universität wien

MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

„The Creativity Changes in Persons with Parkinson's Disease"

verfasst von / submitted by

Yosefin Emilia Himmelbauer, B. Mus.

angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien, 2022/ Vienna, 2022

Studienkennzahl lt. Studienblatt / degree programme code as it appears on the student record sheet:	UA 066 840
Studienrichtung lt. Studienblatt / degree programme as it appears on the student record sheet:	Masterstudium Psychologie UG2002
Betreut von / Supervisor:	Ass.-Prof. Matthew Pelowski, PhD

Acknowledgments

I expressed my gratitude to Mr. Pelowski and Ms. Spee for opening my eyes to another fascinating world, where neurodegenerative disease and the creative/art could meet. Because of the patience and passion of both, this thesis could be finished. More, I thank my father-in-law, a very brave man with a non-stoppable work ethic, and my mother-in-law, for her countless warmth. To my husband, thank you for dealing with me on any journey possible.

To my mother in Indonesia, this is for you.

Table of Contents

1. Parkinson's Disease: The Problems, Symptoms, and Impacts

Parkinson's Disease (PD) was first brought to the world's attention in an "Essay on Shaking Palsy" by James Parkinson in 1817 (Hurwitz, 2014; Parkinson,1817/2002; Ward, 2020), yet the cause of this onset remains unknown (Lauring et al., 2019; Ward, 2020). Although the original cause of PD is still a puzzle, Kalia and Lang (2015) mentioned that the complexity of genetic as well as environmental factors might play a role as risk factors for developing this disease. Even though the original causes of PD remain elusive, the neuropathological mechanism resulting in these symptoms is well understood. PD progressively impairs the function of the brain in producing dopamine (DA) (Lauring et al., 2019; Pelowski et al., 2020). DA is the major neurotransmitter essential for movement, behavior, mood, attention, learning, and reward-seeking behaviors (Pelowski et al., 2020). Further, this impairment encompasses the degeneration of certain dopaminergic neurons, which are primarily located in the ventral trier substantia nigra pars compacta (vSNc), and in the ventral tegmental area (VTA). Another insight into the neuropathological mechanism of PD is evidence of lesions, where certain DA pathways were included, causing the formation of Lewy bodies (LBs) and further promoting neurodegeneration and neural dysfunction.

As one of the most devastating neurodegenerative disorders, PD quickly grows in numbers. Roughly 0.3% of the population has been diagnosed with PD, which rises rapidly to 3% of the population over the age of 65 years old (Gilliet et al., 2014). The consequences of living with PD, caused by its symptoms that worsened as the illness progressed, impacts many aspects of one's life. Several characterized symptoms, such as the poverty of spontaneous movements (hypokinetic) (Ward, 2020) are not uncommon for PD patients. These hypokinetic symptoms include the slowness of movements (bradykinesia), the lack of spontaneous movements (akinesia), rigidity, and tremor (Ward, 2020). In addition to hypokinetic, PD also comes with non-motoric deficits and symptoms, such as problems with cognition, language processing, emotion regulation, and sensory and visual function (Bloem et al., 2015; Chaudhuri et al.,2006; Lauring et al., 2019). While the diagnosis of PD is mostly performed by examining the motoric features in patients, more recent studies have investigated the non-motoric features impacts in person with PD, such as the disturbances of smell (hyposmia), sleep (especially the rapid eye movement sleep behavior disorder), mood, and the gastrointestinal function. These symptoms may precede PD in the very early stages (Poewe, 2008), which could result in an earlier diagnosis by five or more years (Goldman & Postuma, 2014).

As there is no-proven disease-modifying therapy yet (Lauring et al., 2019), PD treatment is aimed at relieving the symptoms (Stacy & Galbreath, 2008). While PD patients have impaired DA production, the current medication therapy primarily aims to restore the dopaminergic function (Brooks, 2000). The most common initial therapy is given through DA-replacement therapy typically via levodopa (i.e., the precursor to DA) and/or combine with DA agonist (it mimics the endogenous neurotransmitter and acts directly on DA receptors) (Brooks, 2000; Lauring et al., 2019; Quinn, 1995) (other types of medication is discussed later in Section 2.3.) Besides giving medication, it is common to give PD patients additional non-pharmacological therapy, such as speech therapy, occupational therapy, physiotherapy, psychotherapy, or creative/art therapy.

Several studies in the past 20 years have reported the impact of PD on the creative/art side of PD patients. Previous publications reported the spontaneous emerged creativity in PD patients, including in persons without any professional creative/art experience who became a painter with remarkable artistry work after their PD diagnosis (Lhommée et al., 2014; Walker et al., 2006). Lakke (1999), on the other hand, reported his observations of over 40 professional artists (painters and sculptors) with PD, in which he reported that all the artists had shown no definite deterioration in their artistry despite their PD diagnosis; however, changes in their artistic styles have appeared (see review by Lauring et al., 2019). Some remarks in the previous publications mentioned the possible relationship between changes and/or emergence in creativity and PD onset and/or medication, which have been reported by the authors or patients (Lauring et al., 2019). These previous publications, however, reported mostly in a single case study and/or had some issues with study design (i.e., insufficient documentation, see Lauring et al., 2019, pp. 134-149). A postal survey by Joutsa et al. (2012a) with over 280 PD patients is the only publication in the past 20 years, which had a larger sample size compared to other previous studies. The survey reported overall increased artistic or sudden creativity in 19.3% of their respondents. Despite its fascinating report and larger sample size, this study has some major issues. One of its major issues is sample bias, in which the respondents were recruited from the same authors' previous study investigating the prevalence of impulse control disorders and depression in Finnish patients with PD (Joutsa et al., 2012b). Having respondents as such, admitted by the authors, created a risk of self-selected bias. Of 19.3% of their respondents who reported increased or sudden creativity after PD diagnosis, 33.3% (18 of the 54) directly tied their creativity changes to PD medications. This might be influenced by their participation in the previous study which had a close relationship between

impulse control disorder in PD patients and PD medications (i.e., DA agonist, levodopa, see Joutsa et al., 2012b, p. 155). Moreover, the study conducted by Joutsa et al. (2012a) lacked proper information and documentation (e.g., how creativity change was assessed, respondents' previous creative/art experiences, PD medication intake, and clinical data) (Lauring et al., 2019). The plausibility of the reported creativity changes in and reported by their respondents of PD patients is compelling, yet questionable.

Despite the issue of study design and sampling, a compelling and interesting insight came from those published studies, particularly about art/creativity and PD patients. The creativity/art—regardless of whether it appeared spontaneously, changed, or appeared obsessively in PD patients—is mostly reported with a change in the person themselves, such as motivation to produce art or adopting art/creative endeavors as a pleasurable and helpful activity (Lauring et al., 2019). The studies showed that PD progression in a person could influence not only the change in a person artistically but in a person's interests and desires. Nonetheless, the published studies reporting the phenomenon of creativity/art with PD patients are closely align with the presumed neurobiological basis of PD.

Creativity/art interacts with the world of medicine in various aspects, such as diagnostic tools, treatments, medical education, raising awareness, improving patient experiences in healthcare, and shaping healthcare (Bloem et al., 2018, p. 4). This interaction could also be applied to the world of PD, in which the nature of creativity and the neurological complexity of creating art between PD and its treatment has been revealed since the 2000s (Pelowski et al., 2020). A better understanding between PD and creativity/art is now required to generate a closer possible collaboration between these two aspects. The appearance of art/creativity changes in PD patients may offer a valuable insight into the development of new PD therapies or approaches to neurorehabilitation methods (Bloem et al., 2018).

Given the issues with previous study designs (Lauring et al., 2019), this thesis is aimed to answer the following research question: how can one create a study with the potential to investigate the phenomenon of PD patients and creativity/art? To address this question, the present study evaluated the phenomenon of creativity changes in PD patients through an epidemiological study. An epidemiological study has the goal to advance understanding of the determinant factors associated with a specific disease (Buka et al., 2018). Furthermore, an epidemiological study targets the group rather than the individual (Coggon et al., 1997). In this case, the determinant influencing factors of certain groups of PD patients and their creativity were investigated thoroughly. All the determinant influencing factors were explored

through a survey. These determinant factors will later help the community in gaining a clearer view on how creativity changes in PD patients, especially related to the history of diagnosis and medications. The results could suggest new possible therapy methods or an improvement in therapy, which would be valuable for PD patients. While a survey study is not a new concept for exploring this phenomenon, as it is used by Joutsa et al. (2012a), a new survey should be conducted to avoid sample bias by opening registration to PD patients from all backgrounds (age, year of diagnosis, gender, profession, education, art/creative education, art/creative experiences). With this simple change, this study can avoid recruiting convenience sampling, resulting in a well-founded study. Besides creating the epidemiological survey study, this thesis further explored several empirical aspects, which have been yielded by previous publications. These aspects were: (1) the incidence of creativity changes in PD patients, (2) the cause of creativity changes reported by PD patients, and (3) the possible relation between creativity changes and PD medication.

2. Theoretical Background and Research Questions

2. 1. The Neuropathological Mechanism of PD

Certain neurons in a patient with PD, specifically the neurons in vSNc (located in the mid-brain), have been found to be degenerated (Bears et al., 2015; Lauring et al., 2019). This part of the brain regulates the DA to communicate with the striatum and later through the direct and indirect pathways of basal ganglia via nigrostriatal dopamine pathway, resulting in the fluidity of movements. In PD, however, the brain loses its ability to produce DA because of the degeneration of the neurons in the vSNc. The degeneration causes a communication problem in the direct and indirect pathways, which results in the loss of smooth movements (Todorovic & Barton, 2019). The connection between the substantia nigra and basal ganglia, including all sets of nuclei (caudate nucleus, putamen, global pallidus, and subcortical thalamus), has a primary function of action selection, habit formation, and regulation of the motor and premotor areas (Lauring et al., 2019; Ward, 2020).

The degeneration of dopaminergic neurons in PD patients has also been found in the VTA, although their degeneration is less severe compared to the dopaminergic neurons in the vSNc (Alberico et al., 2015). The depletion and dysfunction of dopaminergic neurons in the VTA have been suggested as the causes for the non-motor symptoms in PD patients, such as anxiety, depression, emotional responses, memory loss, learning issues (motivation and reward reaction), judgments problems, cognitive function and executive function loss (Alberico et al.,

2015; Lauring et al., 2019). Dopaminergic neurons in the VTA communicate with the other parts of the brain via mesolimbic and mesocortical dopamine pathways. Mesolimbic dopamine pathways project dopamine largely to the nucleus accumbens (NAcc). The NAcc is believed to play a significant role in the feelings of pleasure, reward, desire, and learning (Bridges, 2016; Blaess et al., 2020; Lauring et al., 2019). The pathways also connect the VTA to the: hippocampus (mediates memory formation, navigation, and emotion) (Grella et al., 2022); ventromedial prefrontal cortex (vmPFC) (mediates motivation, reward responses, anticipation, and introspection) (Pujara et al., 2016; Wade-Bohleber et al., 2021); and orbitofrontal cortex (OFC), especially in its medial portions (mediates the reward responses) (Elliot et al., 2020). The other pathways—mesocortical dopamine pathways—connect the VTA to the areas in the prefrontal cortex (PFC), especially the dorsolateral regions (dlPFC), which are more related to the executive functions involving cognition, working memory, and decision making (Lauring et al., 2019; Lin et al., 2022; Zgaljardic et al., 2010).

Besides the degeneration of dopaminergic neurons in certain brain areas, lesions in the brain, which cause impaired DA production, have also been found in patients with PD. These lesions are caused by intraneuronal inclusions (Lauring et al., 2019; Mahul-Mellier et al., 2019). These intraneuronal inclusions are formed by the accumulation of misfolded and abnormal α-synuclein proteins (a-syn) aggregation that grow inside the cells, called Lewy bodies (LBs). Mahul-Mellier et al. (2019) reported that the formation of LBs is one of the major causes of neurodegeneration and neuronal dysfunctions. In PD patients, the lesions involve the area related to DA pathways and spread through the medulla oblongata, midbrain, prosencephalic, mesocortex, neocortex, and PFC (Braak et al., 2003; Lauring et al., 2019).

2. 2. Classifying PD Stages

A common way to classify PD stages utilizes the Hoehn and Yahr (HY) scale (Hoehn & Yahr, 1967). The HY stages are scaled from stage I to stage V based on the level of motoric disability. Stage I involves only one side (unilateral) motoric disability and is normally accompanied by no or minimal functional impairment. The impairment of balance and both sides (bilateral) or midline motoric impairment are seen in Stage II. Stage III is utilized for the patients who show signs of impaired erect reflexes. The patients in Stage III are still able to live independently even though their activities are somewhat restricted, depending on the type of activities in which they are engaged; their disabilities are considered mild to moderate. In Stage IV, the

disease is fully developed, and patients have a severe disability. Patients are still able to walk and stand unassisted, but are distinctly incapacitated. The last stage, Stage V, is utilized for patients who must stay in bed or sit in a wheelchair unless receiving external aid.

Another classification of PD comes from Braak et al. (2003), in which the stages of damage or lesion in the brain are classified from Stage 1 to 6. This system relies on the pathologic processes underlying PD, in which the development of thread-like Lewy neurites (LNs) in cellular processes and the form of LBs are used for classification. Furthermore, this classification system is focused on sporadic PD, in which only a few types of nerve cells are particularly vulnerable to lesions and where this damage evolves simultaneously as the disease progresses (Braak et al., 2003). Stages 1 and 2 are restricted to lesions in the medulla oblongata, with the addition of the pontine tegmentum area in Stage 2. Stage 3 is the continuation of Stage 2 with the addition of lesions in the midbrain, particularly in the vSNc. The pathology of Stage 3 evolves to Stage 4 with the addition of prosencephalic and mesocortex lesions. In Stage 5, the pathology of Stage 4 continues with the addition of lesions in the neocortex and PFC, specifically in high-order sensory association areas. The last stage, Stage 6, is the continuation of the Stage 5 pathology with the addition of lesions in the first-order sensory association areas of the neocortex and premotor areas and mild changes in the primary sensory areas and primary motor field.

Different from the other two classification systems, the Unified Parkinson's Disease Rating Scale (UPDRS) (Fahn et al., 1987; updated by Goetz et al., 2007) classifies the symptoms in PD into four parts, which also include the HY stages. The first part assesses the non-motor aspects of the daily living experiences and involves several aspects to assess: cognitive impairment; hallucination and psychosis; depressed mood; anxious mood; apathy; features of dopamine dysregulation syndrome; sleep problems; daytime drowsiness; pain and other sensations; urinary problems; constipation problems, lightheadedness on standing; and fatigue. The second part of UPDRS is designed to assess the motor aspects of the daily living experiences and contains aspects of: speech; saliva and drooling; chewing and swallowing; eating tasks; dressing; hygiene; handwriting; hobbies and other activities; turning in bed; tremors; getting out of a bed, car, or deep chair; walking and balance; and freezing. The third part of UPDRS involves a motor examination, but does not particularly assess the daily living experiences. It includes the aspects of: speech;

facial expression; rigidity; finger tapping; hand movements; pronation-supination[1] movements of hands; toe taping; leg agility; arising from chairs; gait; freezing of gait; postural stability; postures; body bradykinesia; postural tremor of the hands; kinetic tremor[2] of the hand; rest tremor amplitude; and the constancy of rest tremor. The fourth part is completed by the neurologist based on the neurologist's clinical observation and judgments of the patient-derived information, and assesses two motor complications, namely dyskinesia and motor fluctuations that include off-state-dystonia.[3] This part assesses the off-state dystonia exclusively with the information on the time spent with dyskinesia and the functional impact of dyskinesia.

2. 3. PD Medication and Treatment

The most effective and primary treatment for symptomatic PD patients is L-dopa, commonly known as levodopa (Muthuraman et al., 2018; Rao et al.,2006; Tambasco et al., 2018). Levodopa is a precursor of the neurotransmitter DA, which is converted into DA in the brain (Lauring et al., 2019; Simuni & Hurtig, 2008). The effectiveness of levodopa includes controlling motoric symptoms, such as bradykinesia and rigidity (Rao et al., 2006). Levodopa is used in combination with carbidopa, which belongs to the class of decarboxylase inhibitors (Rao et al., 2006). This combination allows the prevention of levodopa breakdown before levodopa reaches the brain and reduces the side effects of levodopa, such as nausea and hypotension (Rao et al., 2006; Simuni & Hurtig, 2008). These medications are taken orally.

Unlike levodopa, which needs a presynaptic enzyme to mediate its conversion to DA, DA agonist works directly on postsynaptic receptors and has longer sustainable benefits compared to levodopa (Simuni & Hurtig, 2008). It mimics the DA and thus stimulates the DA receptors directly. After the discovery of bromocriptine in 1974, the DA agonist is prescribed to treat the fluctuation of motor symptoms as well as to overcome the decreased efficacy of levodopa (Lauring et al., 2919). DA agonist (the non-ergot type) could also be used as an initial treatment for PD early in the disease progression as a monotherapy (Halli-Tierney et al., 2020; Hely et al., 2000). However, it is typically administered consecutively with levodopa

[1] Pronation-supination is a term to describe the up and/or down orientation, considered the most complicated movement that primates can perform. The ability of pronation-supination in the forearm is advantageous for gait and posture stability. Therefore, it is useful in order to check the stage of PD (Cakmak et al., 2022).
[2] Kinetic tremor is the kind of tremor that is associated with movement (Kraus et al., 2006).
[3] Dystonia refers to contorted human posture, often with a twisting component (Goetz et al., 2008)

(Halli-Tierney et al., 2020; Lauring et al., 2019). The most common side effects of DA agonist are similar to levodopa, such as nausea, but could also have other side effects like confusion, visual hallucination, or excessive daytime drowsiness (Borovac, 2016). Additional issues with DA agonist administration in PD patients are reports of impulsive-compulsive-disorders (ICDs), including uncontrolled gambling, eating, sex, shopping, and punding, or doing the same activity repetitively without reasonable intention. Certain DA agonists, including ropinirole and pramipexole, stimulate more D2/ D3 receptors and are assumed to induce more ICD behavior (Garcia-Ruiz, 2014: Napier et al., 2020). Levodopa and DA agonist combination in the long term may lead to cravings for dopamine medication or dopamine dysregulation syndrome (DDS), even though levodopa may be the most likely to trigger the cravings (Lauring et al., 2019; O'Sullivan et al., 2009).

The combination of levodopa and DA agonist is typically administered together with catechol-O-Methyltransferase (CAOMT), a MAO-B inhibitor, and/or anticholinergic agents. The other combinations, besides levodopa and DA agonist, however, will not be discussed further as these are not typically related to the phenomenon of creativity/art changes in PD patients and focus of the thesis.

Some PD patients might be unresponsive to pharmacological treatment, while others may need to reduce their reliance on long-term medical treatments. For these patients, some doctors may offer Deep Brain Stimulation (DBS) (Volkmann, 2004). This involves a surgical procedure where electrodes are implanted in one or more of three grey-matters structures in the brain (Lauring et al., 2019). Bronstein et al. (2011) concluded that the subthalamic nuclei (STN) is an effective target of these structures, and quickly became the most common target for placing the electrodes. Other than the STN, the globus pallidus pars interna and thalamus, are also electrode targets in DBS procedures (Conolly & Lang, 2014). The stimulation by high-frequency electrical impulses from the electrode may involve a functional disruption of the abnormal neural messages associated with PD (Benabid, 2003). The DBS procedure may also lead to issues in some patients, such as increased depression, apathy, impulsivity, worsened verbal fluency, and executive dysfunction (Schüpbach et al., 2008).

Other non-pharmacological treatments for PD include various types of therapies: sports and exercise (physiotherapy); speech; occupational; psychological (psychotherapy); and art/creative. These treatments are aimed to relieve symptoms, help PD patients manage their daily activities, and improve their quality of life (Bloem et al., 2015).

2. 4. Publications Highlighting PD and Creativity/Art

The motoric and non-motoric deficits in PD patients may lead one to assume that PD would impair the creativity and originality of artists with PD (Lakke, 1999). The physical difficulties, such as rigidity and tremor, and the possibility of the loss of cognitive and executive functions caused by the progression of the illness may greatly affect artists suffering from PD, and impair their ability to continue working. This topic was first discussed in the publication of a study conducted on 40 professional artists with PD. In this study, Lakke's (1999) initial assumption was proven false as almost all the artists with PD were indeed continuing and maturing their creativity. Lakke (1999) also reported that some artists had an urge to make artworks or even had a trancelike state during hyperkinetic periods. After Lakke's publication, more studies reporting the phenomenon of creativity/art related to PD appeared. Lauring et al. (2019) published a review of about 16 publications from the last 20 years that reported this phenomenon, covering three major fields of study.

The first field covers studies on PD patients who have been artists prior to their diagnoses, and explores their changes in artistic creativity, motivation, and style (Forsythe et al., 2017; Kulievsky et al., 2009; Lakke, 1999; Pinker, 2002; Schwingenschuh et al., 2010, Shimura et al., 2012; Witt et al., 2006; Drago et al., 2009a). This field comprises case studies of visual artists, mostly painters. The art evaluation method of the study was based primarily on the authors' and artists' subjective opinions. Only two studies attempted to use other methods of evaluation. One is Drago et al. (2009a), which evaluated 59 paintings using nine judges; however, there was no report on the artistic experiences of these judges. The second was Forsythe et al. (2017), which ran a comparison between Salvador Dali's artworks (PD artist), artworks from artists with Alzheimer's Disease, and control artworks from artists experiencing normal aging. This study used a computer program to assess the variation in complexity (fractal dimension) in order to determine the changes in artworks. Some studies in this field reported changes in the style and/or content of the participants samples' artworks, but only one study (Pinker et al., 2002) failed to report whether changes in style and/or content occurred because of practical difficulties brought about by clinical symptoms.

Other studies in this field also reported that the motivations for the creativity of all samples increased. Only one study reported decreased motivations for creativity, which was reported by Shimura et al. (2012) on one Japanese painter. A study by Lakke (1999) reported no decline in motivation by the artists. Meanwhile, other studies were not clear when reporting whether there was an increase, decrease, or

no change in artistic motivation (Schwingenschuh et al., 2010; Drago et al., 2009a). Additionally, the impact of PD on the quality of art production was not reported by some studies (Forsythe et al., 2017; Schwingenschuh et al., 2010, Shimura et al., 2012; Witt et al., 2006). Finally, some of these studies lacked a clear review of pre-PD artworks of all the artists. Studies that had more than one sample could not report the pre-PD artworks of all their samples simultaneously (Drago et al., 2009a; Lakke,1999; Pinker, 2002; Schwingenschuh et al., 2010).

The second field covers studies on PD and spontaneous artistic creativity (Walker et al., 2006; Chatterjee et al., 2006; Joutsa et al., 2012a; Lhommée et al., 2014). This field is occupied by mostly single case studies, except for Joutsa et al. (2012a), who executed a survey study of a large sample (over 280 PD patients). Joutsa et al. (2012a) found that roughly 19.3% of the participants reported increased creativity after their PD diagnosis and subsequent medication intake. The relationship between the result of this survey and PD medication was discussed subjectively by the author as the participants were biased, and increases the risk of over-reporting (Lauring et al., 2019). The participants were part of a previous study about ICDs and PD medication (Joutsa et al., 2012a), and the method of participant assessment of creativity was not reported (Lauring et al., 2019). Similarly to the methods used in the first field of study, most of the study employed art evaluation methods that were merely based on the authors' or patients' subjective opinions, with the exception of a study by Walker et al. (2006), which evaluated artworks by artists' critiques and sales success. Other studies in this field focused only on sample-producing visual art. All the studies in the second field reported an increase in creative motivation after diagnosis. The artistic experiences behind all samples from previous studies are mostly not mentioned, or, if they are, not explained clearly. Only Chatterjee et al. (2006) reported the pre-PD artistic experience of their sample, which was a sporadic painter with an art study background who suddenly became a productive artist who developed an abstract theme with a central square inspired by a city park view 15 years after diagnosis (the time the subjects took part of the study). Nonetheless, the impact of PD on the quality of art production is minimally, if at all, reported.

The third field covers studies on PD and general creativity, or PD aspects with artists/art viewing (Canesi et al., 2012; Canesi et al., 2016; Drago et al., 2009c; Drago et al., 2009b; Lhommée et al., 2014). The studies in this field have used methods other than subjective evaluation of artworks. The standardized creativity measurement, such as The Abbreviated Torrance Test for Adults (ATTA) (Goff & Torrance, 2002), other creativity tests like The Torrance Test of Creative Thinking (TTCT) (Torrance, 1966), The Barratt Impulsiveness Scale (BIS) -11A (Patton et al.,

1995), The Minnesota Impulsive Disorder Interview (MIDI) (Grant et al., 2005), or standardized measurement of behaviors related to PD, such as the Ardouin Scale (Ardouin et al., 2009), were used. This field also reported other types of art besides visual, including writing (Canesi et al., 2012; Lhommée et al., 2014). Most of these studies, except Drago et al. (2009c), were conducted on larger samples than just a single case study, even though the number of samples was rather small (3-18 patients). unfortunately, the pre-PD artistic or creativity history of their samples were mostly not reported. Similar to the other two fields, the impact of PD on the quality of art production of the study participants as not reported thoroughly (Lauring et al., 2009, pp. 134-149)

2. 5. Epidemiological Study Creation and Development

2. 5. 1. Study with the Potential to Investigate the Phenomenon of PD Patients and Creativity/Art

Lauring et al. (2019) primarily discussed the robustness of methods in the publications mentioned above, as well as proper documentation of aspects related to the phenomenon of art/creativity changes in PD patients. The proper documentation of influencing factors, such as demographic data, medication-illness-related, person-related, and motivational factors, is a valuable variable in investigating this phenomenon. Additionally, most of the studies mentioned above focused on one creativity/art domain, visual art, with the exception of two studies (Canesi et al., 2012; Lhommée et al., 2014). Another creativity/art domain might be unrevealed should another approach be used. Finally, the small number of samples and the evaluation method, which was mostly based on authors' and patients' subjective opinions, could be improved. A larger sample size with a more objective research method, specifically with regards to the evaluation method, could yield a more objective and meaningful result with which to explore this phenomenon.

The robustness of methods, proper documentation, inclusion of a larger sample size, and a more objective evaluation method in investigating the phenomenon of PD patients and creativity/ art, will potentially answer the main research question: how can one create a study with the potential to investigate the phenomenon of PD patients and creativity/art? As proposed in Section 1, this research question can be addressed through an epidemiological study. Further, this epidemiological study has an explorative kind, cross-sectional, and is conducted by means of a survey. Further detail on developing this epidemiological study is discussed later in Section 3.1.

2. 6. Empirical Part of the Epidemiological Study

2. 6. 1. Creativity Change in Persons with PD

The phenomenon of increasing or maintaining creative productivity and quality within PD patients is possibly related to the onset of PD diagnosis and medication intake. This statement was mentioned in the review by Lauring et al. (2019). Studies in this review reported stylistic changes in creative or art production that occurred after PD diagnosis (Forsythe et al., 2017; Kulisevsky et al., 2009; Lakke, 1999; Pinker, 2002; Shimura et al., 2012). Lakke (1999), in his observation, reported how his subject of focus, a professional sculptor, developed new techniques and materials with his artworks after diagnosis (29 years after diagnosis and 38 years after symptoms onset). Shimura et al. (2012) reported in their single case study how one Japanese painter transformed his painting style from abstract (before PD diagnosis) to realism (0-4 years after diagnosis). Not only have stylistic changes in professional artists with PD been reported, but Lhommée et al. (2014), for example, also reported spontaneous artistic creativity in the form of illustration (visual art) after PD diagnosis when a person became obsessed with painting and started to paint on the walls and furniture after receiving DBS. Chatterjee et al. (2006), on the other hand, reported a re-uptake of artistic creativity in a single case study where a PD patient, an art student in his youth, had developed an abstract theme with the central square of his painting at least 15 years after receiving a diagnosis (the specific time when this exact abstract theme emerged was not reported). In a larger sample, Joutsa et al. (2012a) found that roughly 19.3% of 280 samples reported an increase in their creativity after their PD diagnosis. Even though concern about the convenience sample was reviewed, around 54 persons in this survey reported having increased creativity after PD diagnosis.

The reported creativity/art changes in PD patients could be observed in three parts: (1) the occurrence, if any; (2) the timing; and (3) the form. Discussion on single case studies (see Lauring et al., 2019 for review) and one survey with a convenience sample (Joutsa et al., 2012a) about the changes in art/creativity in persons with PD led to a deeper examination of the epidemiological study suggested here. With the proper precautions against gathering a convenience sample (see the previous section regarding open registration), this thesis seeks to discover if PD patients, on average, report creativity changes. The previous studies, which had evaluation methods based on the subjective opinion of PD patients about their creativity/artworks, reported PD patients felt both more creative since PD onset

(Pinker et al., 2002) and less creative/not satisfied with their creative production after PD diagnosis/onset (which was not well documented) (Shimura et al., 2012). The reported changes in previous studies could be due to the patients being confused about the feeling of being creative and creative expression or art/creative production per se. Therefore, this thesis proposed exploring creativity in two parts: (1) the feeling of being creative; and (2) the creative expression (i.e., actual creative products production and/or actual creative activities)

Additionally, previously published studies often failed to provide proper documentation when reporting the creativity change in PD patients. The review from Lauring et al. (2019) reported that investigations on pre-PD diagnosis were mostly missing or not systematically documented. Hence, there is a need to document the timeline of when the changes in creative feelings and creative expression (activity), if any, occurred in PD patients.

Furthermore, previous studies focused on the creative expression of visual art (Lauring et al., 2019), with the exception of two studies, (Canesi et al., 2012; Lhommée et al., 2014) reported other forms of creative productivity, such as creative writing (e.g., poetry, novels, short stories). Therefore, it is worthwhile to evaluate the possibilities of the occurrence of another art/creativity domain. As it is intended to collect a broader sample through epidemiological study, this thesis may find instances of broader creativity/art domains. Moreover, this thesis focused on everyday creativity, which different from the traditional concept of exceptionally creative people and their achievements (Benedek et al., 2020). Everyday creativity (acts and ideas) is situated in a real-world environment. Therefore, one must get close to everyday creativity when it is unfolded and in its natural habitat (Sylvia, 2018). Furthermore, everyday creative activities do not necessarily need publicly-recognized accomplishments and occur during one's leisure time or when one is free from life's necessities (e.g., eating, hygiene, house chores) (Benedek et al., 2020). The assessment of everyday (real-life) creativity can be accomplished by asking about the frequency of creative activities and/or the level of creative achievement (Diedrich et al., 2018). Specifically, the individual differences in creative activities (everyday creativity) will represent the estimated frequency of how often a person has been occupied with creative behaviors and not the public acclaim of these behaviors (Benedek et al., 2020; Diedrich et al., 2018). In the method section, the range of domains of everyday creativity is further discussed.

The main research question of the empirical part of this thesis is centered on three foci: (1) the reported changes in feeling creative in PD patients, (2) the reported changes in the frequency of creative expression (i.e., actual producing creative

products and/or actual creative activities) in PD patients, and (3) the reported type of changes in creative activity in PD patients. The thesis explored these foci along the illness timeline, which covered: (1) the period after the onset of PD symptoms but before the onset of PD diagnosis (pre-diagnosis), (2) after the onset of diagnosis (post-diagnosis), and (3) the time just (three months) before the study was conducted. These three timepoints would be further called: (1) pre-diagnosis timepoint, (2) post-diagnosis timepoint, and (3) current timepoint, consecutively.

2. 6. 2. PD Patients on Reporting the Cause Driving Their Creativity/Art Changes

Remarks from the participants of previous studies reported that the feeling of being creative, the motivation/desire to do a creative activity, and the spontaneous feeling to produce creativity/art were linked to the time of the diagnosis and the medication (Lakke, 1999; Chatterjee, 2006; Schwingenschuh et al., 2010; Joutsa et al., 2012a; Walker et al., 2006; Kulisevsky et al., 2009; Lhommée et al., 2014). In his observation, Lakke (1999) reported that some of his study participants attributed their art productivity to medication-induced mental changes. A subject from the study by Schwingenschuh et al. (2010) gave remarks on not feeling creative and believed that DA drugs might help him to feel creative for his work. Similarly, remarks from Walker et al.'s (2006) study subject also reported that medication had positively contributed to his creativity changes. Joutsa et al. (2012a), despite their convenience sample, found that 33.3% of their participants who reported increasing creativity (19.3% of the total sample) had subjectively linked this change directly to medication. The urge to produce art was remarked by the subject of Lhommée et al.'s (2014) study, in which the feeling of obsession and happiness with painting was reported. Kulisevsky et al. (2009) reported remarks from their subject on feeling emotionally relieved regarding his artworks, and the need to express inner emotion as his style of art changed. Nonetheless, Drago et al. (2009b) reported that their subject remarked that DBS interfered with his artistic creativity and appreciation of art.

