



Capacity, control and responsibility in Parkinson's disease patients with impulse control disorders: Views of neurological and psychiatric experts

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ABSTRACT

Dopamine replacement therapy can induce impulse control disorders (ICDs) (e.g., hypersexuality) in susceptible Parkinson's disease patients. ICDs can sometimes result in criminal offending. In a number of past Commonwealth cases, it appears offending ICD patients have been considered to be suffering from 'irresistible impulses' such that their decision-making capacity, behavioural control and responsibility were totally compromised. This contrasts with courts' general scepticism of drug-induced 'compulsion' in cases of addiction-related offending. In one case of explicit ICD-related offending, testimony was limited to three experts and not contested by the prosecution. We explored whether the testimony offered in this particular case, and another similar case, reflects the views of the neurological and psychiatric communities at large. Thematic analysis revealed that neurologists, geriatricians and psychiatrists ($n = 11$): (a) attributed ICDs to a variety of causes; (b) considered ICD patients' decision-making capacities and behavioural control to be partially, but not totally, compromised; (c) were divided or ambivalent about ICD patients' responsibility; and (d) astutely noted the difficulties inherent in assessing complex constructs such as 'control' and 'responsibility'. We suggest that there is sufficient divergence between our findings and expert testimony from past cases for prosecution teams to engage their own experts in future cases of ICD-related offending.

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1. Introduction

Parkinson's disease (PD) is a neurodegenerative movement disorder characterised by loss of dopaminergic neurons in the substantia nigra (Kish, Shannak, & Hornykiewicz, 1988). For many decades, the cornerstone treatment for this debilitating condition has been dopamine replacement therapy (DRT) (Averbeck, O'Sullivan, & Djamshidian, 2014). DRT involves the administration of dopamine agonists and levodopa (a dopamine precursor). Unfortunately, approximately 1 in 7 PD patients develop severe impulse control disorders (ICDs) from these medications (Weintraub et al., 2010). ICDs include pathological gambling, hypersexuality, compulsive shopping and binge eating.

Abbreviations: ICD, impulse control disorder; PD, Parkinson's disease; DRT, dopamine replacement therapy.

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Other compulsive behaviors, such as 'punding' (stereotyped, repetitive behavior), hoarding and dopamine dysregulation syndrome (a form of DRT addiction) (Ambermoon, Carter, Hall, Dissanayaka, & O'Sullivan, 2012), can also emerge in some individuals (Averbeck et al., 2014). The cognitive mechanism by which DRT induces ICDs in vulnerable individuals is unknown. However, there is a broad scientific consensus as to the important role that DRT plays in the emergence of these aberrant behaviors (Weintraub, David, Evans, Grant, & Stacy, 2015).

ICDs have occasionally resulted in serious criminal offending (Carter, Ambermoon, & Hall, 2011). In the majority of these cases (cf. GetSurrey, 2016), there appears to have been a strong emphasis on the allegedly 'overpowering' role of dopaminergic medication when justifying non-custodial sentences handed down to offending patients (Bartlett, Hall, & Carter, 2013). Offending patients have essentially been deemed to be suffering from 'irresistible impulses' (Carter et al., 2011; Penney, 2012). For example, in an Australian case, *Tasmania v Martin*, a former politician was convicted of child sexual abuse after taking dopamine agonists for his PD and developing hypersexuality (Bartlett et al., 2013). At sentencing, Justice Porter remarked that "there was a "direct

causal link between the medication prescribed for Mr Martin's Parkinson's disease and the offending (emphasis added)" and that Martin's "sexual inhibitions were markedly lessened by the medication and his capacity to make proper judgments adversely affected". These were the primary justifications for the Court imposing a non-custodial sentence. Justice Keyser made similar claims in a Canadian case, *R v Henderson*, involving a patient treated with DRT for restless leg syndrome. In this case, Joan Henderson struck and seriously harmed a street worker after driving home intoxicated from a bar. She received a non-custodial sentence because, in Justice Keyser's view, "the drug... caused her [Henderson] to drink compulsively that day (emphasis added)" [29]. The Court of Appeal in Manitoba agreed, adding that Henderson had demonstrated 'impaired capacity' and "poor judgment" [16]. These are surprising conclusions, given the lack of evidence of a relationship between dopamine agonist use and increased alcohol consumption (e.g., Weintraub et al., 2010). Similar conclusions about the 'overpowering' role of dopaminergic medication can reasonably be inferred to have been reached in other unreported cases from the United Kingdom. These involved a school headmaster with PD possessing child pornography (McDermott, 2008); a male PD patient who repeatedly exposed himself to young females (Philipson, 2013); a retired executive with PD who possessed child pornography (Tozer, 2016); and a leading male scientist with PD who recorded women undressing, possessed child pornography and developed a 'manual' for child sex abuse (Dixon, 2017).

