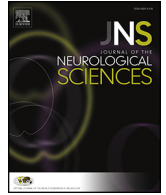




Contents lists available at ScienceDirect

## Journal of the Neurological Sciences

journal homepage: [www.elsevier.com/locate/jns](http://www.elsevier.com/locate/jns)

## Review Article

## Misperceptions and Parkinson's disease

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## ARTICLE INFO

## Article history:

Received 12 December 2016

Accepted 27 December 2016

Available online xxx

## Keywords:

Parkinson's disease

Misperceptions

Agnosias in Parkinson's disease

Center of gravity

## ABSTRACT

Most of the neurobehavioral aspects of Parkinson's disease have been well established and studied, but many are not well known, and hardly studied. This article focuses on several behavioral abnormalities that are common, and frequently cause difficulty for the patient and family due to lack of recognition as part of the disease. While it is well known that L-Dopa dyskinesias are frequently not recognized or under appreciated by patients, a similar lack of recognition may affect the patient's own speech volume, where their center of gravity is located, whether they are tilted to one side, and their under-recognition of others' emotional displays. In addition, PD patients are often misperceived by others incorrect impression of their emotional and cognitive state based purely on facial expression. These changes and others are briefly reviewed.

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## Contents

1. Introduction . . . . .	0
2. Perceptions by others . . . . .	0
3. Self perception errors . . . . .	0
4. Primary sensory distortions . . . . .	0
5. Vision and visual-spatial impairments . . . . .	0
6. Hearing . . . . .	0
7. Motor . . . . .	0
8. Dyskinesias . . . . .	0
9. Center of gravity and orientation in space . . . . .	0
10. Lateral tilt. . . . .	0
11. Emotions . . . . .	0
12. Compulsive disorders . . . . .	0
13. Conclusion . . . . .	0
Conflicts of interest . . . . .	0
References . . . . .	0

## 1. Introduction

O, wad some power the giftie gie us  
To see ourselfs as others see us!  
[Robert Burns. To a Louse]

People with Parkinson's disease (PWP) suffer from a variety of misperceptions, and they, themselves, are often misperceived in very specific ways. Misperceptions may be due to an abnormal interpretation of a stimulus, or the absence of a perception entirely. Many of these misperceptions occur in normal people, but their increased severity, relatively stereotyped nature, or increased prevalence in PWP, compared to healthy aged matched controls, suggests that they are part of the disease process. Many of the perceptual problems in Parkinson's disease (PD), such as visual-spatial impairment or difficulty with emotional

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<http://dx.doi.org/10.1016/j.jns.2016.12.059>  
0022-510X/© 2016 Published by Elsevier B.V.

Please cite this article as: J.H. Friedman, Misperceptions and Parkinson's disease, J Neurol Sci (2016), <http://dx.doi.org/10.1016/j.jns.2016.12.059>

interpretation and processing, have been explored, while some, like the mis-perception of center of gravity have not. And there has been little work on how PWP are misperceived by others and none on how mis-perceptions of them by others affects them.

Agnosia, is defined as an inability to recognize or process a stimulus in the absence of a perceptual deficit [1]. It is not clear if mis-perception of self-generated stimuli constitutes an agnosia, such as not recognizing one's own dyskinesias, or not recognizing the loudness of one's own voice. PWP may not accurately assess their own speech volume, their own spatial misjudgments (Photo 1), their center of gravity (see photo), their lack of awareness of visual stimuli when driving, their strength, postural abnormalities, dyskinesias, emotional expressions of others, their own emotional states, as well as other stimuli as well. Mis-perceptions occur in emotional as well as the physical realms, and, while often similar to misperceptions in healthy controls, they occur more commonly than in healthy controls and appear to be part of the pathological process. Unawareness complicates dysfunction and makes rehabilitation more challenging, if not impossible.

Some misperceptions of PWP by others, being thought to be angry, less social or less cognitively intact by others, for example, although not accurate, coupled with mis-perceptions by PWP of others' emotions undoubtedly colors how patients interact with the social world. These misperceptions may contribute to the long-standing hypothesis, never validated, that there is a "Parkinson personality."