PD patients have made various subjective remarks on several possible reasons behind their changes in creativity. From the patients' perspectives, for example, PD medications and the onset of PD itself affected the urge to produce creative works and the pleasure of producing creative works. It is worthwhile looking deeper and broader at patients' perspectives behind their changes in creativity. This thesis proposed investigating the possibility of both intrinsic and extrinsic motivations behind creativity changes. Intrinsic motivation refers to internal sources of motivation, such as the need to gain knowledge, the urge to produce creative works, or the

pleasure of producing creative works (Deci & Ryan, 1985). Extrinsic motivation refers to external sources of motivation (Deci & Ryan, 1985), such as acclaim from others, suggestions from others, medications, or other treatments.

With this proposed epidemiological study involving a broader sample size, the thesis aims to provide a subjective perspective behind the changes in creativity in PD patients. This might reveal other possible reasons, the intrinsic as well as extrinsic motivations, aside from remarks reported by previous studies. The subjective reason underlying creativity changes would be the first sub-research question of the empirical part of this thesis.

2. 6. 3. Relation Between PD Medication and Reported Creativity/Art Changes

In most previous case studies, there was compelling evidence of patterns of assumptions between creativity within PD patients and PD medication, even though these studies struggled with small number of samples, improper documentation, and sample bias (Lauring et al., 2019). First, DA replacement therapy is associated with the onset of creative production and the changes in feeling creative in PD patients (Joutsa et al., 2012a; Kulisevsky et al., 2009; Lakke, 1999). PD patients reported an increase in their creative production with no decrease in art quality (Canesi et al., 2012; Lakke, 1999). The drive to make the art tended to relate to the dosage of DA replacement therapy. Lowering the dosage of DA replacement therapy was reported to lower the drive of art production in PD patients (Kulisevsky et al., 2009). Second, the increased art production was reported to come with increased motivation, a feeling of being rewarded, or being free or more spontaneous (Chatterjee et al., 2006; Kulisevsky et al., 2009; Lhommée et al., 2014). The increased motivation and the feeling of being rewarded are closely related to DA being a major neurotransmitter for those roles in neuromodulation. Further, the feeling of being free and spontaneous might be associated with mood regulation, in which DA also plays a major role. The DA replacement, which is initiated to ease the symptoms of PD, might not only help with the symptoms, but also might have a relationship with creativity changes in PD patients.

This thesis would explore the administration of levodopa and DA agonist in an attempt to focus on the possible relationship between PD medications and creativity changes. These two most common medications in PD patients have been discussed in a review of over 16 publications by Lauring et al. (2019). With a planned epidemiological study, this thesis would explore when and how (simultaneously or consecutively) these two medications were administered along with the changes in

creativity in PD patients, if any. This would be the second sub-focus of the empirical part of this thesis.

3. Methods

3. 1. Epidemiological Study Development

To address the numerous problems that appeared in published studies about creativity changes in PD patients, this thesis utilized an epidemiological study design. Epidemiology is the basic science of public health, and it is intended to assess the distribution and determinants of diseases, disabilities, injuries, natural disasters, and health-related events (Holmes, 2017). Furthermore, epidemiological research focuses on specific populations (population-based research (e.g., children, teenagers, pregnant women, obese persons, people with a certain disease, etc.) The aim of the research was to advance the understanding of determinants of health (and certain diseases) within these populations (Buka et al., 2018; Holmes, 2017). As previously discussed, the published studies about creativity/art and PD patients shared the issue of having a small sample, primarily with just a single case study (Lauring et al., 2019). Although one survey (Joutsa et al., 2012a) included a large sample to try to address this problem, it faced a different problem in sample bias. Therefore, the conclusion of that single, large-sample investigation was reported rather subjectively by the author. To overcome this sample problem, an epidemiological study design was used as it aims to investigate at the population level.

In published studies, the determinant factors behind the phenomenon of creativity and PD patients were vague or not rigorously assessed due to the lack of proper case documentation (e.g., sociodemographics, pre-PD condition, etc.) (Lauring et al., 2019). The epidemiological study was designed to assess the determinant factors among the specific population, and correct this issue. This correction can be achieved with broader data collection using the proper tools (i.e., surveys with comprehensive and detailed questions).

The basis for the epidemiology study used in this thesis was conducted in Nijmegen, the Netherlands at Radboud University Medical Centre. This study, which was still ongoing when this thesis was written, utilized three surveys conducted in two languages, Dutch and English. The three surveys were described in greater detail below.

3. 1. 1. The Prevalence Survey

A prevalence study was prepared to avoid the problem of sample bias. The prevalence study consisted of two short questions: (1) “Have you noticed any changes in your own creativity or your desire to make something creative that you think related to your life with Parkinson’s disease?” and (2) “To what extent did you engage in or were you creative before you were diagnosed with Parkinson’ Disease?”. These two short questions were expected to overcome the existing limitations of the previous study, which only interested patients who were creative or had perceived changes participated in such studies As our participant was not yet exposed to the motives of our study to look at changes in creativity, the participant will give a representative group of PD patients in Austria to investigate the prevalence of experienced creativity changes within a non-biased group. Based on their responses to these two questions, PD patients were then invited to participate in the main study. Following their confirmation, the patients were asked in what manner they preferred to do the main study: online, via phone call, or post.

3. 1. 2. The Main Survey

The main survey was constructed in nine sections.

The first section was comprised of sociodemographic questions, including gender, nationality, current age, age when symptoms began, and age when diagnosed. Additionally, the participants were asked about their current marital status, art education, general education, current occupation status, and occupation status for the first five years of participants’ professional life and the last five years prior to the survey date.

The second section contained questions regarding creativity changes over time. Details on how this second section was constructed are conveyed in Section 3. 3. 1., as the methodological development of the empirical part of the epidemiological study is the focus of this thesis.

The third section covered aspects of PD treatments, both pharmacological and non-pharmacological treatments. The details of the pharmacological section and how it was adapted for use in Austria is explained in Section 3. 3. 3. The non-pharmacological portion was comprised of options for physical therapy, occupational therapy, specific mobility training (e.g., *Mensendieck* of Cesar), psychotherapy, logopedics, creative/art therapy, and dietetics. Participants were allowed to write down their non-drug treatment if it was not in the list or chose “none” if they did not participate in any non-pharmacological treatments.

The fourth section investigated the self-reported motivational factors behind any change in creativity or lack thereof. This was constructed as a multiple-choice question with twelve options and one free answer. The options were self-constructed by Spee (2021). Details regarding this section was explained in Section 3.2., as the methodological development of the empirical part of the epidemiological study was the focus of this thesis

The fifth section contained questions where the personality traits of the PD patients were explored. In this survey, the short version of the Big Five Inventory (BFI-10) with ten items constructed by Rammstedt and Oliver (2018) was used. This short version was chosen to shorten the overall survey administration time.

The sixth section covered aspects of hyper-dopaminergic behaviors. The questions were self-constructed and translated by Spee (2020) based on the Ardouin Scale (Ardouin et al., 2009), which appeared in Lhommée et al. (2014). The questions were administered with yes or no options in order to investigate seven typical hyper-dopaminergic behaviors: (1) punding, (2) shopping, (3) gambling, (4) sexual behavior, (5) drug abuse, (6) hobbyism, and (7) eating.

The seventh section investigated schizophrenia-spectrum psychopathology in PD patients. This section used the Multidimensional Schizotypy Scale (MSS) constructed by Kwapil et al. (2018), which included 38 items with yes or no options.

The eighth section explored PD patients' inability to feel pleasure (anhedonia). This section used the Snaith–Hamilton Pleasure Scale (SHAPS) constructed by Snaith et al. (1995) with 14 yes or no items.

In the ninth and final sections, the participants were asked to share any additional information about their creativity in relation to their situation with PD in the form of free text.

3. 1. 3. The Spouse/Partner Survey

This survey, which was filled out by the participant's spouse or partner, was aimed to verify the self-reported information from certain sections of the main survey. Verification of some important data is crucial, especially considering that cognitive impairment may influence PD patients' answers. Dutch neurologists specializing in PD had been consulted on this course of action.

The survey began with demographic questions for the spouse or partner, including gender, ethnicity, marital status, general education, and art education. Following the initial section, the verification section began. This section included questions on the demographics of the participant (PD patient), including the ages of the PD patient when symptoms began and at diagnosis. Furthermore, it verified the

PD treatments that the patient has undergone for the first three months after diagnosis and the last three months prior to the survey. Next, the spouse/partner was asked about any creativity changes or lack thereof that they noticed in their spouses during four timepoints (which were discussed in greater detail in Section 3. 3. 1.), as well as any hyper-dopaminergic behaviors. The next question investigated the perceived motivational factors behind the changes in creativity or lack thereof of their spouse/partner (PD patient). At the end of the survey, the participant was allowed to provide more information about their experiences with their spouse's/partner's (PD patient's) creativity.

This thesis did not discuss the results of the spouse/ partner survey later.

3. 2. Adapting the Dutch Version for Austria

Based on the meetings held in early March 2021 with B. Spee, the Dutch project leader, it was decided that this project be brought to Austria. This decision required adapting the Dutch surveys into a suitable version for use in Austria and creating the connection to patient samples in Austria (discussed in greater detail in Section 3.6). As the official language of Austria is German, the survey was translated into German, while also keeping the English version available for convenience as more than 40% of the Austrian population speaks English (Straub, 2022). Adapting the Dutch survey for the Austrian population and creating a relationship with patient samples were major aspects in this thesis.

Adapting the Dutch version of the survey began with the prevalence study. In addition to translating, the online version was adapted into a paper version. The second question ("To what extent did you engage in or were you creative before you were diagnosed with Parkinson' Disease?") in the online version used a two-sided slider with seven differentiation values. The slider had a neutral value in the middle. Moving the slider to the left was interpretated as having a larger value of "never done anything creative" while moving the slider to the right was interpretated as having a larger value of "very often doing something creative. If the slider stayed in the middle, the participants showed that they have never done anything creative nor very often did something creative before the diagnosis. This two-sided slider was adapted into a 7-point Likert scale in the paper version with the instruction that the participants could select number 5 or 6 if they felt they often did something creative before the diagnosis. number 4 indicated that the participants who were not very often doing something creative, nor were they never done anything creative before the diagnosis. In the end of prevalence study, the participants were asked if they were interested to join the main study and, if so, what their preferred survey administration method was.

Considering the participants will share their email address, phone number, or postal address, a declaration of data protection was included. Based on a pre-test conducted on early April 2021 using the online version of the prevalence study, survey completion took 5-10 minutes.

The next step was adapting the main survey. Some answer options had to be revised, such as the ones for ethnicity and education. Based on the information from the Austrian Federal Chancellery, there are six indigenous ethnic groups in Austria (i.e., Burgenland Croats, Slovenes, Hungarians, Czechs, Slovaks, and Roma). As such, Slovene, Hungarian, Czech, Austrian, and German were included as the answer options for the ethnicity question. Compared to the Dutch version, the Austrian version could have more options for ethnicity; however, it was decided to keep the number of options unchanged considering the technical limitation from the available online survey platform. The participants also had the choice to put other ethnicities as they wished or to choose the “not applicable” option. Meanwhile, the options for the general education question had to be adapted to the Austrian education system. Based on the information from the Austrian Federal Ministry of Education, Science, and Research, the participants were given eight options to denote their highest level of education (*Grundschule*, *Berufliche Ausbildungslehrgänge*, *Hauptschule*, *Realschule/Gymnasium*, *Berufsbildende höhere Schule*, *Fachhochschule*, *Universität*, *keine Ausbildung* (no education), and one option for them to write another type of education if theirs was not listed). Further, four types of creative/art education were asked: (1) theoretical education in the field of fine arts; (2) education in art history; (3) practical education in arts; and (4) other kinds of education in the arts. For each type of creative/art education, participants chose from four options regarding the frequency and type. Participants could choose between “none”, “a few (max.3) courses”, “several courses (as a hobby)”, “several courses (as education, professional)”, and “finished a study degree”. These sociodemographic questions were translated into German by the original Dutch author from English (Spee, 2021).

In the section related to creativity changes, again, all the questions were translated by the original Dutch author from English (Spee, 2021). Furthermore, the German version of ICAA, as provided by Benedek et al. (2020), was used. As discussed above, a paper version of the main survey was also created. In the online version, questions regarding what extent the patient noticed the changes in feeling creative and their creative activities, in general, were shown as a two-sided slider with 11 differentiation points. If the patient did not notice any changes, they could place the slider in the middle. These questions were adapted into an 11-point Likert

scale (point -5 to point 5) in the paper version with the instruction that the participant could select the number 0 if they did not notice any changes. The 11 points of the Likert scale and 11 differentiation points were chosen to prevent categorization effects, which might happen if answer alternatives were too few (Scherpenzeel, 2002). In line with this, Scherpenzeel (2002) claimed that scales with more responses alternatives would prevent measurement errors or have more reliability than scales with fewer alternatives. By providing 11 alternative answers, the participant whose answer was between the lowest and middle points or whose answer was between the highest and middle points were given appropriate responses selections

Next, the drug options for pharmacological therapy had to be adapted. According to suggestions from a neurologist, seven base options for class of drugs were chosen: levodopa, DA agonists, MAO-B inhibitors, COMT inhibitors, *parasympathicolytica* (*anticholinergica*), cholinesterase inhibitors, and amantadine. Under these seven options, the medication and brand names that belong to those options were listed (see Appendix E). Additionally, the medicine and brand names used by international pharmacies were discussed with an Austrian neurologist in April 2021 (i.e., trihexane (from *parasympathicolytica*) is not available in Austria). Based on this consultation, an additional choice of “others” was provided, with the medicine names like bornaprine (Sormodren) and cabergoline (Dostinex) listed under this option. The non-pharmacological treatment options remained the same as the Dutch version; they were simply translated into German.

The personality traits section for the Austrian population used the available German version of the BIF-10 (Rammstedt & John, 2007), and the Anhedonia section used the SHAPS-D, which was SHAPS in German (Franz et al., 1998). The questions about motivational factors behind creativity changes or the lack thereof, hyper-dopaminergic behaviors, and schizotypy were translated into German by the author of this thesis and proofed by Spee (2021).

Based on the main survey pre-test conducted at the end of May 2021, the whole survey completion took 45-60 minutes. The pre-test has been conducted online since May 2021. Since then, additional notes and questions on items and the survey have been recorded and discussed.

The spouse/partner survey used both English and German. The English version was the same as the Dutch version (Spee, 2021). Meanwhile, in the German version, the available German scale, specifically the ICAA (Benedek et al., 2020), was used.

The entire Austrian portion of the project was approved by the Ethics Committee from University of Vienna (Reference Number: 00682) on June 21, 2021.

3. 3. Empirical Foci of the Epidemiological Study

3. 3. 1. Investigating Creativity Changes

In this epidemiological study, creativity was differentiated between the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities). Both aspects of creativity were investigated through four timepoints: (1) baseline: the time before the PD patient noticed any PD-related symptoms; (2) pre-diagnosis: the time after the PD patient began noticing PD-related symptoms but before receiving a PD diagnosis; (3) post-diagnosis: the time after which the PD patient received their PD diagnosis; and (4) current: three months prior to the survey. These timepoints were chosen to address the issue in previous studies, in which the changes over time within the patients' disease timeline were not properly documented. In every timepoint, the questions about changes in creativity were posed to the PD patient in three parts.

First, for the baseline timepoint, participants were asked to rank on a scale of 0 to 10 their feeling of being creative and creative expression before their PD symptoms appeared. With regards to the feeling of being creative, number 0 reffered to not being creative at all, while number 10 reffered to being highly creative. With regards to creative expression (i.e., actual producing creative products and/or actual creative activities), number 0 reffered to never doing anything creative, while number 10 reffered to very often doing something creative. In the online version, participants could move and position a slider with 11 scale differences according to their responses. In the paper version, participants placed a cross under the box numbered 0 to 10. In the phone version, participants were asked to rank their feeling of being creative and creative expression from 0 to 10.

Additionally, at the baseline timepoint, participants were asked to report their creative activity in nine creative domains using the ICAA. ICAA balances all creativity domains and levels in order to not represent only one field in the inventory. The original version of ICAA covered eight domains of creativity, with six activities for each domain and eleven levels of achievement. These domains had been frequently considered in other self-assessment inventories (Silvia et al., 2012), including the less common domain (i.e., sport). However, a more recent study explored the type and reason behind everyday creativity (Benedek et al., 2020) and asked the study's participants to openly report their most important creative activities. This study

concluded that some creative activities did not fit well into any of eight domains and/or only showed little relevance.

Moreover, this study used nine creative domains instead to capture more reported creative activities comprehensively. These nine domains were literature, music, interior/garden design, social, performing arts, handicraft, visual art, creative cooking, and science/ technology. This version of ICAA was also found to be more suitable for online study administration, according to M. Benedek (personal communication on April 14, 2021). Furthermore, the questions regarding each domain provided one or two examples of creative activities in the form of a 5-point Likert scale (“never actually”; “occasionally (once every few months)”; “regularly (about once a month)”; “often (about once a week)”; and “very often (almost every day)”). This ICAA version with the nine domains of creative activities was used in this thesis.

For the other three timepoints, participants were asked to report to what extent they noticed changes in their feeling of being creative and their creative activities in general. Here, the 11-point Likert scale (point -5 to point 5) was used again, with the number 0 referring to “no change”. In the online version of the survey, this scale was visualized in moveable sliders with the starting point in the middle referring to “no changes”, 5 points increasing to express to what extent the change has increased, and 5 points decreasing to express to what extent the change has decreased. Participants were also asked to report their creative activities in the same ICAA nine creative domains (Benedek et al., 2020) at that particular timepoint.

3. 3. 2. Investigating causes of creativity changes perceived by PD patients

The participants were asked to report the factors that they thought played a role in their creativity changes if any. The available factors for participants to choose from were constructed using two classic determinations of motivations/factors: intrinsic and extrinsic (Deci & Ryan, 1985). The intrinsic factors used in the survey included: interest in creative expression or activities (including artistic) in general, interest in creative expression or activities (including artistic) as a hobby or professionally, feeling of reward attained when carrying out creative activities, and personal reactions to their living situation after diagnosed with PD. The extrinsic factors used in the survey included: profession; therapies; increased amount of free time; recommendations from friends and/or family; recommendations from doctors, therapists, and/or nurses; Parkinson’s medication; DBS; and consequences of PD. If participants chose the option “Parkinson’s medication”, they needed to write the specific medication. If the listed factors were insufficient, participants might choose

the option “others” and write free text. At least one of the options must be chosen by the participants.

3. 3. 3. Investigating PD Medication Intake

A list of medications (Appendix E) was given to participants, which included two extra options: (1) I did not yet start with the drug-treatment; and (2) I do not know. Participants must choose at least one of the medication options. Medication intake was to be reported for two timepoints: (1) the first three months after the diagnosis; and (2) the three months prior to the survey. These two timepoints were specifically asked to maintain the proper documentation of treatment changes over time. The medication question was in a multiple-choice format, which allowed participants to choose more than one option.

3. 4. Survey Administration

Considering the COVID-19 situation when the project started, the administration of the prevalence survey was delivered via two methods: online (prepared in the SoSci Survey platform) and on paper. Meanwhile, the main survey was offered using three methods: online (prepared in the SoSci Survey platform), via post and phone. The paper version was sent to the provided address. It included a stamped return envelope for the participant to use when returning their completed survey at no cost to the participant. If the participant chose to take the survey via phone, the participant was called from the study’s service number, and they were asked all the questions from the main survey while their answers were input into the online version. The participant might choose to conduct the survey in one, two, or three phone sessions. Each survey obtained informed consent at the beginning of the survey.

3. 5. The Sample

The sample for the prevalence study consisted of self-reported PD patients obtained through Parkinson’s organizations, doctors, and Parkinson’s practitioners in Austria. Approximately 450-600 participants in Austria were expected to partake in the prevalence study. For the main study, there were two sample groups. The first group was a subgroup of the prevalence study sample, which was expected to be approximately 150-200 self-reported PD patients. The second group consisted of the consenting spouses/partners of the first group; therefore, approximately 150-250 individuals were also expected for the second group. Considering sample size, this study had an explorative character; hence we did not calculate a formal minimal

sample size for the survey. In line with this exploratory nature, a convenience sample of participants was included. Relative to the total prevalence of PD cases in Austria, our target sample size was expected to reach 3% out of the total number of reported PD cases (20,000 cases, according to a report from Österreichische Gesellschaft für Neurologie 2022).

3. 6. Sample Recruitment

Organizing sample recruitment was one of the major aspects of this thesis that made this epidemiological study running in Austria possible. This included developing relationship to patient samples through Parkinson's organizations, neurologists, and other Parkinson's practitioners in Austria.

The first introduction of this project was conducted with the Director of Parkinson Selbsthilfe Wien. In this meeting, it was agreed that the study would provide materials to be printed in the organization newsletter and posted on its website as soon as ethics approval was obtained. The study produced a short text explaining to stakeholders in the PD field about the project, background, and the need for participation (from PD patients, doctors, and therapists). In the newsletter, PD patients were invited to participate in the project by going to the online prevalence study link or calling the study's service number. Following meeting with Parkinson Selbsthilfe Wien, similar organizations in different states in Austria were contacted. These organizations were Parkinson Selbsthilfe Niederösterreich, Parkinson Selbsthilfe Burgendland, JUPPS Parkinsonselbsthilfe Burgendland, Parkinson Selbsthilfe Vorarlberg, Parkinson Selbsthilfe Oberkärnten, Selbsthilfegruppe Leoben, Selbsthilfegruppe Graz, Selbsthilfegruppe Feldbach, Slebsthilfegruppe Deutschlandsberg, Selbsthilfegruppe Bruck/Mur, and Parkinsonline (PON) Österreich. Not all communication succeeded. The newsletter was posted by the organizations in Wien (Vienna), Niederösterreich (Lower Austria), and Parkinsonline in June 2021.

In August 2021, another Parkinson organization, Parkinson Tanzen, was contacted and the project was introduced. This organization offers dance course where people with PD meet and dance together under the guidance of Mag. Ursula Löwe MA, an art therapist specializing in PD patients. In early September 2021, I visited the dance course, introduced the project in a short lecture, and distributed the newsletter and copies of the paper version of the prevalence survey.

In September 2021, the research team leader "Chorgesang gegen Parkinson" (Choir singing against Parkinson), whose project was running in Salzburg, was contacted. Cooperation was proposed, in which they would aid with organizational

matters, and introduce the study to the PD patients in this singing group. As of this thesis writing, the “Chorgesang gegen Parkinson” project was still in the planning phase. However, through the leader of this singing project, connections to two neurologists specializing in PD in Salzburg were made. They agreed to announce this project to their patients by distributing the newsletter. Copies of the newsletter were sent in early September 2021.

In addition to collaborating with neurologists, PD organizations, and PD practitioners, this project was also announced through social media (e.g., Facebook and Instagram). Specifically, I used my personal accounts to announce the project in several Facebook groups in July 2021, namely “Masterstudium Psychologie Uni Wien”, “Psychologie Uni Wien”, “Psychologie Netzwerk Österreich”, “Gruppe Klosterneuburg”, and “Forum Klosterneuburg”. Moreover, using my Instagram business account and Instagram’s promotion feature, I promoted this project to a targeted Instagram population utilizing three keywords: Austria, aged 45+, and Parkinson. This promotion could appear in anyone’s newsfeed that fell within those three categories. Once the promotion caught their interest, they could click the promotion page, which led them to the online prevalence study. I set the promotion for three days straight on the weekend (starting Friday) during three separate months: July, August, and September 2021, costing 12 EUR for each promotion.

In early 2022, the next batch of sample recruitment was conducted by contacting neurologists practicing in Austria. Through these contacts, the project was presented to more PD patients and practitioners via the June 1, 2022 online event “NeuroSkop - Neues aus der Studienwelt”. However, this thesis only covered the sample recruited until April 30, 2022.

4. Results

The result section in this thesis covered the empirical part analysis of the epidemiological study as this was the focus of the thesis. The results from the study development and adaptation of the survey running in Austria could be found in the Appendix F and G.

4. 1. Prevalence Survey Results

Through contact with various Parkinson’s organizations, doctors, and practitioners, the prevalence study ran from April 24, 2021, to April 30, 2022, and successfully gathered 34 persons with a self-reported PD diagnosis. Nearly 73.5% of participants reported felt or noticed a change in their creativity related to their PD

diagnosis, and 26.5% of participants reported not felt nor noticed creativity changes related to their PD diagnosis.

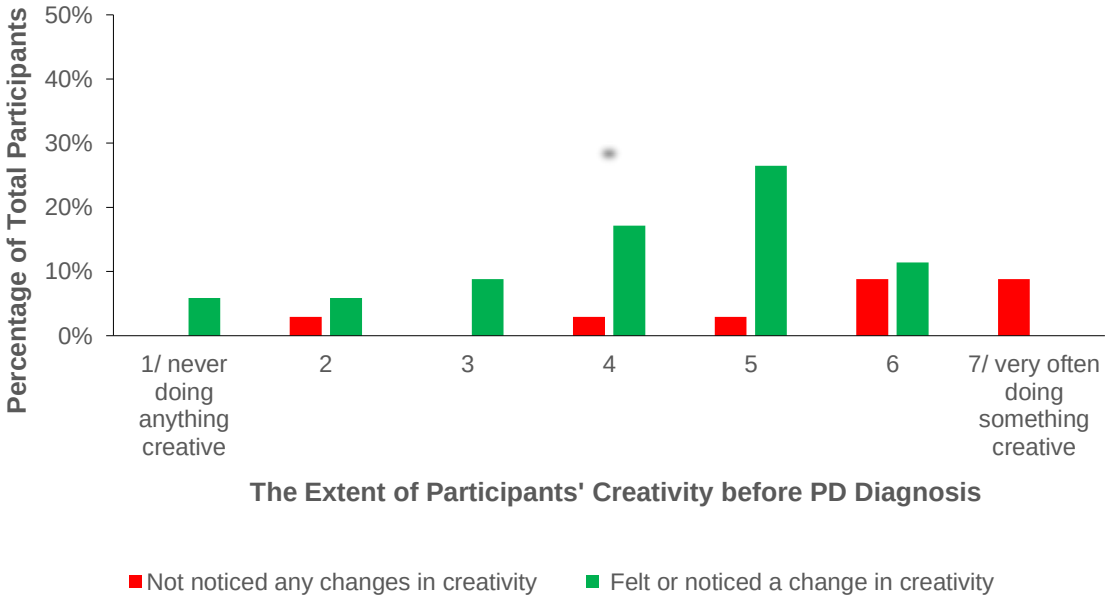
Further, these participants were asked to rank their creativity on a scale of 1 (never doing anything creative) to 7 (very often doing something creative) before their PD diagnosis. There were 5.88% of the total participants chose scale number 1 to report the extent of their creativity before PD diagnosis who also reported noticing a change in their creativity related to PD. Meanwhile, nearly 26.47% of total participants chose scale number 5 to report the extent of their creativity before their PD diagnosis who also reported noticing a change in their creativity related to PD.

There were at least 8.82% of total participants who chose the highest scale (number 7) who also reported not noticing any changes in creativity related to PD. However, there was no participant who chose scale number 1 who also reported not noticing any changes related to PD. As seen in Figure 1, 8.82% of total participants chose scale number 6 and 7 to report their creativity before their PD diagnosis who also reported not noticing any changes in creativity related to PD.

As the gathered sample size by the end of the data collection phase for this thesis was considered small, no further statistical analysis was performed. Hence, this thesis remained at a purely descriptive level.

Figure 1

Crosstabulation between participants who noticed changes in their creativity related to PD and people who were actively creative before PD



Note. N = 35 (as of April 30, 2022, data collection is still running). Participants reported the extent of their creativity before PD on a 7-point Likert scale. Point 1 refers to never doing anything creative and point 7 refers to very often doing something creative.

From the initial short survey, 94.11% (*n* = 32) of the total participants registered an interest in participating in the main survey. From this percentage, 73.53% (*n* = 25) also reported noticing changes in their creativity in relation to PD. Of these 25 participants, 13 of them participated in the main survey. From the group of participants who registered their interest in joining the main study, 20.59% (*n* = 7) reported not noticing any changes in their creativity in relation to PD; all seven participants ended up participating in the main survey. Out of the 20 main survey participants, only data from 19 participants could be analyzed, as one participant who used the paper version only answered approximately half the questions.

4. 2. Main Survey Results

4. 2. 1. Social Demographics

Participants of this epidemiological study (the main survey) were 73.7% female and 26.3% male. Most of the participants (around 63.2%) were married, the rest participants had diverse marital statuses, including living together with their partner (around 10.5%), single or unmarried (around 10.5%), divorced (around 5.3%), widow/widower (around 5.3%), and/or in partnership but not living together with their partner (around 5.3%).

Most of the participants (nearly 47.5%) were 60-69 years old, around 42.2% were older than 70 years old, 5.3% were 50-59 years old, and around 5.3% under 40 (*M* = 66.68, *SD* = 11.255). Around 47.6% of participants reported onset of PD symptoms when they were 50-59 years old., around 26.4% at 60-69 years old, around 10.6% at older than 70, around 10.6% at younger than 50, and 5.3% when they were under 40 years old (*M* = 55.84, *SD* = 10.388). However, the participants reported receiving their PD diagnosis on average no earlier than five years after symptom onset (*M* = 61.28, *SD* = 8.574). Around 42.2% of participants reported getting diagnosed at 60-69 years old, 31.6% at 50-59 years old, 15.9% when they were older than 70, and 5.3% when they were younger than 50. There was only one participant who did not report their age at diagnosis.

With regards to the ethnicity of participants, from the seven options given (Austrian, German, Czech, Hungarian, Slovenian, others, and not applicable), 94.7% were reported to be Austrian and 5.3% Czech.

Regarding occupation, 78.9% of participants were retired, while the rest had different current occupation statuses between full-time employment, self-employment, part-time employment, and no employment.

None of the participants reported having no education. Of the total participants, 31.2% graduated from university, 21.1% graduated from a professional high school (*berufsbildende höheren Schule*), and the rest graduated from secondary vocational education (*beruflichen Ausbildungslehrgänge*), Austrian secondary school (*Hauptschule, Gymnasium*), various academies, and/or technical schools.

4. 2. 1. 1. Creative/art Education Status as Socio-demographic Characteristics Was Explored. Besides asking the participants' highest general education status, this epidemiological study also inquired about the creative/art education level of participants. From these options, most of the participants reported having no fine arts theoretical education (78.9%), no art history education (78.9%), no practical arts education (73.7%), and no other kind of art education (78.9%). Only 5.3% of participants reported having a finished study degree in theoretical fine arts, art history, or practical arts. The rest of the participants reported having several courses (as education, professional) in art history, several courses (as a hobby) in practical arts, and several courses (as a hobby).

More detailed information about the socio-demographics of the survey participants was available in Appendix B.

4. 2. 2. The Reported Creativity Changes in Persons with PD

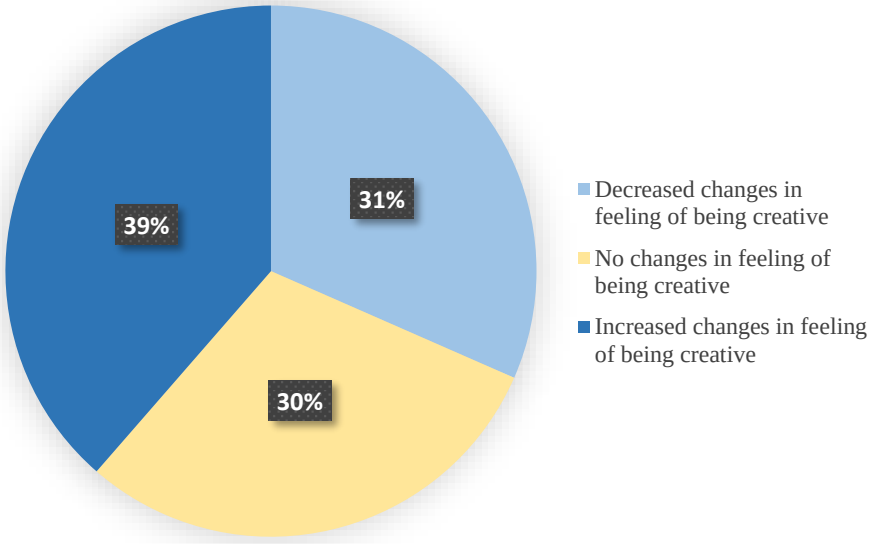
The participants were asked to rank the changes both in their feeling of being creative and their creative expression (i.e., actual producing creative products and/or actual creative activities) for three timepoints. As mentioned in section 3, the participants were asked to rank the changes in both the feeling of being creative and creative expression with a slider or by placing a cross in boxes, both of which had 11 scale differences (point -5 to point 5) (see Appendix E). Points -1 to -5 were analyzed as decreased changes, point 0 was analyzed as no change, and points 1 to 5 were analyzed as increased changes. Therefore, participants who chose any point from -1 to -5 were registered as a group of participants who reported decreased changes. Participants who chose any point from 1 to 5 were registered as a group of participants who reported increased changes. Participants who chose point 0 were registered as a group of participants who reported no change.

