

Algorithmic Nudging, Hypernudging and the Transformation of Consent in European Private Law

Nudging algoritmico, hypernudging e trasformazione del consenso nel diritto privato europeo

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Abstract

This article examines the implications of algorithmic nudging and hypernudging for European private law. It argues that AI-driven choice architectures shape preferences and blur the boundary between influence and manipulation, challenging the validity of consent and traditional doctrines. The paper proposes a design-oriented approach grounded in autonomy, good faith, and emerging EU regulation.

Il contributo analizza le implicazioni del nudging algoritmico e dell'hypernudging per il diritto privato europeo. I sistemi di IA modellano le preferenze e offuscano il confine tra influenza e manipolazione, mettendo in crisi il consenso. Si propone un approccio orientato al design fondato su autonomia e buona fede.

Keywords: algorithmic nudging; hypernudging; consent; private law; AI regulation.

Summary: 1. Introduction. – 2. Behavioural Vulnerability and Algorithmic Choice Architectures. – 3. From Nudging to Manipulation. – 4. Contract Law and the Transformation of Consent. – 4.1 Hypernudging, Good Faith and Pre-Contractual Liability. – 4.2 Toward Invalidity? – 5. Tort Law, Personality Rights and the Protection of Autonomy. – 6. Toward a Design-Oriented Liability Framework. – 7. Concluding remarks.

1. Introduction

Artificial intelligence systems increasingly mediate how individuals perceive options, evaluate alternatives, and ultimately make decisions in digital environments. Recommendation systems, personalised interfaces, default settings, and adaptive choice architectures no longer operate as neutral infrastructures for facilitating transactions, but rather as complex socio-technical environments capable of shaping attention, structuring preferences, and influencing behaviour. In this context, behavioural steering frequently takes the form of algorithmic nudging, that is, subtle modifications of the decision-making environment designed to influence users' choices without formally restricting their freedom of choice¹.

While the concept of nudging has traditionally been framed—especially in behavioural economics—as a potentially legitimate tool for improving decision-making, its transformation in the digital ecosystem raises qualitatively new concerns. In online environments, nudges are no longer static or general but are instead continuously optimised through machine-learning systems that rely on vast amounts of behavioural data. These systems enable the deployment of highly personalised forms of influence, tailored to the specific characteristics, preferences, and vulnerabilities of individual users. As a result, the distinction between influencing and manipulating behaviour becomes increasingly blurred².

This development is closely linked to the emergence of what has been described as “hypernudging”, namely the use of artificial intelligence and big data to dynamically and continuously reshape the decision-making environment of individuals. Unlike traditional nudges, which operate at the level of general populations, hypernudges rely on real-time profiling and behavioural prediction, allowing traders to anticipate and steer users' decisions with increasing precision. In doing so, they exploit the well-documented

¹ RH Thaler and CR Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (Yale University Press 2008) 6 ff., 25 ff.; CR Sunstein, *The Ethics of Influence* (Cambridge University Press 2016) 1 ff.

² F Pasquale, *The Black Box Society* (Harvard University Press 2015) 1 ff., spec. 18 ff.; Sunstein, *The Ethics of Influence* (n 1) 21 ff.; A Acquisti and others, 'Nudges for Privacy and Security' (2017) *ACM Computing Surveys* 1 ff.; K Yeung, 'Algorithmic Regulation' (2017) 11 *Regulation & Governance* 505 ff.; K Yeung and M Lodge (eds), *Algorithmic Regulation* (Oxford University Press 2019); S Zuboff, *The Age of Surveillance Capitalism* (PublicAffairs 2019) 8 ff.; R Montinaro, 'I sistemi di raccomandazione nelle interazioni tra professionisti e consumatori' (2022) *Persona e Mercato* 368 ff., spec. 380 ff.

limitations of human rationality, transforming behavioural vulnerabilities into economic opportunities³.

Against this background, the present paper argues that algorithmic nudging and manipulative design practices pose a significant challenge to the foundational principles of European private law. In particular, they call into question the assumptions underlying private autonomy, freedom of contract, and the genuineness of consent. By intervening not only in the presentation of options but also in the formation of preferences, these technologies risk undermining the conditions under which decisions can be regarded as truly autonomous. Consequently, they require a rethinking of the role of private law as a normative framework capable of protecting individuals in increasingly data-driven and technologically mediated markets.

