

**"A user interface [... that] has the effect of substantially subverting or impairing user autonomy, decisionmaking, or choice, regardless of a business's intent."
(CPRA §7004.(c), 2020)**

**"Dark patterns on online interfaces of online platforms are practices that materially distort or impair, either purposefully or in effect, the ability of recipients of the service to make autonomous and informed choices or decisions."
(DSA Recital 51b, 2022)**

WHAT ARE "DARK PATTERNS"?

"a user interface carefully crafted to trick users into doing things they might not otherwise do [...] They're carefully crafted with a solid understanding of human psychology, and they do not have the user's interests in mind." (Brignull, 2013)

"where user value is supplanted in favor of shareholder value" (Gray et al., 2018)

"user interfaces that benefit an online service by leading users into making decisions they might not otherwise make." (Narayanan et al., 2020)

DARK PATTERNS ATTRIBUTES

Table 2: Dark patterns attributes grouped by how they modify the user's choice architecture.

Choice Architecture	Attribute	Description
Modifying the decision space	Asymmetric	Unequal burdens on choices available to the user
	Restrictive	Eliminate certain choices that should be available to users
	Disparate Treatment	Disadvantage and treat one group of users differently from another
	Covert	Hiding the influence mechanism from users
Manipulation the information flow	Deceptive	Induce false beliefs in users either through affirmative misstatements, misleading statements, or omissions
	Information Hiding	Obscure or delay the presentation of necessary information to users

Table reproduced from Mathur, A., Kshirsagar, M., & Mayer, J. (2021). What Makes a Dark Pattern... Dark? Design Attributes, Normative Considerations, and Measurement Methods. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–18. <https://doi.org/10.1145/3411764.3445610>

DARK PATTERNS ARE UBIQUITOUS

De Geronimo et al. (2020) report that their analysis of 240 common smartphone applications **“showed that 95% of apps contain one or more forms of DPs [dark patterns] and, on average, popular applications include at least seven different types of deceiving UIs.”**

Bongard-Blanchy et al. (2021) demonstrated that while users are **“generally aware of the influence that manipulative designs can exert on their online behaviour . . . being aware does not equip users with the ability to oppose such influence.”**

Nouwens et al. (2020) revealed that **“dark patterns and implied consent are ubiquitous [in GDPR consent banners]; only 11.8% meet the minimal requirements that we set based on European law.”**

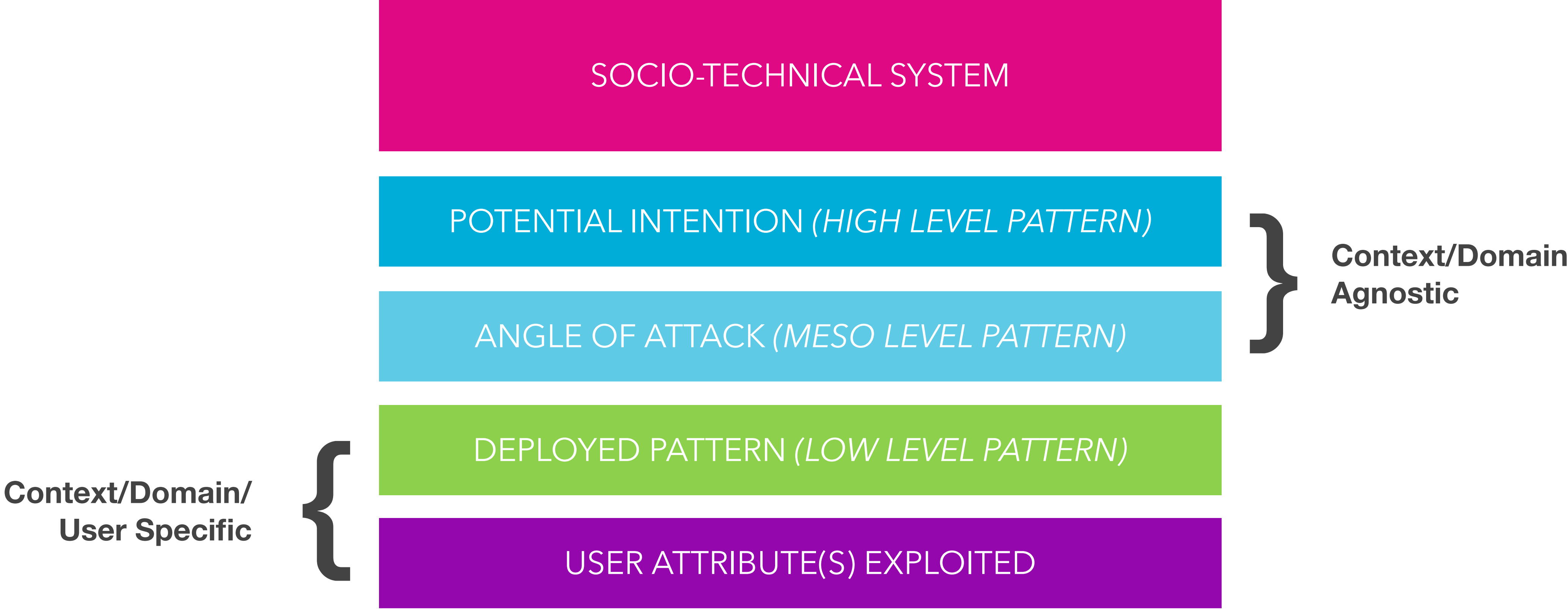
Bongard-Blanchy, K., Rossi, A., Rivas, S., Doublet, S., Koenig, V., & Lenzini, G. (2021). “I am Definitely Manipulated, Even When I am Aware of it. It’s Ridiculous!” - Dark Patterns from the End-User Perspective. *Designing Interactive Systems Conference 2021*, 1, 763-776. <https://doi.org/10.1145/3461778.3462086>