Acceptance that there was medication-induced 'compulsion' and impaired capacity in these particular Commonwealth cases stands in stark contrast to Commonwealth courts' general scepticism of 'medical' models of drug and gambling addiction² (e.g., Brooks & Blaszczynski, 2011; Taylor, 2002). In *Martin* and *Henderson*, however, crucial medical evidence of medication-induced 'compulsion' and impaired capacity stemmed from the expert testimony of only four neurologists, psychiatrists and neuropsychologists. Significantly, this evidence was not contested by the prosecution and competing perspectives were not offered. It is not clear whether neurologists and related health care professionals in general share the views of those who testified in these prominent cases. It is plausible that neurological and psychiatric experts in this field hold a wider array of views on patient decision-making capacity, behavioural control and responsibility than the testimony in *Martin* and *Henderson* might suggest.

In this study, we report the first qualitative investigation into neurological and psychiatric perspectives on decision-making capacity, behavioural control and responsibility in PD patients with ICDs. Insights from these individuals will provide an important resource for the courts when encountering these complex and emotionally charged cases.

2. Methods

2.1. Participants

We conducted semi-structured interviews with prominent neurologists, geriatricians and psychiatrists with extensive experience treating PD patients with ICDs ($n = 11$) between March and August 2016. Participants were identified from online publication databases, neurologist and psychiatrist listings and the Movement Disorders Society of Australia and New Zealand membership registrar, and were invited via email to participate in a study examining clinical aspects of ICDs in PD. The present study forms part of a larger study examining health care professionals' views about ICDs and their treatment ($n = 15$). We

excluded data from nursing specialists ($n = 4$) as only neurologists and psychiatrists were engaged as expert witnesses in the current cases. This novel, exploratory study represents a spread of experienced, highly credible participants (Patton, 2015) who represent those likely to be required upon to provide expert testimony. All participants were male with an average of 15 years experience working with movement-disordered patients at the time of interview (range: 4–30 years). All participants were based in Australia except one psychiatrist from the United States.

2.2. Materials

The qualitative interview schedule emerged from a previous neuroethical analysis by members of the research team (Carter et al., 2011). For this arm of the study, participants were asked about PD patients' decision-making capacities and control relevant to ICDs via three related questions. Firstly, (a) "What is the impact of medication on a Parkinson's patient's ability to control their behavior?" Prompt questions included (ai) "Do they maintain control over their behavior?" and (a ii) "What factors influence their capacity to control their behavior?" Secondly, (b) "Where does the responsibility lie when a Parkinson's patient develops an ICD following dopamine replacement therapy?" Prompt questions included (bi) "To what extent is the patient responsible? How and in what way?" and (b ii) "To what extent is the clinician responsible? How and in what way?" Thirdly, (c) "Some individuals with Parkinson's disease have committed harmful or criminal behaviors as a result of their ICDs (e.g. sex offences; large financial loss due to pathological gambling). To what extent do you think they are responsible for these harmful or criminal behaviors?" Prompt questions included (ci) "Do you think these individuals should be held responsible for these actions?" and (cii) "Do you believe dopamine replacement therapy makes them more or less responsible?"

Before data collection, all interview questions were piloted on colleagues to ensure they were comprehensible. Adding and modifying questions to explore new avenues and enhance clarity is possible during initial stages of data collection (Braun & Clarke, 2006). After unprompted reflection from the first two participants as to their own responsibility for the development of ICDs in their patients, question (b ii) was included for every subsequent participant.

2.3. Procedure

This study was approved by the Monash University Human Research Ethics Committee (CF16/733-2016000359). Six interviews were conducted over the telephone and five were conducted face to face. Informed consent was obtained before each interview. JM conducted all interviews with occasional assistance from AC and AD. Audio recordings of interviews were transcribed verbatim by a professional transcription service. These transcriptions were checked against the audio recordings for accuracy. All identifying data were replaced with generic terms.

