Determinism, Freedom and Sin: Reformed Theological Resources for a Conversation with Neuroscience and Philosophy

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Abstract

This paper engages with one debate in the emerging field of neuroethics. It is sometimes claimed on the strength of neuroscientific research that our actions are causally determined and therefore not truly free, or more modestly that brain structures or processes constrain some choices and actions, raising questions about our moral responsibility for them. I argue that a Reformed account of providence, sin and grace offers an account of causation able to resist hard determinism, reframes concepts of freedom and responsibility, and provides a theological perspective for evaluating medical interventions in brain activity. Thus the paper not only contributes to a neuroethical debate, but also illustrates the capacity of Reformed ethics to respond creatively to novel problems.**Keywords**

Neuroethics; neuroscience and theology; freewill; determinism; causation; providence; sin; Reformed ethics; Barth.

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I/ Introduction

Recent research in neuroscience has achieved great advances in understanding the workings of the human brain, and this growth in knowledge and understanding has raised a range of questions for ethics. These range from the highly theoretical (for example, what might research on the neuroscience of moral decision-making imply for normative ethical theory?) to the very practical (for instance, how and when might it be permissible to modify the workings of the brain?). Some of these questions are fairly familiar to philosophical and theological ethics, others less so. In response to such developments, the field of neuroethics has emerged in recent years, gathering this cluster of questions together under one roof, so to say.

In this paper I explore briefly how a Christian ethic located in a broadly Reformed theological tradition might engage one of those questions: *how does neuroscience affect our understanding of human freedom and moral responsibility?* First, I specify a little more fully the questions that neuroscience raises about freedom and responsibility. Next I discuss one of those questions, concerning the relationship between determinism and freewill. There follows a proposal for what we might understand theologically by freedom and responsibility, particularly in light of a Christian doctrine of sin: does 'ought' really imply 'can'? The paper concludes with an exploration of the response this theological understanding of freedom, responsibility and sin might offer to some of the particular problem cases discussed at the outset.

The paper thus has a dual aim. It is intended as a contribution to the discussion of a specific neuroethical question, bringing a theological voice into a discussion often dominated by neuroscience and philosophy. As such, though, it also serves as a test case of the capacity of a broadly Reformed theological ethic to address novel problems, bringing core themes and emphases from this tradition to bear on new contexts and the questions they raise.

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II/ Questions from neuroscience

1. Is our freedom 'only a self-delusion'?

The neuroscientific study best known for raising questions about freewill dates from the 1980s, when Benjamin Libet and his colleagues first performed an experiment in which participants were asked to flick a switch and report the time at which they had decided to do so. Libet et al. found that the 'readiness potential', a characteristic pattern of brain activity which occurs in advance of voluntary muscle movements, could be detected *before* the time at which participants reported they had decided to flick the switch.[1]

The philosophical significance of this (if any) has been much debated. Libet's finding has been interpreted to mean, in Michael Gazzaniga's words, that 'before you are aware that you're thinking about moving your arm, your brain is at work preparing to make that movement!'[2] This in turn has sometimes been taken to mean, as Edward O. Wilson once put it, that 'our freedom is only a self-delusion'.[3] To put it in more rigorous language, it has been taken to support hard determinism: the view that freewill is incompatible with causally deterministic brain processes, and since the physical processes of the brain are deterministic, there cannot be true freewill.[4] And if that is the case, it is often taken also to rule out the possibility of genuine moral responsibility – though some authors argue that even if freedom and responsibility are fictions, they are nonetheless useful fictions for society to maintain.[5]

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[1] Benjamin Libet, 'Do We Have Free Will?' *Journal of Consciousness Studies*, 6 (1999), pp. 47- 57.
[2] Michael S. Gazzaniga, *The Mind's Past* (Berkeley, CA: University of California Press, 1998), p. 73, quoted by Daniel C. Dennett, *Freedom Evolves* (London: Allen Lane, 2003), p. 230.
[3] Edward O. Wilson, *On Human Nature* (Cambridge, MA: Harvard University Press, 1978), p. 71.
[4] I make use here of the standard terminology of freewill and determinism, in which *compatibilists* hold that determinism and free will are compatible, *incompatibilists* that they are not; incompatibilists are further subdivided into *hard determinists*, who hold that determinism is true and rule out freewill, and *libertarians*, who affirm freewill and reject determinism (see Dennett, *Freedom Evolves*, pp. 97–8). A further possible position is that regardless of whether determinism is true or not, there can be no freewill: see Galen Strawson, 'The Bounds of Freedom', in Robert Kane (ed.), *The Oxford Handbook of Free Will* (Oxford: Oxford University Press, 2002), pp. 441-60.
[5] Robert Wright, *The Moral Animal: Evolutionary Psychology and Everyday Life* (London: Abacus, 1996), pp. 349-58.