Di Geronimo, L., Braz, L., Fregnan, E., Palomba, F., & Bacchelli, A. (2020). UI Dark Patterns and Where to Find Them: A Study on Mobile Applications and User Perception. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1-14. <https://doi.org/10.1145/3313831.3376600>

Mathur, A., Acar, G., Friedman, M. J., Lucherini, E., Mayer, J., Chetty, M., & Narayanan, A. (2019). Dark Patterns at Scale: Findings from a Crawl of 11K Shopping Websites. *Proceedings of the ACM on Human-Computer Interaction*, 3(CSCW), Article No. 81. <https://doi.org/10.1145/3359183>

Nouwens, M., Liccardi, I., Veale, M., Karger, D., & Kagal, L. (2020). Dark Patterns after the GDPR: Scraping Consent Pop-ups and Demonstrating their Influence. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1-13. <https://doi.org/10.1145/3313831.3376321>

LEVELS OF DARK PATTERNS KNOWLEDGE



High-Level Pattern	Meso-Level Pattern	Low-Level Pattern
Nagging D: Gr Lu EUCOM FTC OECD I: EDPB CMA	–	–
	Roach Motel (D: Br Gr Lu EUCOM ; I: Bö Ma FTC OECD)	Immortal Accounts (D: Bö FTC)
	<i>Creating Barriers</i>	Dead End (D: EDPB)
Obstruction D: Gr Lu Ma EUCOM FTC OECD I: EDPB CMA		Price Comparison Prevention (D: Br Gr Lu FTC EUCOM OECD)
	<i>Adding Steps</i> (I: EDPB)	Intermediate Currency (D: Gr Lu FTC EUCOM OECD ; I: CMA)
	Bait and Switch (D: Br Gr Lu FTC EUCOM ; I: OECD)	Privacy Maze (D: EDPB)
		Disguised Ad (D: Br Gr Lu FTC EUCOM OECD)
Sneaking D: Gr Lu Ma EUCOM OECD I: EDPB CMA FTC	<i>Hiding Information</i>	Sneak into Basket (D: Br Gr Ma Lu FTC EUCOM OECD)
		Drip Pricing, Hidden Costs, or Partitioned Pricing (D: Br Gr Ma Lu CMA FTC EUCOM OECD)
	<i>(De)contextualizing Cues</i>	Reference Pricing (D: CMA OECD)
		Conflicting Information (D: EDPB)
		<i>Information without Context</i> (I: EDPB)
		False Hierarchy (D: Gr Lu FTC OECD ; I: EDPB)
	<i>Manipulating Visual Choice Architecture</i> (I: CMA)	<i>Visual Prominence</i> (I: EDPB)
		Bundling (D: CMA)
		Pressured Selling (D: Lu FTC)
	Bad Defaults (D: Bö Gr Lu FTC OECD ; I: CMA EUCOM EDPB)	–
Interface Interference D: Gr Lu EUCOM FTC OECD I: Br Ma EDPB FTC	<i>Emotional or Sensory Manipulation</i> (I: Gr Lu CMA EUCOM OECD)	Cuteness (D: Lu)
	Trick Questions (D: Br Gr Ma Lu FTC EUCOM OECD)	<i>Positive or Negative Framing</i> (I: Gr EDPB)
	<i>Choice Overload</i> (I: EDPB CMA)	–
	Hidden Information (D: Gr Lu FTC EUCOM OECD ; I: EDPB)	–
	<i>Language Inaccessibility</i>	<i>Wrong Language</i> (I: EDPB)
	<i>Feedforward Ambiguity</i> (I: EDPB)	Complex Language (D: CMA)
		–