2. Behavioural Vulnerability and Algorithmic Choice Architectures

The effectiveness of algorithmic nudging is rooted in the well-established insight that individuals do not behave as fully rational agents. Behavioural sciences have demonstrated that decision-making processes are shaped by cognitive limitations, heuristics, and systematic biases, which affect how individuals perceive and evaluate available options. Consumers, in particular, rely on simplified decision-making strategies that allow them to cope with complex environments, but which also expose them to predictable errors in judgment⁴.

From this perspective, consumer behaviour is influenced both by endogenous factors – such as emotions, intuitions, and psychological predispositions – and by exogenous factors, including the way in which information and options are presented. The latter aspect is particularly relevant in digital environments, where the architecture of choice is deliberately designed and continuously modified by technological systems. As a result, decision-making cannot be understood independently of the context in which it occurs⁵.

Digital choice architectures differ fundamentally from traditional ones. In online environments, recommendation systems play a central role in structuring the information that users encounter. These systems rely on large-scale data collection and profiling techniques in order to predict users'

³ Thaler and Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (n 1) 72 ff.; K Yeung, 'Hypernudge: Big Data as a Mode of Regulation by Design' (2016) 20 *Information, Communication & Society* 118 ff.; Montinaro, 'I sistemi di raccomandazione' (n 2) 368 ff., spec. 380 ff.; R Montinaro, 'When Clicks are Cheating' (2023) *EuCML* 252 ff., spec. 253-255; L Dani, *Manipolazione algoritmica e hypernudging* (2025) 137 ff., spec. 139 ff.

⁴ Thaler and Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (n 1) 7 ff., 9 ff.; RH Thaler, 'Choice Architecture' in *The Behavioral Foundations of Policy* (2012) 428 ff.; Sunstein, *The Ethics of Influence* (n 1) 36 ff.; Dani (n 3) 137 ff., spec. 139 ff. On the relevance of cognitive limitations and bounded rationality for private-law analysis, see R Caterina, 'Paternalismo e antipaternalismo nel diritto privato' (2005) *Il Rivista di diritto civile* 771 ff.; R Caterina, 'Modelli di razionalità e incompletezza del regolamento contrattuale' in *Oltre il soggetto razionale. Fallimenti cognitivi e razionalità limitata nel diritto privato* (Roma TrE-Press 2014) 47 ff.

⁵ M Hildebrandt, *Smart Technologies and the End(s) of Law* (Edward Elgar 2015) 5 ff.; Sunstein, *The Ethics of Influence* (n 1) 50 ff.; Montinaro, 'I sistemi di raccomandazione' (n 2) 368 ff., spec. 380 ff.; Dani (n 3) 139 ff.

preferences and tailor content accordingly. They are not merely tools for filtering information in contexts characterised by information overload, but are also mechanisms for directing attention and influencing behaviour⁶.

In particular, recommendation systems operate within what has been described as the “attention economy”, in which users’ attention constitutes a scarce and valuable resource that firms seek to capture and monetise. The design of digital interfaces is therefore oriented toward maximising engagement, often through the use of behavioural techniques that encourage users to remain active on platforms and to interact with specific content. This creates an environment in which behavioural influence is not incidental, but structurally embedded in the design of digital systems⁷.

Within this framework, hypernudging represents a significant evolution of traditional nudging techniques. By leveraging real-time data and machine-learning algorithms, platforms are able to create highly personalised and adaptive decision environments. These environments rely on different types of default mechanisms – persistent, predictive, and adaptive – which continuously adjust the presentation of options based on users’ past behaviour and inferred preferences. The result is a self-reinforcing system in which past choices influence future opportunities, progressively narrowing the range of perceived alternatives⁸.

Such dynamics raise serious concerns regarding individual autonomy. As highlighted in the literature, recommendation systems may limit the diversity of options to which users are exposed, reinforce existing preferences, and ultimately constrain the space of decision-making. In extreme cases, they may lead to forms of behavioural manipulation that go beyond mere influence, effectively steering users toward outcomes that serve the interests of the platform or of third parties⁹.