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2. Are we less free than we like to think?

Even if neuroscience does not entail hard determinism, it might question whether our actions are as freely chosen as we like to think. The website of the Oxford Centre for Neuroethics claims that 'there is already extensive evidence that our ability to make rational choices is constrained in unexpected ways.'[6] To give a few examples:

- a range of stimuli can influence subjects' decision-making without their being aware of it;[7]
- there appear to be neurological influences on addiction, among other things making it more difficult for addicts than others to delay the gratification of their desires;[8]
- studies of 'ego-depletion' suggest that the more self-control subjects have exercised in the recent past, the harder they find it to do so again: the responsible self may be, in the words of one paper, 'a limited resource';[9]
- impulsive or antisocial behaviour might be harder for adolescents than adults to resist, because areas of the brain involved in executive control are not yet fully developed;[10]
- executive control varies in strength among adults too, and tends to be weaker, for example, among those serving prison sentences.[11]

If neuroscience does reveal hidden constraints on our freedom of choice and action, what might this imply for our moral responsibility? Assuming the Kantian principle that

[6] Anon., 'Free Will & Addiction', *The Oxford Centre for Neuroethics* website, online at http://www.neuroethics.ox.ac.uk/research/area_3 (accessed 16 June 2014).
[7] A. Kiesel et al., 'Unconscious manipulation of free choice in humans', *Consciousness and Cognition* 15 (2006), pp. 397-408.
[8] C.A.Boettiger et al., 'Immediate reward bias in humans: fronto-parietal networks and a role for the catechol-methyltransferase genotype', *Journal of Neuroscience* 27 (2007), pp. 14383-91.
[9] R.F. Baumeister et al., 'Ego-depletion: Is the active self a limited resource?', *Journal of Personality and Social Psychology* 74 (1998), pp. 1252-65.
[10] Margaret Beckman, 'Crime, Culpability, and the Adolescent Brain', *Science* 305 (2004), pp. 596-9.
[11] Anon., 'Free Will & Addiction'.

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'ought' implies 'can', if a neurobiological constraint on my freedom were so severe as to make it effectively impossible for me to do something, presumably I could not be obliged to do it, or blamed after the event for having done it. If my neurobiology merely made it difficult, not impossible, then presumably it could still be an obligation – though perhaps my failure should be judged less harshly, as some commentators also argue in the arena of criminal justice.[12] To repeat: all this follows *if* 'ought' implies 'can': I shall return to that 'if' later.

II/ Neuroscience, determinism and freedom[13]

As I noted earlier, Libet's finding about the timing of the readiness potential has sometimes been taken to mean that supposedly voluntary actions are not really voluntary: 'before you are aware that you're thinking about moving your arm, your brain is at work preparing to make that movement'.[14] However, philosophers of mind who wish to argue for a compatibilist view – that a deterministic view of brain activity *is* compatible with freewill – do not have much difficulty resisting this inference. For example, Daniel Dennett thinks it odd (at least for non-dualists) to make Gazzaniga's distinction between *you* and *your brain*.[15] That distinction implies that the real 'you' inhabits a kind of control centre in the brain, where it simultaneously issues instructions and is aware of issuing them. If that were so, it would indeed be perplexing to find that the commander-in-chief was not issuing commands until after his or her subordinates

[12] For example, Beckman (op. cit.) raises the question whether, because their executive control functions are not yet fully developed, juvenile offenders should be sentenced more leniently than adults who commit the same offences.
[13] Some of the discussion in this section and the next draws on aspects of the longer account in Neil Messer, *Selfish Genes and Christian Ethics: Theological and Ethical Reflections in Evolutionary Biology* (London: SCM, 2007), pp. 145-58.
[14] Above, note 2.
[15] Dennett, *Freedom Evolves*, pp. 227-42.

had begun to implement them.[16] However, if instead we think of decision-making as a process that takes time and involves various parts of the brain, then the problem seems to dissolve. As Dennett puts it, 'You are not out of the loop; you *are* the loop.'[17]

However, even if Libet's findings by themselves do not entail hard determinism, might the achievements and future prospects of neuroscience, taken together, support a hard determinist view? If it is in principle possible to describe a complete sequence of cause and effect from sensory input through brain activity to action, does that mean that there is no explanatory space left for free and reasoned decision-making?

