Exploratory analysis of anhedonia, apathy, and depression in Parkinson's Disease

Jennifer Lynn Lambarth

The University of Toledo
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Research Advisor: David L. Nelson, Ph.D., OTR/L

Occupational Therapy Doctorate Program

Department of Rehabilitation Sciences

The University of Toledo

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Abstract

Depression (low mood), apathy (a lack of motivation), and anhedonia (reduced ability to experience pleasure), have all been linked to Parkinson’s disease (PD) in various research studies. However, research regarding the prevalence of anhedonia and the inter-relatedness of these three conditions in individuals with PD has been inconclusive. In this prospective study, 61 patients with idiopathic PD diagnosed in later life were assessed at an outpatient interdisciplinary clinic. The results of the Geriatric Depression Scale (GDS), Apathy Scale (AS), and Snaith-Hamilton Assessment of Pleasure Scale (SHAPS) for these individuals were available in a de-identified database. Spearman correlations among the continuously measured variables were all statistically significant but not strong: a) $\rho = .33$ between the SHAPS and GDS, $\rho = .52$ between the AS and GDS, and c) $\rho = .51$ between apathy and anhedonia. In terms of apathy and depression, 29.5% of participants had neither condition, 39.3% had both conditions, 21.3% had apathy only, and 9.8% had depression only. Anhedonia was distinct among the three conditions with a relatively low number of participants (7 of 61) exceeding the SHAPS cut-off; 6 of these 7 participants also exceeded the cut-offs for both depression and apathy. The results of this study suggest that while apathy and depression are quite common and often exist independently of one another in individuals with PD, the expression of anhedonia exclusively may be rare. Occupational therapists are especially vital and well-positioned to address these disabling conditions associated with Parkinson’s disease.
Exploratory Analysis of Anhedonia, Apathy, and Depression in Parkinson’s Disease

Parkinson’s Disease (PD) is a neurodegenerative disorder characterized by the degeneration of primarily dopaminergic neurons of the substantia nigra. Other regions of the brain, such as the locus ceruleus, hypothalamus, nucleus basalis, and the cerebral cortex may also be affected (Olanow, Jenner, Tatton, & Tatton, 1998). The outward manifestations of this neuropathology include tremor at rest, flexed posture, festinating gait, dysarthria, dysphagia, rigidity, bradykinesia, and hypomimia (Jankovic, 1992). With an estimated average prevalence 160 cases per 100,000, PD is among the leading neurological causes of disability, especially in older persons (Martilla, 1992).

Although the more readily observable motor features of PD can be devastating on their own, non-motor features are gaining attention for their contribution to the debilitation and decreased quality of life caused by the disease. These features include depression, dementia, sleep disturbances, incontinence, and pain (Hou & Lai, 2007).

