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**An Interdisciplinary Analysis in Philosophy,
Psychology, and Physics.**

Free Will as a Multilevel, Graded, and Empirically
Tractable Capacity for Reflective Self-Governance

Thesis Summary

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Table of contents

Part I. Framing the Problem.....	9
Chapter 1: Free Will as an Interdisciplinary Problem.....	9
1.1 Why Free Will Matters.....	9
1.2 Why the Problem Remains Unresolved.....	11
1.3 Why Free Will Requires an Interdisciplinary Framework.....	12
1.4 Understanding the Factors That Influence Free Will.....	12
1.5 The Case for Investigating Whether Agency Can Be Strengthened.....	14
1.6 Conclusion.....	15
Chapter 2: Historical Conceptions of Agency and the Development of Free Will.....	16
2.1 Introduction: Free Will as a Historically Evolving Concept.....	16
2.2 Early Conceptions of Agency Across Ancient Civilizations.....	17
2.3 Greek Philosophy: Rational Agency and Voluntary Action.....	23
2.4. Late Antiquity and the Emergence of the Will.....	29
2.5 Medieval Philosophy and the Systematization of Free Will.....	33
2.6 Renaissance Humanism: Human Dignity and Moral Self-Formation.....	38
2.7 The Reformation: Grace, Sin, and the Limits of Human Freedom.....	43
2.8 Early Modern Philosophy: Mechanism and the Determinism Problem.....	46
2.9 The World During the Enlightenment.....	50
2.10 From Moral Autonomy to Historical Freedom: German Idealism after Kant.....	54
2.11 Nineteenth-Century Critiques of Free Will.....	58
2.12 The Scientific Transformation of the Free Will Debate: Darwin, Early Psychology, and the Naturalization of Human Agency.....	61
2.13 Twentieth-Century Developments in the Analysis of Free Will.....	64
2.14 Historical Yield for the Present Thesis.....	69
Part II. Interdisciplinary Analysis of Free Will.....	75
Introduction to Part II: Free Will as a Persistent Philosophical and Scientific Problem..	75
Chapter 3: Contemporary Philosophical Approaches to Free Will.....	77
3.1 The Contemporary Terrain: From Determinism to Self-Governance.....	77
3.2 Libertarianism: Openness, Sourcehood, and the Demand for Deep Authorship...	78
3.3 Compatibilism: Ownership, Guidance, and the Structure of Control.....	79
3.4 Scepticism and Hard Incompatibilism.....	80
3.5 Revisionist and Naturalized Approaches: Reformulating the Problem.....	81
3.6 Convergences, Explanatory Limits, and the Need for Interdisciplinary Extension...	82
Chapter 4: Psychological Perspectives on Free Will.....	83

4.1 From Philosophical Control to Psychological Mechanisms.....	83
4.2 From a Unitary ‘Will’ to a Distributed Architecture of Control.....	83
4.3 Major Psychological Dimensions of Reflective Self-Governance.....	84
4.4 Deliberation.....	84
4.5 Executive Control.....	85
4.6 Self-Regulation.....	85
4.7 Emotion.....	86
4.8 Valuation.....	86
4.9 Context-Sensitive Agency.....	87
4.10 Bias.....	87
4.11 Framing.....	88
4.12 Distortions of Judgment.....	88
4.13 Metacognition.....	89
4.14 Behavioural Revision.....	89
4.15 Sense of Agency.....	90
4.16 Authorship.....	90
4.17 Emotion Regulation.....	91
4.18 Belief-Mediated Agency.....	91
4.19 Trainability.....	92
4.20 Cultivation of Agency-Relevant Capacities.....	92
4.21 Implications for the Free-Will Debate.....	93
Chapter 5: Physics, Free Will, and Decision-Making.....	94
5.1 Introduction.....	94
5.2 The Role of Physics in the Free-Will Debate.....	94
5.3 Determinism, Indeterminism, and the Limits of Physical Explanation.....	95
5.3.1. What Determinism Does and Does Not Claim.....	95
5.3.2 Indeterminism and the Limits of Causal Openness.....	96
5.3.3 Levels of Description and Physical Constraint.....	97
5.4 Major Physics-Based Positions on Free Will.....	97
5.4.1 Einstein, Hawking, and Greene: the anti-libertarian line.....	98
5.4.2 Carroll and Rovelli: emergence, levels, and compatibilism.....	99
5.4.3 Penrose and Non-Computability.....	100
5.4.4 Dyson and metaphysical extrapolation.....	102
5.4.5 Conway, Kochen, and the language of “free choice” in physics.....	103
5.4.6 Bell experiments and the “freedom-of-choice” literature.....	104
5.5 From Physical Law to Multilevel Agency.....	106
5.6 Decision-Making as a Dynamic Process.....	107
5.7 Agency, Action, and Reflective Control.....	108
5.8 Beyond Classical Rationality: Uncertainty, Risk, and Non-Ideal Choice.....	109
5.9 Complexity, Social Interaction, and Emergence.....	110
5.10 Biological Decision Systems and Multistability.....	112