Figure 2 below showed that out of 57 responses (participants' answers through three timepoints: (1) pre-diagnosis timepoint, (2) post-diagnosis timepoint,

and (3) current timepoint), around 39% reported increased changes in the feeling of being creative, 31% reported decreased changes, and 30% reported no change.

Figure 2

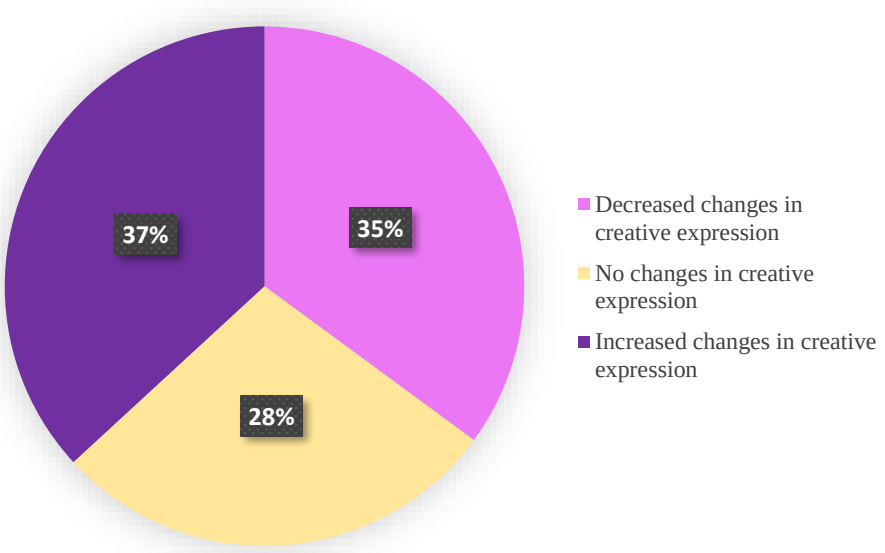
*Participants reported changes in their feeling of being creative (*N = *19)*



The changes in creative expression (i.e., actual producing creative products and/or actual creative activities) were reported slightly differently. As seen in Figure 3, the increased changes in creative expression were around 37% of the total responses. This was around 2% less than the reported increased changes in the feeling of being creative. Furthermore, around 35% of the responses reported decreased changes in creative expression, around 4% more than the reported decreased feeling of being creative. Consequently, around 28% of total responses reported no change in creative expression, around 2% less than the reported no change in feelings of being creative.

Figure 3

*Participants reported changes in their creative expressions (i.e., actual producing creative products and/or actual creative activities) (*N = *19)*



Below, reported changes in both the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) within each timepoint were explored in greater detail. In the following section, the terms “pre-diagnosis timepoint”, “post-diagnosis timepoint”, and “current timepoint” were used. Pre-diagnosis reffered to the time when participants noticed their PD symptoms but had not yet received a diagnosis. Post-diagnosis reffered to the time after participants received their PD diagnosis. Current timepoint reffered to the three months period prior to the survey being conducted.

4. 2. 3. Changes in the Feeling of Being Creative

As seen in Table 1, on average, participants reported slightly decreased changes in the feeling of being creative at the pre-diagnosis timepoint (*M* = -.05, *SD* = 1.96). The feeling of being creative was reported to have no changes at this timepoint by nearly 47.4% of participants. Around 26.8% of participants reported a decreased feeling of being creative, and around 21.1% of participants reported an increased feeling of being creative.

The changes in the feeling of being creative at the post-diagnosis timepoint were reported differently by the participants. Participants on average, reported increased changes after getting diagnosed (*M* = .58*, SD* = 2.22*)*. From the total number of participants, around 47.4% reported that their feeling of being creative increased, 26.3% reported a decrease, and the remaining 26.3% reported no change.

On average, participants reported a slight increase at the current timepoint (*M* = .47*, SD* = 2.59*)*. However, this change was only slightly different from the reported

change at the earlier timepoint (post-diagnosis). The increased changes in the feeling of being creative were reported by around 47.4% of total participants for this timepoint, while 36.8% of participants reported decreased changes and, only 15.8% of participants reported no changes.

Table 1

*Reported changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) at the pre-diagnosis timepoint, post-diagnosis timepoint, and current timepoint (*N = *19).*

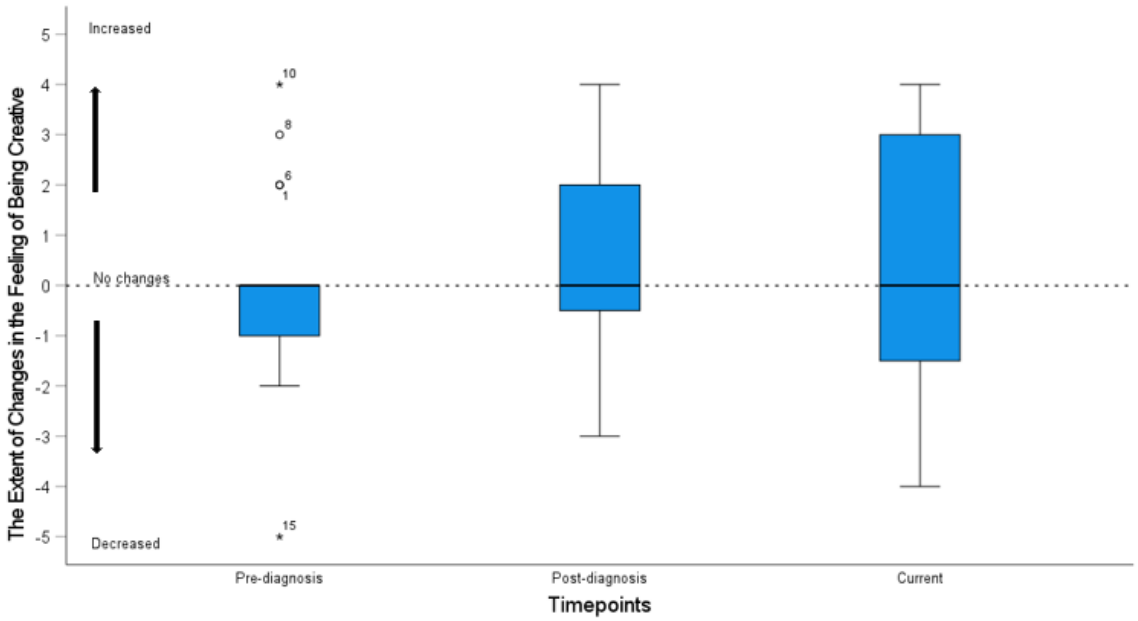
	Pre-diagnosis		Post-diagnosis		Current	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Change in the feeling of being creative	-.05	1.96	.58	2.22	.47	2.59
Change in creative expression (i.e., actual producing creative products and/or actual creative activities)	-.37	1.83	.68	2.08	.05	2.74

Note. The changes in the feeling of being creative and creative expression were reported on an 11-point Likert Scale (paper version) and an 11-point slider (online version), with values from -5 to 5.

Figure 4 depicted how the reported changes in the feeling of being creative per timepoint were distributed. The median of the reported changes for every timepoint was all equal; however, the answers were distributed differently for each timepoint. The reported changes spread out as the timepoint moved from pre-diagnosis to current. At the pre-diagnosis timepoint, the reported changes had an extreme negative skewness. The upper limit of the reported changes at the pre-diagnosis timepoint was the upper limit of the interquartile, which was 0 (refers to no changes). The reported changes at the pre-diagnosis timepoint contained possible outliers from subjects no. 1, 6, 8, 10 (extremely high) and 15 (extremely low). The reported changes at the post-diagnosis timepoint were further spread out than at pre-diagnosis; however, the dispersion of reported changes at the current timepoint were even further spread out than both pre- and post-diagnosis. The reported changes at the post-diagnosis and current timepoints were positively skewed, whereas the changes at post-diagnosis were more positively skewed versus the current timepoint.

Figure 4

*Box plots of reported changes in the feeling of being creative (*N= *19) over three timepoints*



Note. Responses were reported on an 11-point Likert Scale (paper version) and 11-point slider (online version), with values from -5 to 5. Values from -1 to -5 refer to decreased changes. Value 0 refers to no change. Values from 1 to 5 refer to increased changes. The pre-diagnosis timepoint had possible outliers in subjects no. 1, 6, 8, 10, and 15.

4. 2. 4. Changes in Creative Expression (i.e., Actual Producing Creative Products and/or Actual Creative Activities)

At the pre-diagnosis timepoint, participants, on average, reported decreased changes in creative expression (*M* = -.37, *SD* = 1.83), as seen in Table 1. Around 36.9% of participants reported decreased changes in their creative expression pre-diagnosis, 42.1% reported no change, and 21.1% reported increased changes.

Table 1 also showed that at the post-diagnosis timepoint, participants, on average, reported increased changes in their creative expression (*M* = .68*, SD*= 2.98*)*. Of the total participants, 52.6% reported increased changes in their creative expression post-diagnosis, 26.3% reported decreased changes, and 21.1% reported no change.

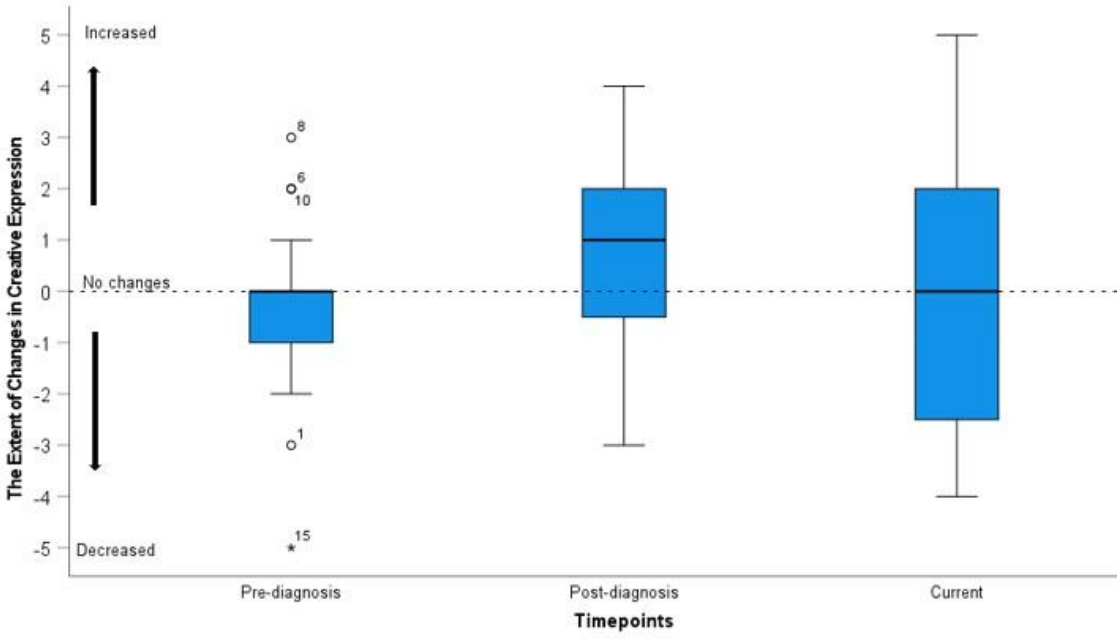
On average, the reported changes in creative expression at the current timepoint were slightly increased (*M* = .05, *SD* = 2.74). At the current timepoint, 42.2

% of total participants reported decreased changes in creative expression, 36.8% reported increased changes, and 21.1 % reported no change.

Figure 5 depicted how the reported changes in creative expression per timepoint were distributed. The median of the reported changes moved from point 0 at the pre-diagnosis timepoint to point 1 at post-diagnosis, and moved back to point 0 at the current timepoint. The reported change at pre-diagnosis had extreme negative skewness, and the median was probably identical to the lower quartile. The reported change at the pre-diagnosis timepoint contained possible outliers from subjects no. 1, 15 (extremely low), 6, 8, and 10 (extremely high). The reported changes in creative expression spread out as the timepoint moves from pre-diagnosis to the current timepoint. However, the reported changes at the post-diagnosis timepoint were negatively skewed, and the reported changes at the current timepoint were slightly negatively skewed.

Figure 5

*Box plots of reported changes in creative expression (i.e., actual producing creative products and/or actual creative activities) (*N = *19) over three timepoints*



Note. Responses were reported on an 11-point Likert Scale (paper version) and 11-point slider (online version), with values from -5 to 5. Values from -1 to -5 refer to decreased changes. Value 0 refers to no change. Values from 1 to 5 refer to increased changes.

4. 2. 5. Recollecting Reports at the Baseline Timepoint

As mentioned in Section 3, before participants were asked to rank the changes in their feeling of being creative and creative expression at the pre-diagnosis, post-diagnosis, and current timepoints, they were asked to rank their feeling of being creative and creative expression at the baseline timepoint.

Table 2 described the number of participants who reported at each scale ranking for the baseline timepoint. On average, participants reported their feeling of being creative as quite highly creative (*M* = 7.79*, SD* = 2.39*)*. Similarly, on average, participants reported their creative expression as quite often/often doing something creative (*M* = 8.00*, SD* = 2.30*)*.

Table 2

*Reported feeling of being creative and creative expression at the baseline timepoint (*N = *19)*

Baseline timepoint: before PD symptoms appeared				
Scale	Feeling of being creative		Creative expression (i.e., actual producing creative products and/or actual creative activities)	
	n	*%*	*n*	*%*
1 (not at all creative/never doing anything creative)	1	5.3	-	-
2	-	-	1	5.3
3	-	-	-	-
4	1	5.3	1	5.3
5	-	-	-	-
6	2	10.5	2	10.5
7	2	10.5	1	5.3
8	7	36.8	7	36.8
9	-	-	1	5.3
10	5	26.3	4	21.1
11 (highly creative/very often doing something creative)	1	5.3	2	10.5

Note. Answers were reported on an 11-point Likert scale, from value 1(not at all creative/never doing anything creative) to 11 (highly creative/very often doing something creative). Participants reported their feeling of being creative as an average of 7.79 (*SD* = 2.39) and their creative expression as an average of 8.00

points (*SD* = 2.30). (-) indicates that scale number was not chosen by any of the participants.

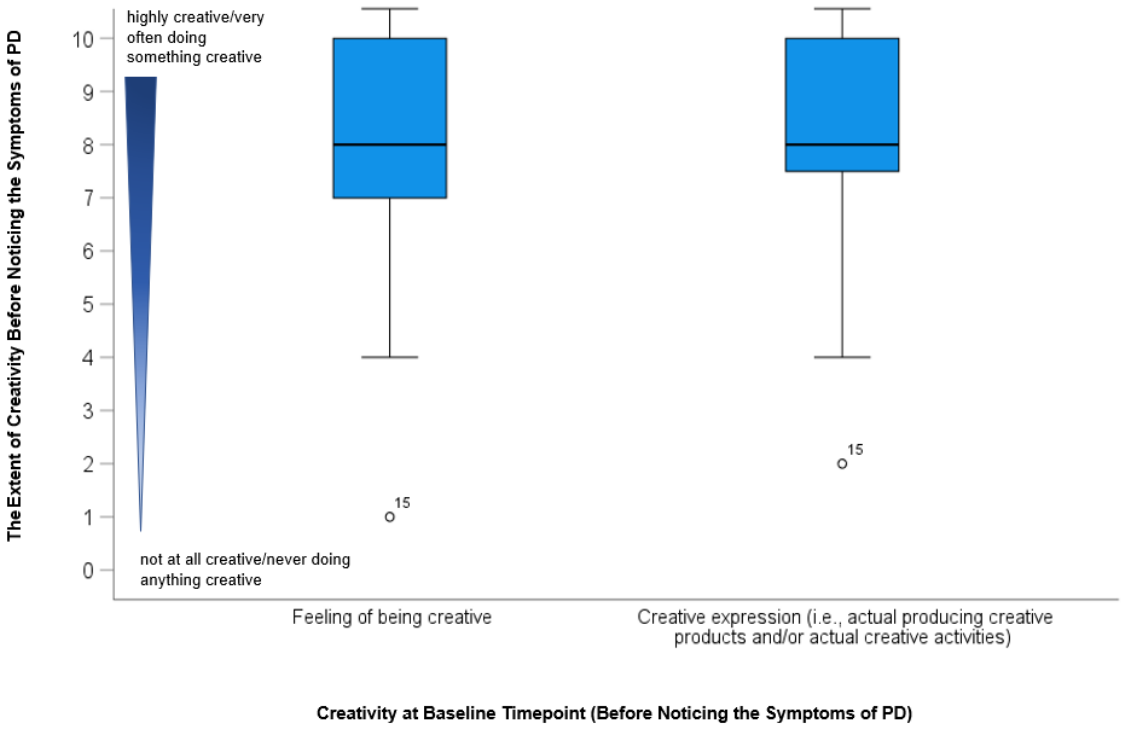
Figure 6 depicted the distribution of reported feelings of being creative and creative expression. The median for both plots was equal, and both had positive skewness. However, the reported creative expression was more positively skewed than the reported feeling of being creative.

The “feeling of being creative” section in Figures 4 and 6 showed that the reported changes decreased quite remarkably at the pre-diagnosis timepoint. It then increased quite drastically at the post-diagnosis timepoint, and further increased at the current timepoint. However, it did not retain the same skewness at the baseline timepoint.

The “creative expression” section in Figures 5 and 6 illustrated that the reported creative expression decreased quite significantly at the pre-diagnosis timepoint. It then increased at the post-diagnosis timepoint, and slightly decreased at the current timepoint.

Figure 6

*Box plots of the reported feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) at the baseline timepoint (*N = *19)*



4. 2. 6. Reported Creativity Changes in Relation with Creativity/Art Education Characteristic

As described in Section 4.2.1.1, the creative/art education background of our participants was investigated. Further, I explored the reported changes in feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) for each investigated creative/art education background: (1) theoretical education in the field of fine arts, (2) education in art history, (3) practical education in arts, and (4) other kinds of education in the arts. Here, I differentiated between participants who took no course at all and participants who took at least a few (max. 3) courses of each type of creative/art education (see Section 4. 2. 1. 1. for more detailed answer options for each type of creative/art education). Moreover, the reported changes in feeling of being creative and creative expression were calculated over three time periods, as calculated and reported in Section 4. 2. 2. Detailed explorations covered in Appendix C.

4. 2. 6. 1. The Reported Creativity Changes from Participants Who Reported of Having No Education from Any Type of Creative/Art Education Were Explored. Participants who reported having no theoretical education in the field of fine arts (*n* = 15) reported the changes between the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) differently. Participants in this group reported more decreased changes in creative expression (i.e., actual producing creative products and/or actual creative activities) (36%) than in the feeling of being creative (31%). On the other hand, the increased changes in feeling of being creative (38%) were reported more than increased changes in creative expression (i.e., actual producing creative products and/or actual creative activities) (35%) by participants from this group. Further, more participants in this group reported no changes in feeling of being creative (31%) than in creative expression (i.e., actual producing creative products and/or actual creative activities) (29%).

Participants who reported having no education in art history (*n* = 15) reported more increased changes in feeling of being creative (36%) compared to creative expression (i.e., actual producing creative products and/or actual creative activities) (33%). Meanwhile, participants from this group reported more decreased changes in creative expression (i.e., actual producing creative products and/or actual creative activities) (36%) than in the feeling of being creative (31%). Nevertheless, no changes in feeling of being creative (33%) were reported more than in creative expression (i.e., actual producing creative products and/or actual creative activities) (31%).

Participants who reported having no practical education in arts (*n* = 14) stated more increased changes in feeling of being creative (36%) than in creative expression (i.e., actual producing creative products and/or actual creative activities) (34%). Meanwhile, the decreased changes in creative expression were reported more than in the feeling of being creative by this group of participants. Participants from this group stated more no changes in feeling of being creative (36%) than in creative expression (i.e., actual producing creative products and/or actual creative activities) (33%).

Participants who reported having no other kinds of education in the arts (*n* = 15) expressed more increased changes in feeling of being creative than in creative expression (i.e., actual producing creative products and/or actual creative activities). Similarly, there were more reports of having no changes in feeling of being creative (33%) compared to no changes in creative expression (i.e., actual producing creative products and/or actual creative activities) (31%). Further, participants from this group expressed more decreased changes in creative expression (i.e., actual producing creative products and/or actual creative activities) than in the feeling of being creative.

4. 2. 6. 2. The Reported Creativity Changes from Participants Who Reported of Having at Least a Few (max. 3) Courses of Any Type of Creative/Art Education Were Further Explored. Participants who had any theoretical education in the field of fine arts (*n* = 4) expressed more increased changes in feeling of being creative (42%) than in creative expression (i.e., actual producing creative products and/or actual creative activities) (25%). In contrast, these participants had more decreased changes in creative expression (i.e., actual producing creative products and/or actual creative activities) were reported more (50%) than in feeling of being creative (33%).

Meanwhile, the group of participants who enjoyed any education in art history (n= 4) reported increased, decreased, and no changes in feeling of being creative as much as 50%, 33%, and 17%, respectively. This proportion was the same as the proportion of increased, decreased, and no changes in creative expression (i.e., actual producing creative products and/or actual creative activities).

The group of participants who enjoyed practical education in arts (n=5) had a similar proportion percentage of increased, decreased, and no changes in feeling of being creative and in creative expression (i.e., actual producing creative products and/or actual creative activities) as the proportion of those who enjoyed education in art history. The percentage values were 47%, 40%, and 13%, respectively.

The group of participants who had any other art education (*n* = 4) reported increased, decreased, and no changes in the feeling of being creative by 42%, 42% and 16%, respectively. This proportion is similar to the increased, decreased, and no changes in creative expression (i.e., actual producing creative products and/or actual creative activities).

4. 2. 7. Reported Frequencies of Activities in Nine Creative Domains

The frequency of activities in nine creative domains at every timepoint was observed. As the ICAA scale was used, the participants reported their frequency of conducting activities in each creativity domain on a scale from 1 (never actually) to 5 (very often or almost every day). Table 3 described the reported occurrence of activity in each creative domain for all four timepoints. The interior and garden design domain had the highest reported frequency at all timepoints: baseline (*M* = 3.37*, SD* = 1.21*)*, pre-diagnosis (*M* = 3.11, *SD* = 1.11), post-diagnosis (*M* = 3.16, *SD* = .90), and current (*M* = 3.00, *SD* = 1.05), with slightly decreasing frequency. The handicraft domain had nearly the same frequency as the pre-diagnosis timepoint at the baseline timepoint (*M* = 3.16, *SD* = 1.43) as its frequency decreased at pre-diagnosis (*M* = 3.05*, SD* = 1.22*),* increased at post-diagnosis (*M* = 3.11*, SD* = 1.20), and decreased at the current timepoint (*M* = 2.90*, SD* = 1.37*)*. The music domain had the lowest reported frequency at the baseline (*M* = 1.78*, SD* = 1.22*)* and pre-diagnosis (*M* = 1.62*, SD* = 1.20) timepoints*.* The science/technology domain had the lowest reported frequency at the post-diagnosis (*M* = 1.56, *SD* = .92) and current (*M* = 1.72*, SD* = 1.13) timepoints.

As shown in Table 3, participants also had the chance to select “I do not know” if they could not report how often they were active in each creative domain for each timepoint. In almost every creative domain, at least 5% of the participants selected “I do not know” (see Appendix B); therefore, the number of participants for each creative domain was not identical to the total number of survey participants. The only two creativity domains where every participant could report their activity level at every timepoint were the handicraft and interior/garden design domains; therefore, the domain participants were equal to the total number of survey participants. Every scale point (from 1 to 5) was reported by at least 5% of the participants for each timepoint in every creativity domain except for the performing arts domain. In performing arts domain, there were no participants reported scale point 5 (very often/every day) at any timepoints. The scale point 1 (never actually), however, was reported only at the pre-diagnosis timepoint by nearly 5% of the participants; no participants reported this scale point at any other timepoints.

Each reported occurrence for every creativity domain at all four timepoints was depicted in a series of graphs in Appendix D, which also included the relevant participant percentages.

Table 3

Reported occurrences of activities in nine creativity domains at four timepoints (baseline, pre-diagnosis, post-diagnosis, and current)

Domains of creativity	Baseline			Pre-diagnosis			Post-diagnosis			Current		
	M	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*
Music (composing or adapting melodies)	1.78	1.22	18	1.62	1.20	18	1.78	1.11	18	1.82	1.43	17
Handicraft (making own cards, cloths, bags, etc.)	3.16	1.43	19	3.05	1.22	19	3.11	1.20	19	2.90	1.37	19
Interior and garden design (designing/embellishing one's living space)	3.37	1.21	19	3.11	1.10	19	3.16	.90	19	3.00	1.05	19
Creative cooking (creative novel dishes/ drinks)	2.72	1.36	18	2.61	1.15	18	2.83	1.34	18	2.56	1.25	18
Visual art (drawing, creative photography, sculpturing, etc.)	2.22	1.11	18	2.28	1.23	18	2.44	1.29	18	2.44	1.42	18
Performing art (playing theater, dance, etc.)	2.00	1.09	18	1.94	1.11	18	2.11	1.23	18	1.94	1.21	18
Science/ technology (solving technical problems, computer programming, etc.)	2.00	1.33	18	2.00	1.37	18	1.56	.92	18	1.72	1.13	18
Social (inventing games, organizing parties, etc.)	2.50	1.15	18	2.39	1.20	18	2.39	1.15	18	2.22	1.17	18

Domains of creativity	Baseline			Pre-diagnosis			Post-diagnosis			Current		
	M	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*
Literature (writing texts, blogs, poems, etc.)	1.83	1.20	18	1.67	.97	18	2.00	1.41	18	2.17	1.58	18

Note. Answers were reported on a 5-point Likert scale. In the survey, there was the possibility for the participants to report “I do not know”, which was counted as a missing answer. Due to this possibility, the number of participants differed for each domain.

4. 2. 8. Self-Reported Causes Behind the Changes in Creativity

After focusing on whether the changes in creativity occurred in the survey participants, this section explored the putative reasons behind the changes in creativity. Table 4 reported the 12 motivational factors, ranked from the most to least chosen by participants. Four factors were chosen by more than 50% of the participants: “the activity gives me a rewarding feeling” (chosen by 73.7% of participants); “Interest in creating creative expressions or activities (also artistic) (as a hobby or professionally)” (chosen by 68.4% of participants); “Interest in creative expressions or activities (including artistic) in general” (chosen by 57.9% of participants); and “My own personal reaction to their living situation after diagnosis” (chosen by 57.9% of participants). The least chosen factor was “my DBS (Deep brain stimulation)”, which was only chosen by 5.3% of participants. As the current medication status was checked, there was actually no participant reported having had DBS procedure three months prior to the survey, which made the plausibility of the reported factor “my DBS (Deep brain stimulation)” questionable.

A more in-depth examination was conducted to specifically analyze the factor “Parkinson’s medication”. Interestingly, this option was chosen by only 15.9% of participants, in which they could write any PD medication that they thought had an influence on their creativity. Following the participants’ medication status (three months prior to the survey) examination, there were 73.7%, 57.9%, 21.1%, and 21.1% of participants reported taking DA agonist, levodopa, MAO-B inhibitors, and Amantadine, respectively. Table 4 displayed the exact written text; all written in German. Only one PD medication was mentioned, “madopar”, one of the Austrian brand names for levodopa. The other written text for this option could not be matched with any brand names of PD medications available in Austria. I translated the other texts (two in total) into English: “kekse”, which means “cookies”; and “nein”, which means “no”.

In participants who chose “Parkinson’s medication” as at least one of their motivational factors behind their creativity changes, I explored the additional factors chosen by this group, which included at least two other factors besides “Parkinson’s medication”. Two out of the three total participants comprising this group chose the following additional factors: “The activity gives me a rewarding feeling”; “Interest in creating creative expressions or activities (also artistic) (as a hobby or professionally)”; “Recommendation by friends and/ or family”; and “my profession”. The other participant comprising this group chose “Interest in creative expressions or activities (including artistic) in general” and “my DBS”. Interestingly, the participant who chose “The activity gives me a rewarding feeling” also chose “Interest in creating creative expressions or activities (also artistic) (as a hobby or professionally)” and “my profession”.

Apart from the 12 hard-coded options, survey participants could also express an alternative factor in the free text section. This option was used by 10.6% of the participants, whose full answers are shown in Table 7. Both answers were written in German, which were translated into English by this thesis author. “Eine positive Lebensführung als nicht-medikamentöse Unterstützung bei der P.- Behandlung, die auch das sozialen Umfeld erfreut und verbessert.EXTREM WICHTIG: gemeinsam SINGEN!” was translated as “A positive lifestyle as non-drug support for P. treatment, which also pleases and improves the social environment. EXTREMELY IMPORTANT: SINGING together”. “Es macht mich einfach glücklich!” was translated as “It just makes me happy!”.

In this survey section, there were no participants who chose every single option at the same time, but all participants chose at least one option.

Table 4

*Self-reported motivational factors behind the any creativity changes related to PD (*N = *19)*

Motivational factors	*n*	*%*
The activity gives me a rewarding feeling	14	73.7
My interest in creating creative expressions or activities (also artistic) (as a hobby or professionally)	13	68.4
My interest in creative expressions or activities (including artistic) in general	11	57.9
My own personal reaction to their living situation after diagnosis	11	57.9
My increased amount of free time	8	42.1
My therapies	7	36.8
Consequences of the disease	7	36.8
My professions	5	26.3
Recommendation by friends and/ or family	4	21.1
Parkinson`s medication	3	15.9
Recommendation by doctor, therapist and/or nurse	2	10.5

Motivational factors	*n*	*%*
My DBS (Deep Brain Stimulation)	1	5.3

Table 5

*Self-written text for those participants that chose "Parkinson's medication" as at least one of the motivational factors (*N = *19)*

Motivational factors	Quoted free text answer	Frequency, *n* (%)
Parkinson's medication	"kekse"	1 (5.3%)
	"madopar"	1 (5.3%)
	"nein"	1 (5.3%)

Table 6

Other motivational factors also chosen by participants who chose "Parkinson's medication" as one of factors behind the change in their creativity

Motivational factors	*Subject no. 1*	*Subject no. 4*	*Subject no. 6*
The activity gives me a rewarding feeling	-	✓	✓
My interest in creating creative expressions or activities (also artistic) (as a hobby or professionally)	-	✓	✓
My interest in creative expressions or activities (including artistic) in general	-	-	✓
My own personal reaction to their living situation after diagnosis	-	-	-
My increased amount of free time	-	-	-
My therapies	-	-	-
Consequences of the disease	✓	-	-
My professions	-	✓	✓
Recommendation by friends and/ or family	✓	✓	-

Motivational factors	*Subject no. 1*	*Subject no. 4*	*Subject no. 6*
Recommendation by doctor, therapist and/or nurse	-	-	-
My DBS (Deep Brain Stimulation)	✓	-	-

Note. (-) indicates that factor was not chosen by the subject. (✓) indicates that factor was chosen by the subject.

Table 7

*Other motivational factors written in free text (*N = *19)*

Motivational factors	Quoted free text answer	Frequency, *n* (%)
Others, namely	"Eine positive Lebensführung als nicht-medikamentöse Unterstützung bei der P.-Behandlung, die auch das sozialen Umfeld erfreut und verbessert.EXTREM WICHTIG: gemeinsam SINGEN!"	1 (5.3%)
	"Es macht mich einfach glücklich!"	1 (5.3%)

4. 2. 9. Possible Relation Between PD Medication and Creativity Changes

In order to discover a possible relation between PD medication and creativity changes, the group of participants who reported changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities), who also took PD medication in the same timepoint, were further analyzed. Two timepoints were investigated: post-diagnosis and current. In the survey, participants had the possibility to choose at least one PD medication (with the Austrian brand name). I grouped PD medication types listed by participants. For example, participants who chose Madopar and/or Duodopa were grouped into the Levodopa group, and participants who chose APO-go and/or Neupro were grouped into the DA agonist group.

Table 8 showed the participants who reported increased changes in the feeling of being creative and/or creative expression and their medication intake at the post-diagnosis timepoint (the first three months after diagnosis).

There were nine participants who reported increased changes in the feeling of being creative at the post-diagnosis timepoint. Most of these participants (around 88.9%) reported taking DA agonists, while around 33.3% reported taking levodopa.

At the post-diagnosis timepoint, there were 10 participants who reported increased changes in their creative expression (i.e., actual producing creative products and/or actual

creative activities). From these participants, 90.0% reported taking DA agonists and 30.0% taking levodopa.