3. From Nudging to Manipulation: Hypernudging and Digital Exploitation

The transition from nudging to hypernudging marks a qualitative shift in the nature of behavioural influence. While traditional nudges aim to guide individuals toward welfare-enhancing choices without restricting their freedom, hypernudging exploits behavioural vulnerabilities in order to maximise engagement and profit. This transformation is made possible by the increasing availability of data and by the capacity of algorithmic systems to process and act upon such data in real time¹⁰.

⁶ Pasquale, *The Black Box Society* (n 2) 18 ff.; Zuboff (n 2) 93 ff.; Montinaro, 'I sistemi di raccomandazione' (n 2) 368 ff., spec. 380 ff.; Montinaro, 'When Clicks are Cheating' (n 3) 252 ff., spec. 253-255.

⁷ Yeung, 'Algorithmic Regulation' (n 2) 505 ff.; Zuboff (n 2) 93 ff., 150 ff.; F Pasquale, *New Laws of Robotics* (Harvard University Press 2020) 25 ff.

⁸ Yeung, 'Hypernudge' (n 3) 118 ff.; Montinaro, 'I sistemi di raccomandazione' (n 2) 368 ff., spec. 380 ff.; Dani (n 3) 140 ff., 140-141.

⁹ J Raz, *The Morality of Freedom* (Oxford University Press 1986) 203 ff.; Pasquale, *The Black Box Society* (n 2) 145 ff.; Zuboff (n 2) 219 ff.; Montinaro, 'When Clicks are Cheating' (n 3) 252 ff., spec. 254 ff.

¹⁰ Thaler and Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (n 1) 72 ff.; Pasquale, *The Black Box Society* (n 2) 1 ff., spec. 18 ff.; Sunstein, *The Ethics of Influence* (n 1) 75 ff.; Yeung, 'Algorithmic Regulation' (n 2) 505 ff.

A crucial feature of hypernudging is its reliance on profiling and personalisation. By analysing large datasets, platforms are able to infer users' preferences, emotions, and behavioural patterns, and to use this information to tailor the decision-making environment accordingly. This creates a form of asymmetry that goes beyond traditional informational asymmetries, as traders acquire not only knowledge about products and markets, but also predictive knowledge about the behaviour of consumers¹¹.

The deployment of such techniques is closely linked to the development of advanced forms of digital marketing, including personalised advertising and neuromarketing. Emotion recognition systems, for instance, allow platforms to infer users' emotional states from behavioural and physiological data, and to use this information to influence their decisions. By targeting users at moments of emotional vulnerability, these systems can significantly enhance the effectiveness of behavioural interventions, raising concerns about the exploitation of individual weaknesses¹².

Moreover, the increasing use of artificial intelligence in communication processes introduces additional risks. Language generation systems, in particular, are capable of producing highly persuasive content that may be perceived as truthful, even when it is not. As has been observed, such systems generate what can be described as "pseudo-truths", that is, outputs that resemble accurate information while lacking a reliable epistemic foundation. In these contexts, the veridicality of information becomes a mere contingent outcome of probabilistic processes rather than the result of a truth-oriented inquiry¹³.

This phenomenon is further exacerbated by the structural characteristics of language generation systems. Their outputs are designed to maximise usability and persuasiveness, rather than accuracy, and are generated through statistical correlations within training data rather than through any form of understanding or verification. As a result, they may produce so-called "hallucinations", namely false or misleading statements presented with high degrees of coherence and plausibility¹⁴.

At the same time, users interacting with such systems are prone to cognitive distortions that reinforce their persuasive power. In particular, the phenomenon of overreliance leads individuals to attribute unwarranted authority and reliability to algorithmic outputs, thereby reducing their capacity for critical assessment. This dynamic is further intensified by design choices

¹¹ Pasquale, *The Black Box Society* (n 2) 145 ff.; Zuboff (n 2) 93 ff., 219 ff.; R Montinaro, 'Emotion Recognition and Personalized Advertising' (2024) 1003 ff.

¹² D Clifford, 'Citizens and Consumers in a Personalized Galaxy: Emotion-Influenced Decision-Making: A True Path to the Dark Side' in L Edwards, B Schafer and E Harbinja (eds), *Future Law: Emerging Technology, Regulation, and Ethics* (Edinburgh University Press 2020) 79 ff.; Montinaro, 'Emotion Recognition' (n 11) 1003 ff., spec. 1005 ff., 1007 ff.; R Montinaro, 'Generatori di linguaggio, disinformazione e pseudo-verità' (2025) 11 ff.