5.11 Quantum Theory, Measurement, and the Limits of Easy Solutions.....	114
5.12 How Physics Contributes to the Study of Free Will.....	115
Chapter 6: From Established Findings to Unresolved Questions.....	117
Part III. Original Contribution.....	121
Chapter 7: Free Will as a Multilevel Capacity.....	121
7.1 Introduction.....	121
7.2 Agency, Free Will, and Reflective Self-Governance.....	122
7.3. The Multilevel Framework: Functional Control and Reflective Self-Governance...	126
7.3.1 The Multilevel Structure of Agency.....	126
7.3.2 Functional Control as the Architecture of Agency.....	127
7.3.3 Reflective Self-Governance as the Core of Free Will.....	128
7.3.4 Constraint Without Elimination.....	129
7.3.5 Relation to Existing Positions and Original Contribution.....	129
7.4 Dimensions of Free Will as a Practical Capacity.....	131
7.4.1 Belief-mediated self-interpretation.....	131
7.4.2 Context-Sensitivity.....	132
7.4.3 Bias-Vulnerability.....	133
7.4.4 Trainability and Educability.....	133
7.4.5 Why These Four Dimensions Matter Together.....	134
7.5 Thresholds of Impairment: When Agency Falls Short of Free Will.....	135
7.5.1 Bypass.....	135
7.5.2 Distortion.....	136
7.5.3 Overload.....	136
7.5.4 Underdevelopment.....	137
7.5.5 Why These Thresholds Matter.....	138
7.6 Judgment and Decision-Making as the Right Empirical Domain.....	138
7.7 The Research Programme Derived from the Model.....	140
Part IV. Empirical Investigation.....	142
Chapter 8: Research Objectives and Overall Methodology.....	142
Chapter 9: Study 1. The Influence of Beliefs About Free Will and Determinism on Task Persistence and Decision-Making.....	146
9.1 Introduction.....	146
9.2 Aims and Hypotheses.....	147
9.3 Method.....	148
9.4 Results.....	150
9.5 Discussion.....	156
9.6 Conclusion.....	158
Chapter 10: Study 2. Effects of Emotional Context on the Decision-Making Process....	159
10.1 Introduction.....	159
10.2 Aims and Hypotheses.....	161

10.3 Method.....	162
10.4 Results.....	164
10.5 Discussion.....	167
10.6 Conclusion.....	169
Chapter 11: Study 3. From Bias Awareness to Bias Control: Does Reading About Anchoring Reduce Susceptibility to Bias?.....	171
11.1.Introduction.....	171
11.2 Aims and Hypotheses.....	172
11.3.Method.....	172
11.4.Results.....	176
11.5 Discussion.....	181
11.6 Conclusion.....	184
Chapter 12 : Study 4. Active Debiasing A Strategy-Based Test of Resistance to Anchoring.....	185
12.1 Introduction.....	185
12.2 Aims and Hypotheses.....	186
12.3 Method.....	186
12.4 Results.....	188
12.5 Discussion.....	191
12.6 Conclusion.....	194
Chapter 13: Study 5. Prior Exposure to Risky Training Contexts and the Stability of Risky Decision-Making Across Emotional Conditions.....	195
13.1 Introduction.....	195
13.2 Aims and Hypotheses.....	196
13.3 Method.....	196
13.4. Results.....	199
13.5. Discussion.....	202
13.6. Conclusion.....	206
Chapter 14: Study 6: Training, Regulation, and Risk: Martial-Arts Experience and Decision-Making Under Uncertainty.....	208
14.1 Introduction.....	208
14.2 Aims and Hypotheses.....	209
14.3 Method.....	210
14.4 Results.....	210
14.5 Discussion.....	218
14.6 Conclusion.....	222
Chapter 15: Contributions and Implications.....	224
15.1 Theoretical Contributions.....	224
15.2 Methodological Contributions.....	225
15.3 Empirical Contributions.....	225
15.4 Practical and Applied Implications.....	226
15.5 Limitations.....	226