Table 8

*Reported medication intake by participants who reported increased changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) in the post-diagnosis timepoint (*N = *19)*

PD medication	Increased feeling of being creative (*n* = 9)		Increased creative expression (i.e., actual producing creative products and/or actual creative activities) (*n* = 10)	
	n	%	*n*	%
Levodopa	3	33.3	3	30.0
DA agonists	8	88.9	9	90.0
MAO-B inhibitors	1	11.1	2	20.0
COMT inhibitors	-	-	1	10.0
Parasympathicolytica	-	-	-	-
Cholinesterase inhibitors	-	-	-	-
Amantadine	-	-	-	-
Others: Bornaprine, Cabergoline	-	-	-	-

Note. The total number of participants who reported an increased change in the feeling of being creative in the post-diagnosis timepoint is nine. The total number of participants who reported an increased change in creative expression in the post-diagnosis timepoint is 10. Medications were reported via multiple-choice question in which participants were allowed to pick more than one option. (-) indicates that type of medication was not chosen by any of the participants.

Table 9 showed those participants who reported decreased changes in the feeling of being creative *(n* = 5*)* and creative expression (i.e., actual producing creative products and/or actual creative activities) *(n* = 5*)* at the post-diagnosis timepoint (the first three months after diagnosis). Levodopa appeared to be the medication taken by most of these participants (80.0%). The second most common medication was DA agonists (60.0%).

Table 9

*Reported medication intake by groups of participants reported decreased changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) in the post-diagnosis timepoint (*N = *19)*

PD medication	Decreased feeling of being creative (*n* = 5)		Decreased creative expression (i.e., actual producing creative products and/or actual creative activities) (*n* = 5)	
	n	%	*n*	%
Levodopa	4	80.0	4	80.0
DA agonists	3	60.0	3	60.0
MAO-B inhibitors	2	40.0	1	20.0
COMT inhibitors	1	20.0	-	-
Parasympathicolytica	-	-	-	-
Cholinesterase inhibitors	-	-	-	-
Amantadine	2	40.0	2	40.0
Others: Bornaprine, Cabergoline	-	-	-	-

Note. The total number of participants who reported a decreased change in the feeling of being creative in the post-diagnosis timepoint is five. The total number of participants who reported a decreased change in creative expression in the post-diagnosis timepoint is five. Medications were reported via multiple-choice question in which participants were allowed to pick more than one option. (-) indicates that type of medication was not chosen by any of the participants.

Table 10 listed those participants who reported no changes in the feeling of being creative (five participants) or creative expression (i.e., actual producing creative products and/or actual creative activities) (four participants) at the post-diagnosis timepoint (the first three months after diagnosis). Out of the participants who reported no changes in the feeling of being creative at the post-diagnosis timepoint, 80.0% of them reported taking DA agonists and around 20.0% of them taking levodopa. Out of the participants who reported no changes in creative expression at the post-diagnosis timepoint, 75% of them reported taking DA agonists and 25% of them taking levodopa.

Table 10

*Reported medication intake by groups of participants who reported no changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) at the post-diagnosis timepoint (*N *=19)*

PD medication	No changes in feeling of being creative (*n* = 5)		No changes in creative expression (i.e., actual producing creative products and/or actual creative activities) (*n* = 4)	
	n	%	*n*	%
Levodopa	1	20.0	1	25.0
DA agonists	4	80.0	3	75.0
MAO-B inhibitors	-	-	-	-
COMT inhibitors	-	-	-	-
Parasympathicolytica	-	-	-	-
Amantadine	1	20.0	1	25.0
Others: Bornaprine, Cabergoline	-	-	-	-

Note. The total number of participants who reported no change in the feeling of being creative in the post-diagnosis timepoint is five. The total number of participants who reported no change in creative expression in the post-diagnosis timepoint is four. Medications were reported via multiple-choice question in which participants were allowed to pick more than one option. (-) indicates that type of medication was not chosen by any of the participants.

At the current timepoint (the last three months until survey administration), shown in Table 11, there were nine participants who reported increased changes in the feeling of being creative. Out of these nine participants, around 77.8% reported having taken DA agonist, and around 55.6% having taken levodopa. At the current timepoint, there were seven participants who reported increased changes in creative expression. Out of these participants, around 85.7% of them reported having taken DA agonists, and around 57.1% having taken levodopa.

Table 11

*Reported medication intake by groups of participants who reported increased changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) at the current timepoint (*N =*19)*

PD medication	Increased feeling of being creative (*n* = 9)		Increased creative expression (i.e., actual producing creative products and/or actual creative activities) (*n* = 7)	
	n	%	*n*	%
Levodopa	5	55.6%	4	57.1%
DA agonists	7	77.8%	6	85.7%
MAO-B inhibitors	3	33.3%	2	28.6%
COMT inhibitors	1	11.1%	1	14.3%
Parasympathicolytica	-	-	-	-
Amantadine	1	11.1%	1	14.3%
Others: Bornaprine, Cabergoline	-	-	-	-

Note. The total number of participants who reported an increased change in the feeling of being creative in the current timepoint was nine. The total number of participants who reported an increased change in creative expression in the current timepoint was seven. Medications were reported via multiple-choice question in which participants were allowed to pick more than one option. (-) indicated that type of medication was not chosen by any of the participants.

At the current timepoint (the last three months until survey administration), there were seven participants who reported decreased changes in the feeling of being creative (Table 12). Most of them, around 71.4%, reported having taken DA agonist, around 57.1% having taken levodopa. At the current timepoint, out of the eight participants who reported decreased changes in creative expression, around 62.5% reported taking DA agonist, and 50.0% taking levodopa.

Table 12

*Reported medication intake by groups of participants who reported decreased changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) at the current timepoint (*N =*19)*

PD medication	Decreased feeling of being creative (*n* = 7)		Decreased creative expression (i.e., actual producing creative products and/or actual creative activities) (*n* = 8)	
	n	%	*n*	%
Levodopa	4	57.1%	4	50.0%
DA agonists	5	71.4%	5	62.5%
MAO-B inhibitors	-	-	-	-
COMT inhibitors	-	-	-	-
Parasympathicolytica	-	-	-	-
Cholinesterase inhibitors	-	-	-	-
Amantadine	2	28.6%	2	25.0%
Others: Bornaprine, Cabergoline	-	-	-	-

Note. The total number of participants who reported a decreased change in the feeling of being creative in the current timepoint was seven. The total number of participants who reported a decreased change in creative expression in the current timepoint was eight. Medications were reported via multiple-choice question in which participants were allowed to pick more than one option. (-) indicated that type of medication was not chosen by any of the participants.

Table 13 showed the participants who reported no changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) at the current timepoint (the last three months until survey administration). Out of the three participants who reported no change in the feeling of being creative, around 66.7% reported taking DA agonist and levodopa, respectively. At the current timepoint, four participants reported no changes in creative expression (i.e., actual producing creative products and/or actual creative activities). Out of these participants, 75% reported taking levodopa and DA agonist.

Table 13

*Reported medication intake by groups of participants who reported no change in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) in the current timepoint (*N *=19)*

PD medication	No change in the feeling of being creative (*n* = 3)		No change in creative expression (i.e., actual producing creative products and/or actual creative activities) (*n* = 4)	
	n	%	*n*	%
Levodopa	2	66.7	3	75.0
DA agonists	2	66.7	3	75.0
MAO-B inhibitors	1	33.3	2	50.0
COMT inhibitors	-	-	-	-
Parasympathicolytica	-	-	-	-
Cholinesterase inhibitors	-	-	-	-
Amantadine	1	33.3	1	25.0
Others: Bornaprine, Cabergoline	-	-	-	-

Note. The total number of participants who reported no change in the feeling of being creative in the current timepoint was three. The total number of participants who reported no change in creative expression in the current timepoint was four. Medications were reported via multiple-choice question in which participants were allowed to pick more than one option. (-) indicated that type of medication was not chosen by any of the participants.

5. Interpretation and Discussion

5. 1. Reported Changes in Creativity Related to PD and History of Being Creative Before PD Diagnosis

Almost three-quarters of the prevalence study participants (73.5%) noticed changes in their creativity related to PD. This percentage of participants reported varied responses on their creative experience before PD, ranging from 1 to 7 (see Figure 1).

No participant from the group who reported changes in creativity related to PD (see green bars in Figure 1) selected scale number 7. The highest percentage of this group selected scale number 5 (moderately often doing something creative), which was nearly 27% of participants. It could be interpreted that one third of participants who reported noticing changes in creativity related to PD practiced creativity moderately often before PD. The

highest selected frequency was at scale number 6 (a high frequency of creative activity), which was only reported by slightly more than 10% of participants. This suggested that only slightly more than 10% of participants who noticed changes related to PD also often conducted creative activities before receiving a PD diagnosis. It is also possible that there is an alternate interpretation in which the participants had at least practiced or performed some type of creativity before getting diagnosed with PD. Nevertheless, this group of participants was not one with much experience in creativity/art.

Next, the group of participants who reported no changes in creativity related to PD, shown in Figure 1 by the red bars, which was around 26.5% of total participants, was analyzed. No participant in this group selected either scale number 1 or 3. The largest percentage of this group selected scale numbers 6 and 7, almost 10% each. It was likely that the combined participants (around 20%) had often and/or very often practiced creativity before PD. Further, in the group of participants who reported no changes in creativity related to PD, around 5% of participants selected scale number 4 and 5, respectively. This might indicate that around half of the participants who did not notice any creativity changes related to PD had often or very often conducted creative/art activities before PD. Therefore, around half of this group of participants could be considered as highly experienced people in the field of creativity/art.

Seven participants who reported not having any creativity change related to PD joined the main survey, making up around 37% of the total main survey's participants (see Figures 2 and 3, $N = 19$). Of 57 responses (participants were asked through three timepoints) of main survey's participants, 30% reported no changes in feeling of being creative, and 28% reported no changes in creative expression (i.e., actual producing creative products and/or actual creative activities) (see Figures 2 and 3). If we assumed that seven participants from prevalence survey, who did not notice any creativity changes related to PD, to select the same response (i.e., reporting no creativity changes in their creativity) in the main survey, the percentages of reported no changes (in feeling of being creative and creative expression) in the main survey would be 36%, which is more than the number reported in the main survey. This discrepancy may be caused by changed responses as the participants were asked to give a response over three timepoints. One or two participants from this group might change their previous report in the prevalence survey (of having no creativity changes) because they could finally recollect their memory over pre-diagnosis, post-diagnosis, and current timepoints.

5. 2. Comparison of the Austrian Epidemiology Study Results to Similar Studies

This epidemiological study is a brand-new tool applied in Austria and other German-speaking populations of PD patients. The prevalence study, which was conducted in Austria

until April 30, 2022, gathered participants by spreading the newsletter, email, and other digital communication through currently accessible, scattered Parkinson's organizations, associations, practitioners, and doctors for almost one year. By the time this study was designed (adapted) for use in Austria, the prospective cohort was yet to be available. Therefore, it is useful to compare these results to the prevalence study survey where the original study cohort has been established (i.e., the Netherlands study).

Although the present prevalence study survey was adapted from the one in the Netherlands, the PD patients cohort in Austria was differed from the one in the Netherlands. Both of these studies were conducted as a capsule survey, which ran via online and post. By June 2021, based on the interim report, the Dutch capsule survey had run for less than a year and gathered almost 40% of the target sample of 1,200 PD patients (344 participants). The interim report described that 30.52% of their participants reported noticing changes in creativity related to PD (Spee, 2021).

The Austrian prevalence study only reached one-tenth (34 participants) that of its predecessor study sample size despite having the longer duration than the Netherlands' capsule survey of nearly one year (April 2021-2022). The participants who reported noticing changes related to PD in Austria were around 73.5% of the total participants, while those who reported their creativity changes related to PD reached only around 4% that of its predecessor study sample size.

In a similar survey study conducted by Joutsa et al. (2012a), it was reported that around 19.3% of their total 280 participants had increased changes in artistic creativity related to PD, specifically after PD diagnosis, despite the issue of sample bias. This study was conducted via post with their previous study participants who were willing to participate in further studies (296 patients returned the survey). These participants had been featured in a previous study to assess impulse control and depression in Finnish PD patients (Joutsa et al., 2012b). Compared to Joutsa et al. (2012a), the Dutch study succeeded in reaching more PD patients, and reported around 11% more patients noticing creativity changes related to PD. The number of Austrian prevalence study participants, who reported their creativity changes related to PD, reached only around 8% that of the study sample size by Joutsa et al. (2012a). Meanwhile, the number of epidemiology study participants in Austria has only reached around 11% of the total participants in the Joutsa et al. (2012a) study.

The goal of this comparison is not to compare participant numbers and percentages but illustrate how a similar study type with similar methods can produce different results with vastly different samples.

5. 3. Sample Bias

As discussed in Section 3, the prevalence survey of this epidemiological study was designed to address the issue of sample bias. The survey registration was open to all interested PD patients in Austria, whether they were creative persons and/or had perceived creative changes. With this type of open registration, the sample was not restricted to certain characteristics, for example, study participants with previous experiences from other similar study areas or interests.

The Austrian prevalence study survey succeeded in gathering 32 participants who were willing to participate in the main study survey. These participants did not come from a single cohort of PD patients, but from various Parkinson's organizations, associations, practitioners, and doctors throughout Austria. Of this number of interested participants, 20 patients effectively joined the main survey (although one of these participants had to be excluded from data analyses due to incomplete answers). In the end, a total of 19 participants of the main survey was collected and the data was further analyzed. When the responses to the two teaser questions in the prevalence study survey were re-examined, the responses suggested that the issue of sample bias had been avoided.

Out of 19 participants, 12 participants reported noticing changes in creativity related to PD and seven participants reported no change in the prevalence study. If these seven participants responded consistently in the main survey, the percentages of participants in Figure 2 and 3 would be different. The percentage of participants who reported no changes in feeling of being creative and creative expression should have been 36% for both instead of 30% and 28%, respectively. The difference is, however, relatively small, which did not give enough evidence to conclude sample bias. The reason why this difference occurred is discussed in Section 5.1.

The previous experiences in creativity/art activities before PD diagnosis among these 19 participants varied from never doing something creative to very often doing something creative, as shown in Figure 1. This shows that the participants in the Austrian epidemiology main study from April 2021-2022 did not appear to have certain characteristics in the field of creativity/art that could influence the results of the main study.

5. 4. Two Sides of Creativity: The Feeling of Being Creative and Creative Expression

In this epidemiological study survey, the participants were asked to differentiate and rate their creativity using two terms: the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities). This distinction was made based on the responses from PD patients in previous studies (or case studies) who often mixed these two sides of creativity when they reported their subjective creativity evaluations. As the distinction between what they feel (the feeling of being creative) and what they produce (creative expression) was deliberately asked, it was discovered that the feeling

and the expression were reported differently by PD patients. As shown in Figures 2 and 3, increased changes in the feeling of being creative were reported at a greater level than the increased changes in creative expression by the participants; the same phenomenon was also observed in those that reported no changes. On the other hand, participants reported more decreased changes in their creative expressions compared to their feeling of being creative.

The questions that arise from these findings are how and why the reported feeling of being creative and creative expression have not been reported as changing in the same trend by the participants. The first possible explanation would be the motoric and non-motoric limitations caused by PD. Motoric and non-motoric abilities are needed to express and/or produce creative work. The level of disability and difficulties with daily activities, including creative activities, could vary from one PD patient to another (see Section 2.2.) The motives and willingness to produce creative tasks seem to remain intact but are restricted by the PD symptoms themselves. Hence, the decreased change in creative expression was reported more often, whilst the decreased change in the feeling of being creative was reported less often by the participants.

The second possible explanation could be the understanding of the concept of creativity among the participants. The concept of creativity could be divided into four levels, as proposed by Kauffman and Begehetto (2009): mini-C, little-C, pro-C, and big-C. The concepts of pro-C and big-C levels of creativity, which were reserved for professional artists and/or people with expert levels of creativity, tend to be emphasized socially (Bendedek et al., 2020; Silvia, 2018). The mini-C and little-C levels of creativity represent individual creativity that could be valuable and meaningful, first for the individual (the creative) themselves and then possibly for others (Kaufmann & Beghetto, 2009). The concept of mini-C and little-C might not be understood or internalized by the study participants; therefore, the individual creativity that is meaningful or valuable for the creator themselves or only small numbers of people may not necessarily be reported by our study participants as their creative expression. Moreover, there is also a possibility that PD causes some motoric and/or non-motoric difficulties for participants to maintain their level of creativity. This idea has been considered because the reported feeling of being creative and creative expression at the baseline timepoint were on similar levels (see Table 2 and Figure 6). It is plausible that participants who practiced their creativity with, for example, a pro-C level of creativity before PD must lower their level of creative expression into little-C or mini-C after PD due to physical limitations. Since the participants might not be as familiar with mini-C and little-C, the changed level of creativity is not reported even though their creative expression still exists or is simply reported as decreased. Additionally, the same level of creative expression following PD diagnosis might not be achieved anymore, resulting possible false report.

Lastly, the familiarity of the study participants with more common creative activities, for example, painting, sculpturing, or singing, may affect the participants' answers. These creative activities are, however, related to the concept of big-C and pro-C (i.e., producing something that involves acclaim from others or impacts others with a certain level of achievement). Singing for other people or having their paintings displayed for others are some examples of activities which perceived by people who limits the concept of creativity only to pro-C or big-C. Furthermore, people who limit their concept of creativity only to a pro-C may find difficulty in reporting blog writing or individual poetry writing as creative expressions. This means that some creative domains, especially for everyday creativity, which might include individual creativity (e.g., writing poetry for oneself, writing a blog, etc.), have not yet been discovered or, rather, may be underestimated by the participants themselves. Thus, it could not be reported as creative expression in the study. This undiscovered creativity domain that is possible but not popular is discussed further in Section 5. 5.

5. 4. 1. Changes in Feeling of Being Creative and Creative Expression (i.e., actual producing creative products and/or actual creative activities) in Relation to Creative/Art Education Background

As presented in section 4. 2. 6, participants who enjoyed any creative/art education presumably reported the same changes, whether it was increased, decreased, or no changes, in both feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities), except for a group of participants who enjoyed theoretical education of fine arts (see Appendix B). Participants who had theoretical education in the field of fine arts seemed to report more decreased changes in creative expression (i.e., actual producing creative products and/or actual creative activities) than in the feeling of being creative. Overall, compared to increased and/or decreased changes in creative expression (i.e., actual producing creative products and/or actual creative activities) participants who enjoyed any creative/art education reported fewer to no changes both in the feeling of being creative and in creative expression (i.e., actual producing creative products and/or actual creative activities).

On the other hand, the group of participants who reported not having any creative/art education at all expressed their changes in feeling of being creative and in creative expression (i.e., actual producing creative products and/or actual creative activities) more dynamically. Roughly, the increased and no changes in feeling of being creative were reported more than in creative expression (i.e., actual producing creative products and/or actual creative activities).

It could be assumed that, despite the small number of participants, having creative/art education background presumably may regulate the creativity change, whether it is increased or decreased, and whether it is in the feeling of being creative or in creative expression (i.e., actual producing creative products and/or actual creative activities). It was possible, that the creative/art education background could be used as a reference if the changes in both feelings of being creative and in creative expression (i.e., actual producing creative products and/or actual creative activities) occurred. It is also possible to assume that having no creative/art education background may influence people to report their creativity changes, if any, more loosely. In a way, people might only guess the level of their creativity changes without really having any recollection of what level or what kind of creativity they perceived before the survey was conducted.

5. 5. The Unexplored Creativity Domain

Most studies exploring creativity reported on PD patients and visual art, either the creativity spontaneously enhanced or changes in artistic creativity, motivation, or style. Interestingly, in this epidemiological study, after the participants were asked to specifically rate their frequency of activities in nine creativity domains (music, handicraft, interior/garden design, creative cooking, visual arts, performing arts, science/technology, and social), the visual art creativity domain was not remarkably different when compared to the other domains (see Appendix D). On average, the participants reported engaging in visual art activities over the four timepoints only occasionally (once in a month) (see Table 3, for additional details, see Figure D5 in Appendix D). Handicrafts and interior/garden design activities have been conducted more frequently, reported as “regularly (about once in a month)” over the four timepoints by the participants (see Table 3, for additional details, see Figures D2 and D3 in Appendix D).

First, several sociodemographic characteristics of the participants must be examined, as it captured the whole picture of our cohorts and describe the influencing factors behind the phenomenon of creativity changes in PD patients in Austria. Most of the participants were female (73.7%), married (63.2%), or retired (78.9%). The highest education level of the participants (around 52.3%) is between university and professional high school (in German: *berufsbildende höhere Schule*). Furthermore, most of the participants (around 73.7%-78.9%) did not attend any art/creative education, whether for theoretical education in the field of fine art, an education in art history, a practical education in arts, or any other kind of education in arts. Overall, it can be inferred that most of the participants were in the phase of life where they enjoy their retirement time, having a partner in married life, had enjoyed a somewhat high education level in Austria, and were not in any creative/art area professionally. Nevertheless, they were somehow engaged in creative activities before PD onset (see

Figure 1), presumably as a hobby. By offering nine everyday creativity domains, these participants, who have existing sociodemographic characteristics background, had the opportunity to report other possible fields of creativity that have not been previously reported elsewhere.

In future epidemiology studies, more possible fields of creativity in relation to everyday creativity (Silvia, 2018) could be explored and made available for reporting in populations without special creative/art tendencies. Having more varied characteristics in the sample might yield different results, especially in the creativity domains.

5. 6. Timing of Creativity Changes in PD Patients

It is interesting to observe how, in this epidemiological study, the drastic changes both in the feeling of being creative and creative expression occurred in the pre- and post-diagnosis timepoints (see Figures 4 and 5).

A previous study by Shimura et al. (2012) reported that the feeling of being creative in PD patients had degenerated after PD diagnosis, which related to the patient's dissatisfaction with his inability to use his imagination in producing his usual type of painting, an abstract style. This dissatisfaction began six years before his PD diagnosis, including the last year when symptoms of a PD-related movement disorders started to appear (Lauring et al., 2019), where both his feeling of being creative and his creative expression of producing abstract style paintings decreased. Another PD patient in a case study by Kulisevsky et al. (2009), an amateur painter, reported that eight months before being finally diagnosed with PD (after presenting progressive resting tremor, rigidity, and bradykinesia of the left arm), he lost interest in painting. These reports about the timing before patients received PD diagnoses are consistent with the results of this epidemiological study, as the feeling of being creative and creative expression were reported as decreasing before PD diagnosis (see Table 1). The finding in this study suggests that the moment PD patients recognize PD symptoms, their feeling of being creative and creative expression are not the same as before symptom onset (see Figure 6); both sides of creativity appear to be decreasing. It is understandable considering how the PD symptoms, both motoric and non-motoric (inclusive cognitive impairment, depression), can influence activities in the patient's daily living and quality of life (Bloem et al., 2015). If creativity was possessed and/or practiced before PD symptoms appeared, it is possible to feel less creative or less urge to practice creativity after PD symptoms appear.

At the post-diagnosis timepoint, the feeling of being creative and creative expression were reported by participants, on average, to be increased. This result is consistent with the case study subject of Kulisevsky et al. (2009), who reported that his production in painting had increased, and the painting itself became the subject's main interest after diagnosis. This

finding is also in line with the case studies reported by Lhommée et al. (2014) and Kulisevsky et al. (2012), in which their subjects became artistically more productive with more positive effects regarding their creativities post-diagnosis. In a larger sample size, the study survey conducted by Joutsa et al. (2012a) found that 19.3% of study participants also reported an increase in creativity and motivation for creative production after PD diagnosis (Lauring et al., 2019).

5. 6. 1. Possible Relationship Between PD Medications and Creativity Changes

What occurred after the patients received their diagnoses, specifically regarding PD medication, was further analyzed in this study. Analysis of the study participants revealed that, on average, the participants joined this study approximately five years after receiving a diagnosis. The average age when the surveys were administered was 66.68, and the average age when the PD was diagnosed was 61.28 (see Section 4. 2). In this five-years gap, the participants reported having more than one type of PD medication the entire time. Within the first three months after the diagnosis (post-diagnosis), participants reported taking four types of medication (with possible combinations of the medication): DA agonists (almost 80% of participants), levodopa (around 42%).

DA agonists at the post-diagnosis timepoint, specifically, are reported as having been taken by 88.9% of participants who reported increased changes in the feeling of being creative and 90% of participants who reported increased changes in creative expression (i.e., actual producing creative products and/or actual creative activities) (see Table 8). Meanwhile, at the same timepoint, only 60% of participants who reported decreased changes in feeling of being creative and 60% of participants who reported decreased changes in creative expression have been taken DA agonists (see Table 9). However, at the same timepoint, 80% of participants who reported no changes in the feeling of being creative and 75% of participants who reported no changes in creative expression have been taken DA agonists (see Table 10).

The relatively large percentages of participants (88.9% and 90%) who took DA agonist and reported increased creativity changes (both in the feeling of being creative and creative expression) were supported by reports from Lhommée et al. (2014) at TP2 (a few years after diagnosis, see Lauring et al., 2019) and Kulisevsky et al. (2012) at 0-2 years after diagnosis. DA agonists bind to D-1 and D-2 dopamine receptors and activate these receptors in the same way dopamine does, thereby ameliorating low dopamine symptoms (Choi & Homer, 2022; Smith, 2021). The older DA agonists also interact with serotonin and adrenergic receptors. Serotonin is the major neurotransmitter responsible for mood stabilizers and well-being (Shiah & Yatam, 2000; Quendo et al., 2007). Adrenergic receptors are tied to the fight-or-flight responses when there is a frightening or stressful condition, which includes the activation of the sympathetic nervous system (Graham, 1990;

Aschenbrener & Venable, 2012). On the other hand, the newer DA agonists have a high affinity not only to D-2 dopamine receptors, but also to D-3 dopamine receptors, similar to psychedelic drugs, like LSD (Choi & Homer, 2022; Lhommée et al., 2014). Consequently, the newer DA agonists with the ability to bind to D-2 and D-3 receptors may facilitate and promote the freedom associated with creative ideas and expression, hence increasing creativity (Lhommée et al., 2014; Lauring et al., 2019). However, DA agonists could not be concluded as the only influence behind increased changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities) for the first three months after diagnosis, since the DA agonists have been taken also by relatively large percentages of participants who reported no changes in the feeling of being creative (80%) and creative expression (90%).

At the current timepoint, which means a more prolonged period post-diagnosis, the participants reported changes in medication. DA agonists were used by around 80% of total participants at the current timepoint. The use of levodopa, however, raised to approximately 61% of total participants. This change showed that more people might take both levodopa and DA agonists at the same time beyond post-diagnosis as reported previously (Walker et al., 2006; Chatterjee et al., 2006). In a case study conducted by Walker et al. (2006), the subject had taken Levodopa for the previous 11 years before the study was conducted with newly-added DA agonists for the last three years. Similarly, Chatterjee et al (2006) reported that the subject in their case study, with a 15-year PD diagnosis, had initially received only levodopa due to the initial intolerance to DA agonists. Later, the subject was prescribed additional DA agonists (in combination with COMT inhibitor, amantadine, and other medication for cholesterol and prostate symptoms) for the past three years, which he finally tolerated.

Compared to the post-diagnosis timepoint, the number of participants in the current timepoint who reported having an increased feeling of being creative remained the same (n = 9), but the percentage of participants who took DA agonists with this change was 10% fewer than post-diagnosis timepoint. Meanwhile, participants who reported having an increased change in creative expression were fewer than at the post-diagnosis timepoint (i.e., seven participants at the current timepoint and 10 participants at the post-diagnosis timepoint). Out of these participants, who reported increased changes in creative expression, 85.7% took DA agonists, which was around 5% less than at the post-diagnosis timepoint (90%).

Nonetheless, more participants reported having both decreased feelings of being creative and creative expression at the current timepoint compared to the post-diagnosis timepoint (see Tables 9 and 12). Out of this group of participants who reported decreased changes in the feeling of creative, four took levodopa, and five took DA agonists. Of participants who reported no changes in the feeling of being creative at the current timepoint,

66.7% took levodopa. From this group, 66.7% of them also took DA-agonist at the same timepoint (see Table 13). Meanwhile, there were 75% of participants who reported no changes in the feeling of being creative at the current timepoint and took Levodopa at the same timepoint. The same percentage (75%) of participants who reported no changes in creative expression (i.e., actual producing creative products and/or actual creative activities) also took DA agonist at the current timepoint (see Table 13).

The long period of DA agonist intake (from post-diagnosis to current timepoint) seemed to not have impacted the increased feeling of being creative or having greater creative expression reported by the participants; rather it stayed the same as the previous timepoint (post-diagnosis). It was found that the reported increased changes in the feeling of being creative went up after PD diagnosis (see Table 1), but the percentage of participants who reported these increased changes in the feeling of being creative and took DA agonists at the post-diagnosis and current timepoints stays the same. The average of reported changes in the feeling of being creative between these two timepoints (see Table 1) were only slightly different, and were presumably caused by the answers' distribution. After all, the increased changes in creative expression were reported less in the current timepoint compared to the post-diagnosis timepoint. Canesi et al. (2012) argued that PD medication does not have a relationship with the emergence of creativity per se, rather the increase in PD patients' drive to create. Consistent with this, several subjects in previous case studies were found to obsessed with their creativity/art and having strong urgency to produce art/creativity (Chatterjee et al., 2006; Walker et al., 2006; Lhommée et al., 2014; see Lauring et al., 2019). The drive to produce creativity/art may be amplified by DA agonist, which were taken right after diagnosis. However, as the disease progresses (or time passes), this drive was perceived by the participants as a stable feeling of being creative from post-diagnosis to current timepoints.

However, the decreased creative expression (i.e., actual producing creative products and/or actual creative activities) was reported by more participants at the current timepoint (*n* = 8) compared to the post-diagnosis timepoint (*n* = 5), which may be related to the use of levodopa and DA agonists combination. The combination of these drugs for a longer period, as the illness progresses, might play a role in the decreased creative expression, possibly arising as their side effects. The long-term side effects of DA agonists may cause dystonic movements, choreiform and psychiatric disturbances, in addition to the most common side effects of DA agonists, which include nausea, vomiting, dizziness, sleep disturbances, confusion, drowsiness, headaches, and hallucination (Choi & Horner, 2022; Westphalen, 2019; Borovac, 2016). The adverse effects of levodopa administration are quite similar to side effects of DA agonists (Gandhi & Saadabadi, 2022). This thesis argues that the adverse and side effects of both DA agonists and levodopa when prescribed long-term might play a

role in why the participants reported more decreased changes in creative expression. One who fights nausea, dizziness, and dystonic movements might have difficulties motivating themselves to do something creative and/or express creativity. Nonetheless, the progression of the illness that caused more motoric and non-motoric impairments may also result in a decreased change in creative expression.

Comparing current timepoint to the earlier timepoint (post-diagnosis timepoint), it seemed that the participants who reported no changes (both in the feeling of being creative and in creative expression) had increased intake of levodopa more as the illness progressed (See Tables 10 and 13). Nonetheless, the relation between changing and/or adding levodopa to medication intake and expressing no changes in creativity could not be strongly establish as there were only a small number of participants who reported no changes in the feeling of being creative and creative expression (i.e., actual producing creative products and/or actual creative activities). Participants who reported no changes in the feeling of being creative at current timepoint (*n* = 3) were, however, fewer compared to post-diagnosis timepoint (*n* = 5). Meanwhile, the number of participants who reported no changes in creative expression at current timepoint (*n* = 4) and at post-diagnosis timepoint (*n* = 4) were the same. While decreased changes of creative expression were reported by more participants at current timepoint (*n* = 8) compared to post-diagnosis timepoint (*n* = 5) along with more levodopa and/ or DA agonist intake, it could be possible that a combination of these two medications and/or longer administration of DA agonist plays a role to affect the feeling from not having any creativity changes after diagnosis into feeling less creative later (see the percentage of reported decreased feeling of being creative in Tables 9 and 12).

5. 7. Self-reported Causes Behind Creativity/Art Changes in PD Patients

Several studies reported that PD patients believed their PD medication played a significant role in the creativity/art changes they experienced (Lakke, 1999; Walker et al., 2006; Chatterjee et al., 2006; Schwingenschuh et al., 2010; Joutsa et al., 2012a). Changes in creative activity (creative expression) driven by PD medication/therapies and PD itself, could be considered as extrinsically-motivated behavior. However, another study has consistently linked creative/ art activities with intrinsic motivators as the creative work is interesting for oneself or self-satisfying (Benedek et al., 2020). This is consistent with the findings in this epidemiological study, in which most of the participants reported intrinsic factors (“The activity gives me a rewarding feeling”; “My interest in creating creative expressions or activities (also artistic) (as a hobby or professionally”; “My interest in creative expressions or activities (including artistic) in general”; “My own personal reaction to their living situation after diagnosis”) as the causes of their creativity changes (see Table 4).

