Investigating behavioural impulsivity: Minimal group differences between people with Parkinson's with and without impulse control disorders or compared to healthy controls

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1. INTRO

- Impulse control behaviours (ICBs) can occur primarily as a result of dopamine agonist medications and can include changes in behaviour such as problem gambling, hypersexuality, compulsive shopping, binge eating, hobbyism, punding.
- We might expect to see such changes in behaviour additionally reflected in various behavioural/experimental tasks and questionnaire measures of impulsivity, but previous research has produced mixed results for people with Parkinson's with additional ICBs, without ICBs, and age-matched control participants according to a recent systematic review.[1]
- By running a cross-sectional study with various tasks in the same participant groups, we hoped to provide a clearer picture of how different types of impulsivity differ in Parkinson's and ICBs.

2. METHOD

- The study was paused due to COVID-19, but methods and analyses were pre-registered.
- 15 people with mild-to-moderate Parkinson's (PwP), 20 PwP with additional ICBs (PwP+ICBs), and 24 healthy controls (HCs) have participated so far with a target sample size of 25 participants per group.
- Full methodological details for each task can be found in the protocol (**https://osf.io/frzpv/**).

3. RESULTS

DOMAIN: Task (measure)	PwP	PwP+ICBs	HCs	Summary†
ACTION RESTRAINT Go/No-Go task (commission errors)	21% ± 14%	9% ± 5%	9% ± 9%	**PwP showed significantly less action restraint than PwP+ICBs and HCs**
RESPONSE INHIBITION Stop Signal task (stop signal reaction time)	316ms ± 33ms	306ms ± 49ms	299ms ± 29ms	No significant group differences
RESPONSE CONFLICT Stroop task (interference effect)	28ms ± 11ms	24ms ± 8ms	25ms ± 10ms	No significant group differences
SET-SWITCHING Trail Making test (switch cost)	29ms ± 30ms	43ms ± 27ms	31ms ± 18ms	No significant group differences
DECISION MAKING UNDER AMBIGIOUS RISK Balloon Analogue Risk task (adjusted pumps)	33.85 ± 11.26	36.65 ± 13.21	38.72 ± 10.68	No significant group differences
DECISION MAKING UNDER OBJECTIVE RISK Cambridge Gambling Task (risk adjustment index)	.32 ± .85	-.19 ± .47	-.06 ± .32	No significant group differences
DELAY DISCOUNTING Kirby Monetary Choice (overall *k*)	.02 ± .02	.02 ± .02	.02 ± .03	No significant group differences
TRAIT IMPULSIVITY Barratt Impulsiveness Scale (total score)	61.17 ± 10.59	59.80 ± 7.00	53.94 ± 9.05	**Main effect of group, but no significant pairwise comparisons**
SENSATION SEEKING UPPS-P (sensation seeking score)	27.27 ± 9.62	28.10 ± 8.83	25.71 ± 8.17	No significant group differences
SENSITIVITY TO REWARD Behavioural Approach Systems questionnaire (total score)	54.20 ± 5.66	56.48 ± 7.13	57.00 ± 8.31	No significant group differences
SENSITIVITY TO PUNISHMENT Behavioural Inhibition Systems questionnaire (total score)	20.60 ± 3.87	20.68 ± 4.17	21.87 ± 3.62	No significant group differences

† An ANOVA or Kruskal-Wallis test was performed depending on whether the data was normally distributed or not and in all instances *a priori* pairwise t-tests or Mann-Whitney U tests were performed to compare PwP with PwP+ICB and PwP with HCs

4. DISCUSSION

- **A cross-sectional study revealed largely no group differences on a range of behavioural, experimental, and questionnaire measures of impulsivity and inhibitory control. Taken together with the inconsistency in results from previous research, the development of impulse control disorders may not contribute to a broad change in impulsivity outside of the clinically significant behaviour itself, and Parkinson's does not seem to contribute to changes in impulsivity more generally.**
- **Publication bias and methodological differences may explain the inconsistency in the literature.**

References: [1] Pickering et al. (in prep) Systematic review of impulsivity and inhibitory control in Parkinson's and impulse control disorders

https://osf.io/frzpv/

https://github.com/jspickering/Experiments

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