15.6 Future Directions.....	227
15.7 Synthesis of Contributions.....	227
Part V. Ethics.....	228
Chapter 16: Responsibility, Freedom, and Ethical Implications.....	228
16.1 Why Ethics Follows from the Problem of Free Will.....	228
16.2 The Normative Contribution of the Present Thesis.....	229
16.3 Responsibility as Responsiveness Under Constraint.....	229
16.4 Why Binary Responsibility Is Inadequate.....	230
16.5 The Ethical Error of Overestimating Free Will.....	230
16.6 The Ethical Error of Underestimating Free Will.....	231
16.7 Law: From Desert to Calibrated Accountability.....	231
16.8 Education: The Cultivation of Free will.....	232
16.9 Therapy: Responsibility Without Blame.....	232
16.10 Bioethics, Intervention, and the Fragility of Authorship.....	233
16.11 Public Policy: From Individual Blame to Shared Responsibility.....	233
16.12 Toward an Ethics of Calibrated Responsibility.....	233
16.13 Conclusion.....	234
Bibliography:.....	236
Primary Sources.....	236
Secondary Sources.....	240

KEYWORDS

free will; agency; reflective self-governance; functional control; multilevel explanation; graded free will; reasons-responsiveness; self-regulation; executive control; decision-making; uncertainty; risky choice; emotional context; cognitive bias; anchoring; debiasing; metacognition; beliefs about free will and determinism; emotion regulation; calibrated responsibility.

SUMMARY

Few philosophical questions have proved as persistent or consequential as the problem of free will. Judgments about free will shape practices of responsibility, praise, blame, autonomy, accountability, and self-government because these practices presuppose a meaningful relation between agents and the actions attributed to them (Fischer & Ravizza, 1998; Frankfurt, 1971; Wallace, 1994). The difficulty is to specify the form of control capable of sustaining such attribution in human beings whose actions are realised through causal, biological, psychological, and social processes. The thesis therefore asks how reflective self-governance is realised, how it varies across persons and situations, and under what conditions it may be strengthened, weakened, distorted, or impaired.

Its central objective is to develop an account of free will that remains philosophically significant while becoming empirically tractable. The thesis reconstructs the historical development of ideas about agency and free will, integrates insights from philosophy, psychology, and physics, develops a multilevel and graded account of free will as reflective self-governance, investigates selected dimensions of that account through six empirical studies, and examines its implications for responsibility and applied ethics.

The empirical programme is guided by the overarching hypothesis that processes relevant to reflective self-governance vary systematically with identifiable psychological and experiential conditions. The six studies test more specific hypotheses concerning beliefs about free will and determinism, emotional context, cognitive bias and corrective intervention, and practice-related regulation.

Methodologically, the thesis combines historical and conceptual analysis with quantitative empirical investigation. The empirical programme includes experimental, within-participant, intervention-based, and comparative-group designs, supplemented by exploratory Quantum Decision Theory (QDT)-informed analyses of risky choice that distinguish the utility structure of the options from subjective or contextual influences on choice.

A historical analysis provides the first stage of the argument. Conceptions of agency, responsibility, willing, and what later became identified as free will developed across changing religious, political, and intellectual contexts. Mesopotamian and Egyptian traditions situated responsible conduct within divine fate and cosmic order (Assmann, 2001; Van De Mieroop, 2015); Hebrew traditions linked agency to covenant, law, and accountability (Blenkinsopp, 1995; Weinfeld, 2004); and Zoroastrianism gave moral choice a prominent role

within a cosmic struggle between truth and deception (Boyce, 2001; Kreyenbroek, 2006). Classical Indian traditions developed accounts of intention, karma, moral agency, and disciplined self-transformation (Ganeri, 2001; Siderits, 2016), while early Chinese philosophy emphasised moral cultivation, practical judgment, and habituation (Graham, 1989; Ivanhoe & Van Norden, 2005). Greek philosophy systematised these concerns through analyses of voluntariness, deliberation, assent, and responsibility (Bobzien, 1998; Frede, 2011). Aristotle connected responsibility to voluntary action originating in the agent and undertaken with knowledge of relevant circumstances (Aristotle, ca. 350 BCE/1985), while Hellenistic debates brought causal necessity, rational assent, alternative possibilities, and the source of action into closer relation (Bobzien, 1998; Frede, 2011).