Depression in particular has been widely recognized in PD patients. Studies have found incidence rates from 4 - 70 percent depending on the measure used and population studied (Lemke, 2007). Depressed affect is listed by Forwell, Copperman, and Hugos (2008) among problems impacting occupational performance to be identified during an occupational therapy evaluation. Depression is generally defined as “a lowering of mood from normal” (Morrison, 2006, p. 191). Specific features used to diagnose depression in PD include: “a feeling of emptiness and hopelessness,” “reduced reactivity to emotional stimuli,” and “loss of the ability to enjoy and feel pleasure (anhedonia)” (Lemke, 2007). Whether anhedonia is a part of depression or a separate feature, however, is a matter for debate.
Anhedonia, defined as the reduced ability to experience pleasure (Ribot, 1897), has also been the subject of research pertaining to PD, the neurotransmitter dopamine, and other disorders (Acquas, Carboni, Leone, & Di Chiara, 1989; Bressan & Crippa, 2005; Horvitz, & Eyny, 2000; Isella et al., 2003; Kondo, 2008; Lemke, Brecht, Koester, & Reichman, 2006; Leventhal, Chasson, Tapia, Miller, & Petit, 2006; Stein, 2008; Snaith et al., 1995). As Kondo (2008, p. 14) asserted, “Family members of PD patients often report that patients do not want to move actively but wish to stay idle at home.” He speculated, “This may be due to anhedonia.” Similar to depression, the rate of anhedonia in PD patients, as measured in differing studies, is highly variable. In a sample of over 600, Lemke and others (2006) found that 45.7 percent of PD patients exceeded the cut-off score of the Snaith-Hamilton Pleasure Scale (SHAPS), the most widely accepted anhedonia measure. However, Pluck and Brown (2002) found no significant differences between osteoarthritis patients and PD patients in terms of SHAPS score, with only 3 of 45 PD patients exceeding the cut-off. Ehrt, Bronnick, Leentjens, Larson, and Aarsland (2006) found that depressed PD patients had significantly less anhedonia, as measured by item 8 of the Montgomery-Asberg Depression Rating Scale (MADRS), than elderly depressed patients without PD. This anomalous finding is confounded by a significant difference in age between the two groups, those without PD being older ($p < .001$). Further confusing any conclusions regarding anhedonia in PD patients are two related “Priamo Group” studies, both of which feature impressively large samples of PD patients. One of these studies (Barone et al., 2009) found only 10.4% of their 1,072 subjects with PD to be anhedonic based on a non-motor features questionnaire, while the other study ($N = 939$) (Santagelo et al., 2009) found a mean score of 1.8 which is much greater than the mean of 0.4 reported for healthy persons by Snaith et al. (1995) [Santagelo et al. (2009) did not report the number of persons exceeding the cut-off].
Another affective feature commonly described as a characteristic of PD and often associated with depression is apathy. Generally defined as a lack of motivation, apathy has been observed in PD patients with a prevalence ranging from 16.5 to 42 percent (Dujardin et al., 2007). Levy and others (1998) argued that apathy, like anhedonia, is commonly mistaken as an aspect of depression, whereas it actually is a distinct construct because its relationship to depression varies across different diseases (Alzheimer’s Disease, Huntington’s Disease, and PD). A meta-analysis by Minich (2008) supported this conclusion. She found only moderate to small correlations between depression and apathy in PD patients across six studies with 125 patients displaying either depression without apathy or apathy without depression compared to 64 patients displaying both. Most of the variance in one variable could not be predicted by the other.

The relationship between anhedonia and depression in PD has not been extensively explored. Lemke and others (2006) found a correlation of $r = .50$ between SHAPS scores and a four-point clinician rating of depression in 626 PD patients. A study by Isella and others (2003) revealed no significant correlation between anhedonia as measured by Chapman’s Physical Anhedonia Scale (CPAS) and the Geriatric Depression Scale (GDS) in 25 PD patients. This may be due to the use of the CPAS, which has been the subject of criticism (Leentjens et al., 2008; Leventhal et al., 2006), or the small sample size. Lieberman (2006) found that anhedonia, as measured on the Neuropsychiatric Inventory (NPI), was present in 76 percent of depressed (defined as scoring a 14 or greater on the Hamilton Depression Scale) PD patients ($n = 29$) compared with 18 percent of non-depressed PD patients ($n = 77$). All three of the PD patients found by Pluck and Brown (2002) to be anhedonic, as defined by the SHAPS cut-off, were also described as having “co-morbid depressive symptomology.” Santagelo and others found a correlation of $r = .305$ ($p < .0001$) between the scores from the SHAPS and Hamilton Depression Scale in 939 in-
dividuals with PD. Other studies measuring some form of anhedonia as well as depression in PD patients (Barone et al., 2009; Ehrt, Bronnick, Leentjens, Larson, & Aarsland, 2006; Miller et al., 2007; Sienkiewicz-Jarosz et al., 2004; Witt et al., 2008) did not report any correlations or frequency cross-tabulations between the two variables.