To address this question, it is necessary to explore briefly what we might mean by 'freedom'. David Hume famously distinguished between *liberty of spontaneity* and *liberty of indifference*:[18] by liberty of spontaneity he meant freedom from force, coercion or constraint on our actions, whereas liberty of indifference denotes radical unpredictability. Confusingly, different positions on freewill and determinism are often associated with different understandings of freedom. Libertarians (incompatibilists who defend the reality of freewill) tend to regard liberty of indifference as a necessary part of that freewill.[19] Alan Torrance, for example, holds that 'genuine indeterminacy in human agency' is needed to allow space for responsibility, accountability and even rationality.[20] Compatibilists may be more interested in the liberty of spontaneity, holding that an action is free insofar as it is not compelled or coerced, but done for reasons the actor can own. *Can* an action be 'done for a reason', though, if it is the

[16] This is reminiscent of a running joke in the 1970s television comedy *M*A*S*H*, in which successive Commanding Officers of the 4077th Mobile Army Surgical Hospital were subjected to Company Clerk Radar O'Reilly's disconcerting habit of knowing what they wanted before they themselves knew, and repeating their instructions back to them before they had spoken those instructions.
[17] Dennett, *Freedom Evolves*, p. 242.
[18] David Hume, *A Treatise of Human Nature* (ed. L. A. Selby-Bigge, rev. P. H. Nidditch, Oxford: Clarendon Press, 1978), p. 407.
[19] To avoid confusion, it should be noted that this use of 'libertarian' is distinct from the sense in which it is used in political philosophy.
[20] Alan Torrance, 'Developments in Neuroscience and Human Freedom: Some Theological and Philosophical Questions', *Science and Christian Belief* 16 (2004), pp. 123–37, at p. 127.

outcome of a deterministic sequence of physical cause and effect? Nancey Murphy is well known for what she calls a non-reductive physicalist view in which the answer is 'Yes'.[21] In this account, mental events such as reasoning and decision-making 'supervene' on the physical events in the brain with which they are correlated. Murphy uses the analogy of an electronic calculator, which conforms both to physical laws and mathematical logic because it has been designed so that 'its causal processes model arithmetic transformations.'[22] Human brains are not programmed by software designers in the same way as calculators, but Murphy proposes that by responding to feedback from their environment, they could become structured in such a way that its causal processes also correspond to rational operations, decisions and so forth.

Murphy's view has been challenged by Jaegwon Kim and others, on the grounds that if a complete sequence of physical cause and effect can be described covering decision-making and action, then Murphy's supervenient mental processes seem redundant, with no causal or explanatory work left to do.[23] In a later section I shall return to Kim's objection and suggest that Christians need not be persuaded by it. Before that, however, it is necessary to consider a different kind of critique made by authors such as Alan Torrance: that Murphy's notion of freedom undermines moral responsibility.

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[21] For a presentation and critical discussion of Murphy's non-reductive physicalism, see Nancey Murphy, 'Physicalism without Reductionism: Toward a Scientifically, Philosophically and Theologically Sound Portrait of Human Nature', Philip Clayton, 'Shaping the Field of Theology and Science: A Critique of Nancey Murphy' and Dennis Bielfeldt, 'Nancey Murphy's Nonreductive Physicalism', *Zygon* 34 (1999), pp. 551-71, 609-618 and 619-28 respectively.

[22] Nancey Murphy, 'The Problem of Mental Causation: How Does Reason Get its Grip on the Brain?', *Science and Christian Belief* 14 (2002), pp. 143-57, at p. 146.

[23] See, e.g., Jaegwon Kim, *Supervenience and Mind* (Cambridge: Cambridge University Press, 1993). For a summary and critical discussion of Kim's position, see Teed Rockwell, 'Physicalism, Non-reductive,' in Chris Eliasmith (ed.), *Dictionary of Philosophy of Mind*, online at https://sites.google.com/site/minddict/physicalism-non-reductive (article last updated May 2004, accessed 9 November 2014).