On the capacity of specific features of digital marketing communications to affect consumer engagement and purchase attitudes, see RG Duffett and M Maraule, 'Customer Engagement and Intention to Purchase Attitudes of Generation Z Consumers toward Emojis in Digital Marketing Communications' (2024) 25 Young Consumers 607–624.

¹³ Zuboff (n 2) 150 ff.; Montinaro, 'Generatori di linguaggio' (n 12) 14 ff., 17 ff.

¹⁴ Montinaro, 'Generatori di linguaggio' (n 12) 16-18, 17, 20.

that anthropomorphise artificial intelligence systems and encourage trust and engagement¹⁵.

The combination of these elements – profiling, emotion recognition, and generative AI – creates a powerful ecosystem of behavioural influence, in which individuals are exposed to highly personalised and context-sensitive interventions. This ecosystem operates largely invisibly, making it difficult for users to detect the presence of manipulation and to resist its effects¹⁶.

From a legal perspective, this raises the question of how to distinguish between legitimate influence and unlawful manipulation¹⁷. Traditional approaches based on deception or coercion appear insufficient to capture the subtleties of algorithmic influence, which often operates at a pre-cognitive or subconscious level. Instead, it becomes necessary to consider the broader conditions under which decisions are made, including the design of the decision-making environment and the extent to which it exploits behavioural vulnerabilities¹⁸.

4. Contract Law and the Transformation of Consent

The rise of algorithmic nudging and hypernudging poses a direct challenge to one of the foundational assumptions of European contract law, namely that legally binding agreements are the result of free, informed, and autonomous consent. In traditional legal theory, consent is understood as the expression of a will formed through a process of rational deliberation, in which individuals evaluate available options and select the one that best aligns with their preferences. However, this model appears increasingly inadequate in digital environments where preferences themselves are shaped by algorithmic systems¹⁹.

Behavioural sciences have long demonstrated that decision-making processes are not purely rational, but are influenced by cognitive biases, emotional responses, and contextual factors. Algorithmic nudging exploits precisely these elements by structuring the decision-making environment in ways that favour certain outcomes. In doing so, it does not merely affect the choice among given options, but intervenes in the very process through which

¹⁵ Zuboff (n 2) 300 ff.; Montinaro, 'Emotion Recognition' (n 11) 1007 ff.

¹⁶ Dani (n 3) 141 ff.

¹⁷ For philosophical accounts of manipulation and its distinction from other forms of interpersonal influence, including coercion and exploitation, see M Baron, 'Manipulativeness' (2003) 77 *Proceedings and Addresses of the American Philosophical Association* 37–54; AW Wood, 'Coercion, Manipulation, Exploitation' in C Coons and M Weber (eds), *Manipulation: Theory and Practice* (Oxford University Press 2014) 17 ff., spec. 31–32.

¹⁸ Hildebrandt (n 5) 15 ff.; Pasquale, *New Laws of Robotics* (n 7) 45 ff.

¹⁹ EJ Weinrib, *The Idea of Private Law* (Oxford University Press 2012) 3 ff., 113 ff.; Hildebrandt (n 5) 5 ff.; H-W Micklitz, *The Politics of Justice in European Private Law* (Cambridge University Press 2018) 45 ff.

On the contractual and consumer-law implications of digital consent and the economic exploitation of personal data, see E Battelli, 'La commercializzazione dei dati e consenso digitale' in E Battelli (ed), *Diritto privato digitale* (Giappichelli 2022) 113 ff.; E Battelli, 'I modelli negoziali di business degli operatori digitali a "prezzo zero" non sono "gratuiti"' (2022) *I Contratti* 355 ff.

preferences are formed. This raises the question of whether consent expressed in such contexts can still be regarded as genuine²⁰.

The problem becomes even more acute in the case of hypernudging. By relying on continuous data collection and real-time personalisation, hypernudging enables traders to anticipate users' behaviour and to design choice architectures that maximise the likelihood of specific decisions. The resulting influence is often subtle, pervasive, and difficult to detect, making it fundamentally different from traditional forms of manipulation such as deception or coercion. Rather than presenting false information or exerting overt pressure, hypernudging operates by shaping the cognitive and emotional conditions under which decisions are made²¹.