2.4. Data analysis

We conducted a thematic analysis of the relevant data in line with the recommendations of Braun and Clarke (2006). The lead author (AD) became acquainted with the data by listening to audio interviews, reading and re-reading their corresponding transcripts, and noting initial observations. AD then coded features of the data with labels designed to identify meaningful themes in the data (see Table 1). To ensure credibility and confirmability via triangulation (Patton, 2015), ED-F cross-coded one third of the data and minor coding differences were discussed until a consensus was reached. Coding was completed using qualitative analysis software (NVivo 10) so that collation could be 'audited' to confirm dependability if necessary (Lincoln & Guba, 1985). This was an inductive (i.e., data-driven) and recursive process

² Medical models of substance and behavioural addictions posit that addictions are (brain) diseases that 'hijack' decision-making processes, rendering substance-use or gambling irresistible for addicted individuals (Leshner, 1997; Volkow, Koob, & McLellan, 2016).

whereby themes were constantly reviewed to ensure they (a) were consistent with coded extracts and the full data-set and (b) shared a degree of coherence.

3. Results

Five primary themes emerged from experts' responses (see Table 1).

3.1. Causes

Experts attributed ICDs in PD to a variety of causes, but all stressed the crucial role of dopaminergic medication in inducing ICDs. The clear role of medication was apparent even to patients:

"I think patients come to realise that, that it is largely, if you like, the drug that is driving it" (Neurologist 7).

Others were even more explicit in attributing ICDs predominantly to medication:

"When I've written reports or reviewed cases there's an argument in some situations to say it's *entirely* the medication (emphasis added)" (Neurologist 4).

However, medication was recognised as only a part of the causal picture. Some observed that not all PD patients develop ICDs following medication administration:

"There is a push to just implicate medications for the development of this (ICDs), but I think it's more complex than that" (Geriatrician 1).

Particular neurobiological and trait predispositions or vulnerabilities were considered necessary, but not sufficient, factors in the development of ICDs:

"I think it's just a kind of mix of the drug with their biology potentially" (Psychiatrist 2).

Neurologist 3 specifically stressed the role of the mesolimbic reward pathway and dopamine receptor levels. Others referred to the importance of specific predisposing personality traits without reference to their neurobiological substrates:

"So people who were risk takers and [had] a tendency to be impulsive before often have a less structured lifestyle anyway and that means that it's harder for them to manage the risk by sort of putting it into a more structured response and I think they're probably the major factors that will determine it in broad terms" (Neurologist 5).

Lastly, experts acknowledged concurrent psychosocial perspectives and highlighted the importance of a patient's personal circumstances. Those without a partner or social support were considered at higher risk of developing ICDs:

"If you take into consideration things like if they've got good social support or if they're depressed, there are other factors going on in their life, their physical control isn't as good, then they tend to be more likely to go off and have these impulse control disorders" (Neurologist 3).

3.2. Decision-making capacity

The issue of whether ICD patients' rational and deliberative capacities are significantly impaired by dopaminergic medication was a strong theme emerging from the data. This theme specifically emerged in the context of experts discussing patients' rational decision-making and insight.

Experts generally considered patients' rational decision-making to be at least partially compromised:

"Cognitive deficits here in Parkinson's...seem to be exacerbated in those patients who go on to get impulse control disorder or have current impulse control disorders" (Neurologist 3).

Psychiatrist 1 identified "some patients who on dopaminergic medication are unable to rationally account for their behavior...they cannot give coherent reasons for their actions". Psychiatrist 2 likened ICD patients to individuals with psychosis and mania in terms of rational decision-making and thus thought ICD patients are "deprived of the capacity in a normal sense". Psychiatrist 3 reported that ICD patients experience "changes in decision making judgment that impairs their ability to control their behavior or to make wise decisions". Nevertheless, Psychiatrist 1 qualified his assessment with the observation that:

"There are other patients who - and these are maybe the same patients at different stages as well - who...[are] capacitive in terms of ability to take on board the information about risks and weigh them against the hedonic impact, the hedonic benefit of their ICD".

Indeed, a patient's capacity for rational decision-making was seen by many experts to be moderated by their level of insight, which varied considerably over time:

"I think insight into the nature of the problem is important. To some degree once you've got a knowledge of what's happening on the milder level some of these things can be controlled by the patient" (Neurologist 6).