The relationship between anhedonia and apathy in PD patients is similarly unclear and little studied. Consistent with their inability to find a correlation with depression, Isella and others (2003) found no significant correlation between scores from the CPAS and Marin’s Apathy Scale (AS). Of the three anhedonic subjects in Pluck and Brown’s study (2002), two were considered “high-apathy” as defined by a cut-off of 38 on the Apathy Evaluation Scale (AES). Additionally, this study found that SHAPS scores were significantly higher in the “high-apathy” patients compared to the “low-apathy” group. In a linear generalized model, Santagelo and others (2009) found that the presence of apathy increased individuals’ scores on the 2-point version of the SHAPS by 1.1 points, but they did not operationalize apathy nor report any correlation or cross-tabulation.

Understanding the nature and relatedness of anhedonia, apathy, and depression is of importance to occupational therapists. At one of the first occupational therapy conferences, Meyer (1922) noted, “A pleasure in achievement; a real pleasure in the use and activity of one’s hands and muscles and a happy appreciation of time began to be used as incentives.” Therefore, pathologies in these psychosocial mechanisms deserve serious attention. Occupational therapy interventions for PD involve encouraging the continuation of industrial occupations, community exploration, physical exercise, and maximum functioning in ODL’s for as long as possible (Takahashi & Huang, 2009). These objectives require PD patients to not only cooperate but also to remain actively engaged and motivated in order to benefit from therapy.
Prior studies investigating apathy, anhedonia, and depression in PD have used a variety of measures. Anhedonia has been measured using the SHAPS, NPI, CPAS, item 4 of the Beck Depression Inventory (BDI) (Miller et al., 2007), item 8 of the MADRS, and hedonic responsiveness to taste or food items (Macht et al., 2006; Sienkiewicz-Jarosz et al., 2005). Of these, the SHAPS was the only scale to be suggested by the Movement Disorder Society for use with PD patients (Leentjens et al., 2008).

For the measurement of apathy, the Movement Disorder Society (Leentjens et al., 2008) recommends the Apathy Scale (AS), which was designed and validated specifically for PD patients (Starkstein et al, 1992). For the measurement of depression, no one scale has been identified as superior for use with PD patients (Miyasaki et al., 2006; Schrag et al., 2007). The Movement Disorder Society (Schrag et al., 2007) has determined that the GDS is valid for depression screening in PD patients with a cutoff of 9/10. They applaud the measure for its limited confounding of motor features with depression thereby facilitating the rating of depression severity across a range of PD severity.

We will analyze data gathered from the administration of the SHAPS, AS, and BDI to patients with PD. In order to determine the degree to which they are dependent upon one another, we will examine the correlations and coefficients of alienation using continuous data as well as the cross-tabulations derived from cut-off scores. A problem we face is the overlap among the items of the three scales due to categorization of a) anhedonia and apathy as features of depression, and b) anhedonia as a feature of apathy. Item by item analyses will be conducted in an attempt to overcome issues of definition (Leentjens et al., 2008). Based on previous research, we predict a moderate to small correlation between apathy and depression. We also predict a moderate correlation between anhedonia and depression based on the findings from a large sample
gathered by Lemke and others (2006). Finally we predict a moderate correlation between anhedonia and apathy.

**Method**

**Participants**

This study consisted of 61 participants from the Parkinson’s Disease Interdisciplinary Clinic (PDIC) at the University of Toledo Health Science and Human Services Campus (UTHSC). All participants were diagnosed with idiopathic PD by a board-certified neurologist specializing in movement disorders. Because the GDS has not been validated in younger populations (Schrag et al., 2007), participants under the age of 60 during the year in which they were diagnosed were excluded.