This dynamic is further intensified by the emergence of generative artificial intelligence systems. As previously observed, language generation systems produce outputs that may be perceived as authoritative and reliable, despite lacking a robust epistemic foundation. Users interacting with such systems may develop forms of overreliance, attributing undue credibility to algorithmic outputs and incorporating them into their decision-making processes without adequate scrutiny. In such circumstances, the formation of consent is influenced not only by external design choices, but also by internalised distortions of judgment.

From this perspective, traditional doctrines of vitiated consent – such as mistake and fraud – appear ill-suited to address the challenges posed by algorithmic influence. These doctrines are primarily concerned with defects affecting the cognitive dimension of decision-making, such as errors regarding the nature or characteristics of the contract, or misrepresentations by the other party. However, the forms of influence exerted by algorithmic systems often operate at a pre-cognitive or subconscious level, targeting emotional responses and behavioural tendencies rather than conscious reasoning²².

This makes it difficult to apply existing categories. In particular, the requirement of recognizability – central to doctrines such as mistake – appears problematic in cases of hypernudging, given the highly personalised and opaque nature of algorithmic influence. Similarly, the notion of fraud presupposes intentional deception, which may be difficult to establish in contexts where influence results from the design of the system rather than from deliberate misrepresentation.

²⁰ Thaler and Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (n 1) 9 ff.; Sunstein, *The Ethics of Influence* (n 1) 36 ff.; L Tafaro, *Neuromarketing e tutela del consenso* (Napoli 2018) 12 ff.; Montinaro, 'I sistemi di raccomandazione' (n 2) 368 ff., spec. 380 ff.

²¹ Yeung, 'Hypernudge' (n 3) 118 ff.; S Zuboff, *Il capitalismo della sorveglianza* (Roma 2019) 297; EM Incutti, 'Sistemi di riconoscimento delle emozioni e ruolo dell'autonomia privata: linee evolutive di un umanesimo digitale' (2022) *Giustizia civile* 515 ff.; I Richards, 'Hypernudging: a Threat to Moral Autonomy?' *Nature* (28 March 2024); R Montinaro, 'Riconoscimento delle emozioni e marketing personalizzato' (2024) *Persona e Mercato* 847 ff.; L Apriliani, 'Hypernudging in the Digital Era: Exploring the Impact and Ethical Considerations of Advanced Behavioral Interventions' (2025) *Upy Business and Management Journal* 200 ff.

²² W Samuelson and R Zeckhauser, 'Status Quo Bias in Decision Making' (1988) *Journal of Risk and Uncertainty* 7 ff.

On the relationship between unconscious influences on decision-making and the degree of control involved in free choice, see L Mudrik and others, 'Free Will without Consciousness?' (2022) 26 *Trends in Cognitive Sciences* 555–566.

The inadequacy of traditional doctrines suggests the need to reconsider the concept of consent itself. Rather than treating consent as a purely formal expression of will, it should be understood as the outcome of a process that must meet certain minimum standards of autonomy and fairness²³. Where the decision-making environment is structured in ways that systematically exploit behavioural vulnerabilities, the resulting consent may be regarded as deficient, even in the absence of deception or coercion in the traditional sense.

This perspective finds support in broader developments in European private law, which increasingly emphasise substantive autonomy over formal consent. In this context, the focus shifts from the mere existence of consent to the conditions under which it is formed. Algorithmic nudging thus becomes legally relevant not because it eliminates choice, but because it undermines the quality of the decision-making process²⁴.

4.1. Hypernudging, Good Faith, and Pre-Contractual Liability

The challenges posed by algorithmic influence are not limited to the validity of contracts, but extend to the broader framework governing pre-contractual conduct. In European legal systems, the principle of good faith plays a central role in regulating the behaviour of parties during negotiations, requiring them to act fairly and to respect the legitimate expectations of their counterpart. This principle ensures that the decision-making process leading to the formation of the contract is not distorted by opportunistic or exploitative conduct²⁵.