Interestingly, intrinsic and extrinsic motivations could co-exist together and act independently (Gong et al., 2017; Amabile et al., 1994). “Parkinson’s medication”, one of the extrinsic motivation factors, as the reason behind the creativity changes was reported by only 15.9% of participants in this epidemiological study. This finding does not support the previous findings regarding the significant role of PD medication in affecting creativity changes perceived by PD patients. Further, it was observed that the other motives co-exist with PD medication. Two of the most frequently chosen intrinsic factors that co-exist with “Parkinson’s medication” were: (1) “The activity gives me a rewarding feeling”; and (2) “Interest in creating creative expressions or activities (also artistic) (as a hobby or professionally)” (see Table 5). These co-existing intrinsic factors may be related to the PD medication that can increase DA level in the brain’s reward processing system as well as mood regulation system (Arias-Carrión et al., 2010; Lauring et al., 2019). The mesolimbic dopaminergic pathway connects VTA to the ventral striatal/NAcc that mediates pleasure and feelings of reward (Bridges, 2016). However, the subjective pleasure or interest (liking), just like interest in producing creative expressions, is one of the components of the extensive reward system, namely “hedonic spots” (Berridge et al., 2009; Berridge & Kringelbach, 2013). Activity in hedonic spots located in sub-compartments within the NAcc, ventral palladium, insula, and OFC (Lauring et al., 2019) may enhance pleasure/liking (Berridge & Klingelbach, 2013). This personal pleasure activated in the hedonic spots is regulated by DA (Lauring et al., 2019).

The most frequently chosen extrinsic factors that co-exist with “Parkinson’s medication” were: (1) “my own profession” and (2) “recommendation by friends and/or family” (see Table 5). These two extrinsic factors are tied to learning function, approach behavior, choices, and emotion. These learning function, approach behavior, choices, and emotion were possibly mediated by neuronal reward and decision signals located in midbrain dopamine neurons (in vSNc , VTA and dorsolateral substantial nigra), selected neurons in the OFC, dorsal and ventral striatum, and amygdala (Schultz, 2015; Schultz; 2017; Kahnt et al., 2010). These signals consitute the basic construct of reinforcement learning theory, which relates to incentives, praises, and acknowledgement that, people with artistic-like professions would normally receive when they produce something creative. Additionally, performing activities based on a recommendation from friends or family may relate to the recognition from the people who recommend the action. This recognition could count as a positive reinforcement (reward) that induces learning, which brings the approach behavior (doing something creative).

6. Limitations and Implications

The ideal recruiting numbers of this project go beyond my master’s thesis. However, the project and the participant recruitment continued. Reaching out to patients has been a

struggle during the COVID-19 pandemic, particularly since PD patients, who are mostly elderly, are a high-risk group. As COVID-19 persist in everyday life a more effective way to reach out to this group of patients needs to be developed to ensure the continuation of this project and to ensure that other similar future projects can run successfully. First, introducing the project through organizations that encourage PD patients to participate is recommended. After the data collection for this thesis was closed, an event organized by Austrian neurologists was conducted for PD patients and practitioners. At this event, new projects and research, including this project, were introduced through presentations and Q & A sessions. More similar events in Austria should be organized to attract more PD patients and practitioners.

It is also crucial to explore methods to improve survey delivery. This project delivered the survey in three different ways: online, via phone, and by post. The most used or most preferable method by participants was the online survey. However, the online survey had several technical issues as some parts remained blank or unfinished, making the data could not be analyzed. Another problem that occurred was related to online registration. To receive the online survey, participants had to confirm their e-mail address by clicking the link in a confirmation e-mail, which many of the prospective participants failed to click. A future iteration of the project is encouraged to make the registration online more accessible and straightforward, considering the technical difficulties that PD patients have. Most PD patients are elderly, making it challenging to use technology. The surveys posted to prospective participants also faced difficulties as some of the surveys were not returned or finished completely, which also made the data unable to be analyzed. Even though the survey via phone call, one-on-one data collection, is more time-consuming and was not preferred by the participants, this method ensure completeness of data collection and bypass the technical difficulties associated with online survey and survey via post. One-on-one data collection may be considered if the COVID-19 safety regulations allow.

The last limitation that this project met was the veracity of illnesses that was self-reported by participants. This project relied only on self-reported PD patients as there was data protection regulation for medical records and other difficulties in approaching PD patients in Austria. As a result, the credibility of diagnoses cannot be guaranteed. Future iterations of this project are encouraged to overcome this problem.

References

Alberico, S. L., Cassell, M. D., & Narayanan, N. S. (2015). The Vulnerable Ventral Tegmental Area in Parkinson's Disease. *Basal Ganglia*, *5*(2-3), 51–55. https://doi.org/10.1016/j.baga.2015.06.001

Amabile, T., Hill, K.G., Hennessey, B.A., & Tighe, E.M. (1994). The Work Preference Inventory: Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology*, *66*, 950–967. https://doi.org/10.1037/0022-3514.66.5.950

Arias-Carrión, O., Stamelou, M., Murillo-Rodríguez, E., Menéndez-González, M., & Pöppel, E. (2010). Dopaminergic reward system: a short integrative review. *International archives of medicine*, *3*(1), 24. https://doi.org/10.1186/1755-7682-3-24

Ardouin, C., Chéreau, I., Llorca, P. M., Lhommée, E., Durif, F., Pollak, P., Krack, P., & groupe évaluation comportementale de la maladie de Parkinson (2009). Evaluation des troubles comportementaux hyper- et hypodopaminergiques dans la maladie de Parkinson [Assessment of hyper- and hypodopaminergic behaviors in Parkinson's disease]. *Revue neurologique*, *165*(11), 845–856. https://doi.org/10.1016/j.neurol.2009.06.003

Aschenbrenner, D. S., & Venable, S. J. (2012). Drugs affecting adrenergic function. In Drug Therapy in Nursing (pp. 161-194). Wolters Kluwer Health Adis (ESP).

Bear, M., Connors, B., & Paradiso, M. A. (2020). *Neuroscience: exploring the brain* (4th ed.). Jones & Bartlett Learning, LLC.

Beghetto, R. A., & Kaufman, J. C. (2009). Intellectual estuaries: connecting learning and creativity in programs of advanced academics. *Journal of Advanced Academics*, *20*(2), 296 –324. https://doi.org/10.1177/1932202x0902000205

Benedek, M., Bruckdorfer, R. and Jauk, E. (2020), Motives for Creativity: Exploring the What and Why of Everyday Creativity. *The Journal of Creative Behavior*, *54*: 610-625. https://doi.org/10.1002/jocb.396

Béreau, M., Fleury, V., Bouthour, W., Castrioto, A., Lhommée, E., & Krack, P. (2018). Hyperdopaminergic behavioral spectrum in Parkinson's disease: A review. *Revue Neurologique*, *174*(9), 653–663. https://doi.org/10.1016/j.neurol.2018.07.005

Berridge, K., C., Robinson, T., E., and Aldridge, J., W. (2009) Dissecting components of reward: 'liking', 'wanting', and learning. *Current Opinion in Pharmacology*, *9*(1):65-73. https://doi.org/10.1016/j.coph.2008.12.014

Berridge, K. C., & Kringelbach, M. L. (2013). Neuroscience of affect: brain mechanisms of pleasure and displeasure. *Current Opinion in Neurobiology*, *23*(3), 294–303. https://doi.org/10.1016/j.conb.2013.01.017

Benabid A. L. (2003). Deep brain stimulation for Parkinson's disease. *Current Opinion in Neurobiology*, *13*(6), 696–706. https://doi.org/10.1016/j.conb.2003.11.001

Blaess, Sandra & Stott, S.R.W. & Ang, S.-L. (2020). The generation of midbrain dopaminergic neurons. *Patterning and Cell Type Specification in the Developing CNS and PNS*, 369–398. https://doi.org/10.1016/B978-0-12-814405-3.00017-5

Bloem, B. R., de Vries, N. M., & Ebersbach, G. (2015). Nonpharmacological treatments for patients with Parkinson's disease. *Movement Disorders*, *30*(11), 1504–1520. https://doi.org/10.1002/mds.26363

Borovac J. A. (2016). Focus: The Aging Brain: Side effects of a dopamine agonist therapy for Parkinson's disease: A mini-review of clinical pharmacology. *The Yale Journal of Biology and Medicine*, *89*(1), 37–47.

Bronstein, J. M., Tagliati, M., Alterman, R. L., Lozano, A. M., Volkmann, J., Stefani, A., Horak, F. B., Okun, M. S., Foote, K. D., Krack, P., Pahwa, R., Henderson, J. M., Hariz, M. I., Bakay, R. A., Rezai, A., Marks, W. J., Jr, Moro, E., Vitek, J. L., Weaver, F. M., Gross, R. E., … DeLong, M. R. (2011). Deep brain stimulation for Parkinson disease: an expert consensus and review of key issues. *Archives of Neurology*, *68*(2), 165. https://doi.org/10.1001/archneurol.2010.260

Braak, H., Del Tredici, K., Rüb, U., De Vos, R. A., Steur, E. N. J., & Braak, E. (2003). Staging of brain pathology related to sporadic Parkinson's disease. *Neurobiology of Aging*, *24*(2), 197-211. https://doi.org/10.1016/s0197-4580(02)00065-9

Bridges, N. (2016, November 25). *Dopamine Pathways*. *Sanesco Health; Sanesco International Inc.*. https://sanescohealth.com/blog/dopamine-pathways/

Brooks, D. J. (2000). Dopamine agonists: their role in the treatment of Parkinson's disease. Journal of Neurology, Neurosurgery & Psychiatry, *68*(6), 685-689. http://dx.doi.org/10.1136/jnnp.68.6.685

Buka, S. L., Rosenthal, S. R., & Lacy, M. E. (2017). Epidemiological Study Designs: Traditional and Novel Approaches to Advance Life Course Health Development Research. In Halfon, N., Forrest, C. B., Lerner, R. M., & Faustman, E. M. (Eds.), *Handbook of Life Course Health Development*. (pp. 541–560). Springer International Publishing.

Cakmak, Y. O., Olcek, C., Ozsoy, B., Khwaounjoo, P., Kiziltan, G., Apaydin, H., Günduz, A., Oztop Cakmak, O., Ertan, S., Gursoy-Ozdemir, Y., & Gokcay, D. (2022). Hand Pronation–Supination Movement as a Proxy for Remotely Monitoring Gait and Posture Stability in Parkinson's Disease. *Sensors*, *22*(5), 1827. https://doi.org/10.3390/s22051827

Canesi, M., Rusconi, M.L., Isaias, I.U. and Pezzoli, G. (2012), Artistic productivity and creative thinking in Parkinson's disease. *European Journal of Neurology*, *19*(3), 468-472. https://doi.org/10.1111/j.1468-1331.2011.03546.x

Chatterjee, A., Hamilton, R. H., & Amorapanth, P. X. (2006). Art produced by a patient with Parkinson's disease. *Behavioural Neurology*, *17*(2), 105–108. https://doi.org/10.1155/2006/901832

Chaudhuri, K. R., Healy, D. G., & Schapira, A. H. (2006). Non-motor symptoms of Parkinson's disease: diagnosis and management. *The Lancet Neurology*, *5*(3), 235-245. https://doi.org/10.1016/S1474-4422(06)70373-8

Choi, J., & Horner, K. A. (2022). *Dopamine Agonists*. In StatPearls. StatPearls Publishing.

Coggon, D., Barker, D. J., & Rose, G. (1997). *Epidemiology for the Uninitiated* (4th ed.). BMJ Books. http://onlinebooks.library.upenn.edu/webbin/book/lookupid?key=olbp14466

Connolly B. S., Lang A. E. (2014). Pharmacological treatment of Parkinson disease: A review. *JAMA*, *311*(16), 1670–1683. https://doi.org/10.1001/jama.2014.3654

Darweesh, S., Ikram, M. K., Faber, M. J., de Vries, N. M., Haaxma, C. A., Hofman, A., Koudstaal, P. J., Bloem, B. R., & Ikram, M. A. (2018). Professional occupation and the risk of Parkinson's disease. *European Journal of Neurology*, 25(12), 1470–1476. https://doi.org/10.1111/ene.13752

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.

Diedrich, J., Jauk, E., Silvia, P. J., Gredlein, J. M., Neubauer, A. C., & Benedek, M. (2018). Assessment of real-life creativity: The Inventory of Creative Activities and Achievements (ICAA). *Psychology of Aesthetics, Creativity, and the Arts*, *12*(3), 304–316. https://doi.org/10.1037/aca0000137

Drago, V., Foster, P. S., Okun, M. S., Cosentino, F. I., Conigliaro, R., Haq, I., Sudhyadhom, A., Skidmore, F. M., & Heilman, K. M. (2009a). Turning off artistic ability: the influence of left DBS in art production. Journal of the *Neurological Sciences*, *281*(1-2), 116–121. https://doi.org/10.1016/j.jns.2009.03.001

Drago, V., Foster, P. S., Okun, M. S., Haq, I., Sudhyadhom, A., Skidmore, F. M., & Heilman, K. M. (2009b). Artistic creativity and DBS: a case report. *Journal of the Neurological Sciences*, *276*(1-2), 138–142. https://doi.org/10.1016/j.jns.2008.09.021

Drago, V., Foster, P. S., Skidmore, F. M., & Heilman, K. M. (2009c). Creativity in Parkinson's disease as a function of right versus left hemibody onset. *Journal of the Neurological Sciences*, *276*(1-2), 179–183. https://doi.org/10.1016/j.jns.2008.09.026

Elliott, R., Dolan, R. J., & Frith, C. D. (2000). Dissociable functions in the medial and lateral orbitofrontal cortex: evidence from human neuroimaging studies. *Cerebral Cortex*, *10*(3), 308–317. https://doi.org/10.1093/cercor/10.3.308

Forsythe, A., Williams, T., & Reilly, R. G. (2017). What paint can tell us: A fractal analysis of neurological changes in seven artists. *Neuropsychology*, *31*(1), 1–10. https://doi.org/10.1037/neu0000303

Franz, M., Lemke, M. R., Meyer, T., Ulferts, J., Puhl, P., & Snaith, R. P. (1998). Deutsche Version der Snaith-Hamilton-Pleasure-Scale (SHAPS-D). Erfassung von Anhedonie bei schizophrenen und depressiven Patienten [German version of the Snaith-Hamilton-Pleasure Scale (SHAPS-D). Anhedonia in schizophrenic and depressive patients]. *Fortschritte der Neurologie-Psychiatrie*, *66*(9), 407–413. https://doi.org/10.1055/s-2007-995279

Gandhi, K. R., & Saadabadi, A. (2022). *Levodopa (L-Dopa)*. In StatPearls. StatPearls Publishing.

Garcia-Ruiz, P. J., Martinez Castrillo, J. C., Alonso-Canovas, A., Herranz Barcenas, A., Vela, L., Sanchez Alonso, P., Mata, M., Olmedilla Gonzalez, N., & Mahillo Fernandez, I. (2014). Impulse control disorder in patients with Parkinson's disease under dopamine agonist therapy: a multicentre study. *Journal of Neurology, Neurosurgery, and Psychiatry*, *85*(8), 840–844. https://doi.org/10.1136/jnnp-2013-306787

Gillies, G. E., Pienaar, I. S., Vohra, S., & Qamhawi, Z. (2014). Sex differences in Parkinson's disease. *Frontiers in Neuroendocrinology*, *35*(3), 370–384. https://doi.org/10.1016/j.yfrne.2014.02.002

Goldman, J. G., & Postuma, R. (2014). Premotor and nonmotor features of Parkinson's disease. *Current Opinion in Neurology*, *27*(4), 434–441. https://doi.org/10.1097/WCO.0000000000000112

Gong, Y., Wu, J., Song, L. J., & Zhang, Z. (2017). Dual tuning in creative processes: Joint contributions of intrinsic and extrinsic motivational orientations. *Journal of Applied Psychology*, *102*(5), 829–844. https://doi.org/10.1037/apl0000185

Goff, K., & Torrance, E. P. (2002). *Abbreviated Torrance Test for Adults manual*. Bensenville, IL: Scholastic Testing Service.

Graham R. M. (1990). Adrenergic receptors: structure and function. Cleveland *Clinic journal of Medicine*, *57*(5), 481–491. https://doi.org/10.3949/ccjm.57.5.481

Grant, J. E., Levine, L., Kim, D., & Potenza, M. N. (2005). Impulse control disorders in adult psychiatric inpatients. *American Journal of Psychiatry, 162*(11), 2184-2188. https://doi.org/10.1176/appi.ajp.162.11.2184

Grella, S. L., Fortin, A. H., Ruesch, E., Bladon, J. H., Reynolds, L. F., Gross, A., Shpokayte, M., Cincotta, C., Zaki, Y., & Ramirez, S. (2022). Reactivating hippocampal-mediated memories during reconsolidation to disrupt fear. *Nature Communications*, *13*(1), 4733. https://doi.org/10.1038/s41467-022-32246-8

Haaxma, C. A., Borm, G. F., van der Linden, D., Kappelle, A. C., & Bloem, B. R. (2015). Artistic occupations are associated with a reduced risk of Parkinson's disease. *Journal of Neurology*, *262*(9), 2171–2176. https://doi.org/10.1007/s00415-015-7828-y

Halli-Tierney, A. D., Luker, J., & Carroll, D. G. (2020). Parkinson Disease. *American Family Physician*, 102(11), 679–691.

Hely, M. A., Fung, V. S., & Morris, J. G. (2000). Treatment of Parkinson's disease. Journal of Clinical Neuroscience, *7*(6), 484–494. https://doi.org/10.1054/jocn.2000.0766

Holmes, L. (2017). *Applied Epidemiologic Principles and Concepts: Clinicians' Guide to Study Design and Conduct* (2nd ed.). CRC Press. https://doi.org/10.4324/9781315369761

Hurwitz B. (2014). Urban observation and sentiment in James Parkinson's Essay on the Shaking Palsy (1817). *Literature and Medicine*, *32*(1), 74–104. https://doi.org/10.1353/lm.2014.0002

Joutsa, J., Martikainen, K., & Kaasinen, V. (2012a). Parallel appearance of compulsive behaviors and artistic creativity in Parkinson's disease. *Case Reports in Neurology*, *4*(1), 77–83. https://doi.org/10.1159/000338759

Joutsa, J., Martikainen, K., Vahlberg, T., Voon, V., & Kaasinen, V. (2012b). Impulse control disorders and depression in Finnish patients with Parkinson's disease. *Parkinsonism & Related Disorders*, *18*(2), 155–160. https://doi.org/10.1016/j.parkreldis.2011.09.007

Kahnt, T., Heinzle, J., Park, S. Q., & Haynes, J. D. (2010). The neural code of reward anticipation in human orbitofrontal cortex. *Proceedings of the National Academy of Sciences of the United States of America*, *107*(13), 6010–6015. https://doi.org/10.1073/pnas.0912838107

Kalia, L. V., & Lang, A. E. (2015). Parkinson's disease. *Lancet*, *386*(9996), 896–912. https://doi.org/10.1016/S0140-6736(14)61393-3

Kraus, P. H., Lemke, M. R., & Reichmann, H. (2006). Kinetic tremor in Parkinson's disease--an underrated symptom. Journal of neural transmission (Vienna, Austria: 1996), *113*(7), 845–853. https://doi.org/10.1007/s00702-005-0354-9

Kulisevsky, J., Pagonabarraga, J., & Martinez-Corral, M. (2009). Changes in artistic style and behaviour in Parkinson's disease: dopamine and creativity. *Journal of Neurology*, *256*(5), 816–819. https://doi.org/10.1007/s00415-009-5001-1

Kwapil, T. R., Gross, G. M., Silvia, P. J., Raulin, M. L., & Barrantes-Vidal, N. (2018). Development and psychometric properties of the Multidimensional Schizotypy Scale: A new measure for assessing positive, negative, and disorganized schizotypy. *Schizophrenia Research*, *193*, 209–217. https://doi.org/10.1016/j.schres.2017.07.001

Lakke, J. P. (1999). Art and Parkinson's disease. *Advances in Neurology*, 80, 471–479.

Lauring, J. O., Ishizu, T., Hollá Kutliková, H., Dörflinger, F., Haugbol, S., Leder, H., Kupers, R., & Pelowski, M. (2019). Why would Parkinson's disease lead to sudden changes in creativity, motivation, or style with visual art? A review of case evidence and new, contextual, and genetic hypotheses. *Neuroscience and Biobehavioral Reviews* , *100*, 129-165. https://doi.org/10.1016/j.neubiorev.2018.12.016

Lhommée, E., Batir, A., Quesada, J. L., Ardouin, C., Fraix, V., Seigneuret, E., Chabardès, S., Benabid, A. L., Pollak, P., & Krack, P. (2014). Dopamine and the biology of creativity: lessons from Parkinson's disease. *Frontiers in Neurology*, 5, 55. https://doi.org/10.3389/fneur.2014.00055

Lin, Y., Pi, Y., Wang, Y., Xia, X., Qiu, F., Cao, N., Wang, Z., Liu, Y., Zhang, J., & Tan, X. (2022). Dorsolateral prefrontal cortex mediates working memory processes in motor skill learning. *Psychology of Sport and Exercise*, *59*, 102129. https://doi.org/10.1016/j.psychsport.2021.102129

Mahul-Mellier, A. L., Burtscher, J., Maharjan, N., Weerens, L., Croisier, M., Kuttler, F., ... & Lashuel, H. A. (2020). The process of Lewy body formation, rather than simply α-synuclein fibrillization, is one of the major drivers of neurodegeneration. *Proceedings of the National Academy of Sciences*, *117*(9), 4971-4982. https://doi.org/10.1073/pnas.1913904117

Muthuraman, M., Koirala, N., Ciolac, D., Pintea, B., Glaser, M., Groppa, S., Tamás, G., & Groppa, S. (2018). Deep Brain Stimulation and L-DOPA Therapy: Concepts of Action and Clinical Applications in Parkinson's Disease. *Frontiers in Neurology, 9,* 711. https://doi.org/10.3389/fneur.2018.00711

Napier, T. C., Kirby, A., & Persons, A. L. (2020). The role of dopamine pharmacotherapy and addiction-like behaviors in Parkinson's disease. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, *102*, 109942. https://doi.org/10.1016/j.pnpbp.2020.109942

O'Sullivan, S. S., Evans, A. H., & Lees, A. J. (2009). Dopamine dysregulation syndrome: an overview of its epidemiology, mechanisms and management. *CNS Drugs*, *23*(2), 157–170. https://doi.org/10.2165/00023210-200923020-00005

Oquendo, M. A., Hastings, R. S., Huang, Y., Simpson, N., Ogden, R. T., Hu, X., Goldman, D., Arango, V., Van Heertum, R. L., Mann, J. J., & Parsey, R. V. (2007). Brain Serotonin Transporter Binding in Depressed Patients With Bipolar Disorder Using Positron Emission Tomography. Archives of General Psychiatry, 64(2), 201. https://doi.org/10.1001/archpsyc.64.2.201

Österreichische Gesellschaft für Neurologie (ÖGN). (2022). *Österreichischer Neurologie-Report 2022.* https://www.oegn.at/wp-content/uploads/2022/07/Neurologie_Report2022_Stand-4.7.2022_LOW_RES-1.pdf

Parkinson, J. (2002). An essay on the shaking palsy. *The Journal of Neuropsychiatry and Clinical Neurosciences*, *14(*2), 223-236. https://doi.org/10.1176/jnp.14.2.223 (Original work published 1817).

Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt impulsiveness scale. *Journal of clinical psychology*, *51*(6), 768-774.

Pelowski, M., Spee, B. T. M., Richard, A., Krack, P., & Bloem, B. R. (2020). What Parkinson's Reveals About the Artistic Spark. *American Scientist*, *108*, 240-245. https://doi.org/10.1511/2020.108.4.240

Poewe, W. (2008). Non-motor symptoms in Parkinson's disease. *European Journal of Neurology*, 15(s1), 14-20. https://doi.org/10.1111/j.1468-1331.2008.02056.x

Pujara, M. S., Philippi, C. L., Motzkin, J. C., Baskaya, M. K., & Koenigs, M. (2016). Ventromedial Prefrontal Cortex Damage Is Associated with Decreased Ventral Striatum Volume and Responses to Reward. *The Journal of Neuroscience*, *36*(18), 5047–5054. https://doi.org/10.1523/JNEUROSCI.4236-15.2016

Quinn, N. (1995). Fortnightly Review: Drug treatment of Parkinson's disease. *BMJ*, *310*(6979), 575-579. https://doi.org/10.1136/bmj.310.6979.575

Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, *41*(1), 203–212. https://doi.org/10.1016/j.jrp.2006.02.001

Rao, S. S., Hofmann, L. A., & Shakil, A. (2006). Parkinson's disease: diagnosis and treatment. *American Family Physician*, *74*(12), 2046–2054.

Scherpenzeel, A. (2002). Why Use 11-Point Scales?. UpToDate. Retrieved September 19, 2022, from from https://www.researchgate.net/publication/241262409_Why_Use_11-Point_Scales

Schultz W. (2015). Neuronal Reward and Decision Signals: From Theories to Data. *Physiological Reviews*, *95*(3), 853–951. https://doi.org/10.1152/physrev.00023.2014

Schultz W. (2017). Reward prediction error. *Current Biology*, *27*(10), R369–R371. https://doi.org/10.1016/j.cub.2017.02.064

Schupbach, W. M. M., & Agid, Y. (2008). Psychosocial adjustment after deep brain stimulation in Parkinson's disease. *Nature Clinical Practice Neurology*, *4*(2), 58–59+. https://doi.org/10.1038/ncpneuro0714

Schwingenschuh, P., Katschnig, P., Saurugg, R., Ott, E. and Bhatia, K.P. (2010), Artistic profession: A potential risk factor for dopamine dysregulation syndrome in Parkinson's disease?. *Movement Disorders*, 25(4), 493-496. https://doi.org/10.1002/mds.22936

Shiah, I.-S. and Yatham, L.N. (2000), Serotonin in mania and in the mechanism of action of mood stabilizers: a review of clinical studies. *Bipolar Disorders*, *2*(2)*,* 77-92. https://doi.org/10.1034/j.1399-5618.2000.020201.x

Silvia, P. J. (2018). Creativity is undefinable, controllable, and everywhere. In Sternberg R. J. & Kaufman J. C. (Eds.), *The nature of human creativity* (pp. 291–301). Cambridge University Press. https://doi.org/10.1017/9781108185936.021

Silvia, P. J., Wigert, B., Reiter-Palmon, R., & Kaufman, J. C. (2012). Assessing creativity with self-report scales: A review and empirical evaluation. *Psychology of Aesthetics, Creativity, and the Arts*, *6*(1), 19–34. https://doi.org/10.1037/a0024071

Simuni, T., & Hurtig, H.; I. (2008). Levodopa: A Pharmacologic Miracle Four Decades Later. In Percy, R. Craig (Eds.), *Parkinson's Disease Diagnosis and Clinical Management* (2nd ed, pp. 471-490). Demos, New York.

Snaith, R. P., Hamilton, M., Morley, S., Humayan, A., Hargreaves, D., & Trigwell, P. (1995). A scale for the assessment of hedonic tone the Snaith-Hamilton Pleasure Scale. The British Journal of Psychiatry, *167*(1), 99–103. https://doi.org/10.1192/bjp.167.1.99

Spee, B., T., M. (2021). *Artistic blossoms in people with Parkinson's: A study investigating experienced changes in creativity and its connection to Parkinson's disease*. [unpublished manuscript].

Stacy, M., & Galbreath, A. (2008). Optimizing long-term therapy for Parkinson disease: levodopa, dopamine agonists, and treatment-associated dyskinesia. *Clinical Neuropharmacology*, *31*(1), 51-56. https://doi.org/10.1097/WNF.0b013e318065b088

Straub, J. (2022, July 14). *What languages are spoken in Austria?*. Lingoda. https://blog.lingoda.com/en/what-languages-are-spoken-in-austria/

Tambasco, N., Romoli, M., & Calabresi, P. (2018). Levodopa in Parkinson's Disease: Current Status and Future Developments. *Current Neuropharmacology*, *16*(8), 1239–1252. https://doi.org/10.2174/1570159X15666170510143821

Torrance, E. P. (1966). Torrance tests of creative thinking—norms technical manual research edition—verbal tests, forms A and B—figural tests, forms A and B. Princeton: Personnel Pres. Inc.

Volkmann J. (2004). Deep brain stimulation for the treatment of Parkinson's disease. *Journal of Clinical Neurophysiology*, *21*(1), 6–17. https://doi.org/10.1097/00004691-200401000-00003

Wade-Bohleber, L. M., Haugg, A., Huber, S., Ernst, J., Grimm, S., Recher, D., Richter, A., Seifritz, E., Boeker, H., & Northoff, G. (2021). Anticipating control over aversive stimuli is mediated by the medial prefrontal cortex: An fMRI study with healthy adults. *Human Brain Mapping*, *42*(13), 4327–4335. https://doi.org/10.1002/hbm.25549

Ward, J. (2019). The student's guide to cognitive neuroscience. Routledge.

Westphalen, D. (December 6, 2019). Understanding Dopamine Agonist. *Healthline.* https://www.healthline.com/health/parkinsons-disease/dopamine-agonist

Zgaljardic, D., Mattis, P., and Charness, A. (2010). Executive dysfunction. In Kompoliti, K., & Verhagen, L. (Eds.) *Encyclopedia of Movement Disorders*. (pp. 458–462). Academic Press. https://doi.org/10.1016/B978-0-12-374105-9.00176-3

Appendix A

Abstract

Parkinson's Disease (PD), a neurodegenerative disorder, impacts one's motoric and non-motoric functions and presumably deteriorates the work or professional life of an artist. Interestingly, some of previous studies on creativity/art in PD patients revealed that PD patients increased their creativity and those who were artists maintained their artistry. Despite these compelling reports, the studies had caveats (i.e., insufficient documentation and small sample size, resulting in questionable findings). To verify the creativity/art changes reported by PD patients, an epidemiological survey study was conducted. This thesis is a part of a larger study in Austria, in which the survey was adapted from a running survey in the Netherlands. The study was introduced to several Parkinson's organizations, associations, and medical practitioners specializing in PD. The current results showed that PD patients (*N* = 19) in Austria differentiated their feeling of being creative and creative expression over three timepoints, namely pre-diagnosis (the period after the onset of PD symptoms but before the onset of PD diagnosis), post-diagnosis (after the onset of diagnosis), and current (three months before the study was conducted) timepoints. Over these timepoints, the percentage of total participants that reported increased, decreased, or showing no change in the feeling of being creative was 39%, 31%, and 30%, respectively. Additionally, the percentage of participants that reported increased, decreased, or no change in creative expression (i.e., actual producing creative products and/or actual creative activities) was 37%, 35%, and 28%, respectively. This thesis also explored: (1) The relationship between the reported changes with creative/art education status, (2) The causes of creativity changes perceived by PD patients, and (3) the possible relationship between PD medication, particularly DA agonists and levodopa, and creativity changes.

Zusammenfassung

Die Parkinson-Krankheit (PD), eine neurodegenerative Erkrankung, beeinträchtigt die motorischen und nicht-motorischen Funktionen und verschlechtert vermutlich die Arbeit oder das Berufsleben eines Künstlers. Interessanterweise haben einige frühere Studien über Kreativität/Kunst bei Parkinson-Patienten*innen ergeben, dass Parkinson-Patienten*innen ihre Kreativität steigern und Künstler*innen ihre Kunstfertigkeit beibehalten. Trotz dieser überzeugenden Berichte waren die Studien mit Vorbehalten behaftet (d. h. unzureichende Dokumentation und geringe Stichprobengröße, was zu fragwürdigen Ergebnissen führte). Um die von Morbus-Parkinson-Patienten*innen berichteten Veränderungen in Bezug auf Kreativität und/oder Kunst zu überprüfen, wurde eine epidemiologische Studie durchgeführt. Diese Arbeit ist Teil einer größeren Studie in Österreich, bei der die Umfrage an eine laufende Umfrage in den Niederlanden angepasst wurde. Die Studie wurde mehreren

Parkinson-Organisationen, Verbänden und auf Morbus Parkinson spezialisierten Ärzte*innen vorgestellt. Die aktuellen Ergebnisse zeigten, dass Morbus-Parkinson-Patienten*innen (*N* = 19) in Österreich ihr Gefühl, kreativ zu sein und sich kreativ auszudrücken, über drei Zeitpunkte hinweg sich unterschieden: Nämlich vor der Diagnose (der Zeitraum nach dem Auftreten von Morbus-Parkinson-Symptomen, aber vor dem Auftreten der Morbus-Parkinson-Diagnose), nach der Diagnose (nach dem Auftreten der Diagnose) und aktuell (drei Monate vor der Durchführung der Studie). Über diese Zeitpunkte hinweg betrug der Prozentsatz der Teilnehmer*innen, die angaben, dass sich ihr Gefühl, kreativ zu sein 39% erhöhte, 31% verringerte, 30% sich nicht veränderte. Bezüglich der Veränderung des kreativen Ausdrucks (d. h. der tatsächlichen Herstellung kreativer Produkte und/oder der tatsächlichen kreativen Aktivitäten) erzielte die Studie folgende Prozentsätze der Teilnehmer*innen: Zuname 37%, Abnahme 35%, keine Veränderungen 28%. Diese Arbeit untersuchte auch: (1) Die Beziehung zwischen den berichteten Veränderungen und dem Status der kreativen/künstlerischen Ausbildung, (2) Was Parkinson-Patienten*innen als Ursache ihrer Kreativitätsveränderungen sehen, (3) Die mögliche Beziehung zwischen Parkinson-Medikamenten, insbesondere DA-Agonisten und Levodopa, und Kreativitätsveränderungen.