Late antiquity and medieval philosophy shifted attention toward willing, inner conflict, and the relations among intellect, will, contingency, necessity, divine foreknowledge, grace, and responsibility (Augustine, ca. 395/1993; Frede, 2011; Knuuttila, 2004). Renaissance humanism emphasised dignity, education, and self-formation (Burke, 2013), while the Reformation intensified disputes about the powers and limitations of human willing within an expanding print culture (Pettegree, 2015). The seventeenth-century transformation of natural philosophy placed human action within an increasingly mathematical and law-governed conception of nature (Shapin, 1996). Spinoza situated conduct within a thoroughgoing causal order (Spinoza, 1677/1994), Locke emphasised deliberation and the suspension of desire (Locke, 1690/1975), Hume linked liberty to action, will, motive, character, and the absence of external impediment (Hume, 1748/2007), and Kant made autonomy and rational self-legislation central to moral freedom (Kant, 1785/1998). Nineteenth-century critiques extended the problem toward character and historical formation, exemplified by Nietzsche's genealogy of responsibility and guilt (Nietzsche, 2017), while twentieth-century philosophy, psychology, and neuroscience made alternative possibilities, ownership, intentional action, and the neurocognitive organisation of volition increasingly explicit objects of inquiry (Frankfurt, 1969; Haggard, 2019).

This historical development shows that the questions asked about free will have changed partly with the explanatory resources available for understanding human action. The resulting interdisciplinary analysis treats physical, psychological, and normative explanations as complementary: description of the physical realisation of action does not determine whether the psychological organisation of control satisfies the normative requirements associated with free will (Craver, 2007; Ismael, 2016; List, 2019).

Contemporary philosophy sharpens these issues through competing accounts of the requirements for free will. Libertarian theories defend demanding requirements of sourcehood or alternative possibility and regard deterministic closure as incompatible with the relevant form of authorship (Kane, 1996; O'Connor, 2000). Compatibilist approaches locate the relevant conditions more directly in the organisation of agency, emphasising identification, guidance, ownership, and responsiveness to reasons (Fischer & Ravizza, 1998; Frankfurt, 1971). These debates establish that questions about causal structure and questions about agential control cannot simply be collapsed into one another. The continuing philosophical issue concerns what organisation of control is sufficient for an action to be attributable to an agent in the normatively significant sense required for free will and responsibility (Fischer & Ravizza, 1998; Wallace, 1994).

Psychology makes important components of this problem empirically accessible. Human control depends on interacting capacities involving attention, inhibition, working memory, cognitive flexibility, monitoring, valuation, and behavioural revision (Diamond, 2013). Affect influences valuation and decisions under uncertainty, making emotional context relevant to the exercise of control (Lerner et al., 2015). Research on heuristics and biases demonstrates systematic vulnerabilities in judgment, including anchoring and framing effects (Tversky & Kahneman, 1974, 1981). Debiasing research shows that corrective intervention can sometimes improve judgment, while the success and transfer of such improvement depend heavily on the structure of the intervention (Morewedge et al., 2015). Psychology therefore depicts human agency as purposive and organised while showing that the capacities relevant to reflective self-governance are limited, context-sensitive, and susceptible to distortion.

Physics specifies the causal conditions within which human agency is physically realised. Determinism means that a complete prior state together with the laws of physics fixes what follows, whereas indeterminism allows more than one physically possible continuation. Neither condition by itself establishes or eliminates free will: randomness does not create authorship, while lawful causation does not prevent complex forms of control (Ismael, 2016). Human decision-making is physically implemented through neural processes whose electrical and chemical dynamics operate within these constraints; biophysical models describe competing neural populations integrating noisy evidence through excitation and inhibition until a decision state is reached (Gold & Shadlen, 2007; Wang, 2002). Control theory further shows that lawful systems can differ substantially in regulatory performance: an inverted pendulum, for example, remains subject to the same physical laws while its stability depends on the accuracy and timing of feedback and correction (Åström & Murray, 2010; Cabrera & Milton, 2002). Drift-diffusion models similarly represent decisions as the accumulation of noisy evidence toward a response threshold, making variation in evidence sensitivity, response caution, bias, and internal variability quantitatively tractable (Bogacz et al., 2006; Wiecki & Frank, 2013). QDT extends this discussion into formal decision modelling by applying a quantum-inspired mathematical structure to context-sensitive choice (Favre et al., 2016; Yukalov & Sornette, 2009a, 2009b). Physics therefore establishes how agency can be naturally realised and constrained without determining whether the resulting organisation of control qualifies as reflective self-governance.

