nolan stifled a burp.

“Agreed,” Brodie patted his stomach to indicate a similar feeling.

For the next several weeks, the new friends spent their spare time together. They went to art museums, took walks down Castro Street, watched movies, and talked about everything. Nolan began to consider Brodie a close friend, and felt extremely comfortable around him. Then it happened.
One night at the local pier, the two men went out for a stroll. They were enjoying a couple of caramel macchiatos that Nolan had prepared back at Starbucks, when a nearby teenager lost control of his soccer ball and hit Brodie’s arm. This caused a chain reaction ending with Brodie’s drink spilling onto Nolan’s shirt collar. The kid apologized quickly and took off.

“Let me get that,” Brodie said, taking a handkerchief out of his pocket to wipe the spill. Completely by accident, Brodie’s fingers slipped slightly, brushing Nolan’s skin. The touch was like an electric shock as Nolan felt his breath leave his lips. For a moment the two men were frozen, their eyes locked on one another...unsure of how to proceed. For the first time in awhile, Nolan felt free of his insecurities.

“Brodie…I…” Nolan started but couldn’t find the words. They had become close friends in such a short amount of time. They were both gay, single, had a lot in common, and even Nolan had to admit he hadn’t felt this comfortable with someone in awhile. His left hand stretched and wrapped itself around Brodie’s waist, pulling them closer together. The two closed their eyes and allowed their developing feelings to take flight as their lips brushed against one another.

Nolan had found a companionship and closeness he had never felt. Though he had been subject to many failed relationships in the past, he knew if he didn’t at least explore his feelings for Brodie, he would regret it for the rest of his life. So, instead of breaking away from the connection, he continued while suppressing his personal reservations. The pair of them went back to Brodie’s apartment to continue this new exploration privately.

The next four months flew for the two new lovers. Unlike anyone he had dated before, Nolan felt something stir inside him whenever he was with Brodie. He had never felt so comfortable with another human being before. The couple became official after a romantic dinner at Marcello’s where their first lunch had been.

During this dinner, Brodie gifted him with a sculpted coffee mug which had Brodie’s lip imprints lined along the rim so that every time Nolan would take a sip, he would be “kissing Brodie.” Though it embarrassed Nolan in public, he thought it was a sweet gesture. It prompted him to begin collecting sculpted coffee mugs. He wasn’t exactly sure where he was going with this particular collection, but it felt good to have a fresh start.

On the night of their fourth month as a couple, Nolan lay naked against his lover’s warm and comforting chest. It was raining that night and the sound of the water pitter-patter against the window calmed him. Their warm heartbeats danced to the tapping of the rain. Everything felt right to Nolan, which prompted him to say something he hadn’t meant in a long time.

“I love you, Brodie,” Nolan sighed happily, finally having said this to his lover for the first time. He snuggled up to Brodie’s chest, taking in the scent of smooth cologne.

“Why do you love me?” Brodie ran a hand through Nolan’s hair.

“Because…” Nolan tried to sound confident, though clearly unsure how to phrase anything cohesively. “I…uhh…” For a moment he couldn’t see straight. His insecurities clouded his vision in a deep fog.

Incomplete. Incomplete. Incomplete. The word danced around his head like the chanting of demented children from a horror movie.

“Because?”

There was uneasiness as the pair separated, looking at one another.

“I…I don’t know…” Nolan sat straight up in bed, the bliss leaving him like reverse osmosis.
“I’m sorry, I didn’t mean to…come back over babe,” Brodie tried to smile and put a hand up to usher Nolan back, but it was no use.

Nolan quickly stood up, putting his clothes on and checking the time from his watch, the first in a failed collection of knock off Rolexes, which an ex-boyfriend in college had given him. “I should go.”

“Why?”
“I just have to, okay?” Nolan snapped.
Brodie took his hand back. “Why are you so riled up?”
“I don’t know. I’ll call you tomorrow,” Nolan finished buttoning his shirt and frantically ran out of the bedroom. As he hurried through the mini-studio, which Brodie used for school projects, he tripped over a box of artist tools. He felt tears stinging the edges of his eyes as he regained his balance and dashed through the door. He rushed down the stairs and out into the rain, hoping the drops would hide his tears.

Incomplete.

The rain continued to pour harder than before, going from a soft, gentle drizzle to a harsh downpour. All of the street lights began to shut off one by one on the path in front of him. His fast walk soon turned into a run. He didn’t stop until he had reached his apartment some thirty blocks away. His hands trembled as he reached for his keys. He finally got hold of them, but they fell from his shaky grasp into a puddle; the final street light half a block away shut off. Unable to hold himself up anymore, Nolan collapsed against the side of the building.

INCOMPLETE.

I’m sorry Nolan, YOU can’t do this. The distance is too much, YOU can’t do this. Nolan dug his fists into his eyes, forcing away the tears. Why the hell couldn’t he figure out what kept him from feeling complete?

He couldn’t understand why an answer hadn’t formed. It reminded him of every failed relationship he had before this. Every time he tried to rationalize why he was doing something or how he felt, it suddenly didn’t seem right.

But things had felt different this time; he was sure that being with Brodie was exactly what he needed. Why hadn’t he been able to express that? Why had he left Brodie lying naked on the bed?