Appendix B

Social Demographic Characteristic of The Main Survey's Participants per April 30, 2021

Table B1

*Social demographic characteristics (*N = *19)*

Social demographic characteristic	*n*	%
Sex		
Male	5	26.3
Female	14	73.7
Ethnicity		
Austrian	18	94.7
German	-	-
Hungarian	-	-
Czechs	1	5.3
Slovenien	-	-
Others	-	-
Not applicable	-	-
Marital status		
Married	12	63.2
Living together with partner	2	10.5
Divorced	1	5.3
Widow/ widower	1	5.3
In partnership/ not living together	1	5.3
Single/ unmarried	2	10.5
Occupation status		
Full-time employment	1	5.3
Part-time employment	1	5.3
Self-employed	1	5.3
retired	15	78.9
Unemployed	1	5.3
Highest education (Austrian education system)		
Universität	6	
Fachhochschule	-	-
Berufsbildende höhere Schule	4	
Realschule/ Gymnasium	2	10.5
Hauptschule	2	10.5
Berufliche Ausbildungslehrgänge	2	10.5
Grundschule	-	-
Keine Ausbildung	-	-
Other highest education (as written by participants)		
Fachschule Meisterbiref	1	5.3
Päd. Akademie	1	5.3
Päd. Hochschule	1	5.3

Note. (-) indicates that there were no participants that chose this option in the survey.

Table B2

*Creative/art education status (*N = *19)*

Creative/art education	none		A few (max.3) courses		Several courses (as hobby)		Several courses (as education, professional)		A finished study degree	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Theoretical education in the field of fine art	15	78.9	1	5.3	1	5.3	1	5.3	1	5.3
An education in art history	15	78.9	1	5.3	2	10.5	-	-	1	5.3
A practical education in arts	14	73.7	-	-	3	15.8	1	5.3	1	5.3
A different kind of education in arts	15	78.9	1	5.3	3	15.8	-	-	-	-

Note. (-) indicates that there were no participants that chose this option in the survey.

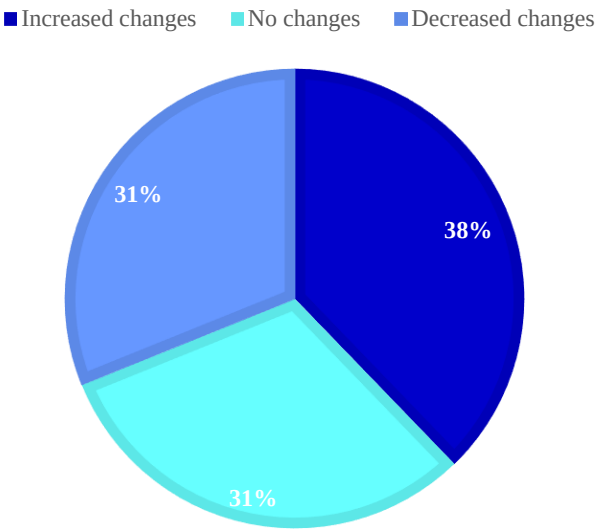
Appendix C

The Percentage of Participants Reported Changes in the Feeling of Being Creative and in Creative Expression According to Their Creative/Art Education Background

This section depicts the answers of total participants (*N*=19) when reported changes in the feeling of being creative and in creative expression according to their background of having (or no) each creative/art education options (four options, see Table B2) given in the survey.

Figure C1.1.1

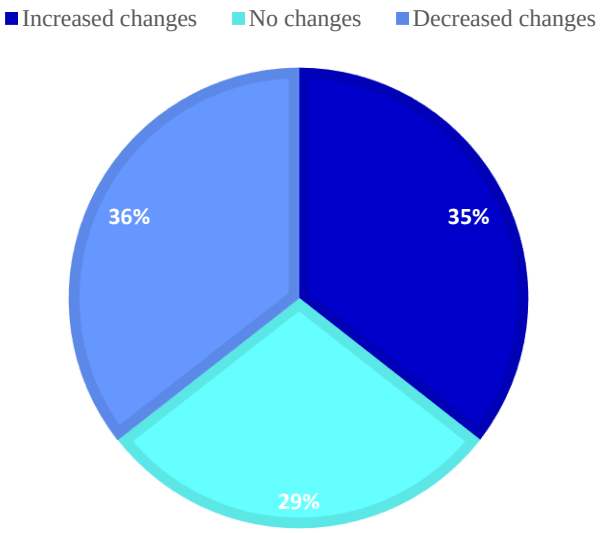
*The percentage of participants who reported of having no theoritical education in the field of fine art (*n *= 15) and their changes in the feeling of being creative*



Note. The percentages were calculated over three timepoints (45 responses in total)

Figure C1.1. 2

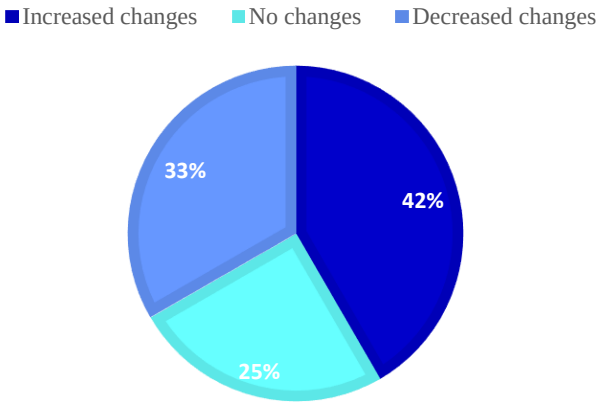
*The percentage of participants who reported of having no theoritical education in the field of fine art (*n *= 15) and their changes in creative expression*



Note. The percentages were calculated over three timepoints (45 responses in total)

Figure C1.2.1

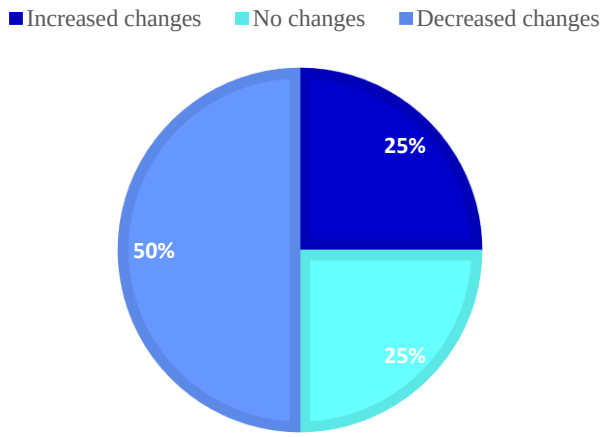
*The percentage of participants who reported of having theoritical education in the field of fine art (*n = *4) and their changes in the feeling of being creative*



Note. The percentages are calculated over three timepoints (12 responses in total)

Figure C1. 2. 2

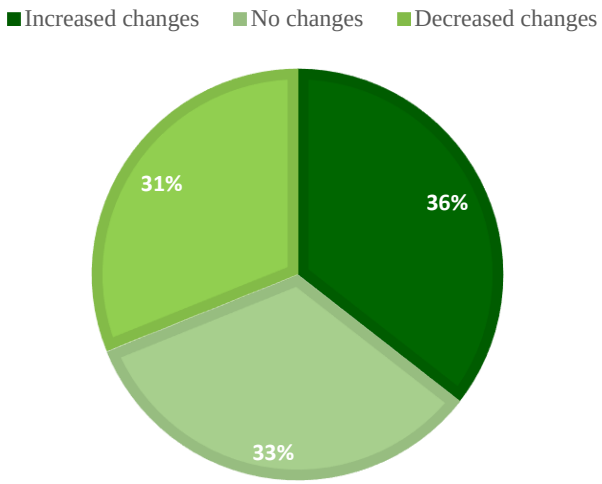
*The percentage of participants who reported of having theoritical education in the field of fine art (*n = *4) and their changes in creative expression*



Note. The percentages were calculated over three timepoints (12 responses in total)

Figure C2.1.1

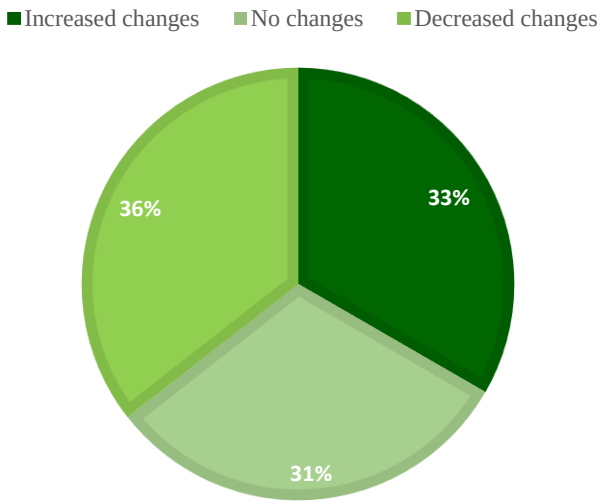
*The percentage of participants who reported of having no education in art history (*n = *15) and their changes in the feeling of being creative*



Note. The percentages were calculated over three timepoints (45 responses in total)

Figure C2.1. 2

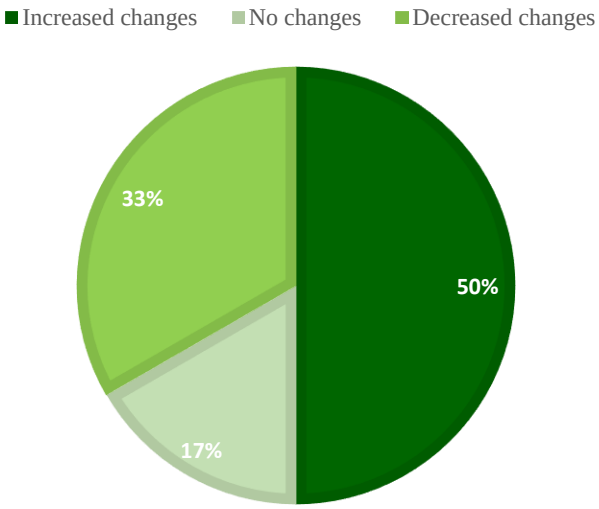
*The percentage of participants who reported of having no education in art history (*n = *15) and their changes in creative expression*



Note. The percentages were calculated over three timepoints (45 responses in total)

Figure C2. 2. 1

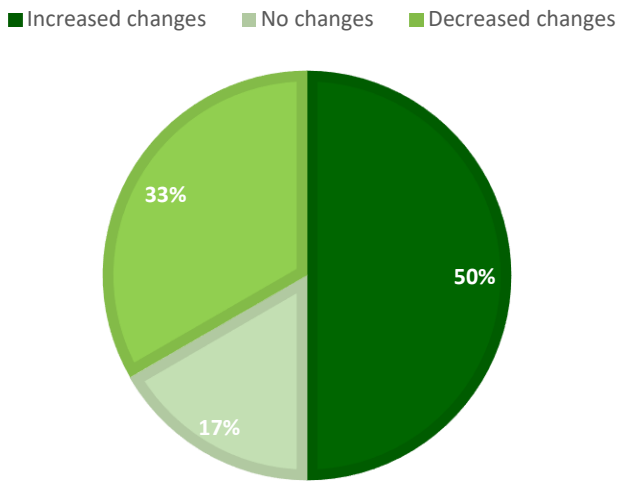
*The percentage of participants who reported of having education in art history (*n = *4) and their changes in the feeling of being creative*



Note. The percentages were calculated over three timepoints (12 responses in total)

Figure C2. 2. 2

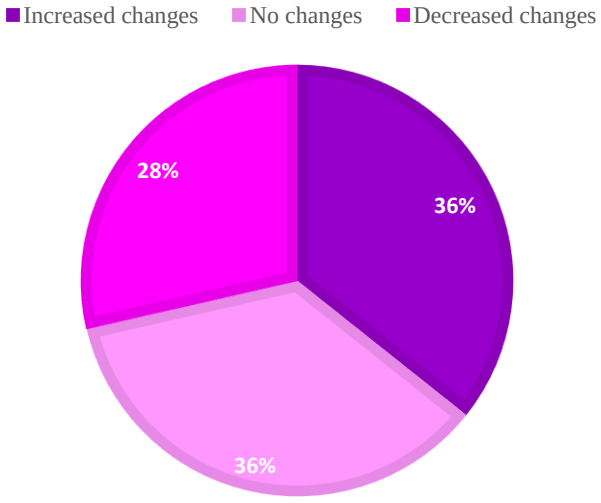
*The percentage of participants who reported of having education in art history (*n = *4) and their changes in creative expression*



Note. The percentages were calculated over three timepoints (12 responses in total)

Figure C3.1. 1

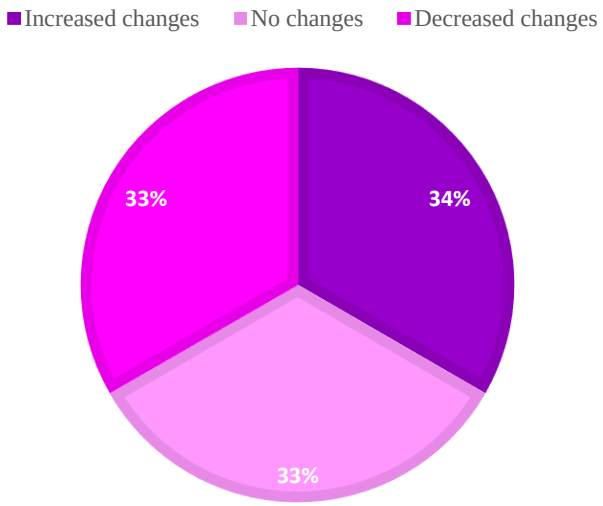
*The percentage of participants who reported of having no education in practical arts (*n = *14) and their changes in the feeling of being creative*



Note. The percentages were calculated over three timepoints (42 responses in total)

Figure C3.1. 2

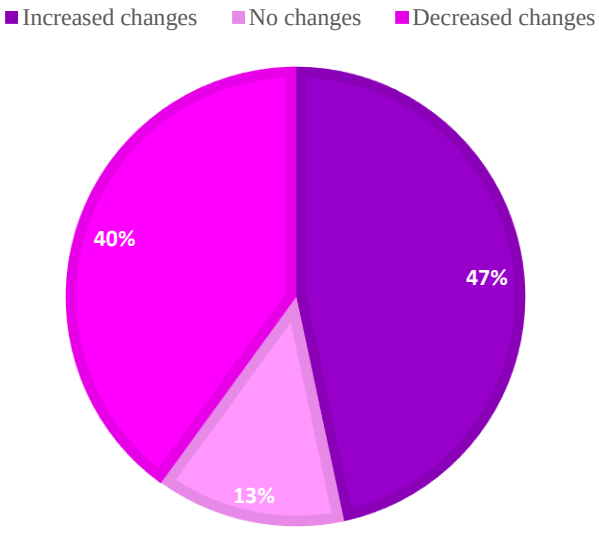
*The percentage of participants who reported of having no education in practical arts (*n = *14) and their changes in creative expression*



Note. The percentages were calculated over three timepoints (42 responses in total)

Figure C3. 2. 1

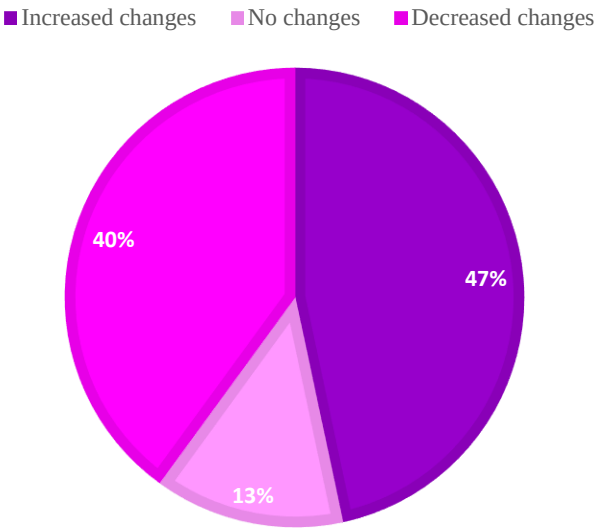
*The percentage of participants who reported of having education in practical arts (*n = *5) and their changes in the feeling of being creative*



Note. The percentages were calculated over three timepoints (15 responses in total)

Figure C3. 2. 2

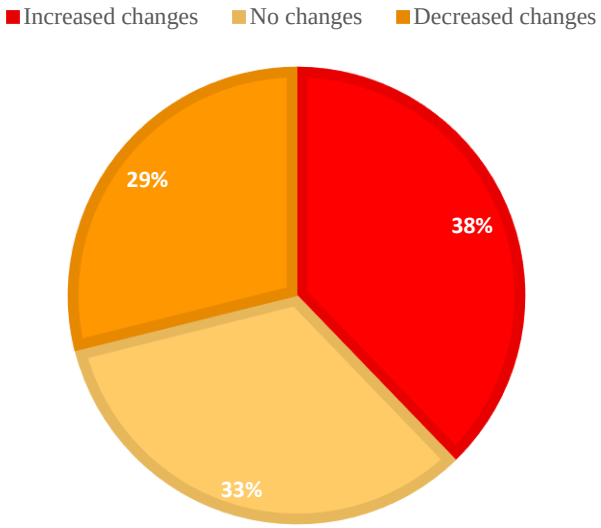
The percentage of participants who reported of having education in practical arts (n = 5) and their changes in creative expression



Note. The percentages were calculated over three timepoints (15 responses in total)

Figure C4. 1. 1

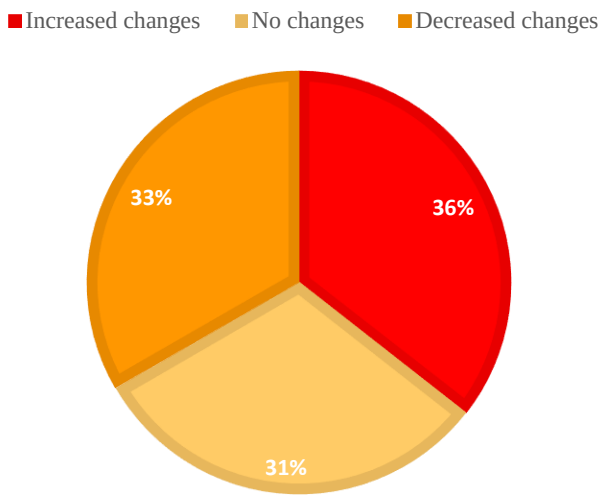
The percentage of participants who reported of having no other kinds of art education (n = 15) and their changes in the feeling of being creative



Note. The percentages were calculated over three timepoints (45 responses in total)

Figure C4. 1. 2

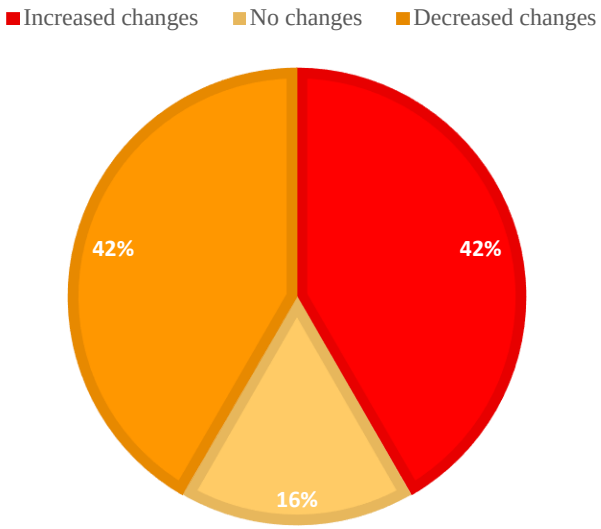
*The percentage of participants who reported of having no other kinds of art education (*n = *15) and their changes in creative expression*



Note. The percentages were calculated over three timepoints (45 responses in total)

Figure C4. 2. 1

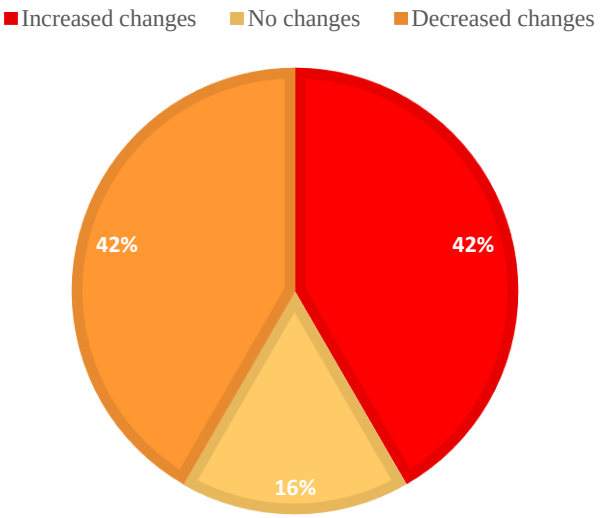
*The percentage of participants who reported of having other kinds of art education (*n = *4) and their changes in the feeling of being creative*



Note. The percentages were calculated over three timepoints (12 responses in total)

Figure C4. 2. 2

*The percentage of participants who reported of having other kinds of art education (*n = *4) and their changes in creative expression*



Note. The percentages were calculated over three timepoints (12 responses in total)

Appendix D

The Percentage of Survey Participants Who Rated Their Creative Activites Through the Nine Creativity Domains From ICAA (Benedek et al., 2020) Over the Four Timeperiods

Figure D1

*Creativity domain: music (composing or adapting melodies) (*N = *19)*

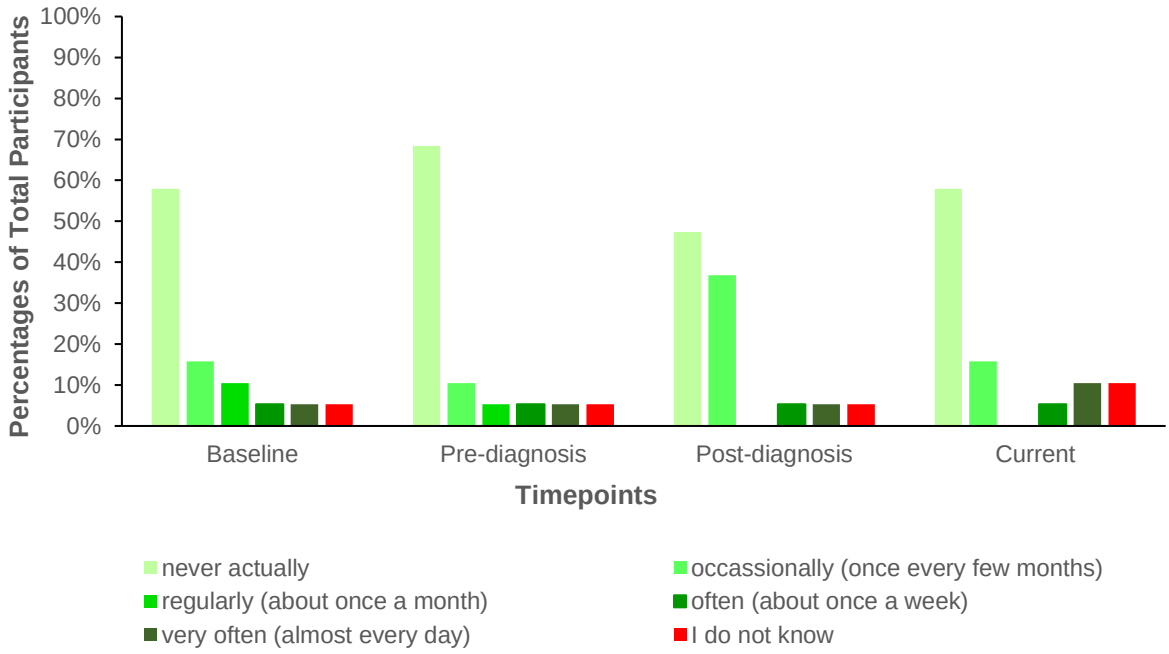


Figure D2

*Creativity domain: handicraft (making own cards, cloths, bags, etc.) (*N = *19)*

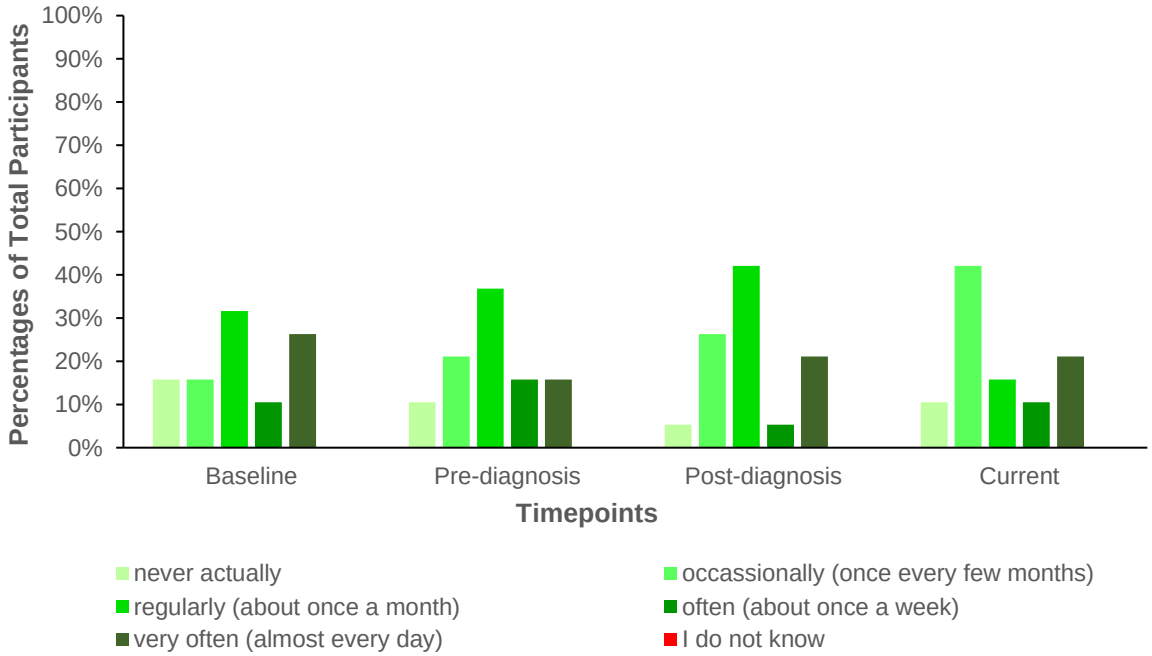


Figure D3

*Creativity domain: interior and garden design (designing/embellishing one's living space) (*N *= 19)*

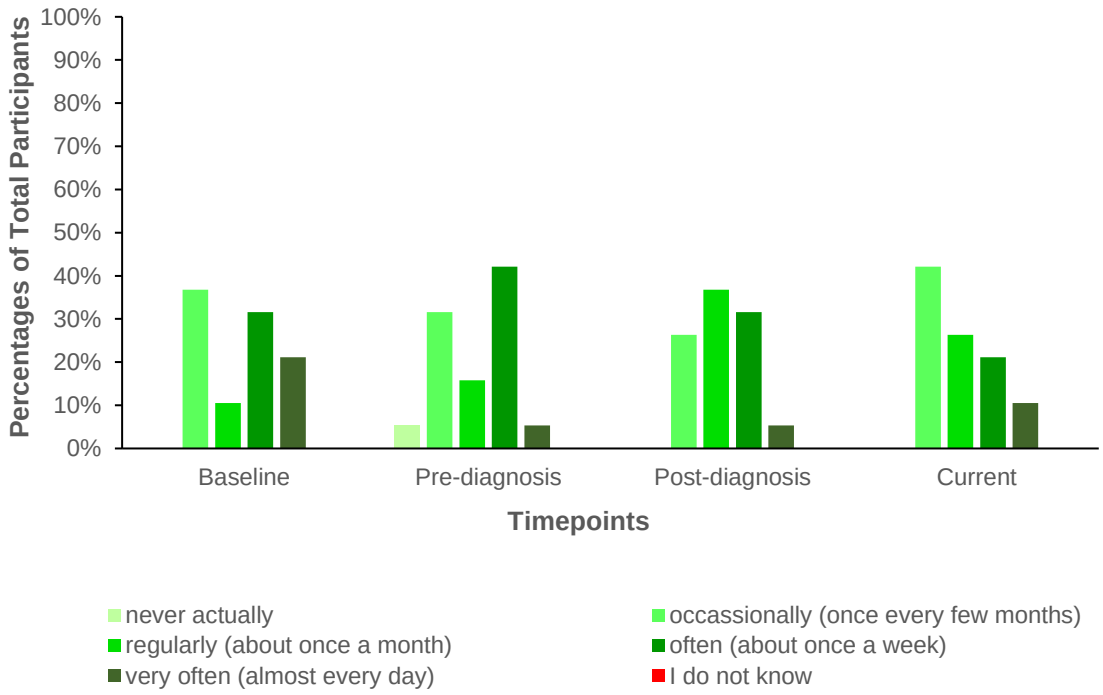


Figure D4

*Creativity domain: creative cooking (creative novel dishes/ drinks) (*N *= 19)*

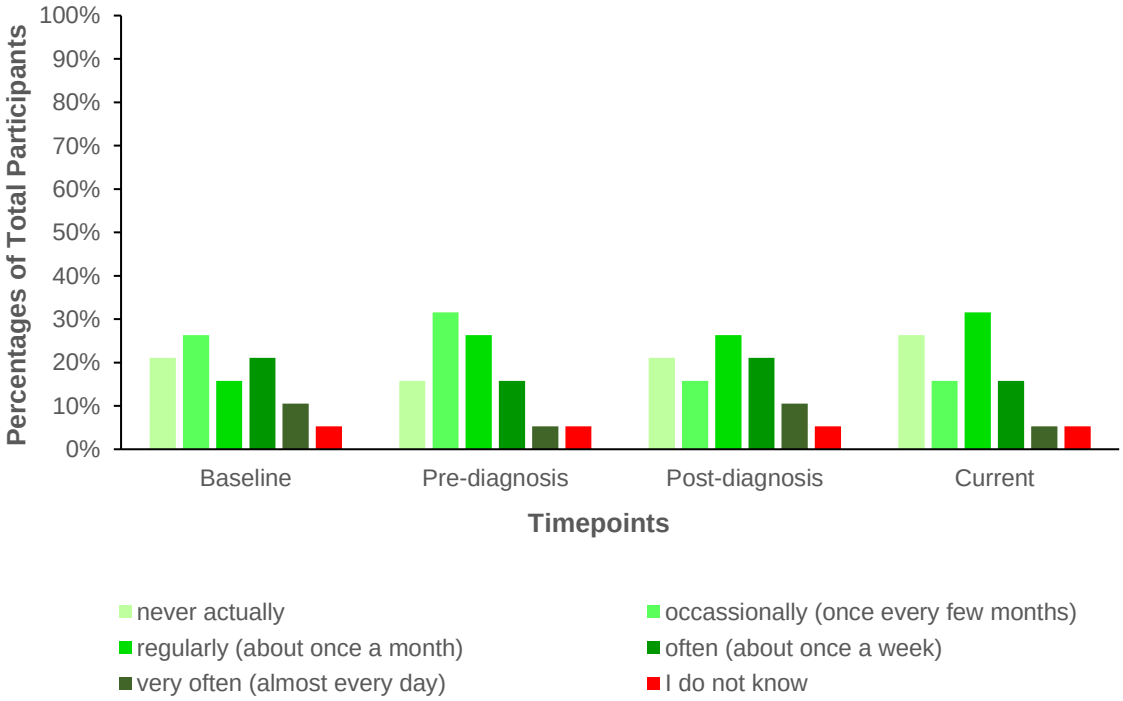


Figure D5

*Creativity domain: visual arts (drawing, creative photography, sculpturing, etc.) (*N = *19)*