From this perspective, the use of hypernudging techniques may constitute a breach of pre-contractual duties. By deliberately or negligently exploiting behavioural vulnerabilities, traders may interfere with the autonomy of consumers and undermine the fairness of the negotiation process. As highlighted in recent scholarship, such practices operate by leveraging cognitive biases and emotional responses in ways that are difficult for individuals to detect or resist. The resulting distortion of the decision-making process can be conceptualised as a form of *culpa in contrahendo*, giving rise to liability independently of the validity of the contract²⁶.

This approach is particularly relevant in contexts where the application of traditional remedies based on invalidity is difficult. Even if the contract remains formally valid, the conduct of the trader may still be considered wrongful if it violates the duty of good faith. In such cases, pre-contractual liability provides a flexible tool for addressing the harms associated with algorithmic manipulation.

²³ Dani (n 3) 139 ff. On consent as an act of private autonomy and on the need to assess its substantive lawfulness beyond its merely formal expression, see S Orlando, 'Per un sindacato di liceità del consenso privacy' (2022) 4 Persona e Mercato 527 ff.

²⁴ Hildebrandt (n 5) 15 ff.; Micklitz (n 19) 120 ff.

²⁵ P Cane, *Responsibility in Law and Morality* (Hart 2002) 130 ff.; Weinrib (n 19) 113 ff.; Micklitz (n 19) 120 ff.

²⁶ Montinaro, 'When Clicks are Cheating' (n 3) 252 ff., spec. 253-255; Dani (n 3) 142 ff., 143 ff.; Montinaro, 'Generatori di linguaggio' (n 12) 19 ff.

Moreover, the use of behavioural techniques in digital environments raises questions about the standard of professional diligence required of traders. Given the increasing sophistication of algorithmic systems, it may be argued that traders have a duty to take into account the behavioural effects of their design choices and to avoid practices that exploit consumers' vulnerabilities. This suggests a shift from a purely informational model of consumer protection to a model based on the regulation of the decision-making environment²⁷.

4.2. Toward Invalidity? Manipulation and the Structure of the Contract

Beyond pre-contractual liability, the question arises whether manipulative practices may affect the validity of the contract itself. This issue touches upon the long-standing debate concerning the relationship between rules of conduct and rules of validity²⁸.

On the one hand, traditional doctrine maintains a distinction between these categories, according to which violations of behavioural duties do not necessarily affect the validity of the contract, but rather give rise to liability. On the other hand, a growing body of scholarship challenges this distinction, arguing that certain forms of misconduct may be so closely connected to the formation of the contract that they affect its very structure²⁹.

In the context of hypernudging, this debate acquires renewed significance. Manipulative practices may be seen as interfering with the very essence of the contractual relationship, insofar as they undermine the autonomy of the parties and distort the formation of consent. In such cases, it may be appropriate to consider remedies that go beyond liability and address the validity of the contract itself³⁰.

In particular, contracts concluded as a result of severe forms of manipulation may be regarded as contrary to fundamental principles of private law, including the requirement of genuine consent and the duty of good faith. This could justify the application of nullity, especially where the manipulation is sufficiently strong to affect the structure or function of the contractual arrangement³¹.

At the same time, the application of invalidity remedies should not be automatic. Rather, it requires a case-by-case assessment of the specific circumstances, including the intensity of the manipulation and its impact on the decision-making process. In this context, the notion of "protection nullity" may play a particularly important role, as it allows for a flexible response tailored to the protection of the weaker party³².

²⁷ Hildebrandt (n 5) 15 ff.

²⁸ Weinrib (n 19) 113 ff.; Dani (n 3) 144 ff.

²⁹ Cane (n 25) 140 ff.; Micklitz (n 19) 120 ff.

³⁰ Raz (n 9) 203 ff.; Hildebrandt (n 5) 15 ff.; Dani (n 3) 145 ff.

³¹ Montinaro, 'Emotion Recognition' (n 11) 1007 ff.; Dani (n 3) 146 ff.

³² Cane (n 25) 150 ff.; Micklitz (n 19) 130 ff.

5. Tort Law, Personality Rights, and the Protection of Autonomy

From a tort-law perspective, algorithmic manipulation may be conceptualised as an interference with personality rights, particularly the right to self-determination. European legal traditions have long recognised that individuals have an interest in shaping their own lives and decisions free from undue external interference³³.