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III/ Freedom, responsibility and sin: does 'Ought' imply 'Can'?

Torrance believes that Murphy's notion of freedom is too easily reduced to 'the uninterrupted outworkings of … brain states with respect to which no external constraints are registered'. This, he argues, could lead us to see the whole range of human behaviour from the admirable to the atrocious as expressions of 'brain states with respect to which the relevant agents *have* no responsibility.'[24]

The libertarian view defended by Torrance has some difficulties of its own. For one thing, it faces the considerable challenge of giving a plausible account of the relationship between brain and mind that can account for the liberty of indifference. Moreover, as Torrance acknowledges, emphasising the latter could lead us to make unpredictability, randomness or arbitrariness the criteria for judging an action free. Yet we are accustomed to thinking that agents still act freely – perhaps more than ever – when they are motivated by their most deep-seated desires, commitments or goals, even though such actions might be far from arbitrary or unpredictable. However, I leave these difficulties aside in order to probe a little further Torrance's moral critique of Murphy. Torrance holds that non-reductive physicalism can support only the liberty of spontaneity, and therefore erodes moral responsibility. Is he correct?

We can begin to assess this claim by noticing that the western Christian tradition has tended to think of freedom in rather different terms from either of Hume's alternatives. Both liberty of spontaneity and liberty of indifference depict freedom as what Alistair McFadyen calls a 'neutral suspension between different possibilities' – for example, to do or to disobey God's will.[25] In that case, the liberty of spontaneity will be the absence of coercion or constraint directing us to one of these possibilities rather than another; the liberty of indifference will be a 'genuine indeterminacy' (as Torrance puts

[24] Torrance, 'Developments in Neuroscience and Human Freedom', p. 129, emphasis original.
[25] Alistair McFadyen, *Bound to Sin: Abuse, Holocaust and the Christian Doctrine of Sin* (Cambridge: Cambridge University Press, 2000), p. 168.

it) in our choice between them. Looking back to the Pelagian controversy, McFadyen attributes this view of freedom (*liberum arbitrium indifferentiae*) to the Pelagians, and suggests that in Augustine's view this is not freedom at all, but a symptom of 'the will's bondage to sin'.[26] If I reserve my freedom to do or to refuse God's will, I am already holding myself back from God, and that is a form of sin as pride. So Augustine argues in the *City of God* that the greatest freedom consists in the *inability* to sin: 'the first freedom of will which man received … consisted in an ability not to sin, but also in an ability to sin; whereas this last freedom of will [the freedom enjoyed by the blessed in the heavenly city] shall be superior, inasmuch as it *shall not be able to sin*.'[27]

In this Augustinian perspective, however, our present human condition is one in which our wills are not bound in this way to the good, but to sin. As McFadyen puts it, this bondage to sin is understood as radical, communicable, contingent and yet universal.[28] It did not have to be this way, but without exception in the world as we experience it, it is. We are born into lives, relationships and social structures distorted by sin; and so distorted, we come in time to make our own contributions to that distortion. Our freedom to bind our wills indissolubly to the good is radically compromised by this condition of sinfulness. Does this suggest that we are not accountable or culpable for our sinful choices and actions? If we accept the Kantian view that 'Ought' implies 'Can', it would seem so. If our condition makes us unable to orient ourselves to the good, we cannot be held responsible for failing to do so. But the view I have just outlined disagrees. Even though we cannot free ourselves from our sin, we are still guilty of it.

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[26] McFadyen, *Bound to Sin*, p. 164.
[27] Augustine, *The City of God* (*Nicene and Post-Nicene Fathers*, Series 1, vol. 2, ed. Philip Schaff, trans. Marcus Dods, Edinburgh: T & T Clark, 1886) xxii.30, emphasis added. Available online at http://www.ccel.org/ccel/schaff/npnf102.i.html (accessed 8 December 2014).
[28] *Bound to Sin*, pp. 16-18.