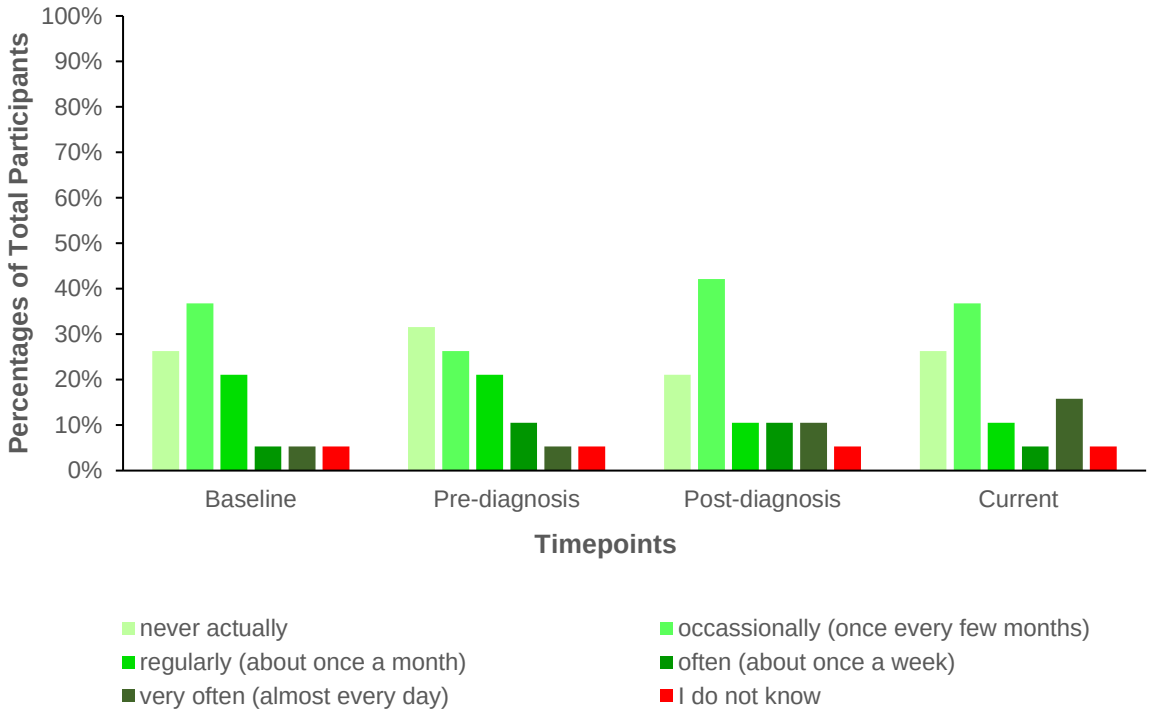


Figure D6

*Creativity domain: performing arts (theater, dance, etc.) (*N = *19)*

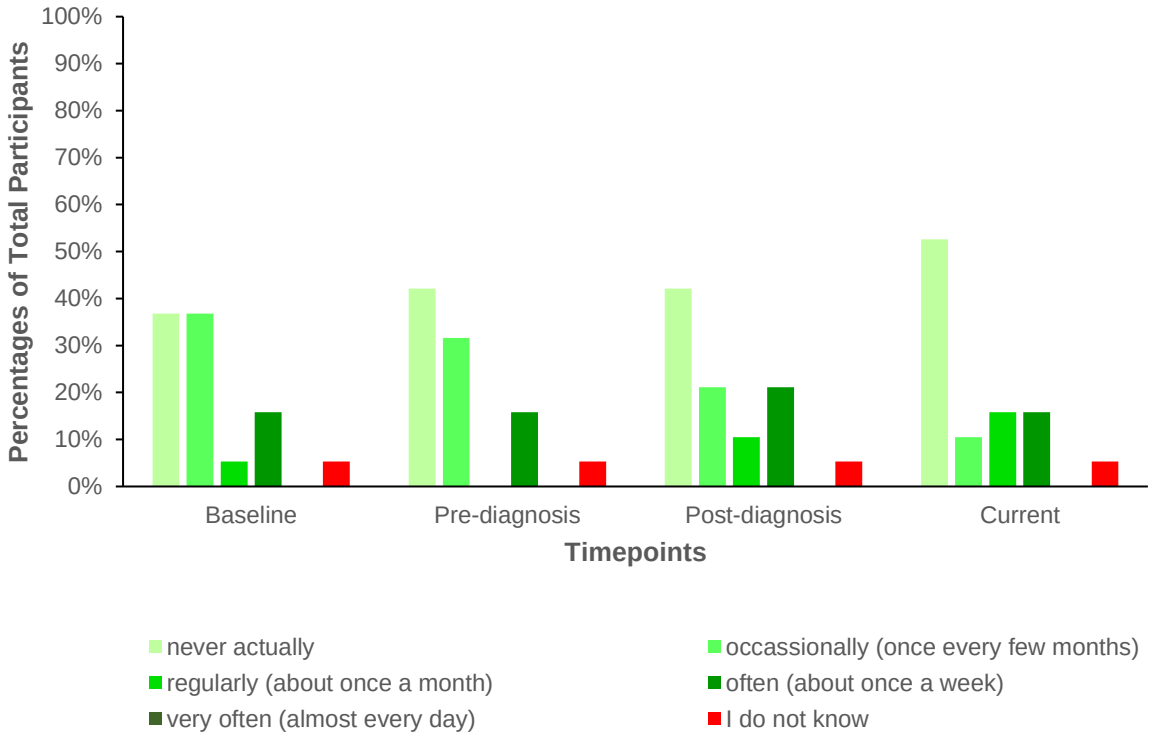


Figure D7

*Creativity domain: science/technology (solving technical problems, computer programming, etc.) (*N = *19)*

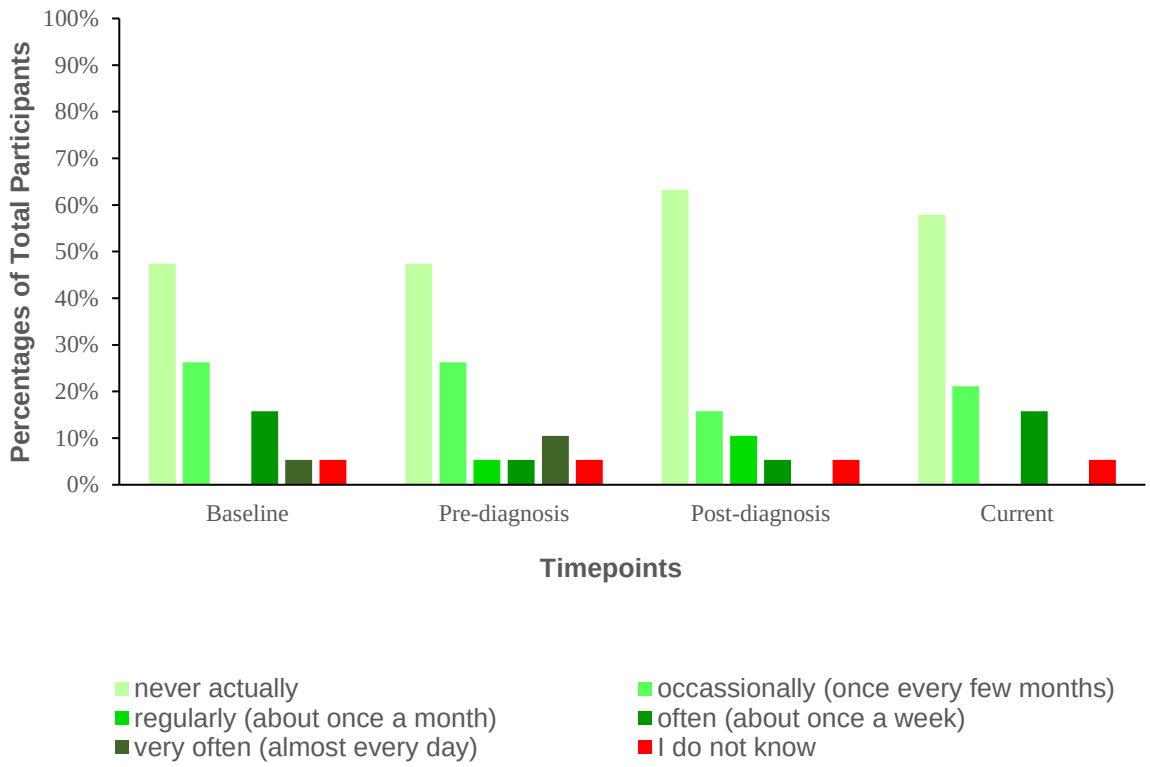


Figure D8

*Creativity domain: social (inventing games, organizing parties, etc.) (*N = *19)*

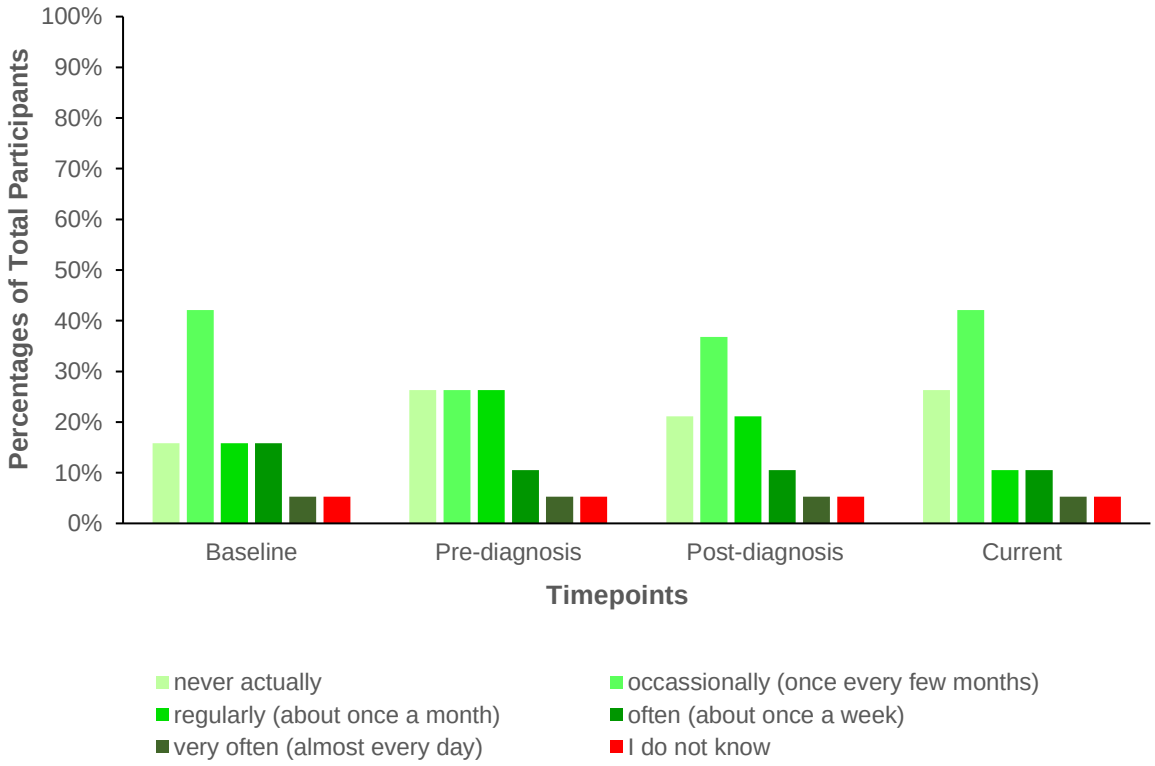
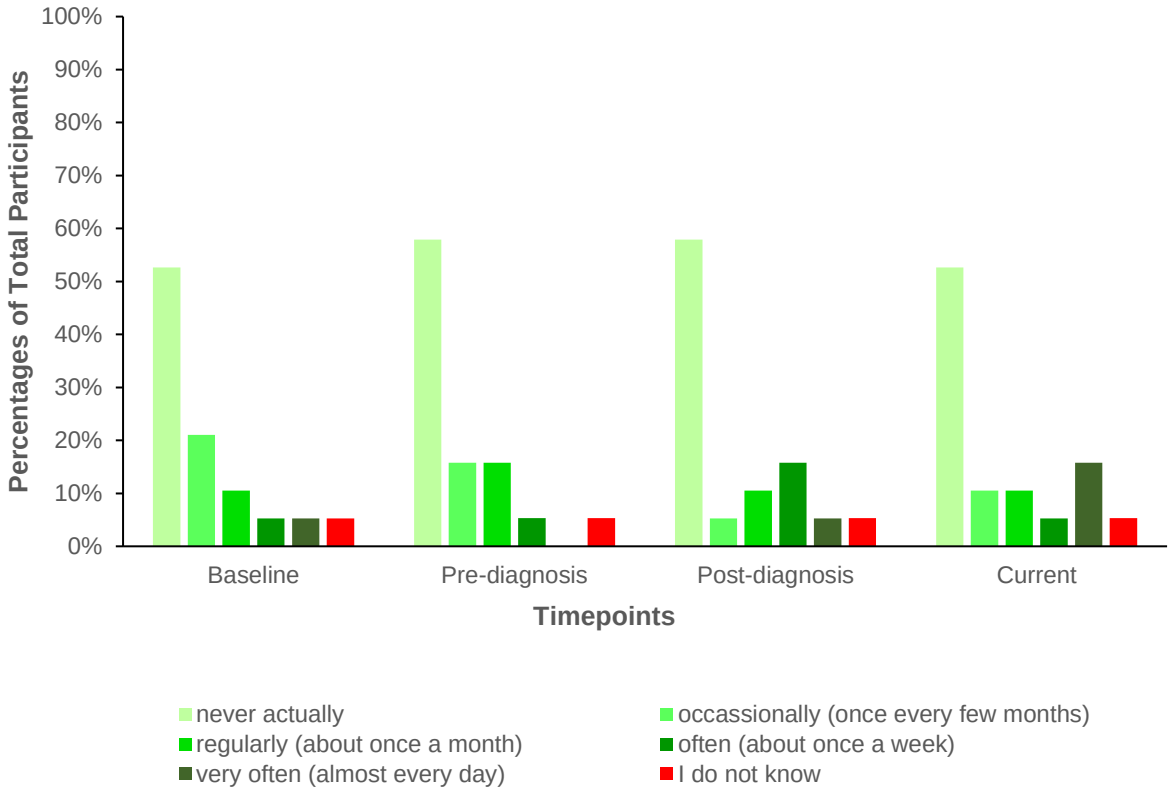


Figure D9

*Creativity domain: literature (writing texts, blogs, poems, etc.) (*N = *19)*



Adapted Types of PD Medications and Their Brand Names for PD Patients in Austria

Table E1

List of medications (adapted for Austrian population)

Class of drugs	Active ingredient and brand names
Levodopa	Carbidopa: Sinemet,Sinemet retard, LevoCar retard
	Benserazide: Madopar, Madopar löslich, Madopar CR (retard)
	Carbidopa: Duodopa, Duodenal-Pumpe
Dopaminerge Agonisten	Pramipexol: Mirapex, Glepark, Sifrol, Calmolan, Oprymea, diverse Pramipexol Generika
	Ropinirol: Requip, Requip modutab (retard), diverse Ropinirol Generika
	Rotigotine: Neupro (transdermal patch), Neupro TTS
	Pomorphine: (APO-go)
	Pramipexol: Mirapex, Glepark, Sifrol, Calmolan, Oprymea, diverse Pramipexol Generika
MAO-B inhibitors	Safinamide: Xadago
	Selegiline: Selegiline, Jumex
	Rasagiline: Azilect, Rasigerolan, diverse Rasagilin Generika
COMT inhibitors	Tolcapon: Tasmar
	Opicapone: Ongentyse
	Entacapon: Comtan, Comtess, Entacapon, in combination of Levodopa/Carbidopa/Entacapon (Firm names: Corbilta, Pentiro, Sastravi, Trigelan)
Parasympathicolytica (Anticholinergica)	Biperideen (Firm name: Akineton)
	Trihexyfenidyl: Artane, Trihexane. (not available in Austria, possible order through international pharmacy)
Cholinesterase inhibitors	Donepezil: Navazil, Aricept
	Rivastigmine: Exelon, Prometax, Rivastigmine, Nimvastid, Rivagelan
Amantadine	Amantadine (Symmetrel) as PK-Merz
Others	Bornaprin (Sormodren)
	Cabergolin (Cabaseril, Dostinex)

Appendix F

The Paper Version of the Prevalence Survey Running in Austria

The online version of this survey can be accessed at:
https://sosci.univie.ac.at/vincent_studienanmeldung/

Radboudumc university medical center

universität wien

Kreativität bei Menschen mit Morbus Parkinson

Einige Menschen mit Parkinson-Krankheit erleben Veränderungen in der Kreativität, andere überhaupt nicht. Um es besser zu verstehen, warum Menschen hierbei unterschiedliche Erfahrungen machen, untersuchen wir Faktoren, die diesen Kreativitätswandel beeinflussen können. Die folgenden Fragen beziehen sich auf Ihre Erfahrung mit Kreativität.
Die Studie startet mit einer sehr kleinen Vorstudie, die nur 2 Fragen enthält. Danach können Sie sich für die epidemiologische Hauptstudie anmelden, wenn Sie das möchten.

Wir wären Ihnen sehr dankbar, wenn Sie jedenfalls nur die zwei kurzen Fragen beantworten würden, unabhängig davon, ob Sie an der Hauptumfrage teilnehmen möchten. Für die Beantwortung dieser beiden Fragen benötigen wir zunächst Ihr Einverständnis.

Einverständniserklärung für die Vorstudie (2 Fragen) von Morbus Parkinson und Kreativität

* Ich habe das Informationsschreiben gelesen. Ich könnte zusätzliche Fragen stellen. Meine Fragen sind ausreichend beantwortet worden. Ich hatte genug Zeit, um mich für eine Teilnahme zu entscheiden.

* Ich weiß, dass die Forschungsdaten aus dieser Studie in einen Computer an der Universität Wien eingetragen und gespeichert werden. Die Papierversion wird an einem sicheren Ort als Dokument abgelegt und an der Universität Wien aufbewahrt.

* Ich weiß, dass die Teilnahme an dieser Studie völlig freiwillig ist. Ich weiß, dass ich mich jederzeit entscheiden kann, aufzuhören. Ich muss dafür keinen Grund angeben.

Ich bin damit einverstanden, an der Studie zur Kreativität und Morbus Parkinson teilzunehmen

(Kreuzen Sie das zutreffende Kästchen an. Beachten Sie, dass Sie ohne Ihre Bestätigung nicht an dieser Studie teilnehmen können.):

☐ Ja
☐ Nein

Haben Sie Veränderungen in Ihrer eigenen Kreativität oder in Ihrem Wunsch, etwas Kreatives zu schaffen, bemerkt, von dem Sie glauben, dass es mit Ihrem Leben mit der Parkinson-Krankheit zusammenhängt?

Dies beinhaltete sowohl das Gefühl weniger oder mehr kreativ zu sein, sowie das Bedürfnis kreative Aktivitäten zu unternehmen (z. B. Malen, Zeichnen, Schreiben, Musik, Tanzen, Fotografieren, kreatives Gärtnern, Nähen usw.).

☐ Ja, ich habe eine Veränderung in meiner Kreativität bemerkt
☐ Nein, ich habe keine Veränderung bemerkt

Radboudumc university medical center

universität wien

Inwieweit haben Sie sich bevor Sie mit Morbus Parkinson diagnostiziert worden sind kreativ betätigt oder waren Sie kreativ?

1	2	3	4	5	6	7
Überhaupt nicht						Sehr oft

Bitte kreuzen Sie das zutreffende Kästchen an, inwieweit sie Ihre kreativen Aktivitäten bevor Ihre Diagnose mit der Parkinson-Krankheit am besten schätzen.
Zum Beispiel, wenn Sie glauben, dass Sie zwischen manchmal und sehr oft kreativ beschäftigt waren, kreuzen Sie entweder die Kästchen Nr. 5 oder Nr. 6

Für unsere epidemiologische Hauptstudie suchen wir sowohl Personen mit Morbus Parkinson, die Veränderungen in ihrer Kreativität bemerkt haben, als auch Personen, die keine Veränderungen erfahren haben.

Dürfen wir Ihnen die Unterlagen für die Hauptumfrage zusenden?

☐ Ja, ich interessiere mich an der Studie und möchte die Unterlagen zugesendet bekommen.

☐ Nein, Ich interessiere mich nicht.

Wenn ja, wie würden Sie gerne teilnehmen?

☐ Ich möchte online teilnehmen, bitte senden Sie mir den Link.
Meine E-Mail Adresse ist: .....

☐ Ich möchte per Telefonanruf kontaktiert werden.
Meine Telefonnummer ist: .....

☐ Ich möchte eine Papierversion der Umfrage.
Meine Postadresse ist: .....

.....

Hiermit bestätige ich, dass dies meine Telefonnummer oder Name/Post Adresse ist, die verwendet werden kann, um mich für die epidemiologischer Hauptstudie zu informieren und einzuladen.
Ihre Telefonnummer oder Name und Post Adresse werden separat gespeichert und daher nicht direkt zusammen mit anderen Umfrage- oder Folgeumfragedaten in Zusammenhang gebracht. Weder die Kontaktdaten noch ein Name, werden zusammen mit den Fragebogendaten gespeichert. Nur ein Referenzcode kann die eingegebenen Fragebogendaten mit Ihren Kontaktdaten verbinden. Der Referenzcode ist eine zufällige Code-ID.

☐ Ja, ich stimme zu

Radboudumc
university medical center

universität wien

Vielen Dank für Ihr Interesse an unserer Studie!

Wir werden im Juni 2021 mit der epidemiologischen Studie beginnen.

Kontaktpersonen:

- Asst.-Prof. Dr. Matthew Pelowski (Projektleiter Österreich)
- Mag. Blanca Spee, M.Sc. (Versuchsleiterin Österreich und Niederlande)
- Yosefin Himmelbauer, B. Mus. (Studentische Unterstützung Österreich)

Leitung:
Universität Wien, Institut für Psychologie & Radboud University Medical Center
Das Projekt ist gefördert von der Österreichischen Austauschdienstgesellschaft (OeAD)
E-Mail-Adresse: kreativpark.psychologie@univie.ac.at
Telefon-Nr.: 0650 3492030

Appendix G

The Paper Version of the Main Study Survey Running in Austria

The online version of this survey can be accessed at:

https://sosci.univie.ac.at/vincent_at/

TeilnehmerInneninformation und Einwilligungserklärung zur Teilnahme an der Studie:

Eine epidemiologische Fragebogenstudie zur Untersuchung der Kreativität in Personen mit Morbus Parkinson

Sehr geehrte Teilnehmerin, sehr geehrter Teilnehmer,

wir laden Sie ein, an der oben genannten Studie teilzunehmen.

Ihre Teilnahme an dieser Studie erfolgt freiwillig. Sie können jederzeit, ohne Angabe von Gründen, Ihre Bereitschaft zur Teilnahme ablehnen oder auch im Verlauf der Studie zurückziehen. Die Ablehnung der Teilnahme oder ein vorzeitiges Ausscheiden aus dieser Studie hat keine nachteiligen Folgen für Sie.

Diese Art von Studien ist notwendig, um verlässliche neue *wissenschaftliche* Forschungsergebnisse zu gewinnen. Unverzichtbare Voraussetzung für die Durchführung von der Studie ist jedoch, dass Sie Ihr Einverständnis zur Teilnahme an dieser Studie schriftlich erklären. Bitte lesen Sie den folgenden Text durch und zögern Sie nicht, Fragen zu stellen und den Studienleiter oder die Studienleiterin zu kontaktieren.

Bitte unterschreiben Sie die Einwilligungserklärung nur

- wenn Sie Art und Ablauf der Studie vollständig verstanden haben,
- wenn Sie bereit sind, der Teilnahme zuzustimmen und
- wenn Sie sich über Ihre Rechte als TeilnehmerIn an dieser Studie im Klaren sind.

1. Was ist der Zweck der Studie?

Der Zweck der Studie ist die Untersuchung von Personen mit Morbus Parkinson und Ihrer Beziehung zum Kreativsein. Hierbei erforschen wir sowohl Personen, die eine Veränderung in Ihrem Gefühl kreativ zu sein bzw. eine Veränderung in Ihren kreativen Aktivitäten wahrgenommen haben; als auch Personen, die keine Veränderung wahrgenommen haben. Das Ziel der Studie ist es Faktoren zu identifizieren, die für die wahrgenommene und die verhaltensmäßig ausgedrückte Veränderung in der Kreativität (kreative Aktivitäten) für Parkinson-PatientInnen entscheidend sind und welche nicht. Weiterhin wollen wir untersuchen, in welchem zeitlichen Verlauf diese Veränderungen, sofern vorhanden, auftreten und wann nicht.

2. Wie läuft die Studie ab?

Die Studie wird von der Universität Wien (Fakultät für Psychologie) durchgeführt und die Universität Wien ist die leitende Institution. Die Studie ist ein Kollaborationsprojekt mit der Radboud University Medical Center, Nijmegen in den Niederlanden. Die Studie dauert insgesamt ca. 45-60 Minuten. Sie können sich solange Zeit nehmen wie sich möchten und auch Pausen einlegen. Wir bitten Sie jedoch innerhalb von 14 Tagen den Fragebogen fertig auszufüllen. Alle TeilnehmerInnen durchlaufen den folgenden Prozess: Der Fragebogen beginnt mit einigen allgemeine demographische Fragen. Darauf folgen Fragen zu Ihrer Persönlichkeit und Fragen zu Ihrer Erfahrung mit Kreativität. Es gibt

keine "richtigen" oder "falschen" Antworten. Wenn Ihre passende Antwort nicht angezeigt ist oder Sie sich der Antwort nicht sicher sind, wählen Sie bitte diejenige, die am besten auf Sie zutrifft.

3. Worin liegt der Nutzen einer Teilnahme an der Studie?

Die Teilnehmenden können durch die Teilnahme einen Einblick in die wissenschaftliche, psychologische Praxis gewinnen. Der indirekte Nutzen der Studie ist, dass mit der Teilnahme helfen, die Grundlagen des menschlichen Verhaltens, das Phänomen von Parkinson-Krankheit und der Kreativität besser zu verstehen. Hierdurch können die Teilnehmenden indirekt für die Entwicklung von neue Therapiemethoden und von transdisziplinärer Forschung beitragen. Sofern die Teilnehmenden sich für das Projekt interessieren, können Sie gerne nach der Studie sich an den Studienleiter oder die Studienleiterin wenden, um weitere Informationen zu erhalten.

4. Gibt es Risiken bei der Durchführung der Studie und ist mit Beschwerden oder anderen Begleiterscheinungen zu rechnen?

Bei der Durchführung der Studie ist mit keinen Beschwerden oder anderen Begleiterscheinungen zu rechnen.

5. Hat die Teilnahme an der Studie sonstige Auswirkungen auf die Lebensführung und welche Verpflichtungen ergeben sich daraus?

Die Teilnahme an der Studie hat keinerlei sonstige Auswirkungen auf Ihre Lebensführung und es ergeben sich daraus keine Verpflichtungen.

6. Was ist zu tun beim Auftreten von Beschwerdesymptomen, unerwünschten Begleiterscheinungen und/oder Verletzungen?

Da es sich um nicht-invasive Verfahren handelt, sind keine Risiken oder Symptome, Begleiterscheinungen und/oder Verletzungen zu erwarten. Sollten wider Erwarten im Verlauf der Studie irgendwelche beschwerlichen Symptome auftreten, bitten wir Sie zu pausieren. Sie haben maximal 14 Tage Zeit den Fragebogen fertig auszufüllen.

7. Wann wird die Studie vorzeitig beendet?

Sie können jederzeit, auch ohne Angabe von Gründen, Ihre Teilnahmebereitschaft widerrufen und aus der Studie ausscheiden, ohne dass Ihnen dadurch irgendwelche Nachteile entstehen.

Ihre Studienleiter werden Sie über alle neuen Erkenntnisse, die in Bezug auf diese Studie bekannt werden, und für Sie wesentlich werden könnten, umgehend informieren. Auf dieser Basis können Sie dann Ihre Entscheidung zur weiteren Teilnahme an dieser Studie neu überdenken.

8. In welcher Weise werden die im Rahmen dieser Studie gesammelten Daten verwendet?

Ihre Daten sind Ihrer Person nicht direkt zuordenbar. Die Daten werden in einer separaten Datei nur über einen randomisierten Code mit Ihren Kontaktdaten in Verbindung gebracht. Nur Sie können eine Löschung der Daten nach Ihrer Teilnahme bei Frau Spee unter blanca.spee@univie.ac.at beantragen. Die Datenlöschung kann bis zu 6 Wochen nach der Datenerhebung verlangt werden. Diese 6 Wochen ist die

vorgelegte Frist wo wir Ihre Kontaktdaten (E-Mail Adresse, Postadresse, oder Telefonnummer) aufbewahren. Danach werden Ihre Kontaktdaten gelöscht und Ihre Fragebogendaten sind vollständig anonym. Ihre personenbezogenen Daten wie Beziehungsstatus, sexuelle Orientierung, Alter und Geschlecht werden in keiner Weise genannt und es können keine Rückschlüsse auf die TeilnehmerInnen gezogen werden. Nur die Studienleitung und ihre MitarbeiterInnen haben Zugriff auf Ihre Daten und sind zur Verschwiegenheit verpflichtet. Die Weitergabe der Daten erfolgt ausschließlich zu statistischen Zwecken. Auch in etwaigen Veröffentlichungen der Daten dieser Studie können keine Rückschlüsse von Ihren personenbezogenen Daten auf Sie gezogen werden.

9. Entstehen für die TeilnehmerInnen Kosten? Gibt es einen Kostenersatz oder eine Vergütung?

Für Ihre Teilnahme an der Studie erhalten Sie keinerlei Vergütung.

10. Möglichkeit zur Diskussion weiterer Fragen

Für weitere Fragen im Zusammenhang mit dieser Studie stehen Ihnen Ihre Studienleitung und ihre MitarbeiterInnen gerne zur Verfügung. Auch Fragen, die Ihre Rechte als ProbandIn in dieser Studie betreffen, werden Ihnen gerne beantwortet.

Namen der Kontaktperson bzw. der Kontaktpersonen:

Versuchsleiterin	Name: Mag. Blanca T.M. Spee, M.Sc. E-Mail: blanca.spee@univie.ac.at Tel.: +43 (0)699 1888 7333
Supervision	Name: Asst.-Prof. Dr. Matthew Pelowski E-Mail: matthew.pelowski@univie.ac.at
Weitere relevante Personen	Name: Yosefin Himmelbauer, B. Mus. E-Mail: a11850529@unet.univie.ac.at Tel.: +43 (0) 677 610 11580

11. Einwilligungserklärung

Ich erkläre mich bereit, an der Studie ***Eine epidemiologische Fragebogenstudie zur Untersuchung der Kreativität in Personen mit Morbus Parkinson*** teilzunehmen.

Ich bin ausführlich und verständlich über Zielsetzung, Bedeutung und Tragweite der Studie und die sich für mich daraus ergebenden Anforderungen aufgeklärt worden. Ich habe darüber hinaus den Text dieser TeilnehmerInneninformation und Einwilligungserklärung gelesen, insbesondere den 4. Abschnitt (Gibt es Risiken, Beschwerden und Begleiterscheinungen?). Aufgetretene Fragen wurden mir von der Studienleitung verständlich und ausreichend beantwortet. Ich hatte genügend Zeit, mich zu entscheiden, ob ich an der Studie teilnehmen möchte. Ich habe zurzeit keine weiteren Fragen mehr.

Ich werde die Hinweise, die für die Durchführung der Studie erforderlich sind, befolgen, behalte mir jedoch das Recht vor, meine freiwillige Mitwirkung jederzeit zu beenden, ohne dass mir daraus Nachteile entstehen. Sollte ich aus der Studie ausscheiden wollen, so kann ich dies jeder Zeit schriftlich oder mündlich bei Blanca T.M. Spee veranlassen.

Ich bin zugleich damit einverstanden, dass meine im Rahmen dieser Studie erhobenen Daten gespeichert und ausgewertet werden.

Ich stimme zu, dass meine Daten dauerhaft in anonymisierter Form elektronisch gespeichert werden. Die Daten werden in einer nur der Projektleitung zugänglichen Form gespeichert, die gemäß aktuellen Standards gesichert ist.

Sollte ich zu einem späteren Zeitpunkt die Löschung meiner Daten wünschen, so kann ich dies schriftlich oder telefonisch ohne Angabe von Gründen und bis zu 6 Wochen nach meiner Teilnahme bei Fr. Spee unter blanca.spee@univie.ac.at veranlassen.

Den Aufklärungsteil habe ich gelesen und verstanden. Ich konnte im Aufklärungsgespräch alle mich interessierenden Fragen stellen. Sie wurden vollständig und verständlich beantwortet.

_____ (Unterschrift der Versuchsperson)

_____ (heutiges Datum)

Radboudumc
university medical center

universität wien

Herzlich Willkommen!