The interdisciplinary analysis leaves a more specific question unresolved. Causal influences on behaviour differ in form and implication. Emotional responsiveness may alter valuation while leaving reflective self-governance substantially intact (Lerner et al., 2015). Cognitive bias can distort judgment while purposive agency remains present (Tversky & Kahneman, 1974, 1981). Severe situational pressure can overload capacities normally available for monitoring and correction, while developmental conditions can affect how strongly relevant regulatory capacities are formed (Diamond, 2013). Manipulative influences may also interfere with the evaluative and regulatory processes through which conduct is attributable to the agent (Bratman, 2007; Fischer & Ravizza, 1998). An account of free will must therefore distinguish the forms and degrees of control realised within agency and evaluate causal influences in terms of how they affect that control, since causal influence alone does not determine whether free will is present or absent.

The original contribution developed in the thesis begins by distinguishing agency from free will. Agency is the broader functional capacity for purposive, goal-directed action (Bandura, 2001; Shepherd, 2021). A person can remain an agent while acting habitually, impulsively, under emotional influence, or through judgment affected by irrelevant information (Bratman, 2007; Diamond, 2013; Fischer & Ravizza, 1998; Haggard, 2019). Free will is a narrower and more demanding capacity realised through agency. It concerns whether the agent possesses and can exercise a sufficiently integrated organisation of evaluation, monitoring, regulation, responsiveness to reasons, and behavioural revision for conduct to count as reflectively self-governed. This account builds on contemporary work on planning, self-management, and the organisation of agential control (Bratman, 2007; Fischer & Ravizza, 1998; Shepherd, 2021).

Reflective self-governance names the organisation of control through which agency can satisfy the requirements associated with free will. It does not require continuous conscious deliberation, but depends on the coordinated availability of capacities for evaluation, regulation, monitoring, and behavioural revision (Bratman, 2007; Diamond, 2013; Haggard, 2019).

The account is multilevel: the physical level concerns the lawful realisation of action, the psychological level its organisation through relevant control processes, and the philosophical level whether that control is sufficiently attributable to the person to support authorship and responsibility (Craver, 2007; Fischer & Ravizza, 1998; List, 2019). Its graded character concerns variation in the integration, stability, and effectiveness of reflective self-governance.

Free will itself is not treated as a directly observable dependent variable; the studies investigate processes and conditions relevant to its exercise. Judgment and decision-making under risk and uncertainty provide a common behavioural domain because they involve valuation, incomplete information, affective influence, individual differences, cognitive bias, monitoring, and behavioural revision (Diamond, 2013; Lerner et al., 2015; Tversky & Kahneman, 1974, 1981).

Study 1 examined whether brief scientific messages supporting free will, challenging free will, or remaining neutral could alter participants' beliefs and whether any such changes extended to persistence and risky choice. It was hypothesised that condition would affect end-of-study beliefs about free will and determinism, persistence on the impossible-anagram task, and risky-choice proportion, with participants in the pro-free-will and anti-free-will conditions expected to diverge most clearly in their belief outcomes and participants exposed to the anti-free-will text expected to show reduced persistence. Post-text evaluations, particularly agreement with the text's main conclusion, were also expected to predict subsequent belief outcomes. Condition significantly affected both belief measures: free-will belief was higher in the pro-free-will than anti-free-will condition, while determinism belief was lower in the pro-free-will condition than in both comparison conditions. Agreement with the substantive conclusion predicted belief outcomes, whereas differences in total persistence and risky-choice proportion were not significant. Exploratorily, condition affected continued responding on impossible anagrams, although invented responses prevented interpreting this unambiguously as persistence. QDT analysis indicated overall risk avoidance, descriptively weakest in the pro-free-will condition and strongest in the neutral condition, but was not

treated as a confirmatory test of QDT or its quarter-law prediction (Favre et al., 2016). Study 1 therefore showed that beliefs about free will and determinism were more readily modified than the broader behavioural outcomes examined.

Study 2 examined risky choice within participants across a neutral baseline, a one-minute calming nature video accompanied by relaxing music, and a one-minute first-person rollercoaster video. It was hypothesised that emotional condition would affect subjective activation and valence and would alter risky-choice proportion relative to the neutral baseline, while trait risk propensity was expected to predict overall risky choice. Both video conditions increased risky choice relative to baseline but did not differ significantly from one another, and the safe option remained preferred overall. Trait risk propensity predicted participants' general level of risky choice but did not moderate the condition effect, while within-person changes in activation and valence did not significantly explain changes in risky behaviour. QDT analysis showed a negative attraction factor for the risky option in all conditions that became less negative following both videos, indicating a weakened preference for safety without a general shift to risk-seeking (Favre et al., 2016).