For Neurologist 1, a pre-existing lack of insight, in the form of alexithymia (a personality trait characterised by persistent difficulties in self-identifying and describing emotion), was particularly devastating, leading to rapid escalation of ICD severity and little opportunity for cognitive 'override'. Even in patients without this trait, numerous experts thought many ICD patients maintain only brief periods of insight that may eventually disappear as medication dose increases:

"They often don't even know how much tablet they've taken. They come in and they'll sell you some waffle about taking tablets as prescribed. Then you call up the pharmacist and get a completely different texture" (Neurologist 1).

Geriatrician 1 offered a similar anecdote:

"What I have noticed is the lack of it being perceived as a problem or certainly, as a significant problem. Many patients have come to me when their wives are sitting in the chair next to them and saying, look, he's up at 12 midnight, he's on the websites and things and the patients will shrug that off and say, no, that's just once a week or, it's not a problem, I can easily control it. So there's a lack of insight".

Table 1
Primary and secondary themes present within experts' responses.

Primary theme	Secondary themes
Causes	Medication Predispositions Personal circumstances
Decision-making capacity	Rational decision-making Insight
Evaluations of patient control	Total loss of control Degrees of control
Ascriptions of responsibility	Outcome responsibility Capacity responsibility Ascription avoidance
Assessments of 'control' and 'responsibility'	Conceptual ambiguity Assessment authority

3.3. Evaluations of patient control

All experts acknowledge that ICD patients' ability to control their behavior was impaired. Views as to ICD patients' level of control ranged from a total loss of control to different degrees of control remaining. Neurologist 1, Geriatrician 1 and Psychiatrist 1, for example, thought patients with severe ICDs to be essentially at the whim of 'irresistible impulses', while Psychiatrist 2 even claimed that dopaminergic medication "compromises [patient control] absolutely". Yet others recognised the undisputable powerful effect dopaminergic medication can have on ICD patients' attention, motivation and decision-making without *totally* eliminating their control:

Neurologist 2: "I think it's [the effect of medication] is really substantial. I think there's a real drive that just possesses people. But it's still a gradation". Interviewer: "So there's not a complete loss of control?" Neurologist 2: "No. So it's a drive but it gets harder and harder. There's a morbid drive, but you can tone it down".

3.4. Ascriptions of responsibility

Some experts touched upon ICD patients' outcome responsibility and capacity responsibility. Outcome, or backward-looking, responsibility is present when states of affairs can be rightfully attributed to an individual's actions (Vincent, 2011a). Capacity responsibility, on the other hand, is present when individuals can deliberate about what to do and what is required of them (Vincent, 2011a). Outcome responsibility thus depends on capacity responsibility.

Within the data there was the perspective that ICD patients lack outcome responsibility for their addictive behaviors and related criminal offending:

"To a large degree, if you're a mug punter going to your doctor and getting a tablet and this [development of an ICD] happens, it's not your fault" (Neurologist 1).

In contrast, in advocating for maintained outcome responsibility, Psychiatrist 3 appealed to individual responsibility as a fundamental principle underlying any Western system of moral and legal responsibility. In his opinion, clinically-diagnosed medication-induced disorders, even when accompanied by vivid explanations of their neurobiological underpinnings, can never excuse ICD patients from outcome responsibility on principle. He also had practical grounds for this stance:

"Because once you start allowing those, then - the way our psychiatric system is set up and the way we make diagnoses, you can give anybody a diagnosis for just about anything, and then you create so many opportunities to misuse that" (Psychiatrist 3).

Others argued that ICD patients maintain outcome responsibility to the extent they maintain capacity responsibility. For Neurologist 3, a degree of insight was deemed sufficient for capacity responsibility:

"The issue of course is that if you recognise that behavior, then you must reach out for help. That's when there's a problem. So if somebody recognises that behavior and doesn't reach out for help, and you'd say hang on, that's a little bit different" (Neurologist 3).

Numerous experts noted that medication did not remove responsibility in a general sense, that is, in all cases of ICDs. However, they suggested that ascriptions of patient responsibility can only be done by considering the specific details of individual cases. They resisted making any universal ascriptions of (outcome or capacity) responsibility in ICD patients. As Neurologist 7 nicely summarised: "I don't have a simple answer...I think it gets a bit down to the nitty-gritty [of] what actually happens".