**Instruments**

To measure anhedonia we used the Snaith-Hamilton Pleasure Scale (SHAPS). The SHAPS is a 14-item questionnaire. As the scale was originally presented, individual responses are scored as either 1 point for an “Agree” response or 0 points for a “Disagree” response. A score of 3 or greater is considered “abnormal.” The items cover the domains of social interaction, food and drink, sensory experience, and interest/pastimes, and they were designed to be simple and unaffected by socio-cultural factors (Snaith et al., 1995). As the most widely used scale for the assessment of anhedonia in PD patients, it is the only scale to be classified as “suggested” by a task force commissioned by the Movement Disorder Society (Leentjens et al., 2008). Frankin, Rassin, and Muris (2007) found the SHAPS to have good internal consistency (Cronbach’s alpha = .91) and satisfactory test-retest reliability ($r = .70$) in non-patient samples. In examining convergence and divergence with other scales including the BDI and Positive and Negative Affect Scales (PANAS), Franken et al. supported the SHAPS’ construct validity. Leventhal, Chasson,
Tapia, Miller, and Pettit (2006) used confirmatory factor analysis to identify a “hedonic capacity” factor in college students, which was best defined by the SHAPS. There is, however, some inconsistency in the literature as to how the SHAPS is typically scored. Although the authors of the scale advocated re-calculation of 4-point scales into 2-point scales, some authors (Franken & Muris, 2007; Leventhal, Chasson, Tapia, Miller, & Pettit, 2006) have chosen to implement the 4-point scoring method for research purposes. Franken and Muris (2007) presented the argument that while the 2-point method is most appropriate for diagnostic purposes, the 4-point method creates greater dispersion of data. The authors of the SHAPS were seemingly aware of the dispersion issues associated with their scale as they analyzed their data using only non-parametric statistics. In accordance with Franken and Muris (2007), we used a 4-point scale for non-categorical analyses and the 2-point scale to determine individual participants’ status regarding the categorical presence or absence of anhedonia as determined by the standard cut-off score presented by the authors of the scale.

To measure depression, the Geriatric Depression Scale (GDS) was used. The GDS is the most commonly used self-report assessment for depression in the elderly (Brown & Shinka, 2005). It consists of 30 yes or no questions and takes approximately 10 minutes to complete (McDonald, et. al, 2006). The GDS may be especially well-suited for use with PD patients due to its inclusion of only 1 somatic item in contrast to 5 such items in the BDI (Beck, Steer, & Hall, 1996; Mondolo, et. al, 2006). Mondolo and others (2006) found that in a sample of PD patients there was a significant correlation ($p < .01$) between GDS scores and the results of the Hamilton Rating Scale for Depression, a semi-structured interview conducted by a neurologist. Using a cut-off of 9/10, McDonald and others (2006) found a sensitivity of .809 and specificity of .837 in a sample of PD patients. This cut-off of 9/10 was used in our study as well.
To measure apathy the Apathy Scale (AS) was used. The AS is the only measure of apathy to be recommended by a task force commissioned by the Movement Disorder Society (Leentjens et al., 2006). It was designed specifically for PD patients as a modified, less demanding version of the Apathy Evaluation Scale (AES) (Leentjens et al., 2006). Starkstein and others (1992) investigated the reliability and validity of the AS in a sample of PD patients and found good interrater and test-retest reliability ($r = .81$ and $.90$ respectively) as well as high internal consistency (Cronbach’s alpha = .76). They also found that patients rated as “apathetic” by a neurologist scored significantly higher on the AS ($p < .001$) than patients rated as “nonapathetic.” The AS has 14 items with four possible responses scored on a scale from 0 to 3 (Starkstein et al., 1992). A score of 14 or higher is considered indicative of “clinically relevant apathetic features” (Leentjens et al., 2006). This is the cut-off score to be used in our study.

**Procedure**

The GDS, the AS, and the SHAPS were among the routine paperwork completed during admittance to the PDIC at the UTHSC. These assessments were distributed by volunteer nurses who monitored them for missing data and asked patients to respond to all items if possible. The data from these assessments were entered into a clinical database by assistants to the coordinator of the PDIC. This database was then de-identified by staff at the Clinical Research Center of the UTHSC. Once it was de-identified, the student investigator retrieved the data from the coordinator of the PDIC. This process was approved by the IRB which exempted this study from human research applications.