Study 3 tested whether brief education about anchoring could reduce subsequent anchor-consistent judgment. Participants were first expected to display anchoring in the initial task. The principal prediction was that participants who received a short educational passage about anchoring and cognitive bias would show a greater reduction in anchoring from Task 1 to Task 2 than participants who received a neutral control passage. The two task blocks contained different estimation items, providing a test of whether any corrective effect transferred beyond the questions encountered before the intervention. Anchoring was robust across all sixteen items, confirming that the task successfully produced the expected bias. The central debiasing hypothesis, however, was not supported: participants who received the educational passage did not show a greater reduction in subsequent anchor-consistent responding than the control group. The same conclusion held among participants who answered all comprehension questions correctly, indicating that the null result could not simply be attributed to failure to understand the material. Study 3 therefore distinguishes conceptual understanding from effective corrective control. Explicit knowledge of a source of distortion did not translate into successful resistance to its influence on subsequent judgments.

Study 4 examined whether a more active and procedural intervention could produce stronger resistance to anchoring. The principal hypothesis was that participants receiving anti-anchoring training would show a larger reduction in anchor-consistent responding from Task 1 to Task 2 than participants in the control condition. A secondary expectation was that trained participants would report approaching the second task differently and using strategies consistent with the intervention. The descriptive behavioural pattern favoured the training condition, and participants clearly reported changing their approach to the task. The predicted behavioural advantage, however, was not statistically significant: the reduction in anchoring among trained participants remained modest and did not differ reliably from the control condition. Study 4 therefore suggests that active procedural support may be more promising than passive education while showing that a brief strategy-based intervention did not establish robust transferable resistance to anchoring. Across Studies 3 and 4, reflective

understanding and effective behavioural correction emerge as related but distinguishable components of self-governance.

Study 5 examined whether broad previous martial-arts experience was associated with greater stability in risky decision-making across changing emotional conditions. Martial-arts experience was used as a naturalistic model of repeated exposure to uncertainty, evaluative pressure, controlled action, and the regulation of arousal under challenge. The principal hypothesis was that participants with martial-arts experience would show less fluctuation in risky choice across emotional conditions, particularly between the relaxing and exciting conditions, than participants without such experience. Risky choice changed significantly across conditions, but the pattern and magnitude of change did not differ significantly between groups, so the hypothesis of greater behavioural stability was not supported. Changes in activation and valence were also comparable between groups, and training histories proved highly heterogeneous in duration, intensity, recency, and form of practice. The study therefore showed that a broad dichotomous measure of martial-arts experience was too coarse to support a general claim of greater stability in risky choice across emotional contexts.

Study 6 examined whether an emotion-regulation condition altered risky choice differently across groups defined by martial-arts background. Intensive, currently active practitioners were compared with participants with less intensive or past martial-arts experience and participants with no martial-arts experience. The principal hypothesis was a Group $\times$ Condition interaction, with intensive and active engagement expected to be associated with a distinct direction or magnitude of behavioural adjustment from the neutral to the emotion-regulation condition; parallel hypotheses concerned group differences in changes in activation and pleasantness. A significant Group $\times$ Condition interaction emerged: intensive practitioners reduced risky choice, while both comparison groups increased it. Activation remained essentially unchanged and pleasantness increased among intensive practitioners, whereas activation increased and pleasantness decreased in the comparison groups. The central finding was therefore a group difference in behavioural and affective adjustment, not a general advantage in caution, rationality, or decision quality. Because martial-arts history was not experimentally assigned, the study cannot establish causation. It supports the narrower conclusion that intensive ongoing martial-arts experience was associated with a distinctive pattern of adjustment under the conditions examined.

Taken together, the studies constrain the theoretical account in several ways. Susceptibility to contextual influence does not imply the absence of agency, and claims about the cultivation of regulatory capacities require specificity about the capacity examined, the nature and continuity of practice, and the context in which control is exercised.

Methodologically, the empirical programme coordinates distinct designs around related dimensions of reflective self-governance. Studies 3 and 4 progress from passive awareness of anchoring to active corrective training, while Studies 5 and 6 move from a broad measure of previous martial-arts experience to a more discriminating analysis of practice history. Null findings constrain the theoretical claims and identify where greater conceptual or methodological specificity is required.

The empirical findings further specify how reflective self-governance varies under ordinary psychological conditions. They distinguish conscious understanding from effective

control and show that regulatory capacities are context-sensitive and selectively open to cultivation. The results therefore support a graded view of free will in which variation concerns the organisation and effectiveness of self-governance.