Algorithmic systems challenge this understanding by introducing forms of influence that are both pervasive and difficult to detect. By continuously monitoring behaviour and adapting the decision-making environment, digital systems shape individuals' preferences and choices in ways that are not fully transparent³⁴.

If autonomy is understood merely as the absence of coercion, such practices may appear relatively unproblematic. However, if autonomy is conceived as the capacity for reflective self-determination, then practices that systematically exploit behavioural vulnerabilities undermine this capacity³⁵.

From this perspective, tort law may play a crucial role in addressing these harms. By recognising non-material damage, including the erosion of autonomy and the distortion of decision-making processes, tort law can provide remedies that go beyond the traditional focus on economic loss³⁶.

6. Toward a Design-Oriented Liability Framework

The challenges posed by algorithmic nudging and hypernudging cannot be fully addressed through traditional ex post remedies alone. While doctrines of invalidity, pre-contractual liability, and tort law provide important tools for reacting to harmful practices, they remain structurally ill-equipped to deal with forms of influence that are embedded in the design of digital systems and operate continuously over time³⁷.

This limitation reflects a deeper transformation in the nature of behavioural influence. As previously observed, algorithmic systems do not merely affect isolated transactions, but shape the very conditions under which individuals perceive, evaluate, and select available options. In such contexts, the harm does not arise only at the moment of contractual formation or performance, but is already embedded in the architecture of the decision-making environment³⁸.

This suggests the need for a shift toward a design-oriented approach, focusing on the ex ante responsibilities of those who develop and deploy algorithmic systems. Such an approach is consistent with recent developments in European regulatory law, particularly the Digital Services Act (DSA) and the Artificial Intelligence Act (AI Act), which increasingly emphasise the importance

³³ Raz (n 9) 203 ff.; Cane (n 25) 58 ff.

³⁴ Pasquale, *The Black Box Society* (n 2) 145 ff.; Zuboff (n 2) 300 ff.

³⁵ Raz (n 9) 369 ff.; Montinaro, 'Generatori di linguaggio' (n 12) 19 ff.

³⁶ Cane (n 25) 130 ff.; Hildebrandt (n 5) 15 ff.

³⁷ Hildebrandt (n 5) 15 ff.; Micklitz (n 19) 120 ff.

³⁸ Zuboff (n 2) 300 ff.; Montinaro, 'When Clicks are Cheating' (n 3) 252 ff., spec. 253 ff.; Dani (n 3) 140 ff.

of preventing harm through the design and governance of digital technologies³⁹.

In particular, the DSA introduces a prohibition of certain manipulative interface designs – commonly referred to as “dark patterns” – which are capable of deceiving or materially distorting the decision-making processes of users. This reflects a recognition that the architecture of digital environments plays a central role in shaping behaviour and that certain forms of design may be inherently incompatible with the protection of user autonomy⁴⁰.

However, the scope of these regulatory interventions remains limited. As highlighted in the literature, existing frameworks struggle to capture the complexity of algorithmic recommendation systems and personalised decision environments, especially where influence is exerted through subtle, adaptive, and continuously evolving mechanisms. Moreover, the fragmentation of regulatory regimes – across consumer law, data protection law, and platform regulation – risks generating gaps and inconsistencies in the protection of individuals⁴¹.

The AI Act further develops this approach by prohibiting certain forms of manipulative artificial intelligence, including systems that exploit vulnerabilities or deploy subliminal techniques capable of materially distorting behaviour. At the same time, it introduces a risk-based framework that imposes obligations on both providers and deployers of high-risk AI systems. While these provisions represent an important step forward, they also raise questions regarding their interaction with private-law remedies and their capacity to address more subtle forms of influence⁴².

In this context, private law can play a complementary role by translating regulatory standards into enforceable rights and obligations between private parties. In particular, the principles of good faith, professional diligence, and fairness may serve as a basis for articulating design-oriented duties of care. These duties would require traders not only to refrain from deceptive or coercive practices, but also to actively consider the behavioural impact of their design choices and to avoid exploitative forms of personalisation⁴³.

Such an approach aligns with the broader idea that responsibility for algorithmic systems should not be limited to their outputs, but should extend to their design and deployment. As algorithmic systems increasingly shape the conditions under which individuals make decisions, the design of such systems becomes a matter of legal relevance⁴⁴.