The ordering of the assessments was counterbalanced by the researchers who stapled the three assessments together so that each possible order was represented once in a stack of six stapled groups. Clinical records with more than three missing data points were excluded from the
study. For clinical records missing three or fewer data points, the within-subject averaging method was used to fill in the gaps.

**Data Analysis**

Data from the PDIC database collected from individuals with a diagnosis other than idiopathic PD were excluded from the analysis. Additionally, data from individuals who were not at least 60 years of age in the year in which they were diagnosed with idiopathic PD were excluded. We tested all three measures for skewness to determine which statistics to use. We decided to use ordinal statistics due to statistically significant skewness in the SHAPS and the GDS (see Results). We then created a correlation matrix using the data from the SHAPS, the AS, and the GDS. A correlation of .75 or greater indicates that two scales are mostly measuring the same thing, a correlation of .25 or less indicates that two scales are measuring two unrelated variables, and a correlation within the range of .25 - .75 indicates that two scales are measuring different but related variables. The categorical data using standard cut-off scores (9/10 for the GDS, 13/14 for the AS, and 2/3 for the SHAPS) is presented in a series of three two-dimensional cross-tabulations (AS by GDS, AS by SHAPS, and SHAPS by GDS) and a three-dimensional, eight-celled cross-tabulation representing AS by GDS by SHAPS. Substantial numbers of persons with one feature in the absence of others would indicate that the three features occur independently. In secondary analyses, we examined the scores after removing items 2, 12, 19, 20, and 21 ("Dropped many of your activities and interests," “Prefer to stay at home rather than try out new things,” “Find life very interesting,” “Hard for you to get started on new projects,” and “Feel full of energy”) of the GDS due to their overlap with apathy and anhedonia. In addition we removed items 10 and 13 of the AS (“Are you indifferent to things?” and “Are you neither happy nor sad, just in between?”) due to overlap with anhedonia.
Results

A total of 90 individuals were assessed at the PDIC during the data collection period from 2009 through 2010. Among these potential participants, 8 were excluded due to a diagnosis other than idiopathic PD. Another 20 were excluded because they did not meet the study’s criterion for age at diagnosis. Finally, one potential participant was excluded due to excessive missing data points. According to demographic information available on the de-identified PDIC database, the remaining 61 participants had a mean age of 76.1 (SD = 5.4) at the time of assessment and consisted of 23 women and 38 men.

In examining the skewness of the three measures, it was discovered that the skewness statistic for the SHAPS was 1.82 (Shapiro-Wilk $W = .86$, $p < .001$), for the GDS was .98 (Shapiro-Wilk $W = .95$, $p = .01$), and for the AS was -.06 (Shapiro-Wilk $W = .99$, $p = .74$). As a result, Spearman correlations were used to test the primary hypotheses investigating the relationships among anhedonia, apathy, and depression.

See Table 1. The correlation between apathy and depression was $\rho = .52$ $p < .001$. The correlation between depression and anhedonia was $\rho = .33$ $p = .01$. The correlation between anhedonia and apathy was $\rho = .51$ $p < .001$. All three calculations indicate statistically significant albeit moderate correlations. The coefficients of alienation (COA), representing the degree to which these variables are independent of one another, are as follows: between apathy and depression the COA = .73; between depression and anhedonia the COA = .89; and between anhedonia and apathy the COA = .74.

Based on standard cut-off scores, 30 participants (49.2%) had depression, 37 (60.1%) had apathy, and 7 (11.4%) had anhedonia. Table 2 and Figure 1 illustrate the cross-tabulations generated using these cut-off data. Between apathy and depression, 19 (31.1%) of participants had one
condition in the absence of the other while 24 (39.3%) had both and 18 (29.5%) had neither. Between depression and anhedonia, 25 (41.0%) had one condition in the absence of the other while 6 (9.8%) had both and 30 (49.2%) had neither. Between apathy and anhedonia, 32 (52.5%) had one condition in the absence of the other while 6 (9.8%) had both and 23 (37.7%).