Eventually, Nolan fished his keys out of the puddle. He sighed as he unlocked the door, and headed inside, alone. He reached for the light switch, but pulled his hand back—he knew his way in the dark too well.

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Nolan broke things off the next morning with Brodie. After a hard discussion, they agreed to stop talking for awhile and let everything sink in. Nolan’s routine went back to how it was before Brodie: Nolan would go to work at Starbucks, serve the same drinks to the regular customers, check their names off the list, come home at night, make dinner, watch some television, and go back to bed.

Roughly three weeks later, while Nolan was closing shop, it happened. He collected the tips made throughout the day, cleaned the dishes, wiped down the counters, and made sure money was even on his register. Just as he was getting ready to put away his apron and turn off the light, the chime rang.

“Sorry we’re—Brodie!” Nolan was astonished to see his ex after so much time spent apart. Brodie looked tanner than when they had dated. There was even a small bit of facial hair on the edge of his chin.
He looked good, which frightened Nolan. The prospect that Brodie had moved on and was doing well without him made Nolan’s heart sink.

“Hey, stranger,” Brodie chuckled as he approached the counter. “I’m sorry, I know you are about to leave. I just wanted to stop by to see you.”

“It’s…not a problem! Here, let me make you the usual.” Nolan’s heart skipped a beat. Brodie wanted to see him?

“You don’t have to…”

“I insist!” Nolan smiled as he turned on the steamer. “How are things lately?”

“Well, not the same since we…well you know…I have a new piercing.” Brodie pointed to his lip.

“I saw that. Did it hurt?” It was a stupid question, but kept the small talk going.

“A lot actually. But it was worth it. It suits me.”

“It does!” Nolan looked up for a second. “How is the studio at school?” He capped the drink, satisfied with its preparation.

“The same as usual,” Brodie shrugged, taking the drink as Nolan offered it to him.

“I see,” Nolan sighed as the warm cup left his hand. He didn’t want the warmth to leave. Brodie’s arrival in the café had made Nolan the happiest he had been since the break-up.

“Brodie…I want you to know that I really did love you.”

Brodie raised an eyebrow. “Why?”

Nolan felt uncertainty rise inside him like before. He had mulled over this question hundreds of times since the last night they had been together. He wanted to tell Brodie everything – express every feeling that had been bottled up. Why couldn’t Brodie just understand that he loved him without having to explain it? Why did there have to be a reason? Nolan struggled with these questions, trying to somehow magically find the words that would satisfy the man he loved.

They didn’t come to him no matter how hard he tried. He had once again failed to produce any response.

Incomplete.

“I still don’t have an answer.”

“Hmm..” Brodie didn’t look convinced at all.

“Can we try being friends again?” Nolan shifted the topic.

“I’d…like that…” Brodie said after a second to ponder the question. Then he smiled. “How about lunch, next week at Marcello’s?”

“Sure!” Nolan found himself smiling too.

Brodie took a sip of his drink and closed his eyes. “You always know how to make my drink just right. Thank you.”

Nolan blushed as he put the measuring cup in the sink and wiped off the steamer with a hot rag. “Don’t mention it.” He turned to the sink to finish his closing duties, “Well, I have to get home. Please stop by more often. It was…nice to see you.”

“Oh, sure. I’ll stop by later this week so we can talk about lunch details,” Brodie then reached into his pocket and pulled out some change, dropping it in the tip cup casually as if to be polite and acknowledge the café’s policy to tip a good barista.
Nolan heard the coins fall and was about to protest, but he was already feeling too awkward to make a big deal about it. He waved to Brodie and went back to washing dishes.

Another employee emerged from the back room. She walked over to Nolan while her long, black ponytail swung from side to side. “I can get the rest,” she said as she rolled her sleeves back and took the rag from Nolan.

“You sure?”


“How did you know?” Nolan looked puzzled.

“Honey, please.” She paused a moment and folded her arms. “I’ve had my fair share. I know the ‘let’s be friends’ conversation when I hear it.”

Nolan didn’t protest any further and hung up his apron. Just as he was about to leave, she stopped him.

“Hold on.” She picked up the tip jar and shook it grinning. “Forgetting something?”

Nolan hadn’t really planned to take the change. However, as she dangled the jar in front of him, he felt obligated. As he poured the change into his hand, something strange caught his eye. One coin, faded almost beyond recognition, was slightly larger than the quarters that accompanied it. To the untrained eye, it may have appeared to be a half dollar, but as a previous coin collector, Nolan knew better. He took the coin and ran it under the water at the nearby sink. The silver began to shine around the date: 1804.

“Complete,” Nolan whispered.

“Excuse me?” She asked.

The gears turned in his body as Nolan dropped the change on the floor.

“Nolan?” She called out to him, but he hardly noticed.

His heart raced and his feet raced even faster as he ran towards the door. He pushed it open with all his might. The sun shone brightly and it took his eyes a moment to adjust. As he put his right hand to his eyes to help with the painful transition, he saw that Brodie hadn’t even walked a full block from the café yet.

“Wait!”