3.5. Assessments of 'control' and 'responsibility'

Reflection on the conceptual ambiguity of the terms 'control' and 'responsibility' occasionally emerged in the data. Neurologist 4 qualified his assessment of patient control, recognising that 'control' is a nebulous term without any single legal, philosophical or scientific definition: "You could have a whole text book or a whole four day conference talking about what control is". Psychiatrist 1 also distinguished between legal and moral responsibility:

"Although someone may be legally found to have diminished responsibility, that does not necessarily equate to them not having moral responsibility for their actions or responsibility in a more philosophical sense".

This thought echoes the distinction made between outcome responsibility (what is traditionally at stake in philosophical discussion of moral responsibility; Vincent, 2011a) and capacity responsibility (what is of central interest to the law; Vincent, 2011b) above.

The issue of whether law or medicine holds the authority for making assessments of responsibility also emerged. Some experts were careful to acknowledge that neurological and psychiatric assessments of causes, capacity, control and responsibility might diverge from legal assessments of these constructs. Of these experts, some argued that neuropsychiatric perspectives should hold normative authority that trumps legal perspectives in cases of ICD-related offending, while others deferred to the law's authority. For example, Psychiatrist 1 argued that legal responsibility assessments should be conducted by someone "skilled in phenomenology and psychopathology and capacity assessment...I would say that the court is probably not the best place to do that per se". In contrast, Psychiatrist 3 considered responsibility "always more of a legal question than a medical question". Neurologist 6 expressed sympathy with both of these positions, recognising that (perhaps relatively crude) legal assessments can always hold epistemic authority over more rigorous neuropsychiatric evaluations of capacity and control:

"Well I mean I've had the experience of patients in this situation where the case has gone through the court and the ruling is that the responsibility is diminished or absent. But I mean I don't know that it's been adequately tested in every particular circumstance. I'm not a lawyer incidentally, I'm only a doctor" (Neurologist 6).

4. Discussion

We explored, for the first time, expert neurological and psychiatric perspectives on decision-making capacity, behavioural control and responsibility in PD patients with ICDs. We aimed to investigate whether the views of expert witnesses in past prominent cases (Martin and Henderson) accurately reflected the views of their wider neurological and psychiatric communities and, if not, what this might mean for future legal cases.

We found that experts' views as to the *causes* (Section 3.1) of ICDs in PD reflected a multifaceted understanding of the phenomenon. This perspective on causality aligns closely with that of other experts in the field (e.g., Averbek et al., 2014). These views are not, however, directly relevant to the sentencing rationales in Martin and Henderson, despite common reference to 'causality'. Experts in the present study discussed causes (including medication, predispositions and personal circumstances) in terms of epidemiology, whereas we can reasonably infer that experts in Martin and Henderson granted medication an overwhelmingly powerful role.

With regard to patients' decision-making capacity, expert testimony in Martin and Henderson and experts' views here generally aligned. This does not mean experts' views as a whole closely reflect the scientific literature on decision-making in ICD patients. Experts were not

questioned on specific decision-making processes that might be impaired in ICD patients. The neurocognition of decision-making capacity in Parkinson's patients with ICDs is a small nascent field that involves considerable debate and uncertainty. We speculate that engaged experts will develop more nuanced views as to the precise decision-making processes (e.g., temporal discounting) impaired in ICD patients as this young field grows (see below 4.1). These more precise, empirically-based views are likely to diverge more significantly from more general clinical assessments of 'impaired capacity' and 'reduced insight' proffered in *Martin*, *Henderson* and here. This should naturally affect the testimony engaged experts offer in future cases of ICD-related offending.

Several respondents interviewed concurred with experts in *Martin* and *Henderson* that ICD patients suffer from a total loss of control in the form of 'irresistible impulses' (Carter et al., 2011; Penney, 2012). Nevertheless, others took the view that ICD patients' level of control lies somewhere between choice and compulsion (Holton & Berridge, 2013); ICD patients experience pathological desires but are still capable of meaningful goal-directed control. We suggest that as experts become more familiar with the cognitive literature (discussed above), this "morbid drive" perspective (Neurologist 2) will be preferred to the medication-induced 'compulsion' perspective. Cognitive studies on PD patients with ICDs, for example, do not reveal evidence of impaired cognitive and motor control in these patients (e.g., Claassen, van den Wildenberg, Harrison, van Wouwe, et al., 2015; Djamshidian, O'Sullivan, Lees, & Averbeck, 2011; Wylie et al., 2012), nor exacerbated compulsivity (e.g., Rossi et al., 2010; Voon et al., 2010).

