

# Predictors of the Effectiveness of Non-Invasive Brain Stimulation in Parkinson’s Disease and Alzheimer’s Disease: A Systematic Review

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## Introduction

Repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (tDCS) are widely investigated as therapeutic interventions in research of Alzheimer’s disease (AD) and Parkinson’s disease (PD). Individualized treatment protocols and improvement of therapeutic efficacy is essential in these diseases, as responsiveness of patients varies. We aim to identify neuropsychological factors, biological markers and disease characteristics that may influence NIBS effectiveness in AD and PD.

## Methods

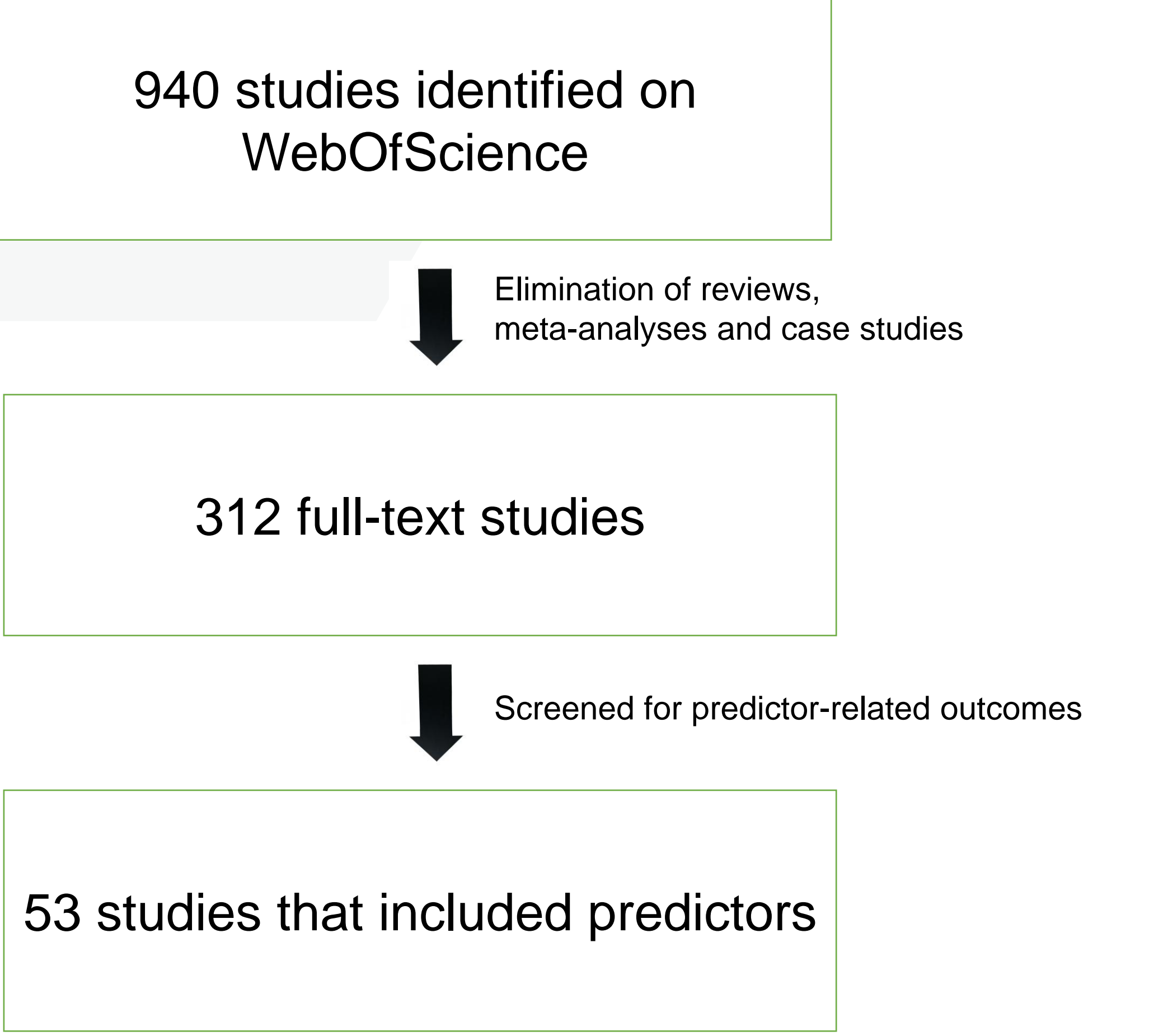
The Web Of Science was systematically searched for studies investigating rTMS or tDCS in AD and PD. Total of 940 studies were found, from which all reviews, meta-analyses and case studies were excluded. There were 312 articles left. From these, 53 studies included predictors of rTMS or tDCS effectiveness and are presented in the current systematic review.