As Roger White has shown, what is going on here is really an argument between two contrasting moral visions, which has occurred repeatedly with variations in the history of Christian thought.[29] In one vision (which we might call Pelagian), praise and blame are foregrounded. A central question is: Can I justly be blamed for doing X or failing to do Y? The answer is: Only if I am capable of doing Y and avoiding X; and a good Pelagian will insist that I am, so I have no excuse. In the opposing vision (which we might call Augustinian), praise- and blameworthiness are not absent from the picture, but they are no longer the most important or interesting questions. As White says, they should be raised only *after* others have been asked.[30] In this moral vision, the central question could be expressed as: In what state or condition do I stand before God? According to White, something like this argument between moral visions is played out in Luther's dispute with Erasmus concerning the freedom of the will,[31] and later on (very roughly speaking) Kant takes the same side as Erasmus on a secularised version of the same issue.

Does 'Ought' imply 'Can'? On the view I have labelled 'Augustinian', not necessarily. In Luther's words, '[i]t is dangerous to believe that the existence of a law implies that it can be obeyed, for the law is fulfilled by the grace of God.'[32] We can still be guilty of sin (not in the modern sense of mere blameworthiness, but in the sense that we stand before God in a sinful condition, which we perpetuate and compound by our own sinful choices and actions) even when it is not fully in our power *not* to sin.

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[29] Roger M. White, '"Ought" Implies "Can": Kant and Luther, a Contrast', in George MacDonald Ross and Tony McWalter (eds.), *Kant and his Influence* (Bristol: Thoemmes, 1990), pp. 1-72.
[30] '"Ought" Implies "Can"', p. 71.
[31] Martin Luther, 'Disputation against Scholastic Theology', in *Luther: Early Theological Works*, Library of Christian Classics, vol. 16 (trans. James Atkinson, London: SCM, 1962), pp. 266-73; Erasmus, 'On the Freedom of the Will', trans. E. Gordon Rupp and A. N. Marlow, in *Luther and Erasmus*, Library of Christian Classics, vol. 17 (London: SCM, 1969), pp. 35-97.
[32] Luther, 'Disputation', p. 270.

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IV/ Neuroscience, sin and grace

How might this theological understanding of freedom, responsibility and sin address the questions raised by neuroscience, which I outlined earlier? The first of those was whether neuroscience entails, or at any rate supports, the hard determinist view that there is no genuine freewill.

We can gain some theological purchase on this question by considering again the kind of objection to Murphy's non-reductive physicalism put forward by critics like Kim: if one physical event in the brain is a sufficient cause of another, then there appears to be no explanatory work left for supervenient mental events to do, and it is hard to see how one mental event can be said to 'cause' another in any significant sense. Murphy herself has offered various responses to this critique.[33] Apart from her specific points, however, it should be noted that Kim's objection seems to presuppose a univocal view of causation, in which the existence of one true and complete causal explanation excludes the possibility of additional true causal explanations of the same event. By contrast Christian thinkers – seeking to do justice to divine sovereignty, human creatures' freedom and responsibility, and the physical necessities to which those creatures are subject – have often maintained richer and more complex understandings of causation, in which more than one true causal story can be told about the same events. For example, Karl Barth observes that early Lutheran and Reformed dogmaticians affirmed God's governance of the world against both 'the Stoic doctrine of fate' and 'the Epicurean doctrine of chance'.[34] It is perhaps not too wayward to see in the opposition of 'fate' to 'chance' a rough counterpart to modern oppositions between determinism and the kind of radical indeterminacy that some libertarians see as a condition of freewill. If a doctrine of divine governance could steer a middle course

[33] See Murphy, 'The Problem of Mental Causation'.
[34] Karl Barth, *Church Dogmatics*, vol. III/3, trans. G. W. Bromiley and R. J. Ehrlich (Edinburgh: T & T Clark, 1960), p. 162.

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between *fatum* and *fortuna*, perhaps it also has the resources to transcend present-day disputes between determinists and libertarians.

According to Barth, God's governance of the world transcends and uses both creaturely freedom and necessity, and there is no contradiction between divine sovereignty and creaturely freedom: 'The freedom of [the creature's] activity does not exclude but includes the fact that it is controlled by God. It is God who limited it by law and necessity and it is God who created it free.'[35] Creaturely freedom, says Barth, operates on the basis, and within the framework and limits, of divine permission. This limitation is in no way a compulsion laid on the creature, but is rather a necessary *condition* of genuine creaturely freedom: the attempt to act outside the limit of divine permission would be a self-destructive effort to claim godlike freedom. Moreover, he continues, 'all creaturely activity aims at a certain effect', but the goal and the outcome are beyond the creature's control:

> Whether the effect comes, and if so how it comes, is a completely new factor in relation to the activity. This is true whether we consider it from the standpoint of necessity or from that of freedom. And if it is God who controls creaturely occurrence and not fate or chance, then we have to say quite baldly that the decisive moment, the very meaning of creaturely activity, its effect, and the goal or end in which it culminates, are all the gift and dispensation of God.[36]

In other words, every aspect of a creature's activity – including the material conditions that make it possible, the physical cause and effect that it involves and the goal to which it is directed – are governed and given space by the providence of God. Although Barth is not offering a theory of causation, he articulates a vision in which God's governance of creation gives enough headroom (so to say) for diverse kinds of creaturely causality

[35] Barth, *Church Dogmatics*, III/3, p. 166.
[36] Barth, *Church Dogmatics*, III/3, p. 166.

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to coexist. Without depending on Aristotelian substance metaphysics (of whose use by theologians Barth is of course profoundly suspicious), this account of divine governance can incorporate a good deal of what is in view in the Aristotelian scheme of material, formal, efficient and final causes. As such it broadens the perspective considerably compared to modern discussions, framed by neuroscience, which often proceed on the tacit assumption that efficient causes are the only ones to be considered.

This

The purpose of this account is not to set up some kind of analogy in which divine providence is to creaturely freedom as human reason and will are to the physical processes of the brain.[37] Nor does it presuppose a particular understanding of the soul or its relationship to the body. What I am suggesting is that it keeps open a space within which even a physicalist view of brain and mind does not entail the hard-determinist conclusion that there is no genuine freedom or moral responsibility. In other words, Christians who wish to think with the Reformed tradition about determinism and freewill need not be constrained by a naturalist framing of the problem. The physical laws by which brains operate, the particular structures and workings of a particular individual's brain, the experiences to which that individual responds and the goal that she seeks in making a decision 'are all the gift and dispensation of God'. That being the case, a cause-and-effect explanation of the physical processes occurring in her brain as she makes her decision is not a zero-sum alternative to an account of her reasons, or a teleological explanation in terms of the goods and goals to which her decision is directed.

[37] Compare Karl Barth, *Church Dogmatics*, vol. III/2, trans. Harold Knight, G. W. Bromiley, J. K. S. Reid and R. H. Fuller (Edinburgh: T & T Clark, 1960), pp. 340-1, which sets up a similar analogy of relationship between God's relation to humanity and the soul's relation to the body. Such analogies may well be valid; my account, however, does not depend on them, but only on an understanding of divine providence as the guarantor both of creaturely freedom and creaturely causation.

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Our second set of questions was raised by neuroscientific evidence that human beings' freedom of choice and action may be constrained in hitherto unsuspected ways by aspects of human neurobiology. We might instinctively feel troubled by evidence of hidden constraints on our freedom. However, Christians who hold the theological view of freedom, responsibility and sin outlined in the previous section should be remarkably *un*troubled by such claims. For one thing, some of the constraints that are said to exist may simply be aspects of our creaturely finitude that we did not know about until now; in Christian perspective it should never be a cause for regret that as finite creatures, we cannot do everything we wish we could. Moreover, the Christian tradition might not have much of a stake in the kind of freedom called into question by neuroscience. I suggested earlier that theology should not be interested primarily in either Hume's 'liberty of indifference' or 'liberty of spontaneity': the freedom that matters most to Christians is the freedom to orient oneself fundamentally to the good. That freedom is compromised not by our creaturely finitude, but by our sinfulness, our fallen condition: the radical alienation from God that we are both born into and perpetuate through our own willing and choosing.[38]

However, the development of neural structures, pathways and mechanisms is significantly shaped by a person's experiences and relationships, particularly through childhood and adolescence. Individual variants of brain structure and function can be seen as a physical 'sediment' (to borrow a metaphor from Alistair McFadyen) of a particular personal history of experiences, relationships and social environment.[39] If aspects of that personal history are distorted by sin (as they are for all of us, in different ways), we might expect that distortion to leave its traces in the brain. Perhaps, therefore, some of the constraints on freedom mapped by neuroscience can be understood

[38] Cf. McFadyen, *Bound to Sin*, pp. 126-30.
[39] Alistair I. McFadyen, *The Call to Personhood: A Christian Theory of the Individual in Social Relationships* (Cambridge: Cambridge University Press, 1990).