Secondary analyses, in which certain confounding items were excluded from the GDS and the AS, are presented in Table 2. The correlations found when making these adjustments are similar to those found without the adjustments.

Discussion

The prevalence of depression (49.2%), anhedonia (11.4%), and apathy (60.1%) observed in this sample of individuals with idiopathic PD were within the ranges reported by similar studies. However, both apathy and depression in this sample were at the high end of these reported ranges. The rate of apathy in this sample exceeded that of most studies reviewed with the only exception reported by Isella and others (2002) who found 21 participants in a sample of 30 to be apathetic using an even higher cut-off (14/15) for the AS than in this study. The correlation between apathy and depression (see Table 1) was also at the high end of the range when compared to other studies, but was matched in a study by Levy and others (1998) published under the title “Apathy is not depression.” Cross-tabulations using categorical data from this study (see Table 2 and Figure 1) would also support that conclusion as 35.1% of individuals displaying apathy did not display depression.

The relatively low rate of anhedonia and the low mean SHAPS score in this sample were consistent with the findings of Pluck and Brown (2002) and Barone et al. (2009), who reported rates of 6.7% and 10.4% using the SHAPS and a self-report questionnaire respectively. These three studies were in contrast to Isella and others (2003) and Lemke and others (2006) who re-
ported rates of 40% and 47.5% using the PAS and SHAPS respectively. Santagelo and others (2009) did not report the rate of clinically significant anhedonia in their sample. However, using the 2-point scoring method, they reported a mean SHAPS score of 1.8 (SD = 2.1) compared to our 2-point mean of .93. They also stated, based on a correlation between depression and anhedonia in their study, that “This result sustains the dopaminergic hypothesis of PD-related depression ... and indicates that the neural substrate of depressed mood coincides with the neural circuit of hedonic tone.” (p. 579). The results of our study are not consistent with this conclusion in that 30 individuals (49.2% of the sample) exhibited depression whereas only six of these displayed anhedonia; the correlation between depression and anhedonia was the weakest relationship in this study (see Table 1).

As shown on Table 1, the correlation between anhedonia and apathy was stronger than that between anhedonia and depression. Bozarth (1994) summarized the theoretical relationship between pleasure and motivation as follows:

The notion that hedonic mechanisms might provide direction to behavior can be traced at least to the Greeks (e.g., Epicures); Spencer (1880) formalized this notion into psychological theory and suggested that two fundamental forces governed motivation—pleasure and pain. Troland (1928) suggested that pleasure was associated with beneception, events that contributed to the survival of the organism (or species) and thus 'benefited' the organism from an evolutionary biology perspective... (p.5)

Our results are consistent with the theoretical relationship presented by Spencer because apathy was related to, but not entirely dependent upon, anhedonia (see Tables 1 and 2).

Although apathy and depression were often present in the absence of the other (see Table 2), the cross-tabulations involving anhedonia, particularly the 3-way cross-tabulation shown in
Figure 1, tell a different story for the expression of clinically significant anhedonia. With just one exception, anhedonia was present only in individuals who also had both apathy and depression. Most individuals with apathy and depression did not exceed the cutoff for anhedonia. While the high rates of apathy and depression in this sample are troubling, the relative absence of clinically significant anhedonia lends some hope for those dedicated to the care of individuals with PD, including occupational therapists. Items from the assessment used to determine anhedonia in this study (Snaith et al., 1995) inquired as to whether participants would enjoy a warm bath or refreshing shower, if they would find pleasure in hobbies, and if they would be pleased to receive praise from others, among other questions. In this study, the majority of the sample agreed that all these things would be pleasurable for them. This suggests that occupation is satisfying for most PD patients, even if they must first break the inertia of depression or apathy-induced inactivity. For those individuals who do exhibit anhedonia, occupational therapists still have some options for facilitating meaningful occupation.