## Results

Across these studies, several potential predictors of treatment response were identified, including disease severity, functional connectivity, genetics, demographic variables, disease subtype and timing of protocol.

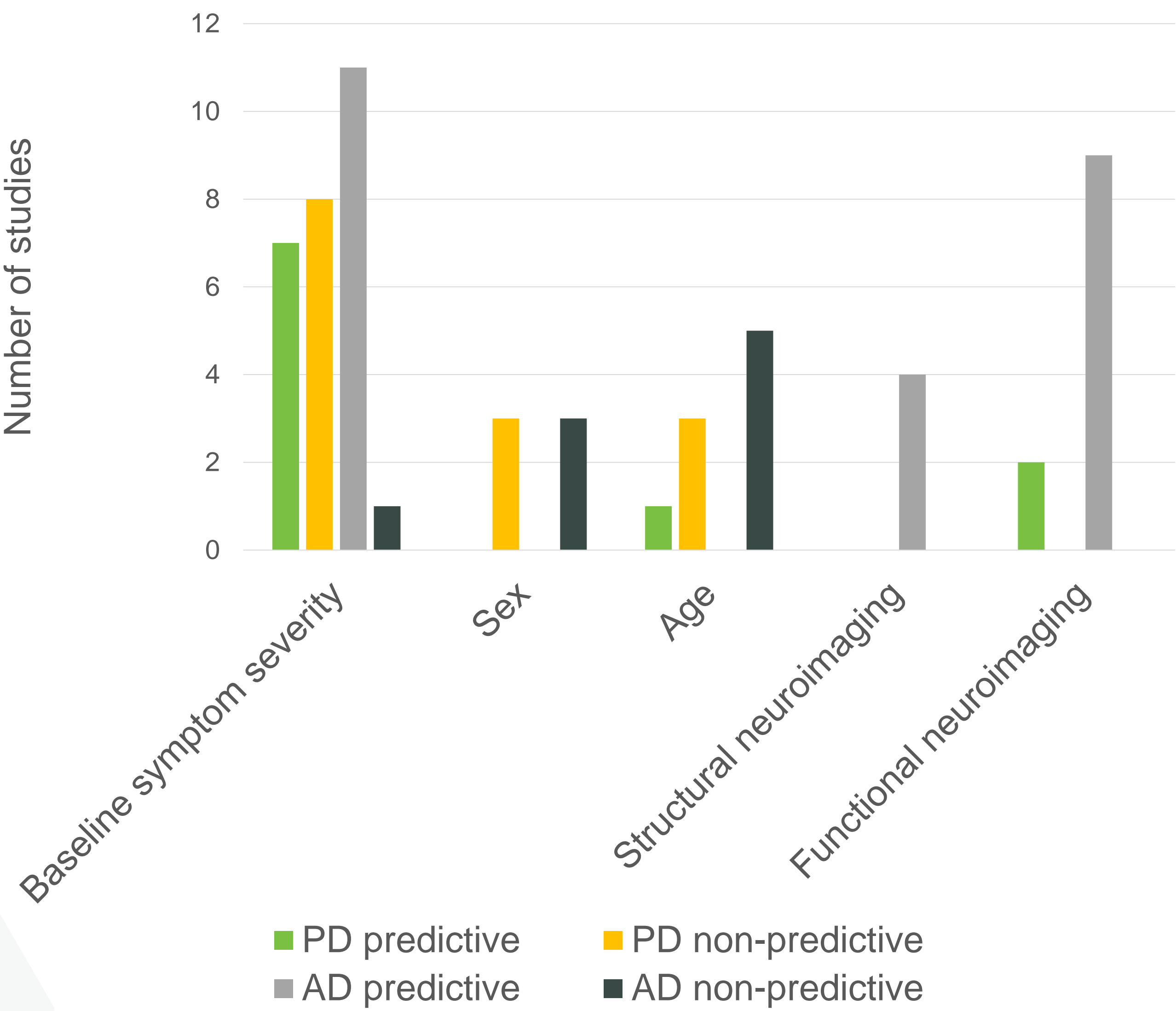
## Conclusions

In AD, milder cognitive impairment appears to predict better responsiveness to rTMS and tDCS. In PD, worse baseline motor symptoms may be associated with greater treatment benefits, but further investigation should validate these predictors in larger and more diverse populations.



Predictor	PD	AD
Baseline symptom severity	!	✓
Sex	✗	✗
Age	!	✗

✓ - predictor  
! – mixed results  
✗ – not a predictor



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