As Brodie turned around, Nolan’s world became illuminated by the bright sun, fading into a shimmering sea of silver. All he could see in front of him was the silver dollar and to reach it would mean change.
Case Study: The Parkinson's Experience
Scott A. Thurman

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Case Study: The Parkinson's Experience

Abstract
Previous research has extensively studied individual components of Parkinson's by studying the disease but thus far does not address the comprehensive impacts and obstacles of life with Parkinson's. The common experiences of Parkinson's can offer insight as to how provide better care by addressing multiple domains in a person's life. This hypothetical case study highlights commonalities shared by those with Parkinson's that spans across social, emotional and biological aspects of life. Possible treatment strategies are discussed concerning the impacts of fatigue, social isolation, increased burdens of care, and family dynamics in order to offer insight to care providers as to the range of care needed by those with Parkinson's disease. The goal of this article is to highlight that, while interventions are needed to address the disease, providers should be mindful that interventions are also needed to limit the negative impacts of Parkinson's on a person's life experience.

Keywords
Parkinson's disease, Fatigue, Burden of Care, Medicare, Social Isolation, Symptoms, Social Work, Palliative Care, Case Study
Case Study: The Parkinson’s Experience

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Previous research has extensively studied individual components of Parkinson’s by studying the disease but thus far does not address the comprehensive impacts and obstacles of life with Parkinson’s. The common experiences of Parkinson’s can offer insight as to how provide better care by addressing multiple domains in a person’s life. This hypothetical case study highlights commonalities shared by those with Parkinson’s that spans across social, emotional and biological aspects of life. Possible treatment strategies are discussed concerning the impacts of fatigue, social isolation, increased burdens of care, and family dynamics in order to offer insight to care providers as to the range of care needed by those with Parkinson’s disease. The goal of this article is to highlight that, while interventions are needed to address the disease, providers should be mindful that interventions are also needed to limit the negative impacts of Parkinson’s on a person’s life experience.

Keywords: Parkinson’s disease, Fatigue, Burden of Care, Medicare, Social Isolation, Symptoms, Social Work, Palliative Care, Case Study

A life with Parkinson’s disease is a life of uncertainty and obstacles brought on from both motor and non-motor symptoms. Not every Parkinson’s experience can be captured by a single story or timeline of symptoms. Parkinson’s disease is not a single symptom experience. Those with this disease have multiple symptoms that present in a variety of manners all compounding in daily life (Poewe, 2008). Research has extensively studied factors of Parkinson’s disease like physical presentations, mental health, and the effects of social support individually, but thus far only a few focus on the comprehensive impacts and obstacles of life with this disease (Boland & Stacy, 2012; Cohen, Underwood, & Gottlieb, 2000; Dobkin, Menza, Allen, Gara, Mark, Tiu, Bienfait, & Friedman, 2011; Janevic, Rosland, Wiitala, Connell, & Piette, 2012; McComb & Tickle-Degen, 2005; Ransmayr, 2011; Poewe, 2008; Schapira, 2005; Schreurs, De Ridder, & Bensing, 2000; Simpson, Faines, Lekwuwa, Wardle, & Crawford, 2006). The nature of Parkinson’s disease is such that there is no guarantee of symptom severity or which symptoms may present. However, there are common experiences among those with Parkinson’s that can offer insight to this progressive and currently incurable disease. With this in mind, this paper addresses multiple domains and potential experiences of Parkinson’s disease and the impacts this disease may have on one’s life. Using a fictional case study, this paper will take a person through the social, emotional, and biological aspects of living with Parkinson’s.

Review of Literature

What is Parkinson’s disease?

Parkinson’s disease is a degenerative condition named after the English doctor, James Parkinson, who helped refine descriptions of the physical presentations associated with this disorder in his published work titled “An Essay on the Shaking Palsy” in 1817 (Burch, & Sheerin, 2005). Since then, Parkinson’s disease has been studied extensively and found to be an idiopathic (cause unknown) loss of cells in the region of the brain known as the substantia nigra which are responsible for producing dopamine (World Health Organization, 2006). Dopamine is the neurotransmitter for signals to control and coordinate movement. In Parkinson’s, the loss of dopamine reduces the ability to directly control motor function (Parkinson’s Disease Foundation, 2013). Parkinson’s disease currently has no known cure.

Who is affected by Parkinson’s disease?

According to a survey by the World Health Organization (2005), there are an estimated 5.2 million diagnosed cases of Parkinson’s disease worldwide, and of those an estimated 1.2 million cases are in the United States (World Health Organization, 2006). Future estimates, given the number of newly diagnosed cases each year and the incurability of the disease, put the United States near 1.8 million diagnosed cases by 2030 (Boland & Stacy, 2012; World Health Organization, 2006). While many studies argue an indiscriminate distribution of Parkinson’s disease across gender and ethnicity, one study found significant data to support their findings that incidences of Parkinson’s are more prevalent in males, non-Hispanic whites, and that the risk for diagnosis increases with age (Van Den Eeden, Tanner, Bernstein, Fross, Leimpeter, Bloch, & Nelson, 2003). The typical age range for a confirmed diagnosis is around one’s fifties or sixties. However some are diagnosed sooner which is known as early onset Parkinson’s (World Health
Organizations, 2006). These figures are only representative of clinically diagnosed cases and do not include people who are living with the disease yet to be diagnosed due to either the lack of health care availability or the reduced symptom severity typically found in early onset stages.