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theologically as ways in which individual, corporate or structural sin compromises our freedom to orient ourselves to the good.

For example, there is abundant evidence that childhood trauma or abuse affects the development of brain structures and functions in multiple, interconnected and lasting ways.[40] Among other things, it can disrupt the development of neurobiological structures and systems involved in homeostasis (the maintenance of the body's internal environment), learning, memory, and executive control. Effects can include difficulties in personal and social relationships, hypersensitivity to perceived threats and stressors, a poor sense of self, inattention, impulsiveness, and aggression. Many people so affected are prone to self-destructive or criminal forms of behaviour as adolescents or adults.[41] To describe this state of affairs theologically: such individuals are egregiously sinned against, and find themselves enmeshed in a context distorted by sin, which may precede their own capacity for understanding, willing, choosing and acting. The development of their understanding, volition and action is distorted by that context and co-opted into that sinful dynamic, so that their own perceptions, choices and acts in their turn take forms distorted by sin, such as violent aggression. A crucial point, theologically speaking, is that this is simply an extreme and visible instance of our common human condition: the will's bondage to sin, which we all share in one way or another.[42]

To give a second example, the neurobiology of self-control and addiction also invites theological analysis. As I noted earlier, studies of ego-depletion are taken to suggest that self-control could be a 'limited resource'.[43] Some commentators link this to evidence of neurobiological factors which influence people's susceptibility to

[40] For a detailed review, see Bessel A. van der Kolk, 'The Neurobiology of Childhood Trauma and Abuse', *Child and Adolescent Psychiatric Clinics of North America* 12 (2003), pp. 293-317.
[41] van der Kolk, 'The Neurobiology of Childhood Trauma', pp. 297-300.
[42] McFadyen makes this point about child abuse and about the Holocaust, the two 'concrete pathologies' he discusses in his treatment of sin: *Bound to Sin*, pp. 49-50.
[43] Baumeister et al., 'Ego-depletion'.

addiction.[44] Such work might 'flesh out' (so to say) our understanding of the condition that Aristotelian and Christian traditions have named *akrasia*, incontinence or weakness of will.

The relationship between addiction, freewill and sin is complex. The philosopher Neil Levy argues that the experience of addiction raises questions for standard philosophical accounts of autonomy.[45] Addictive behaviour may be subjectively experienced as chosen rather than compulsive or coerced; at the time it is done, it appears as the preferred alternative, even if beforehand or afterwards the person strongly wishes to avoid it. According to Levy, this is best understood not as a loss of the capacity for autonomous decision-making, but a failure to integrate one's desires and volitions into a coherent life-project. In similar vein, Christopher Cook considers alcohol dependence in terms of first- and second-order volitions.[46] One might have a second-order volition, a long-term desire, to be sober; but that second-order desire is easily overwhelmed by the immediate first-order desire to satisfy the craving for drink. With reference to Paul and Augustine, Cook offers an illuminating theological analysis of addiction as sin, understood in terms of the divided will or self ('I do not do the good I want, but the evil I do not want is what I do', Rom. 7:19). Importantly, he too emphasizes that this is one, perhaps extreme, instance of a common human condition: perhaps not all of us are addicts, but we are all sinners with divided selves.[47]

We stand before God in a fallen condition, our wills bound not to the good, but to sin: to a fundamental distortion in our relationship with God, a distortion that we both inherit and willingly contribute to, which in its turn spawns distorted relations with one another, ourselves and the created world. We are unable to free ourselves by our own

[44] Anon., 'Free Will & Addiction'.
[45] Neil Levy, 'Autonomy and Addiction', *Canadian Journal of Philosophy* 36 (2006), pp. 427-48.
[46] Christopher C. H. Cook, *Alcohol, Addiction and Christian Ethics* (Cambridge: Cambridge University Press, 2006), ch. 6.
[47] Cook, *Alcohol, Addiction and Christian Ethics*, pp. 164-6.