We infer from the Justices' sentencing remarks that experts in *Martin* and *Henderson* considered ICD patients to lack capacity responsibility and, therefore, outcome responsibility for their ICD and any related offending. A number of experts in our sample expressed this view, although as many argued that ICD patients maintain outcome responsibility. This suggests it would be prudent for prosecution teams to engage their own expert witnesses in future cases of ICD-related offending. If outcome responsibility tracks capacity (Hart, 1968; Vincent, 2011b), and engaged experts update their views on capacity as further cognitive evidence becomes available (above), it is also possible that experts who deny the outcome responsibility of ICD patients may temper their views and future legal testimony. Alternatively, they might adopt the scepticism of any kind of 'global outcome responsibility' evident in our data and insist upon closer attention being paid to individuals' circumstances, clinical behavior and, perhaps, cognitive function.

In our interview schedule, we deliberately used the terms 'control' and 'responsibility' as they would be used in common language. Our experts rightly observed that both nebulous terms can have various legal, scientific and philosophical meanings. We have already observed the distinction between outcome and capacity responsibility, although further varieties of 'responsibility' have been suggested (Vincent, 2011a). How experts understand 'control' is more tightly linked to the impact of their testimony. In the case of 'control', the law might emphasise, for example, 'volitional capacity' or 'irresistible impulses', whereas cognitive science might emphasise, for example, 'action cancellation' (Buckholtz & Faigman, 2014).³ Although experts are likely to discuss 'control' from a cognitive science perspective in light of their training (hence our speculation above that cognitive science will influence experts' views on ICD patients' capacity and control), others disagree that these competing legal and scientific conceptions can be meaningfully reconciled, at least not anytime soon (Buckholtz & Faigman, 2014). In the meantime, experts testifying in future ICD cases should bear these distinctions in mind and attempt to find a crude 'common

language' between their personal scientific understanding and the less familiar legal constructs on which they might be asked to comment.

Finally, some of our experts essentially called for closer neuropsychiatric assessments of ICD patients who have come before the courts, whereas others took the conservative stance that legal assessments (behavioural observation) prevail. Vincent (2011b) has discussed this issue at length. We broadly agree with her 'incremental reform' perspective that was also shared by some of our experts and quote it here at length:

"Although science lacks normative authority in this domain, its findings can have normative significance. This does not mean that courts should replace judges and juries with scientists, that science and scientists can henceforth dictate what norms we ought to endorse, to enforce and to reject, or that the moralising language of the law should be replaced with the morally neutral and maybe even medical lingo of psychology and neuroscience. But it does mean that scientific findings which shed light on the human condition should be taken seriously, and that received wisdom about normative issues should always remain open to scrutiny, to reassessment, to criticism, and even to reform in light of relevant and accurate empirical findings" (326).

4.1. Limitations and future directions

Our sample was comprised entirely of males, the vast majority of whom were based in Australia. This largely reflects the fact that neurology is a male-dominated profession (Australian and New Zealand Association of Neurologists, 2010). It is not clear whether female neurologists would share the views of those interviewed in our study.

Future studies could be quantitative or mixed-methods in nature (Cabrera & Reiner, 2016) and involve, for example, an online worldwide survey of experts working with movement-disordered patients. This might reveal particular worldviews (e.g., political conservatism, religiosity or belief in a just world) associated with particular stances on ICD-patient decision-making capacity, behavioural control and responsibility (Carey & Paulhus, 2013). We also require further well-conducted cognitive studies to determine the nature and extent of impairment caused by DRT. Experts could refer to these studies and update their views on patient decision-making capacity and control accordingly.

5. Conclusions

In sum, our data indicate that neurological and psychiatric experts hold wider and more sophisticated views on ICD patient decision-making capacity, behavioural control and responsibility than the testimony in *Martin* and *Henderson* suggests. Moreover, engaged experts are likely to update their views as a greater understanding of the cognitive mechanisms underlying ICDs in PD comes to light. For these reasons, it seems in the interests of prosecution teams to engage their own expert witnesses in future cases of ICD-related offending, even if understandably seeking a non-custodial sentence on independent grounds.

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³ To further complicate matters, within the philosophical compatibilist tradition, 'control' could refer to 'guidance control', 'moderate reasons-responsiveness', 'mechanism ownership' or 'action-sensitivity' (Vincent, 2015).

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