**Pre-Diagnosis**

Prior to diagnosis a person may become aware of unexplained symptoms, or changes in posture, memory, or gait. Researchers suggest that one reason for the delay in consulting a doctor may be due to the lengthy onset of symptoms, role changes, and cognition decline often mistaken for the natural decline of the physical body (Wressle, Engstrand, & Granerus, 2007). When under the care of a doctor, a comprehensive medical history along with a thorough neurological assessment is first taken in order to rule out other possible explanations before Parkinson’s can be diagnosed (Michael J. Fox Foundation, 2012). It is estimated that by the time motor symptoms present themselves, 60% of dopamine neurons in the brain are lost or destroyed (Adler, 2011).

It is not uncommon for those seeking treatment for Parkinson’s-like symptoms to see a neurologist along with their primary care provider in order to have a collaborative effort when diagnosing possible causes for their symptoms (McLaughlin, Hasson, Kernohan, Waldron, McLaughlin, Cochrane, & Chambers, 2010).

**Motor/Non-Motor Changes Associated with Parkinson’s disease**

When surveyed about the most common symptoms associated with Parkinson’s, people often report the symptoms that have an outward presentation such as bradykinesia, tremors, erratic movements, and rigidity (Burch & Sheerin, 2005; European Parkinson’s Disease Association, 2008). Research suggests that as motor symptoms worsen, activities of daily living such as getting out of bed, brushing one’s teeth, or going to the bathroom require greater amounts of concentration or assistance (McLaughlin, et. al., 2011; Platt, 2004). As mentioned before, by the time motor symptoms appear approximately 60% of dopamine neurons are lost (Adler, 2011).

Along with motor symptoms, those with Parkinson’s disease may also experience what are called non-motor symptoms. Non-motor symptoms include cognitive, psychological, and emotional changes due to the destruction and slowing of neurons and synapses in the brain (Barbas, 2006). Due to the destruction of neurons and slowing of synapses, actions in the brain that normally occur without much effort (e.g., basic math, word recognition, and memory recall) may become more difficult, often resulting in states of confusion (Barbas, 2006; Platt 2004; Wressle, Engstrand & Granerus, 2007).

Another problematic occurrence of Parkinson’s disease can be described as the On-Off phenomenon (Haahr, Kirkevold, Hall, & Ostergaard, 2011). “On” can be describes as when motor and non-motor symptoms are under control either through medication or having a good day. “Off” can be attributed to episodes of severely decreased mobility, rigidity, cognitive impairment, or tremors and is common when medications start to wear off or perceived stress is too much, allowing for such symptoms to take control. The on-off phenomenon may happen randomly or regularly depending on the progression of the disease, stress, and medication schedules (Haahr, Kirkevold, Hall, & Ostergaard, 2011).

**Concerns about the Future**

A successful diagnosis of any disease may bring a sense of great relief and validation over the health concerns a person may have (Haahr, Kirkevold, Hall, & Ostergaard, 2011). However, as with any diagnosis, Parkinson’s can also bring feelings of fear, uncertainty, and frustration (Haahr, Kirkevold, Hall, & Ostergaard, 2011; McLaughlin et al., 2011). These feelings of fears are often reported as concerns over what the future will be like with this disease and in what capacity the symptoms will leave them in (Haahr, Kirkevold, Hall, & Ostergaard, 2011).

**Medication Effectiveness**

Even though there is no known cure for Parkinson’s, there are medications that, when administered, help to at least manage symptoms. One medication has had great success since its implementation in the 1960’s is known as Levodopa. Levadopa, when ingested, is converted into dopamine which is the neurotransmitter responsible for movement control and coordination (National Parkinson Foundation, 2013). Levodopa alone works well in managing symptoms of Parkinson’s disease, but recent research indicates that adding in a second medication has proven to significantly reduce both symptom severity especially in those younger than 70-75 years of age (Schapira, 2005; Vu, Nutt, & Holford, 2012).

The current trajectory of Parkinson’s guarantees that it will eventually require alterations to medications, medication schedules, lifestyle changes, and possible surgical interventions in order to combat both the symptoms and side effects of this disease (Platt, 2004; Vu, Nutt, & Holford, 2012). In early stages of Parkinson’s, research has shown the effectiveness of medications in controlling symptoms. This period of effectiveness may last several years before the progression of the disease outruns the effectiveness of the medications (Burch & Sheerin, 2005; Vu, Nutt, & Holford, 2012).

Previous research suggests that, over time, Parkinson’s medications become even less effective and symptoms may worsen (Vu, Nutt, & Holford, 2012). It has been reported by some that this feels like being trapped in an alien body unable to exert either command or control over what one does (Haahr, Kirkevold, Hall, & Ostergaard,
Symptoms may progress slowly, however, given enough time, symptoms will progress faster than treatments are able to keep up, resulting in a person severely incapacitated and becoming more reliant on others for care (Barbas, 2006; Haahr, Kirkevold, Hall, & Ostergaard, 2010; Platt, 2004; Shapira, 2005; Vu, Nutt, & Holford, 2012).