There is little research regarding occupational therapy for individuals with anhedonia. Negative reinforcement would theoretically be an effective means of motivating individuals with anhedonia to engage in therapy. Occupational therapists could use a strong emphasis on engagement in occupation as a means of avoiding naturally occurring negative consequences associated with PD in order to motivate individuals who have difficulty experiencing pleasure in occupation. For example, occupational therapists could remind individuals with anhedonia that staying active can help prevent falls, relieve constipation, regulate sleep cycles, and improve other uncomfortable features of Parkinson’s disease. For individuals in the later stages of Parkinson’s disease, positioning to relieve discomfort may become a high priority for the occupational therapist working with an individual with anhedonia.
For individuals with apathy, positive and negative reinforcement would theoretically be equally ineffective. Occupational therapy with these individuals may require a client and family-centered approach in which high motivation on the client’s behalf is not a necessity. By targeting the environment, utilizing compensatory strategies and devices, and enlisting the support of family and friends, an occupational therapist could assist an apathetic individual to safely participate in more occupations without expending a greater effort.

Occupational therapy for individuals with depression has been studied more frequently (Custer & Wassink, 1991; Devereaux & Carlson, 1992; Pepin, 2008). Pepin and her team of occupational therapists (2008) stated that, “Clients with the most severe and treatment resistant forms of depression can present substantial challenges due to their level of functional decline and the difficulty of engaging them in therapy.” Their therapy “seeks to support these clients to achieve a reconnection with the world while gradually increasing a person's sense of personal causation, values, and interests” (p.117).

Based on our results, further development and evaluation of occupational therapy approaches designed specifically for various affective profiles are needed. Occupational therapy should vary depending on the individual’s profile: apathy alone, depression alone, anhedonia alone (rare in this study but possible), or any of the three in all possible combinations. It is important for therapists to establish the individual affective profile for each person because, as we have shown, the presence of apathy does not imply depression, nor does the presence of depression imply anhedonia.

Limitations of this study include the data collection method in which nurses and volunteers handed out the assessments (as compiled by the researcher) along with other routine paperwork completed as part of the PDIC intake process. After the assessments were filled out,
the scores were entered into a de-identified database by other staff and volunteers. The information from this de-identified database was then available for researcher use. As discussed by Hill (2009), while more naturalistic than a strictly controlled study involving informed consent, this method makes it impossible to know exactly how the assessments were administered to each participant, if the counterbalancing was maintained, and if any participants misunderstood any of the assessments. It also allows for the possibility that data were entered into the database incorrectly, although this is also a possibility when researchers control all aspects of data collection. Additionally, our sample size of 61, while respectable for a single site, is a small fraction of the individuals with PD studied by Santagelo and others (2009) and Lemke and others (2006).

There were also limitations with the assessments and data analysis chosen for this study. As noted in the results section, scores from the SHAPS were highly skewed. Upon examining the data, a floor effect was noted in which 7 participants scored a 0 despite the 4-point scoring method used. The GDS was also significantly skewed (although to a lesser extent. In addition to skewed continuous data, the categorical data in this study may not accurately represent the amount of apathy and anhedonia present in our sample. For example, five participants were within one point of exceeding the cut-off for anhedonia and six participants were within one point of exceeding the cut-off for apathy.

The inconsistent findings among studies related to anhedonia in individuals with PD warrant further investigation. Developing or validating an instrument that can generate continuous data for the assessment of anhedonia in individuals with PD may be a worthwhile endeavor. Additionally Loas and Krystowiak (2010) have suggested that anhedonia in individuals with PD can separated into anticipatory and consummatory forms, the first being the inability to enjoy the thought of future pleasurable experiences, and the second being the inability to enjoy the plea-
surable stimulus. These different forms of anhedonia have been assessed in other populations using the Temporal Experience of Pleasure Scale (TEPS) consisting of anticipatory and consummatory subscales (Gard, Gard, Kring & John, 2005). Loas and Krystowiak (2010) believe that anticipatory anhedonia may be more common in individuals with PD while the consummatory form is primarily present in those individuals with severe depression. This theory ties in well with the differentiation of apathy and depression because anticipatory anhedonia would theoretically lead to apathy whereas depression, according to Loas and Krystowiak (2009), is linked with consummatory anhedonia in individuals with PD.