Vielen Dank für Ihr Interesse an der Studie, in der **der Zusammenhang zwischen der Parkinson-Krankheit und Kreativität untersucht** wird. Wir suchen nicht nur Personen, die eine Veränderung in ihrer Kreativität erfahren haben, sondern auch Personen, die keine Veränderung in ihrer Kreativität erfahren haben.
Der Fragebogen beginnt mit einigen allgemeine Fragen über Ihre Person. Darauf folgen Fragen zu Ihrer Persönlichkeit und Fragen zu Ihrer Erfahrung mit Kreativität. Es gibt keine "richtigen" oder "falschen" Antworten. Wenn Ihre passende Antwort nicht angezeigt ist oder Sie sich der Antwort nicht sicher sind, wählen Sie bitte diejenige, die am besten auf Sie zutrifft.
Das Ausfüllen des gesamten Fragebogens dauert **45 bis 60 Minuten**. Sie können jederzeit entscheiden, Ihre Teilnahme an der Umfrage abzubrechen. Sie müssen keinen Grund dafür angeben.
Für diese Studie, arbeiten Forscher*innen **Universität Wien, Österreich** mit Forscher*innen der Abteilung für Neurologie des **Radboud University Medical Center, Nijmegen, Niederlande** zusammen. Ihre persönlichen Daten und Ihre Antworten in den Fragebögen werden separat auf einem sicheren Server der Universität Wien gespeichert. Um Ihre Privatsphäre zu gewährleisten, speichern wir Ihre Antworten unter einem einzigartigen Code. Somit sind Ihre Daten anonym. Ihre anonymen Fragebogenantworten werden dann zur Analyse verarbeitet. Nur das Forschungsteam hat Zugriff auf Ihre persönlichen Daten und Ihre anonymen Forschungsdaten. Spätestens 6 Monate nach dem Studienende werden Ihre personenbezogenen Daten dauerhaft gelöscht. Alle anderen Forschungsdaten werden zur weiteren Erforschung aufbewahrt.

Radboudumc

universität wien

Was ist Ihr Geschlecht?

☐ Männlich

☐ Weiblich

☐ Andere: ....

☐ Ich möchte es lieber nicht zu sagen

Wie alt sind Sie?

In Zahlen: ☐

In welchem Alter begannen die Symptome, die Sie jetzt mit der Parkinson-Krankheit in Verbindung bringen können?

In Zahlen: ☐

☐ Ich weiß es nicht.

In welchem Alter wurde bei Ihnen die Parkinson-Krankheit diagnostiziert?

In Zahlen: ☐

☐ Ich weiß es nicht.

Wie lange nach Ihrer Diagnose haben Sie begonnen, Medikamente gegen Ihre Parkinson-Symptome einzunehmen?

☐ Direkt nach meiner Diagnose

☐ Nach 1 Monat

☐ Nach 3 Monaten

☐ Nach 6 Monaten

☐ Nach einem Jahr oder länger

☐ Ich kann mich nicht erinnern.

☐ Ich habe noch nicht mit der medikamentösen Behandlung begonnen.

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc universität wien

Wenn Sie an die Zeit um Ihre Diagnose zurückdenken (ungefähr die ERSTE 3 Monate), welche Art von Medikamenten gegen Ihre Parkinson-Krankheit haben Sie eingenommen? (mehrere Optionen möglich)

☐ Ich habe mit der medikamentöse Behandlungen noch nicht begonnen.

☐ Ich weiß es nicht.

☐ **Levodopa:**

- ☐ Levodopa/carbidopa – Sinemet,Sinemet retard, LevoCar retard
- ☐ Levodopa/benserazide – Madopar, Madopar löslich, Madopar CR (retard)
- ☐ Levodopa/carbidopa – Duodopa, Duodenal-Pumpe

☐ **Dopaminerge agonisten:**

- ☐ Pramipexol – Mirapex, Glepark, Sifrol, Calmolan, (Oprymea), diverse Pramipexol Generika
- ☐ Ropinirol – Reqnip, Reqnip modutab (retard), diverse Ropinirol Generika
- ☐ Rotigotine – Neupro = transdermal patch, Neupro TTS
- ☐ Apomorphine (APO-go)

☐ **MAO-B Inhibitor:**

- ☐ Safinamide – Xadago
- ☐ Selegiline – Selegiline, Jumex
- ☐ Rasagiline – Azilect, Rasigerolan, diverse Rasagilin Generika

☐ **COMT-Inhibitors:**

- ☐ Tolcapon – Tasmar
- ☐ Opicapone – Ongentyse
- ☐ Entacapon – Comtan, Comtess, Entacapon, als Kombination: Levodopa/Carbidopa/Entacapon (Handelsname: Corbilta, Pentiro, Sastravi, Trigelan)

☐ **Parasympathicolytica (Anticholinergica):**

- ☐ Biperideen (Handlesname: Akineton)
- ☐ Trihexyfenidyl: Artane, Trihexane.(In Österreich nicht erhältlich, Bestellung über internationale Apotheke)

☐ **Cholinesterase-inhibitors:**

- ☐ Donepezil – Navazil, Aricept
- ☐ Rivastigmine – Exelon, Prometax, Rivastigmine, Nimvastid, Rivagelan

☐ **Amantadine:**

- ☐ Amantadine (Symmetrel) als PK-Merz

☐ **Sonstige:**

- ☐ Bornaprin (Sormodren)
- ☐ Cabergolin (Cabaseril, Dostinex)

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

Haben Sie eine künstlerische, kreative Ausbildung erhalten?

Haben Sie erhalten…	Keine	ein paar (max. 3) Kurse	mehrere Kurse (als Hobby)	mehrere Kurse (als Ausbildung, beruflich)	ein abgeschlossenes Studium
… eine **theoretische** Ausbildung im Bereich der **darstellende** Künst?	☐	☐	☐	☐	☐
…eine **kunsthistorische** Ausbildung?	☐	☐	☐	☐	☐
… eine **praktische Ausbildung** in Kunst?	☐	☐	☐	☐	☐
… eine andere Art der Kunstausbildung?	☐	☐	☐	☐	☐

Sind Sie derzeit berufstätig?

☐ Vollzeitbeschäftigung
☐ Teilzeitbeschäftigung
☐ Selbständig
☐ Pensioniert
☐ Freiwillige/r
☐ In Weiterbildung (nicht vom Arbeitgeber bezahlt)
☐ Arbeitslos
☐ Arbeitsunfähig
☐ Aktiv im Haushalt, Betreuung von Kindern oder andere Personen
☐ Im Krankenstand

Welche Art von Arbeit haben Sie während Ihrer ersten 5 Jahre Ihrer beruflichen Laufbahn ausgeübt? *(Bitte schreiben Sie Ihre Antwort in das Feld unten)*

Welche Art von Arbeit haben Sie während Ihrer letzten 5 Jahre Ihrer beruflichen Laufbahn ausgeübt? *(Bitte schreiben Sie Ihre Antwort in das Feld unten)*

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboud umc

universität wien

Auf den nächsten 4 Seiten werden wir Ihnen einige Fragen zu Ihrer eigenen Erfahrung mit Kreativität stellen.

Wir werden Fragen sowohl zu Ihrem Gefühl kreativ zu sein als auch zu Ihren kreativen Aktivitäten stellen. Wir möchten auch wissen, wie sich Ihr Gefühl kreativ zu sein und Ihre kreativen Aktivitäten möglicherweise geändert haben. Wir werden 4 Zeitpunkte fragen:

I. BEVOR Sie Parkinson-bedingte SYMPTOME bemerkt haben.

II. NACHDEM Sie die SYMPTOME der Parkinson-Krankheit bemerkt haben, aber BEVOR Ihrer DIAGNOSE.

III. NACH Ihrer DIAGNOSE mit Parkinson.

IV. In den LETZTEN 3 MONATEN bis HEUTE.

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

I. BEVOR Sie die SYMPTOME der Parkinson-Krankheit bemerkt haben.

Bitte kreuzen Sie das Kästchen unter die jeweilige Zahl an, welche Position Ihrer Meinung nach am besten Ihre eigenen Erfahrungen mit Kreativität beschreibt. *(Falls Sie keine Änderung bemerkt haben, können Sie unter die Zahl 5 ankreuzen)*

Ihr Gefühl, kreativ zu sein

Bevor ich Parkinson-bedingte **Symptome** in mir bemerkte, **fühlte ich mich**:

	0	1	2	3	4	5	6	7	8	9	10	
Überhaupt nicht kreativ	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	**Sehr kreativ**

Ihre kreativen Aktivitäten im Allgemeinen

Bevor ich Parkinson-bedingte **Symptome** in mir bemerkte, habe ich:

	0	1	2	3	4	5	6	7	8	9	10	
Niemals etwas Kreatives getan	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	**Sehr oft etwas kreatives getan**

Wie oft haben Sie sich, BEVOR Sie die Parkinson-bedingte Symptome bemerkt hatten, mit kreativen Aktivitäten aus in den unten genannten Bereichen in Ihrer Freizeit beschäftigt?

	Eigentlich nie	Gelegentlich (Wenige Male pro Jahr)	Regelmäßig (Etwa 1 Mal pro Monat)	Häufig (Etwa 1 Mal pro Woche)	Sehr häufig (fast jeden Tag)	Ich weiß es nicht
Im Bereich **Literatur** (Texte, Blogeinträge, Gedichte scheiben etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Musik** (Melodien komponieren, adaptieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Handwerk** (Geschenke basteln, Kleidung/Schmuck herstellen etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Gestaltung** (in Wohnung, Garten etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Kochen** (neue Gerichte, Drinks kreieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **bildender Kunst** (Malen, kreatives Fotografieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **darstellender Kunst** (Theater, Tanz etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Technik und Wissenschaft** (Experimentieren, Entwickeln, Programmieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Soziales** (Spiele ausdenken, Feiern planen etc.)	☐	☐	☐	☐	☐	☐

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

II. NACHDEM Sie die SYMPTOME der Parkinson Krankheit bemerkten, aber BEVOR Ihrer DIAGNOSE. (Diese Symptome können alle Arten von Symptomen sein, die Sie persönlich mit der Parkinson-Krankheit in Verbindung bringen.)

Bitte kreuzen Sie das Kästchen unter die jeweilige Zahl an, welche Position Ihrer Meinung nach am besten Ihre eigenen Erfahrungen mit Kreativität beschreibt. *(Falls Sie keine Änderung bemerkt haben, können Sie unter die Zahl 0 ankreuzen)*

Ihr Gefühl, kreativ zu sein: Nachdem ich die ersten Parkinson-bedingte Symptome in mir selbst bemerkt hatte, merkte ich in meinem Gefühl, kreativ zu sein:

	-5	-4	-3	-2	-1	0	1	2	3	4	5	
Eine Reduktion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Einen Anstieg

Ihre kreativen Aktivitäten im Allgemein: Nachdem ich die ersten Parkinson-bedingte Symptome in mir selbst bemerkt hatte, merkte ich, in meine kreativen Aktivitäten:

	-5	-4	-3	-2	-1	0	1	2	3	4	5	
Eine Reduktion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Einen Anstieg

Wie oft haben Sie sich NACHDEM Sie Symptome bemerkt hatten, aber BEVOR bei Ihnen Parkinson diagnostiziert wurden, mit kreativen Aktivitäten aus in den unten genannten Bereichen in Ihrer Freizeit beschäftigt?

	Eigentlich nie	Gelegentlich (Wenige Male pro Jahr)	Regelmäßig (Etwa 1 Mal pro Monat)	Häufig (Etwa 1 Mal pro Woche)	Sehr häufig (fast jeden Tag)	Ich weiß es nicht
Im Bereich **Literatur** (Texte, Blogeinträge, Gedichte scheiben etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Musik** (Melodien komponieren, adaptieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Handwerk** (Geschenke basteln, Kleidung/Schmuck herstellen etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Gestaltung** (in Wohnung, Garten etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Kochen** (neue Gerichte, Drinks kreieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **bildender Kunst** (Malen, kreatives Fotografieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **darstellender Kunst** (Theater, Tanz etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Technik und Wissenschaft** (Experimentieren, Entwickeln, Programmieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Soziales** (Spiele ausdenken, Feiern planen etc.)	☐	☐	☐	☐	☐	☐

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc universität wien

III. NACH Ihre Diagnose mit PARKINSON.

Bitte kreuzen Sie das Kästchen unter die jeweilige Zahl an, welche Position Ihrer Meinung nach am besten Ihre eigenen Erfahrungen mit Kreativität beschreibt. *(Falls Sie keine Änderung bemerkt haben, können Sie unter die Zahl 0 ankreuzen)*

Ihr Gefühl, kreativ zu sein

Nach meiner Diagnose mit Parkinson, merkte ich in meinem Gefühl, kreativ zu sein:

	-5	-4	-3	-2	-1	0	1	2	3	4	5	
Eine Reduktion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	**Einen Anstieg**

Ihre kreativen Aktivitäten im Allgemein

Nach meiner Diagnose mit der Parkinson merkte ich, in meinen kreativen Aktivitäten:

	-5	-4	-3	-2	-1	0	1	2	3	4	5	
Eine Reduktion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	**Einen Anstieg**

Wie oft haben Sie sich NACH Ihre Diagnose mit Parkinson mit kreativen Aktivitäten aus in den unten genannten Bereichen in Ihrer Freizeit ungefähr beschäftigt?

	Eigentlich nie	Gelegentlich (Wenige Male pro Jahr)	Regelmäßig (Etwa 1 Mal pro Monat)	Häufig (Etwa 1 Mal pro Woche)	Sehr häufig (fast jeden Tag)	Ich weiß es nicht
Im Bereich **Literatur** (Texte, Blogeinträge, Gedichte scheiben etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Musik** (Melodien komponieren, adaptieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Handwerk** (Geschenke basteln, Kleidung/Schmuck herstellen etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Gestaltung** (in Wohnung, Garten etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Kochen** (neue Gerichte, Drinks kreieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **bildender Kunst** (Malen, kreatives Fotografieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **darstellender Kunst** (Theater, Tanz etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Technik und Wissenschaft** (Experimentieren, Entwickeln, Programmieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Soziales** (Spiele ausdenken, Feiern planen etc.)	☐	☐	☐	☐	☐	☐

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

IV. In die LETZTTEN 3 MONATEN bis HEUTE.

Bitte kreuzen Sie das Kästchen unter die jeweilige Zahl an, welche Position Ihrer Meinung nach am besten Ihre eigenen Erfahrungen mit Kreativität beschreibt. *(Falls Sie keine Änderung bemerkt haben, können Sie unter die Zahl 0 ankreuzen)*

Ihr Gefühl, kreativ zu sein

In die letzten 3 Monaten bis heute, merkte ich in meinem Gefühl, kreativ zu sein:

	-5	-4	-3	-2	-1	0	1	2	3	4	5	
Eine Reduktion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	**Einen Anstieg**

Ihre kreativen Aktivitäten im Allgemein

In den letzten 3 Monaten bis heute, merkte ich in meinen kreativen Aktivitäten:

	-5	-4	-3	-2	-1	0	1	2	3	4	5	
Eine Reduktion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	**Einen Anstieg**

Wie oft haben Sie sich in den LETZTEN 3 MONATEN bis HEUTE mit kreativen Aktivitäten aus in den unten genannten Bereichen in Ihrer Freizeit ungefähr beschäftigt?

	Eigentlich nie	Gelegentlich (Wenige Male pro Jahr)	Regelmäßig (Etwa 1 Mal pro Monat)	Häufig (Etwa 1 Mal pro Woche)	Sehr häufig (fast jeden Tag)	Ich weiß es nicht
Im Bereich **Literatur** (Texte, Blogeinträge, Gedichte scheiben etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Musik** (Melodien komponieren, adaptieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Handwerk** (Geschenke basteln, Kleidung/Schmuck herstellen etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Gestaltung** (in Wohnung, Garten etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Kochen** (neue Gerichte, Drinks kreieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **bildender Kunst** (Malen, kreatives Fotografieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **darstellender Kunst** (Theater, Tanz etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Technik und Wissenschaft** (Experimentieren, Entwickeln, Programmieren etc.)	☐	☐	☐	☐	☐	☐
Im Bereich **Soziales** (Spiele ausdenken, Feiern planen etc.)	☐	☐	☐	☐	☐	☐

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

Bitte geben Sie an, inwieweit Ihrer Meinung nach die folgenden Faktoren zu einer Veränderung in Ihrer Kreativität beigetragen haben:

- ☐ Mein **Interesse an kreativen** Ausdrücken oder Aktivitäten (einschließlich künstlerisch) im Allgemeinen
- ☐ Mein **Interesse an der Schaffung** kreativer Ausdrucksformen oder Aktivitäten (auch künstlerische) (als Hobby oder beruflich)
- ☐ Mein **Beruf**
- ☐ Meine erhöhter Anteil an **Freizeit**
- ☐ Meine **Therapien**
- ☐ Empfehlung von meinen **Freunden und/oder meiner Familie**
- ☐ Meine **persönliche Reaktion** auf meine Lebenssituation nach der Diagnose
- ☐ Empfehlung von **meinem Arzt, Therapeuten und/oder meiner Krankenschwester/Krankenpfleger**
- ☐ Die Tragweite der **Krankheit**
- ☐ Die Aktivität gibt mir ein **belohnendes Gefühl**
- ☐ Parkinson **Medikamente**: .....
- ☐ Meine **Tiefe Hirnstimulation (DBS, deep brain stimulation)** (falls Sie schon eine hatten)
- ☐ Sonstige, nämlich: .....

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc universität wien

Welche Art von Medikamenten nehmen Sie derzeit (etwa die letzten drei Monate) ein? (mehrere Optionen möglich)

☐ Ich habe mit der medikamentöse Behandlungen noch nicht begonnen.

☐ Ich weiß es nicht

☐ **Levodopa:**

- ☐ Levodopa/carbidopa – Sinemet,Sinemet retard, LevoCar retard
- ☐ Levodopa/benserazide – Madopar, Madopar löslich, Madopar CR (retard)
- ☐ Levodopa/carbidopa – Duodopa, Duodenal-Pumpe

☐ **Dopaminerge agonisten:**

- ☐ Pramipexol – Mirapex, Glepark, Sifrol, Calmolan, (Oprymea), diverse Pramipexol Generika
- ☐ Ropinirol – Requip, Requip modutab (retard), diverse Ropinirol Generika
- ☐ Rotigotine – Neupro = transdermal patch, Neupro TTS
- ☐ Apomorphine (APO-go)

☐ **MAO-B Inhibitor:**

- ☐ Safinamide – Xadago
- ☐ Selegiline – Selegiline, Jumex
- ☐ Rasagiline – Azilect, Rasigerolan, diverse Rasagilin Generika

☐ **COMT-Inhibitors:**

- ☐ Tolcapon – Tasmar
- ☐ Opicapone – Ongentyse
- ☐ Entacapon – Comtan, Comtess, Entacapon, als Kombination: Levodopa/Carbidopa/Entacapon (Handelsname: Corbilta, Pentiro, Sastravi, Trigelan)

☐ **Parasympathicolytica (Anticholinergica):**

- ☐ Biperideen (Handelsname: Akineton)
- ☐ Trihexyfenidyl: Artane, Trihexane (In Österreich nicht erhältlich, Bestellung über Internationale Apotheke)

☐ **Cholinesterase-inhibitors:**

- ☐ Donepezil – Navazil, Aricept
- ☐ Rivastigmine – Exelon, Prometax, Rivastigmine, Nimvastid, Rivagelan

☐ **Amantadine:**

- ☐ Amantadine (Symmetrel) als PK-Merz

☐ **Sonstige:**

- ☐ Bornaprin (Sormodren)
- ☐ Cabergolin (Cabaseril, Dostinex)

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

Haben Sie derzeit nicht-medikamentöse Behandlungen für Ihre Parkinson-Krankheit?

- ☐ Tiefe Hirnstimulation (DBS: deep brain stimulation)
- ☐ Physiotherapie
- ☐ Ergotherapie
- ☐ Spezifisches Mobilitätstraining (z. B. Mensendieck von Cesar)
- ☐ Psychotherapie
- ☐ Sprach-Therapie (Logopädie)
- ☐ Kreative- / künstlerische Therapie
- ☐ Ernährungstherapie
- ☐ Sonstige, nämlich: .....
- ☐ Keine

Haben Sie seit Ihrer Parkinson-Diagnose Perioden erlebt, in denen Sie die folgenden Verhaltensweisen zeigten?

	Ja	Nein
Haben Sie immer und immer wieder das Gleiche getan?	☐	☐
Haben Sie mehr als sonst eingekauft (auch online)?	☐	☐
Haben Sie mehr als sonst an einem Glückspiel teilgenommen oder dem Wunsch dazu gehabt (auch online)?	☐	☐
Haben Sie eine ungewöhnliche Steigerung Ihrer Libido bemerkt?	☐	☐
Haben Sie mehr Medikamente eingenommen als verschrieben?	☐	☐
Haben Ihre Gewohnheiten oder Hobbyaktivitäten zugenommen?	☐	☐
Haben Sie eine Veränderung Ihrer Essgewohnheiten (z. B. häufigeres Naschen, nachts Essen) und eine Steigerung Ihres Appetits bemerkt?	☐	☐

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

Lesen Sie jede der folgenden Aussagen und geben Sie die Antwort, inwieweit die folgenden Aussagen auf Sie zu treffen?

Bitte geben Sie an, was Sie tatsächlich fühlen, nicht was Sie denken, dass Sie fühlen sollten.

Ich…	trifft überhaupt nicht zu	trifft eher nicht zu	weder noch	eher zutreffend	trifft voll und ganz zu
...bin eher zurückhaltend, reserviert.	☐	☐	☐	☐	☐
...schenke anderen leicht Vertrauen, glaube an das Gute im Menschen.	☐	☐	☐	☐	☐
...bin bequem, neige zur Faulheit.	☐	☐	☐	☐	☐
...bin entspannt, lasse mich durch Stress nicht aus der Ruhe bringen.	☐	☐	☐	☐	☐
...habe nur wenig künstlerisches Interesse.	☐	☐	☐	☐	☐
...gehe aus mir heraus, bin gesellig.	☐	☐	☐	☐	☐
...neige dazu, andere zu kritisieren.	☐	☐	☐	☐	☐
...erledige Aufgaben gründlich.	☐	☐	☐	☐	☐
...werde leicht nervös und unsicher.	☐	☐	☐	☐	☐
…habe eine aktive Vorstellungskraft, bin phantasievoll.	☐	☐	☐	☐	☐

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

In den folgenden Aussagen wird nach einer breiten Auswahl von Einstellungen, Erfahrungen und Überzeugungen, die Menschen haben, gefragt.

Bitte beantworten Sie jeden Punkt so, wie er Sie am besten beschreibt. Bitte beachten Sie, dass es keine richtigen oder falschen Antworten gibt – antworten Sie einfach so, wie es Ihnen am ehesten entspricht.

	Richtig	Falsch
Im Laufe meines Lebens habe ich festgestellt, dass ich selten starke positive oder negative Emotionen empfinde.	☐	☐
Ich habe manchmal das Gefühl gehabt, dass Fremde meine Gedanken lasen.	☐	☐
Meine Gedanken und Verhaltensweisen sind fast immer desorganisiert.	☐	☐
Generell ist es für mich wichtig, enge Beziehungen zu anderen Menschen zu haben.	☐	☐
Ich denke oft, dass ich Leute reden höre, nur um festzustellen, dass niemand da war.	☐	☐
Die meiste Zeit finde ich es sehr schwierig, meine Gedanken zu ordnen.	☐	☐
Ich habe es immer bevorzugt, von der Welt abgeschottet zu sein.	☐	☐
Ich habe gespürt, dass es Botschaften für mich in der Art und Weise gab, wie die Dinge angeordnet waren, wie Möbel in einem Raum.	☐	☐
Ich habe oft Schwierigkeiten, dem zu folgen, was jemand zu mir sagt.	☐	☐
Wenn ich die Wahl hätte, würde ich viel lieber mit einem anderen Menschen zusammen sein als allein.	☐	☐
Ich glaube, dass Träume magische Eigenschaften haben.	☐	☐
Ich fühle mich oft so durcheinander, dass ich Schwierigkeiten habe zu funktionieren.	☐	☐
Im Laufe meines Lebens gab es nur sehr wenige Dinge, die für mich spannend oder interessant waren.	☐	☐
Ich frage mich manchmal, ob es eine kleine Gruppe von Menschen gibt, die das Verhalten aller anderen kontrollieren kann.	☐	☐
Meine Gedanken sind so verschwommen und unklar, dass ich mir wünsche, ich könnte einfach nach oben greifen und sie zurechtrücken.	☐	☐
Enge Freunde zu haben ist nicht so wichtig, wie die Leute sagen.	☐	☐
Ich hatte kurzzeitig das Gefühl, dass der Platz von jemandem durch einen Doppelgänger eingenommen wurde.	☐	☐
Meine Gedanken und Verhaltensweisen fühlen sich zufällig und unkonzentriert an.	☐	☐
Im Allgemeinen habe ich nicht viele Gedanken oder Gefühle.	☐	☐
Es gibt Zeiten, in denen es sich anfühlt, als würde mich jemand berühren, obwohl eigentlich niemand da ist.	☐	☐
Egal wie sehr ich es versuche, ich kann meine Gedanken nicht ordnen.	☐	☐
Mein ganzes Leben lang hatte ich wenig Interesse daran, mich zu verabreden oder in einer romantischen Beziehung zu sein.	☐	☐

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboud umc

universität wien

	Richtig	Falsch
Ich habe Erfahrungen mit dem Sehen der Zukunft, der außersinnlichen Wahrnehmung oder einem sechsten Sinn gemacht.	☐	☐
Ich stelle fest, dass ich sehr oft verwirrt bin über das, was um mich herum vor sich geht.	☐	☐
Die meiste Zeit habe ich das Bedürfnis, mit anderen Menschen verbunden zu sein.	☐	☐
Ich mache mir oft Sorgen, dass andere Leute mich holen wollen.	☐	☐
Die Leute finden meine Unterhaltungen verwirrend oder schwer zu folgen.	☐	☐
Es gibt einfach nicht viele Dinge, die ich jemals wirklich gerne gemacht habe.	☐	☐
Manche Menschen können mich auf sich aufmerksam machen, indem sie einfach an mich denken.	☐	☐
Meine Gedanken sind fast immer schwer zu verfolgen.	☐	☐
Ich bin generell nicht an emotionaler Nähe zu anderen interessiert.	☐	☐
Ich glaube, dass es geheime Zeichen in der Welt gibt, wenn man nur weiß, wie man sie sucht.	☐	☐
Ich habe oft Schwierigkeiten zu organisieren, was ich eigentlich tun soll.	☐	☐
Meine Emotionen scheinen fast immer flach zu sein, unabhängig davon, was um mich herum vorgeht.	☐	☐
Ich mache mir oft Sorgen, dass jemand oder etwas mein Verhalten kontrolliert.	☐	☐
Ich habe Schwierigkeiten, Gesprächen mit anderen zu folgen.	☐	☐
Zeit mit engen Freunden und der Familie zu verbringen, ist für mich wichtig.	☐	☐
Manchmal habe ich mich gefragt, ob mein Körper wirklich mein eigener ist.	☐	☐

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

Lesen Sie jede der folgenden Aussagen und geben Sie die Antwort, die zu diesem Zeitpunkt am besten zu Ihnen passt.
Bitte geben Sie an, was Sie tatsächlich fühlen, nicht was Sie denken, dass Sie fühlen sollten.

	Ich stimme überhaupt nicht zu	Ich stimme nicht zu	Ich stimme zu	Ich stimme voll zu
Meine Lieblingssendung im Fernsehen oder Radio würde mir Vergnügen bereiten.	☐	☐	☐	☐
Ich würde mich freuen, mit meiner Familie oder Freunde zusammen zu sein.	☐	☐	☐	☐
Meine Hobbies und Freizeitaktivitäten würde mir Spaß machen.	☐	☐	☐	☐
Ich könnte mein Lieblingsessen genießen.	☐	☐	☐	☐
Ich würde ein warmes Bad oder eine erfrischende Dusche genießen.	☐	☐	☐	☐
Ich würde den Duft von Blumen genießen, den Geruch einer frischen Meeresbriese oder den Duft von frisch gebackenem Brot.	☐	☐	☐	☐
Ich würde mich freuen, freundliche Gesichter um mich herum zu sehen.	☐	☐	☐	☐
Wenn ich mir Mühe mit meiner Äußeren Erscheinung gebe, könnte ich mich über mein gutes Aussehen freuen.	☐	☐	☐	☐
Es würde mir Vergnügen bereiten, ein Buch, eine Zeitschrift oder eine Zeitung zu lesen.	☐	☐	☐	☐
Ich würde eine Tasse Tee, Kaffee oder mein Lieblingsgetränk genießen.	☐	☐	☐	☐
Ich würde mich über kleine Dinge freuen, z. B. über einen sonnigen Tag.	☐	☐	☐	☐
Ich könnte eine schöne Landschaft oder Aussicht genießen.	☐	☐	☐	☐
Ich würde mich freuen, anderen zu helfen.	☐	☐	☐	☐
Ich würde mich über ein Lob von anderen freuen.	☐	☐	☐	☐

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

Haben Sie weitere Informationen über Ihre Erfahrungen mit Ihrer Kreativität, die wertvoll sein könnten?

Zum Beispiel: haben Sie zu einem bestimmten Zeitpunkt in Ihrem Leben angefangen, kreative Ausdrucksformen zu machen; zu einem bestimmten Zeitpunkt eine Pause eingelegt oder aufgehört; gab es besondere Umstände; die Hilfe von Menschen angenommen, die Sie in Ihrem Leben getroffen haben; oder bestimmte Therapien gehabt.
Sie können das Feld auch gerne leer lassen:

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc universität wien

Was denken Sie, was Ihr Partner oder Ihre Partnerin über Ihre Kreativität denkt?

Ihre Antworten auf alle Fragen konzentrierten sich auf Ihre eigene Sicht auf Ihre Kreativität. Aber was hält Ihre Partnerin/Ihr Partner davon? Vielleicht hat sie/er die Dinge etwas anders gesehen als Sie. Deshalb laden wir Ihre Partnerin/Ihrer Partner auch zu einer kurzen Nachuntersuchung ein. Diese Umfrage kann in 10 bis 15 Minuten abgeschlossen werden. Mit der Partnerin/ dem Partner meinen wir die Person, mit der/dem Sie zusammenlebten, als bei Ihnen Parkinson diagnostiziert wurde.

Wenn Ihre Partnerin/Ihrer Partner sich für eine Teilnahme entscheidet, geben Sie bitte unten die E-Mail-Adresse Ihres Partners ein. Nachdem die E-Mail-Adresse Ihres Partners bestätigt wurde, erhält sie/er sofort eine weitere E-Mail mit einem direkten Link zur Folgeumfrage. Diese Bestätigung ist aus Gründen der Datensicherheit erforderlich. Wir bitten Ihre Partnerin/Ihren Partner, die Umfrage innerhalb von zwei Wochen nach Erhalt der Einladung auszufüllen.

☐ Ja, meine Partnerin/mein Partner ist an einer Teilnahme interessiert.

☐ Nein, meine Partnerin/mein Partner ist nicht an einer Teilnahme interessiert.

Wenn ja, in welchem Format möchte Ihre Partnerin/ Ihr Partner an der Umfrage erhalten?

☐ Online

Die E-Mail-Adresse meiner Partnerin/ meines Partners ist: .....

☐ Papier Version (Der Fragebogen für Ihre Partnerin/ Ihren Partner ist an Sie zugeschickt worden)

Der Name und die Post-Adresse meines Partners ist (Falls Ihre Partnerin/Ihr Partner eine andere Post-Adresse als Ihre hat):

.....

.....

☐ Per Anruf

Die Telefonnummer meiner Partnerin/ meines Partners ist: .....

Ihre Partnerin/ Ihr Partner muss das Kästchen ankreuzen, um ihre/ seine Zustimmung zur Bereitstellung der personenbezogenen Daten zu geben.

☐ Ich bestätige hiermit, dass diese E-Mail-Adresse, Post-Adresse oder Telefonnummer verwendet werden darf. Ich bin damit einverstanden, dass meine E-Mail-Adresse eingefügt wird. Die E-Mail-Adresse wird nicht direkt zusammen mit anderen Daten der Umfrage oder der Folgebefragung gespeichert, sondern separat. Lediglich ein Referenzcode kann die eingegebenen Daten aus beiden Befragungen verbinden. Weder die E-Mail-Adresse noch ein eventuell in der E-Mail-Adresse sichtbarer Name werden zusammen mit Umfragedaten gespeichert.

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!

Radboudumc

universität wien

Haben Sie Interesse auf dem Laufenden bezüglich der Studie zu bleiben?

Wenn Sie über unsere kommenden Neuigkeiten, Studien, Projekte etc. zum Thema Parkinson-Krankheit und Kreativität informiert werden möchten, geben Sie bitte unten Ihre E-Mail-Adresse:

Meine E-Mail-Adresse ist: .....

Danke, dass Sie diesen Fragebogen ausgefüllt haben!

Wir möchten uns herzlich für Ihre Mithilfe bedanken.
Wenn Sie Fragen zur Umfrage haben, wenden Sie sich bitte an die Forscherin:

B.T. M. Spee
E-Mail Adresse: kreativpark.psychologie@univie.ac.at

Haben Sie alle Fragen auf dieser Seite beantwortet?
Bitte überprüfen Sie es noch einmal, danke!