**Fatigue and Mental Health**

While fatigue and mental health concerns are common in many chronic illnesses, it is important to note how these factors affect those with Parkinson’s disease. The amount of energy required for maintaining control over the physical body to accomplish the simplest of tasks may compound on one another, resulting in those with Parkinson’s feeling exhausted (Poewe, 2008; Wressle, Engstrand & Granerus 2007). While mental concentration can be fatiguing in healthy people, it is more so for those dealing with Parkinson’s. Due to destruction of neurons and synapses which results in cognitive slowing and states of confusion and for motor and non-motor symptoms, the amount of effort now used to conduct once basic of mental tasks can leave those with Parkinson’s feeling exhausted after just a short time (Wressle, Engstrand, & Granerus, 2007). A significant contributing factor to fatigue is the high co-morbidity of sleep disturbances reported by those with Parkinson’s (Alder, 2011; Boland & Stacy, 2012; Poewe, 2008; Shapira, 2005; Schreurs, De Ridder, & Bensing, 2000; Wressle, Engstrand, & Granerus, 2007). More often than not, sleep disturbances are reported as a side effect of Parkinson’s disease and result from both motor and non-motor symptoms. These disturbances include difficulty falling asleep, waking up several times a night, and motor symptoms like restless leg syndrome or painful cramping (Adler, 2011; Poewe, 2008). As with many illnesses, doctors generally recommend getting plenty of rest, reducing stress, and limiting exhaustive daily activities as key components to reducing fatigue (Wressle, Engstrand & Granerus, 2007).

Mental health concerns are common to those living with a chronic illness like Parkinson’s disease. The impact of depression should be noted as a significant factor affecting those with Parkinson’s (Alder, 2011; Barbas, 2006; Boland & Stacy, 2012; Bucks, Cruise, Skinner, Loftus, Barker, & Thomas, 2011; Burch & Sheerin, 2005; Dobkin et. al., 2011; Janevic, Rosland, Wiitala, Connell, & Piette, 2012; McComb & Tickle-Degnen, 2005; McLaughlin et. al., 2010; Platt, 2004; Poewe, 2008; Schreurs, De Ridder, & Bensing, 2000; Wressle et. al., 2007). The relationship between depression and Parkinson’s is like most chronic illnesses and has been found to be negatively correlated to one’s quality of life, in that those who self-report higher levels of depression often indicate low perceptions in their quality of life (Bucks et. al., 2011; McComb & Tickle-Degnen, 2005; Poewe, 2008; Schreurs et al., 2000; Wressle, et. al., 2007).

Areas of life that are examined when establishing changes in one’s quality of life may include changes in social behavior, physical mobility, emotional wellbeing, stress, and social support (Borland & Stacy, 2012; Bucks et al., 2011; Schreurs, De Ridder, & Bensing, 2000; Simpson, Haines, Lekwuwa, Wardle, & Crawford, 2006). Social support was identified as a significant correlating factor in the quality of life in those with Parkinson’s disease on the PDQ-39 subscale (PDQ-39, or Parkinson’s Disease Quality of Life Questionnaire, is a questionnaire used in evaluating different domains of life such as social support, communication, and stigma), in that higher levels of perceived social support significantly mitigated perceived depression, anxiety, and stress (McComb & Tickle-Degnen, 2005; Simpson, Haines, Lekwuwa, Wardle, & Crawford, 2006).

**Burdens of Care and Social Isolation**

Often people with Parkinson’s disease experience varying levels of reduced social interaction. When symptoms are unpredictable, it is not uncommon for those with Parkinson’s to voluntarily reduce social outings due to fatigue, medication schedules, need for additional care, or out of fear of unwanted attention or embarrassment due to uncontrolled symptoms (McComb & Tickle-Degnen, 2005; Wressle, Engstrand & Granerus, 2007). This may be partly due to an insecurity or feeling hesitant in explaining their symptoms to others (Haahr, Kirkevold, Hall, & Ostergaard, 2011; McLaughlin et al., 2010; Platt, 2004; Wressle, Engstrand & Granerus, 2007).

Often when symptoms become unpredictable, a great deal of assistance is needed for daily activities and that reliance may result in one perceiving themselves as a burden on their caretakers (of which most are likely to be family members or spouses; Abendroth, Lutz, & Young, 2011; Boland & Stacy, 2012; Dobkin, et al., 2011; Haahr, Kirkevold, Hall, & Ostergaard, 2012; Janevic, Rosland, Wiitala, Connell, & Piette, 2012; McLaughlin et al., 2010; Platt, 2004; Wressle, Engstrand, & Granerus, 2007). As symptoms worsen and greater levels of care are needed public outings and visitors become less frequent, especially for those who are placed in a care facility due to caregiver fatigue, socioeconomic limitations, or the need for constant care (Abendroth, Lutz, & Young, 2011; Gallo & Matthews, 2003; Haahr, Kirkevold, Hall, & Ostergaard, 2010; McLaughlin et al., 2010; Platt, 2004; Wressle, Engstrand, & Granerus, 2007).