These claims also have consequences for responsibility. If free will depends on sufficiently integrated reflective self-governance, responsibility should be sensitive to the quality of control actually available in the circumstances of action. Contemporary accounts of guidance control connect responsibility to reasons-responsiveness and ownership (Fischer & Ravizza, 1998), while broader approaches to moral responsibility emphasise the agent's evaluative capacities and normative standing (Wallace, 1994). A graded understanding of self-governance extends these insights by treating impairments, situational burdens, and developmental differences in control as potentially relevant to the degree and form of responsibility appropriate to a case.

The practical implications extend across several domains. In law, a psychologically realistic account of control supports more discriminating judgments concerning culpability, mitigation, and accountability while preserving the importance of agency and answerability (Morse, 2007). Education is relevant because capacities such as attention, inhibition, planning, and cognitive flexibility develop over time and contribute to effective self-regulation (Diamond, 2013). Therapy illustrates how responsibility can be maintained while blame is reduced where psychological difficulties burden regulation without eliminating the person's status as an agent (Pickard, 2011). Bioethical cases involving deep-brain stimulation show that autonomy, authenticity, experienced authorship, and behavioural control can diverge under intervention (Kraemer, 2013; Wardrope, 2014). Public policy extends the analysis to the social and institutional conditions that shape the opportunities and resources through which reflective self-governance develops and is exercised. From this perspective, questions of responsibility concern not only individual conduct but also the structures and collective practices that help create, sustain, or constrain those conditions (Young, 2006).

The thesis ultimately presents free will as a natural and normatively significant capacity realised through human agency. Agency identifies the broader capacity for purposive, goal-directed action, while reflective self-governance identifies the organisation and quality of control relevant to free will. Free will is realised to the extent that this control is sufficiently integrated, reasons-responsive, and available to guide action. This account connects philosophical questions of authorship and responsibility with empirical knowledge of human decision-making and provides a basis for understanding how self-governance can be strengthened, weakened, distorted, or partially impaired across ordinary human conditions.

Selective Bibliography

- Aristotle. (1985). *Nicomachean ethics* (T. Irwin, Trans.). Hackett. (Original work published ca. 350 BCE).
- Assmann, J. (2001). *The search for God in ancient Egypt*. Cornell University Press.
- Åström, K. J., & Murray, R. M. (2010). *Feedback systems: An introduction for scientists and engineers*. Princeton University Press.
- Augustine. (1993). *On free choice of the will* (T. Williams, Trans.). Hackett Publishing. (Original work published ca. 395).
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1–26.
- Blenkinsopp, J. (1995). *Sage, priest, prophet: Religious and intellectual leadership in ancient Israel*. Westminster John Knox Press.
- Bobzien, S. (1998). *Determinism and freedom in Stoic philosophy*. Oxford University Press.
- Bogacz, R., Brown, E., Moehlis, J., Holmes, P., & Cohen, J. D. (2006). The physics of optimal decision making: A formal analysis of models of performance in two-alternative forced-choice tasks. *Psychological Review*, 113(4), 700–765.
- Boyce, M. (2001). *Zoroastrians: Their religious beliefs and practices*. Routledge.
- Bratman, M. E. (2007). *Structures of agency: Essays*. Oxford University Press.
- Burke, P. (2013). *The Italian Renaissance: Culture and society in Italy* (3rd ed.). Polity.
- Cabrera, J. L., & Milton, J. G. (2002). On-off intermittency in a human balancing task. *Physical Review Letters*, 89(15), Article 158702.
- Craver, C. F. (2007). *Explaining the brain: Mechanisms and the mosaic unity of neuroscience*. Oxford University Press.
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64, 135–168.
- Favre, M., Wittwer, A., Heinemann, H. R., Yukalov, V. I., & Sornette, D. (2016). Quantum decision theory in simple risky choices. *PLOS ONE*, 11(12), e0168045.
- Fischer, J. M., & Ravizza, M. (1998). *Responsibility and control: A theory of moral responsibility*. Cambridge University Press.
- Frankfurt, H. G. (1969). Alternate possibilities and moral responsibility. *The Journal of Philosophy*, 66(23), 829–839.
- Frankfurt, H. G. (1971). Freedom of the will and the concept of a person. *The Journal of Philosophy*, 68(1), 5–20.
- Frede, M. (2011). *A free will: Origins of the notion in ancient thought* (A. A. Long, Ed.). University of California Press.
- Ganeri, J. (2001). *Philosophy in classical India: The proper work of reason*. Routledge.
- Gold, J. I., & Shadlen, M. N. (2007). The neural basis of decision making. *Annual Review of Neuroscience*, 30, 535–574.
- Graham, A. C. (1989). *Disputers of the Tao: Philosophical argument in ancient China*. Open Court.
- Haggard, P. (2019). The neurocognitive bases of human volition. *Annual Review of Psychology*, 70, 9–28.