Considering only three affective features was an additional limitation of the current study. The work of Barone and others (2009) indicated that anxiety may also be a major factor in the affective experience of individuals with PD. In their sample of 1,072 individuals, 55.8% reported experiencing anxiety as a non-motor feature of PD. This rate of anxiety exceeded rates of sadness/depression, apathy, and anhedonia. In fact, anxiety was second to fatigue among the most widely reported non-motor features.

A better understanding of the affective features associated with PD can promote patient insight, practitioner empathy, and overall improved care for individuals with PD. Despite some attention by researchers to this topic, clinicians lack clear guidelines for different affective profiles. If one thing is hard to dispute, it is the seriousness of these features. When Politis and others (2010) investigated patients’ perspectives of PD, they found that “mood” was the second most bothersome feature or PD-related condition for individuals with more than a 6-year disease duration. Occupational therapists may be among the best equipped professionals in healthcare at meeting the emotional needs of individuals with PD through successful participation in meaning-
ful, pleasurable occupation while also addressing the possible functional implications of affective disturbances.
References


Minich, C.M. (2008). A meta-analytic review: Can apathy be isolated from depression in Parkinson’s disease? Department of Occupational Therapy, Occupational Therapy Doctorate Program, University of Toledo Health Science Campus.


### Table 1

*Summary of Intercorrelations Means, and Standard Deviations for Scores on the SHAPS, GDS, AS, and AS-m (n=61).*

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<td></td>
<td>(p &lt; .001)</td>
<td></td>
<td></td>
<td></td>
<td>(p &lt; .001)</td>
</tr>
</tbody>
</table>

Note. Intercorrelations represent Spearman’s rho values. SHAPS = Snaith-Hamilton Pleasure Scale; GDS = Geriatric Depression Scale; AS = Apathy Scale; GDS-m = Geriatric Depression Scale without items 1, 12, 19, 20, and 21; AS-m = Apathy Scale without items 10 and 13.
Table 2

Summary of Cross-tabulations of Apathy, Depression, and Anhedonia defined by Standardized Cut-off Scores of the AS, GDS, and SHAPS.

<table>
<thead>
<tr>
<th>No Depression</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Apathy</td>
<td></td>
</tr>
<tr>
<td>18 (29.5%)</td>
<td>6 (9.8%)</td>
</tr>
<tr>
<td>Apathy</td>
<td></td>
</tr>
<tr>
<td>13 (21.3%)</td>
<td>24 (39.3%)</td>
</tr>
<tr>
<td>No Anhedonia</td>
<td></td>
</tr>
<tr>
<td>23 (37.7%)</td>
<td>31 (50.8%)</td>
</tr>
<tr>
<td>Anhedonia</td>
<td></td>
</tr>
<tr>
<td>1 (1.6%)</td>
<td>6 (9.8%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No Anhedonia</th>
<th>Anhedonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Depression</td>
<td></td>
</tr>
<tr>
<td>30 (49.2%)</td>
<td>1 (1.6%)</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
</tr>
<tr>
<td>24 (39.3%)</td>
<td>6 (9.8%)</td>
</tr>
</tbody>
</table>

Note. SHAPS = Snaith-Hamilton Pleasure Scale; GDS = Geriatric Depression Scale; AS = Apathy Scale. Anhedonia = SHAPS 2-point scale score greater than 2; Apathy = AS score greater than 13; Depression = GDS score greater than 9. Percentages due not necessarily total precisely 100.0% due to rounding of dividends.
Figure 1. Cross break illustrating the overlap and divergence of participants whose scores exceeded the standard cutoff (+) for the Geriatric Depression Scale (GDS), Snaith-Hamilton Pleasure Scale (SHAPS), and Apathy Scale (AS), as well participants scoring below the cutoff (-).