**Burdens of Care and Family**

Changes in roles are often reported as the symptoms of Parkinson’s progress. However, not all such changes were reported as being negative; some were reportedly a factor that helped to strengthen family bonds (Wressle, Engstrand, & Granerus, 2007). Many with Parkinson’s...
disease commonly report handing over responsibilities like cooking, paying the bills, or household chores to their families or spouses (Haahr, Kirkevold, Hall, & Ostergaard, 2011; McLaughlin et al., 2010; Platt, 2004; Wressle, Engstrand, & Granerus, 2007). In some cases, relationships with a family member or spouse who took on the primary role of caregiving were reported as strained due to the amount of time, resources, and difficulty of care required by some who live with Parkinson’s (McLaughlin et al., 2010). An additional burden of care for family members who take on the role of an informal caregiver is that they may also report experiencing reduced socialization due to not wanting to leave their spouse or family member with Parkinson’s alone for too long (McLaughlin et al., 2010; Wressle, Engstrand, & Granerus, 2007). If the care required by those with Parkinson’s becomes too great for a family member or caregiver to maintain, the decision to institutionalize those with Parkinson’s disease in a long-term care facility may seem like the only solution (Abendroth, Lutz, & Young, 2011; Haahr, Kirkevold, Hall, & Ostergaard, 2010; McLaughlin, et al., 2010; Platt, 2004; Wressle, Engstrand, & Granerus, 2007).

Burdens of Care; Financial Impact
The quality of care one has access to is often the reflection of a means to pay for such care and, by extension, is often dictated by socioeconomic status (Gallo & Matthews, 2003). Current estimates for the amount of money spent on care for those with Parkinson’s disease are around 23 billion dollars annually in the United States (Borland & Stacy, 2012). The economic burdens associated with the costs of care can be defined as lost wages, costs of prescription medications (often reported to be out of pocket expenses), and inpatient/outpatient care. These factors may impact decisions to institutionalize those with Parkinson’s in to long-term care facilities (Boland & Stacy, 2012; Kaltenboeck, Johnson, Davis, Birnbaum, Carroll, Tarrants, & Siderowf, 2011; Platt, 2004). Findings in a report published by Kaltenboeck and colleagues (2011) on the direct costs of Medicare beneficiaries with early and advanced Parkinson’s disease reported costs of care ranging from $1500 per quarter to over $8000 per quarter, depending on the amount of care required by those with Parkinson’s disease. Additionally if families or care-givers have limited to no access to quality care due to socioeconomic status, out of pocket expenses can create unnecessary economic burdens economically for those with a chronic illness like Parkinson’s disease (Boland & Stacy, 2012; Gallo & Matthews, 2003; McLaughlin et al., 2010).

The impact of this disease is clearly not limited to one’s body by way of the brain. The impact of Parkinson’s is evident in the total life experience of those with, and those involved with, this degenerative disease, and such impacts (motor/non-motor symptoms, medication effectiveness, mental health, fatigue, social isolation, and family/informal care giver burnout) should be considered as symptoms of the overall Parkinson’s experience and addressed accordingly.

Demographics
The following section is a fictional character named Bill. Basic demographics are presented along with pertinent information spanning multiple domains of life. This information is helpful in determining appropriate courses of action to comprehensively treat Parkinson’s and the person who lives with this disease.

Name: Bill
Age: 69
Gender/ Ethnicity: Male, White
Family Dynamics: Twice divorced, the second time after 15 years of marriage. Bill has no contact with ex-wife or plans of dating. Bill has one daughter from his first marriage, age 39, who is married with two children of her own. Both of Bill’s parents are deceased as of three years ago and died within just a couple months of one another. Bill has had reduced contact with his daughter since his separation from her mother and recently had contact with his grandchildren reduced as well with due to differing opinions with his daughter over what to do with Bill’s terminally ill parents while they were in the hospital. His daughter urged to allow natural death of Bill’s parents while Bill wanted to continue treatment in spite of the urging of health care professionals that there would be little change for their quality of life to improve from further treatments. Bill was very close to his parents and in their last years had moved them into his house to help with daily care. Bill still has bouts of depression over their death and has kept their room as it was when they were alive. The current course of Parkinson’s disease has Bill concerned over the status of his relationship with his daughter, and he wants increased contact with both his daughter and grandchildren.

Occupation: Retired from a county appraiser position a year after his parents died. Bill waited to retire until his parent’s life insurance paid out, all medical debts were settled, and his home mortgage was paid in full. During the last years of work Bill had to continuously reduce his hours and work load due to increased fatigue brought on in the early stages of Parkinson’s. Now, Bill spends most of his time at home watching TV, going to medical appointments, or occasionally visiting a friend that lives nearby.

SES: Retired, but makes enough money from a retirement fund and social security to not have to worry about bills as long as he stays within his current budget. Bill lives a modest lifestyle due to his fixed income but is
still able to occasionally eat lunch out and buy small gifts for his grandchildren. His monthly expenses are limited and include things like a cell phone (daughter’s idea), basic cable, and car insurance for the car he has owned for the last 10 years. His parent’s life insurance was used up to pay medical expenses prior to their deaths, cover funeral expenses, as well as pay off the mortgage on Bill’s house. Without the life insurance to cover these expenses Bill would not have been able to afford to live on his own.