- Hume, D. (2007). *An enquiry concerning human understanding* (P. Millican, Ed.). Oxford University Press. (Original work published 1748).
- Ismael, J. T. (2016). *How physics makes us free*. Oxford University Press.
- Ivanhoe, P. J., & Van Norden, B. W. (2005). *Readings in classical Chinese philosophy* (2nd ed.). Hackett.
- Kane, R. (1996). *The significance of free will*. Oxford University Press.
- Kant, I. (1998). *Groundwork of the metaphysics of morals* (M. Gregor, Trans.). Cambridge University Press. (Original work published 1785).
- Knuuttila, S. (2004). *Modalities in medieval philosophy*. Routledge.
- Kraemer, F. (2013). Me, myself and my brain implant: Deep brain stimulation raises questions of personal authenticity and alienation. *Neuroethics*, 6, 483–497.
- Kreyenbroek, P. G. (2006). Theological questions in an oral tradition: The case of Zoroastrianism. In R. G. Kratz & H. Spieckermann (Eds.), *Götterbilder, Gottesbilder, Weltbilder: Polytheismus und Monotheismus in der Welt der Antike* (Vol. 1, pp. 199–222). Mohr Siebeck.
- Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). Emotion and decision making. *Annual Review of Psychology*, 66, 799–823.
- List, C. (2019). *Why free will is real*. Harvard University Press.
- Locke, J. (1975). *An essay concerning human understanding* (P. H. Nidditch, Ed.). Clarendon Press. (Original work published 1690).
- Morewedge, C. K., Yoon, H., Scopelliti, I., Symborski, C. W., Korris, J. H., & Kassam, K. S. (2015). Debiasing decisions: Improved decision making with a single training intervention. *Policy Insights from the Behavioral and Brain Sciences*, 2(1), 129–140.
- Morse, S. J. (2007). The non-problem of free will in forensic psychiatry and psychology. *Behavioral Sciences & the Law*, 25(2), 203–220.
- Nietzsche, F. (2017). *On the genealogy of morality and other writings* (3rd ed., C. Diethe, Trans.; K. Ansell-Pearson, Ed.). Cambridge University Press.
- O'Connor, T. (2000). *Persons and causes: The metaphysics of free will*. Oxford University Press.
- Pettegree, A. (2015). *Brand Luther: 1517, printing, and the making of the Reformation*. Penguin Press.
- Pickard, H. (2011). Responsibility without blame: Empathy and the effective treatment of personality disorder. *Philosophy, Psychiatry, & Psychology*, 18(3), 209–223.
- Shapin, S. (1996). *The scientific revolution*. University of Chicago Press.
- Shepherd, J. (2021). *The shape of agency: Control, action, skill, knowledge*. Oxford University Press.
- Siderits, M. (2016). *Studies in Buddhist philosophy*. Oxford University Press.
- Spinoza, B. (1994). The ethics. In E. Curley (Ed. & Trans.), *A Spinoza reader: The ethics and other works* (pp. 85–265). Princeton University Press. (Original work published 1677).
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124–1131.
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453–458.

- Van De Mieroop, M. (2015). *A history of the ancient Near East ca. 3000–323 BC* (3rd ed.). Wiley-Blackwell.
- Wallace, R. J. (1994). *Responsibility and the moral sentiments*. Harvard University Press.
- Wang, X.-J. (2002). Probabilistic decision making by slow reverberation in cortical circuits. *Neuron*, 36(5), 955–968.
- Wardrope, A. (2014). Authenticity and autonomy in deep-brain stimulation. *Journal of Medical Ethics*, 40(8), 563–566.
- Weinfeld, M. (2004). *The place of the law in the religion of ancient Israel*. Brill.
- Wiecki, T. V., & Frank, M. J. (2013). A computational model of inhibitory control in frontal cortex and basal ganglia. *Psychological Review*, 120(2), 329–355.
- Young, I. M. (2006). Responsibility and global justice: A social connection model. *Social Philosophy and Policy*, 23(1), 102–130.
- Yukalov, V. I., & Sornette, D. (2009a). Physics of risk and uncertainty in quantum decision making. *The European Physical Journal B*, 71(4), 533–548.
- Yukalov, V. I., & Sornette, D. (2009b). Processing information in decision making. *Entropy*, 11(4), 1073–1120.