efforts from this binding of the will. Rather, what sets us free is God's liberating Word (in) Jesus Christ. That being the case, what should we make of technological attempts to modify the workings of the brain – such as drugs or surgery – aimed at alleviating what I have described as the physical traces left on the brain by sin? Are they to be understood as instruments of God's saving work? Or are they attempts to substitute human action for that saving work: instances of the human pride which, as Barth says, wants to be its own helper and so turns us away from the divine source of our true help?[48] Cook discusses this question in relation to the treatment of alcohol dependence, in a way that demonstrates the complexity of the issue but does not fully resolve it.[49] On the one hand, for example, he sees in the twelve-step programme of Alcoholics Anonymous, with its appeal to a 'Higher Power', a recognition of the need for divine assistance. On the other, he argues that therapeutic techniques and 'anti-craving' drugs 'are grace of a kind, and do produce a form of salvation' – a form, however, which is oriented not to God but to 'human freedom and fulfilment.'[50]

Perhaps we can gain further clarity here by means of Dietrich Bonhoeffer's distinction between the ultimate and the penultimate.[51] The ultimate – God's last word of judgment and salvation in Christ – judges and sets at nought all our merely-human efforts to save ourselves. But it also validates those human efforts as *penultimate* activities: forms of responsible human action in the world that can help to prepare the way for the coming of grace. Feeding the hungry, housing the homeless, befriending the lonely, giving order to the undisciplined and freeing the enslaved can all be forms of penultimate activity, which can prepare the way for the coming of grace into these

[48] Karl Barth, *Church Dogmatics*, vol. IV/1, trans. G. W. Bromiley (Edinburgh: T & T Clark, 1956), pp. 458-78.
[49] Cook, *Alcohol, Addiction and Christian Ethics*, pp. 186-9.
[50] Cook, *Alcohol, Addiction and Christian Ethics*, p. 188, citing Doctrine Commission of the Church of England, *The Mystery of Salvation* (London: Church House Publishing, 1997), pp. 31-40.
[51] Dietrich Bonhoeffer, *Ethics* (Dietrich Bonhoeffer Works, vol. 6, ed. Ilse Tödt et al., trans. Reinhard Krauss, Charles C. West and Douglas W. Stott, Minneapolis, MN: Fortress, 2005), pp. 146-70.

people's lives by removing obstacles that would inhibit them from responding to God's justifying word.[52] It has sometimes been argued that medicine and healthcare can likewise have this penultimate character, curing or alleviating conditions that inhibit patients from responding to God's liberating command to 'will to be healthy'.[53] Similar clinical techniques and practices, however, could acquire a very different meaning were they to be used in an attempt to transcend human creaturely limits as such: uses of this sort would be much more reminiscent of that aspect of pride which Barth calls '[t]he attempt at self-help'.[54]

When we consider clinical interventions to address what I have called the physical traces left on the brain by sin, the line between responsible penultimate activity and hubristic substitute salvation becomes finer than ever. But the line still exists, and discernment between the two possibilities, though all the more difficult, is all the more crucial. For this reason, Cook's description of therapeutic interventions as 'a form of salvation … oriented towards human freedom and fulfilment' does not seem to me entirely helpful, because it tends to obscure rather than clarify this line. However, his core understanding of the place and limits of clinical interventions appears quite close to what I have described as responsible penultimate activity. Such therapies could be considered penultimate insofar as they help clients overcome obstacles to living and acting responsibly towards God and neighbour, or open up a space in which they have the opportunity to locate their treatment in the context of questions about their ultimate goods, goals and ends.[55]

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[52] Bonhoeffer, *Ethics*, p. 163.
[53] Karl Barth, *Church Dogmatics*, vol. III/4, trans. A. T. Mackay et al. (Edinburgh: T & T Clark, 1956), pp. 356-74; on medicine as a penultimate activity, see, e.g., Neil Messer, *Flourishing: Health, Disease, and Bioethics in Theological Perspective* (Grand Rapids, MI: Eerdmans, 2013), pp. 181-2.
[54] *Church Dogmatics*, IV/1, p. 463 *et passim*.
[55] Cf Cook, *Alcohol, Addiction and Christian Ethics*, p. 189.

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V/ Conclusion

In this paper I set out to offer both a theological contribution to a particular neuroethical debate and a test-case of the capacity of a Reformed ethic to address new problems. I have tried to show how theological themes such as sin, grace and divine providence, as articulated in the Reformed tradition and its antecedents, offer a distinctive understanding of freedom and responsibility: an understanding that can fruitfully reframe and address puzzling questions about determinism, freewill and ethics. I hope that this account, partial and exploratory though it has been, has demonstrated the liveliness of this tradition, and the richness of its resources for responding to new occasions and the questions they generate.

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