Living Arrangements: Bill owns his single level home and lives on the other side of town from his daughter. He has a friend that lives nearby and occasionally checks on him to see how he is doing, but he is stopping by less frequently as Bill’s symptoms progress. Bill suspects that his friend may not be sure how to handle the changes in his cognition as well as seeing the physical symptoms, like tremors, associated with Parkinson’s disease. His friend is most likely unsure how to assimilate Bill’s changes in his schema of whom Bill should be and is distancing himself from the source of what is making him uncomfortable. Bill is still able to conduct all necessary activities of daily living (ADL’s), such as cooking, cleaning, bathing, and grooming, but has started to notice a reduced ability in fine motor skills making it difficult to operate button-up shirts and has opted to wearing simple clothes that do not require much effort to put on.

Emotional State of Mind: Bill has concerns over the progression of his symptoms and worries about future cognition declines as he occasionally forgets exactly what he was doing and why he went into a room. Even though his condition will eventually require greater amounts of assistance, Bill is reluctant to give up the independence he has been used to his entire adult life. Bill contemplates the idea of eventually moving to a skilled nursing facility when he is no longer able to safely live alone but would rather live with family and have them assist with care. The main barrier Bill feels to moving in with his daughter and her family is the current status of the family relationship and the reduced contact.

Bill was in denial of his symptoms for several years before diagnosis. His reluctance to accept that something was wrong was due to the slow onset of physical symptoms and mistakenly attributing symptoms to the decline of natural aging. Finally after the urging of family and his friend Walter, Bill finally acknowledged his physical and cognitive changes and went to see his doctor who, with the help of a neurologist, eventually diagnosed Bill with Parkinson’s disease.

As physical and cognitive symptoms progress, Bill has bouts of anger, resentment, and sadness. Bill is angry with his symptoms and feels as though his identity is disappearing more and more as his physical and cognitive abilities decline. He also fears that his dignity will one day be gone and feels saddened by the thought of having to rely on someone to wipe drool from his chin or dress him like a child. Due to everything that has gone on the last few years (diagnosis of Parkinson’s, death of his parents, the continued strain of family relationships), Bill suffers from depression, a common co-morbidity found in those living with a chronic illness. A major source of Bill’s depression centers on the idea that as his symptoms progress he will lose more and more of who he used to be and will eventually be a burden on others.

Health Care Access: Bill now relies on Medicare and sometimes has to pay for services and medications out of pocket due to his loss of insurance that would have covered his current medical expenses. Bill had the opportunity to continue coverage through this insurance but found it to be too expensive for his retirement budget. Bill visits his doctor every other month, and as needed when symptoms are worse, to see how the Parkinson’s medication as well as the medication for depression is working. Based on the recommendation from his physician, Bill is seeing both a physical therapist as well as an occupational therapist. Bill visits an outpatient rehabilitation clinic for his physical therapy and occupational therapy appointments and perceives to have significant success in limiting declines in physical abilities. Their appointment coordinator works to ensure that Bill’s appointments are back to back on the same day to reduce the need for frequent trips during the week to the clinic.

Bill’s physician is also discussing options for future care to help ease the pain sometimes associated with physical symptoms like rigidity. One option his physician recommends is that Bill speaks to palliative care specialist in the near future to discuss and coordinate treatment options for specific needs as the progressive nature of this disease is certain.

Choice of Treatment(s): Bill has chosen to take medications as prescribed by his physician and to take part in physical and occupation therapy to treat the symptoms of Parkinson’s. Bill’s physician, along with his neurologist, works to maintain the right combination of medications that will best treat the symptoms of Parkinson’s as well as the depression Bill now suffers from. Bill relies on the successes and interactions at the outpatient rehabilitation clinic to maintain his optimism for treatment during his adjustment to new medication levels, which may leave him feeling less in control over his symptoms.

Advance Directive/POLST: Bill had an advance directive filed with his doctor’s office several years ago. However, due to the diagnosis of Parkinson’s, advancement of symptoms, and urging from his physician, Bill has an updated version in place that reflects an overall desire to maintain dignity. Bill’s POLST also reflects his desire for dignity in that he wishes that all life saving measures
(CPR, feeding tubes, and transportation to a hospital for further care) are used to continue life.

**Specific Support Strategies**

Assuming a starting point of Bill’s diagnosis, the following section will discuss specific support strategies based on evidence and research. The goal is to comprehensively treat Bill for both Parkinson’s and address parts of Bill’s life as integrated parts of his Parkinson’s experience.

**Bill’s Physician**

At the time of a successful diagnosis of Parkinson’s disease, Bill will likely have had various possible emotional shifts in mood like relief, fear, or disbelief. Bill’s physician, if keen to these emotional shifts, should take the time to address any concerns and discuss with Bill what a diagnosis of Parkinson’s disease actually means. The task of educating Bill about what it means to live with Parkinson’s disease or discussing all available resources for assistance may be too much for one appointment, so additional office visits may be recommended. Bill’s physician should be at least able give Bill the basics of what this incurable disease does to the physical body as well as the mind. He should also discuss symptoms that may appear later, treatment options, and decide on a plan of action for treating Bill specifically.

Monitoring the success of Bill’s medication regime will be the job of both Bill and his physician. The need for effective communication between Bill and his physician regarding how well Bill’s medication(s) control his symptoms is crucial so Bill doesn’t suffer side effects of incorrectly prescribed medications. Such side effects may include nausea, vomiting, confusion, or experiencing unnecessary physical symptoms like involuntary or erratic movements (National Parkinson Foundation, 2013).