## 2. Perceptions by others

PD is a stigmatizing illness. Patients feel marked by their disease and are aware that they stand out because of their posture, facial expression, tremor, soft voice, drooling, slowness [2]. They feel that others think they are feeble and need assistance, increasing their sense of ostracism

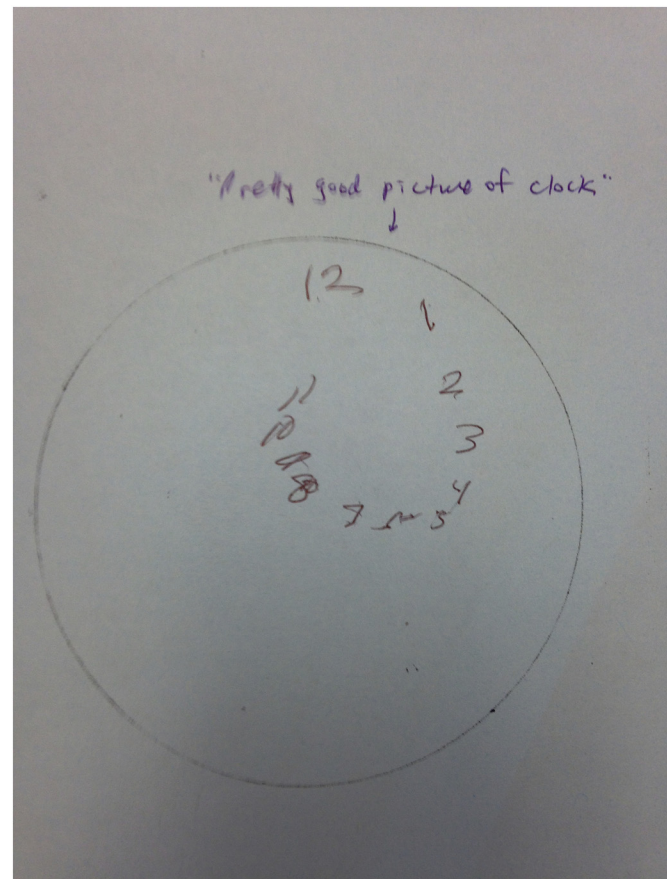


Photo 1. Patient reports that the clock drawing, "looks pretty good."

and weakness, sometimes engendering a feeling of anger. However, this stigma that they correctly perceive may be only part of the picture, as PD patients' emotional states and social capabilities are often misperceived by others [3–5], as assessed by studies based solely on facial expression.

In one study, speech therapy students assessed silent videos of PWP and concluded that they were more "somber, introverted, anxious, dependent and angrier" than people with heart disease, who also were only perceived in silent videos [6]. In another study [4] health professionals with experience in PD viewed videos, with sound, of PD patients' faces and incorrectly related increased facial masking to reduced social interaction and being less agreeable [5]. A later study [3] of 58 older non-health professionals found that observers thought that those with greater facial masking would be less supportive in social interactions. Furthermore, greater masking produced an even larger negative impression of female PWP than male PWP. In fact, the greater the facial masking, the greater the divergence between the observers' and the PWP own assessments of these personality traits. One of these studies [5] compared the assessments of PD facial videos of Caucasians and Chinese by 159 health professionals in the U.S. to 125 students in Taiwan. In both countries, facial masking was incorrectly interpreted to be associated with depression, reduced social interaction, and lower cognitive function.

Thus PWP are often viewed as weak and infirm, depressed, somber, introverted and less cognitively intact, based on no information other than their appearance and these assessments are incorrect. How PWP react to this bias, unknown to them, has not been studied.

## 3. Self perception errors

Perhaps the most common error in self perception is weakness. Although the "official" names for PD have been, "the shaking palsy," and "paralysis agitans," patients, although feeling weak [7,8] are not, in fact, weak on routine clinical testing. Formal testing may reveal mild weakness compared to age-matched controls [9], and older authorities [10], including James Parkinson, included weakness as a physical finding but there should be no demonstrable weakness due to PD alone [11,12]. In one study 40% of PWP reported leg weakness [8], and descriptions of legs feeling "like lead," "encased in concrete," "dead," etc. [7] are common. The perception of weakness did not match the degree of gait impairment. While one study showed differences in leg strength between the sides of individual patients, leg strength did not differ, overall, with that of a control population [9]. Presumably the sensation of decreased control is perceived as weakness.

## 4. Primary sensory distortions

Olfactory sensation is impaired early in PD [13–15], yet it is an uncommon complaint by patients [15] and many PWP are unaware of their deficit. A high percentage of PD patients will deny impairment in smell. This reduced recognition of olfactory impairment may be related to cognitive dysfunction [16], although that is not the experience of this author. The pleasure associated with certain scents seems to be reduced in PWP [17].

Taste is probably affected in PD as well, although the data on this is mixed. Perception of taste impairment is decreased [15]. Whether pleasure from food is reduced, as would be expected with a reduced capability to recognize and take pleasure from scents is uncertain.

The data on olfactory and taste sensation, as perceived by PWP is under active investigation.

## 5. Vision and visual-spatial impairments

Vision is often affected in PD, but this is almost always subclinical, involving contrast sensitivity, color vision [18] and non-clinical alterations of eye movements [19]. The classic visuo-spatial problems of PD [20] are seen in clock drawing (Photo 1), driving and attempts to sit on a chair

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