³⁹ Yeung, 'Algorithmic Regulation' (n 2) 505 ff.; Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services and amending Directive 2000/31/EC (Digital Services Act), art 25; Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act), art 5.

⁴⁰ Regulation (EU) 2022/2065 (Digital Services Act), art 25; Montinaro, 'I sistemi di raccomandazione' (n 2) 368 ff., spec. 380 ff.; Zuboff (n 2) 219 ff.

⁴¹ Hildebrandt (n 5) 15 ff.; Pasquale, *New Laws of Robotics* (n 7) 45 ff.; Montinaro, 'When Clicks are Cheating' (n 3) 252 ff., spec. 254 ff.

⁴² Regulation (EU) 2024/1689 (Artificial Intelligence Act), art 5; Hildebrandt (n 5) 40 ff.

⁴³ Cane (n 25) 130 ff.; Micklitz (n 19) 130 ff.; Montinaro, 'Emotion Recognition' (n 11) 1007 ff.

⁴⁴ Pasquale, *The Black Box Society* (n 2) 145 ff.; Zuboff (n 2) 350 ff.

A crucial element of this framework is the concept of transparency. However, as widely noted, traditional forms of transparency – based on the mere disclosure of information – are often ineffective in complex algorithmic environments. Users may lack the capacity to understand the functioning of algorithmic systems, and even where information is available, it may not be sufficient to counteract the effects of behavioural influence. This has led to what has been described as the “transparency fallacy”⁴⁵.

In response, a more substantive notion of transparency is required, focusing not only on the availability of information, but also on the intelligibility of the decision-making environment and the capacity of users to meaningfully exercise control over it. This may involve, for example, the development of user interfaces that promote reflective decision-making, the limitation of certain forms of personalisation, and the provision of meaningful choices regarding the use of data and algorithms⁴⁶.

Ultimately, a design-oriented approach to liability reflects a broader transformation in the role of private law. Rather than focusing exclusively on individual transactions, private law must increasingly address the structural conditions under which interactions take place in digital environments⁴⁷.

7. Concluding remarks

Algorithmic nudging and manipulative design challenge the foundational assumptions of European private law by blurring the boundary between voluntary choice and engineered influence. In digital environments, decisions are no longer made in neutral contexts, but within carefully designed architectures that shape attention, structure preferences, and guide behaviour.

The analysis developed in this paper has shown that traditional private-law doctrines, while still relevant, are not fully equipped to address these challenges. The categories of mistake, fraud, and coercion fail to capture the subtleties of algorithmic influence, which operates through the exploitation of cognitive biases, emotional responses, and informational asymmetries of a new kind.

In contract law, this implies a shift from a formal to a substantive understanding of consent, taking into account the conditions under which preferences are formed. In the field of pre-contractual liability, it requires a reconsideration of the duties of good faith and professional diligence. In tort law, it calls for the recognition of autonomy as a protected interest capable of grounding claims for non-material harm.

⁴⁵ Pasquale, *The Black Box Society* (n 2) 18 ff.; Zuboff (n 2) 150 ff.; Montinaro, 'Generatori di linguaggio' (n 12) 17 ff.

On the relationship between algorithmic transparency and the validity of consent to the processing of personal data, see S Orlando and C Sartoris, 'La Corte di Cassazione subordina la validità del consenso al trattamento dei dati personali alla trasparenza dell'algoritmo che governa il servizio per il quale il consenso è prestato' (2021) *Persona e Mercato* 650 ff.

⁴⁶ Hildebrandt (n 5) 15 ff.; Montinaro, 'Emotion Recognition' (n 11) 1007 ff.

⁴⁷ Micklitz (n 19) 140 ff.

At the same time, the increasing importance of design in shaping behaviour suggests the need for a more proactive approach. Private law can contribute to this development by articulating design-oriented duties of care, complementing public regulatory frameworks such as the DSA and the AI Act.

Ultimately, the challenge posed by algorithmic nudging is not merely technical or regulatory, but normative. It concerns the kind of digital environment that legal systems seek to promote and the extent to which individuals can remain authors of their own choices in a context increasingly shaped by data-driven technologies.