Bill’s physician will also need to direct Bill to other sources for information for Parkinson’s disease, including a neurologist, local associations who deal with Parkinson’s, support groups, outpatient rehabilitation therapy, and a social worker/case manager. Most important are the referrals to a social worker/case manager and an outpatient rehabilitation therapist. Social workers or case managers are individual who have been trained in educating Bill about what it means to live with Parkinson’s disease actually means. The task of educating Bill about what it means to live with Parkinson’s disease or discussing all available resources for assistance may be too much for one appointment, so additional office visits may be recommended. Bill’s physician should be at least able give Bill the basics of what this incurable disease does to the physical body as well as the mind. He should also discuss symptoms that may appear later, treatment options, and decide on a plan of action for treating Bill specifically.

**Social Worker or Case Manager**

Areas of focus that a social worker or case manager should be concerned with are Bill’s perceived social support and depression. Evidence has shown a significant correlation to perceived social support on both health related outcomes and quality of life (Bucks et al., 2011; Cohen, Underwood, & Gottlieb, 2000; McComb & Tickle-Degnen, 2005; Schreurs, De Ridder, & Bensing, 2000; Simpson, Haines, Lekwuwa, Wardle, & Crawford, 2006; Wressle et al., 2007). Another area of focus that needs to be addressed is depression, as it too has been indicated to be a significant factor in health-related outcomes, as well as quality of life (Alder, 2011; Barbas, 2006; Borland & Stacy, 2012; Bucks et al., 2011; Burch & Sheerin, 2005; Dobkin et al., 2011; Janevic, Rosland, Witala, Connell, & Piette, 2012; McComb & Tickle-Degnen, 2005; McLaughlin et al., 2010; Platt, 2004; Poewe, 2008; Schreurs, De Ridder, & Bensing, 2000; Wressle et al., 2007)

Since Bill has expressed feelings of depression and voiced concern about his relationship with his family, a social worker or case manager should encourage Bill to speak to a therapist regarding these issues. A therapist, in addressing Bill’s depression, should use cognitive behavioral therapy (CBT) along with medications to treat depression prescribed by a physician. Evidence indicates that when CBT and medication are combined, depression is significantly reduced more so than when medication therapy is used alone (Dobkin et al, 2011).

For Bill’s concern over his relationship with his daughter a therapist should attempt to include family members, if willing, in counseling to address events that have led to the current family dynamic. As previously mentioned, Bill and his daughter disagreed over end of life issues for Bill’s parents and those disagreements resulted in decreased communication between the two. The lack of communication may have added to Bill’s increased perceptions of social isolation as well as incidence of depression. There is research to suggest that relatives are more willing to assist in the care of family members when there are reports of depression (Janesvic, Rosland, Witala, Connell, & Piette, 2012). This means that Bill’s daughter may be more willing to participate and help with Bill’s care, to include counseling, if Bill’s condition (Parkinson’s and depression) is shared openly. Increased participation from Bill’s daughter will not only help Bill receive needed assistance for medically related care but will also address issues like perceived social support, social isolation, and help mitigate symptoms of depression. However, there are risks to those who take the role of an informal caregiver that should be presented to Bill and his daughter. Such risks include those who provide care may also experience decreased social isolation and incidence of depression (McLaughlin et al., 2010; Platt, 2004). Another concern is over the incidence of informal caregiver strain due to the amount of time and resources needed by those who live with Parkinson’s disease (McLaughlin et al., 2010;
A well-trained social worker or case manager needs to inform families of these risks and provide resources, if available, to help mitigate such risks so Bill and his family are better prepared for the long term burdens of providing assistance for someone with a chronic illness like Parkinson's disease.

**Outpatient Rehabilitation Specialist**

Physical, occupational, and speech therapy are used to help reduce the progress of symptoms associated with Parkinson's disease (Ransmayr, 2011). Quantitative evidence is lacking as to the benefits of physical and occupational therapy, however significant improvements have been documented with the use of speech therapy in those with Parkinson's. While research examining the effects of physical and occupational therapy in the treatment of Parkinson's remain inconclusive in regards to their impact on the disease itself, both patients and their caregivers indicate significant improvements in their perceived health-related quality of life (Ransmayr, 2011; Sturkenboom, Graff, Borm, Veenhuizen, Bloem, Munneke, & Nijhuis-van der Sanden, 2012; Wressle, Engstrand, & Granerus, 2007). Given reports of both physical therapy and occupational therapy resulting in positive impacts related to quality of life factors, continued use of these therapies is recommended.

**Conclusion**

A life with Parkinson's disease is a life of predictable uncertainty. Not every experience of Parkinson's can be summarized by a single story. The symptoms of Parkinson's that present do so in a variety of manners which require specific interventions. However, there are threads of this incurable disease that are commonly shared. This hypothetical case study addresses several of these commonalities those with Parkinson's disease may experience across multiple domains like one’s social, emotional and biological aspects of life. In recognizing common experiences shared by those with Parkinson’s, care providers can incorporate interventions designed to address a person’s life in a holistic manner in an effort to minimize negative impacts of one’s Parkinson’s experience.

**References**