High-Level Pattern	Meso-Level Pattern	Low-Level Pattern
	Forced Continuity (D: Br Gr Lu FTC EUCOM OECD ; I: Ma)	–
	Forced Registration (D: Bö Lu FTC EUCOM OECD ; I: Ma CMA FTC)	–
	<i>Forced Communication or Disclosure</i>	Privacy Zuckering (D: Br Gr Lu OECD ; I: FTC)
Forced Action D: Gr Lu Ma EUCOM OECD I: CMA FTC		Friend Spam (D: Br Lu FTC OECD)
		Address Book Leeching (D: Bö Lu FTC OECD)
		Social Pyramid (D: Gr Lu FTC OECD)
		Pay-to-Play (D: FTC)
	Gamification (D: Gr Lu OECD)	Grinding (D: FTC)
	<i>Attention Capture</i>	Auto-Play (D: FTC)
	Scarcity and Popularity Claims (D: Ma Lu FTC CMA)	High Demand (D: Ma Lu FTC EUCOM OECD)
		Low Stock (D: Ma Lu FTC EUCOM OECD)
	Social Proof (D: Ma Lu EUCOM OECD)	Endorsements and Testimonials (D: Ma Lu FTC EUCOM OECD ; I: FTC)
		Parasocial Pressure (I: FTC)
		Activity Messages (D: Ma Lu FTC EUCOM OECD)
	Urgency (D: Ma Lu FTC EUCOM OECD)	Countdown Timer (D: Ma Lu FTC EUCOM OECD)
	<i>Shaming</i>	Limited Time Message (D: Ma Lu FTC EUCOM OECD)
	Personalization (D: CMA)	Confirmshaming (D: Br Ma Lu FTC EUCOM OECD)

Social Engineering

DARK PATTERNS ONTOLOGY

Gray, C. M., Santos, C., & Bielova, N. (2023). Towards a Preliminary Ontology of Dark Patterns Knowledge. *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems (CHI EA '23)*. <https://doi.org/10.1145/3544549.3585676> (after 22 April, 2023); <https://www.dropbox.com/scl/fo/h6e0blwslmjt30hf1du2r/h?dl=0&rlkey=6jpe28vk8xsrpruht74z2w21a>

ONTOLOGY EXAMPLE

High-Level Pattern

Meso-Level Pattern

Low-Level Pattern

Interface Interference

D: **Gr** **Lu** **EUCOM** **FTC** **OECD**
 I: **Br** **Ma** **EDPB** **FTC**

Manipulating Visual Choice Architecture
 (I: **CMA**)

Bad Defaults (D: **Bö** **Gr** **Lu** **FTC** **OECD**;
 I: **CMA** **EUCOM** **EDPB**)

Emotional or Sensory Manipulation
 (I: **Gr** **Lu** **CMA** **EUCOM** **OECD**)

Trick Questions
 (D: **Br** **Gr** **Ma** **Lu** **FTC** **EUCOM** **OECD**)

Choice Overload (I: **EDPB** **CMA**)

Hidden Information
 (D: **Gr** **Lu** **FTC** **EUCOM** **OECD**; I: **EDPB**)

Language Inaccessibility

Feedforward Ambiguity (I: **EDPB**)

False Hierarchy
 (D: **Gr** **Lu** **FTC** **OECD** I: **EDPB**)

Visual Prominence (I: **EDPB**)

Bundling (D: **CMA**)

Pressured Selling (D: **Lu** **FTC**)

Cuteness (D: **Lu**)

Positive or Negative Framing (I: **Gr** **EDPB**)

Wrong Language (I: **EDPB**)

Complex Language (D: **CMA**)

ONTOLOGY **EXAMPLE**

HIGH-LEVEL

—
strategy

MESO-LEVEL

—
angle of attack

LOW-LEVEL

—
means of execution

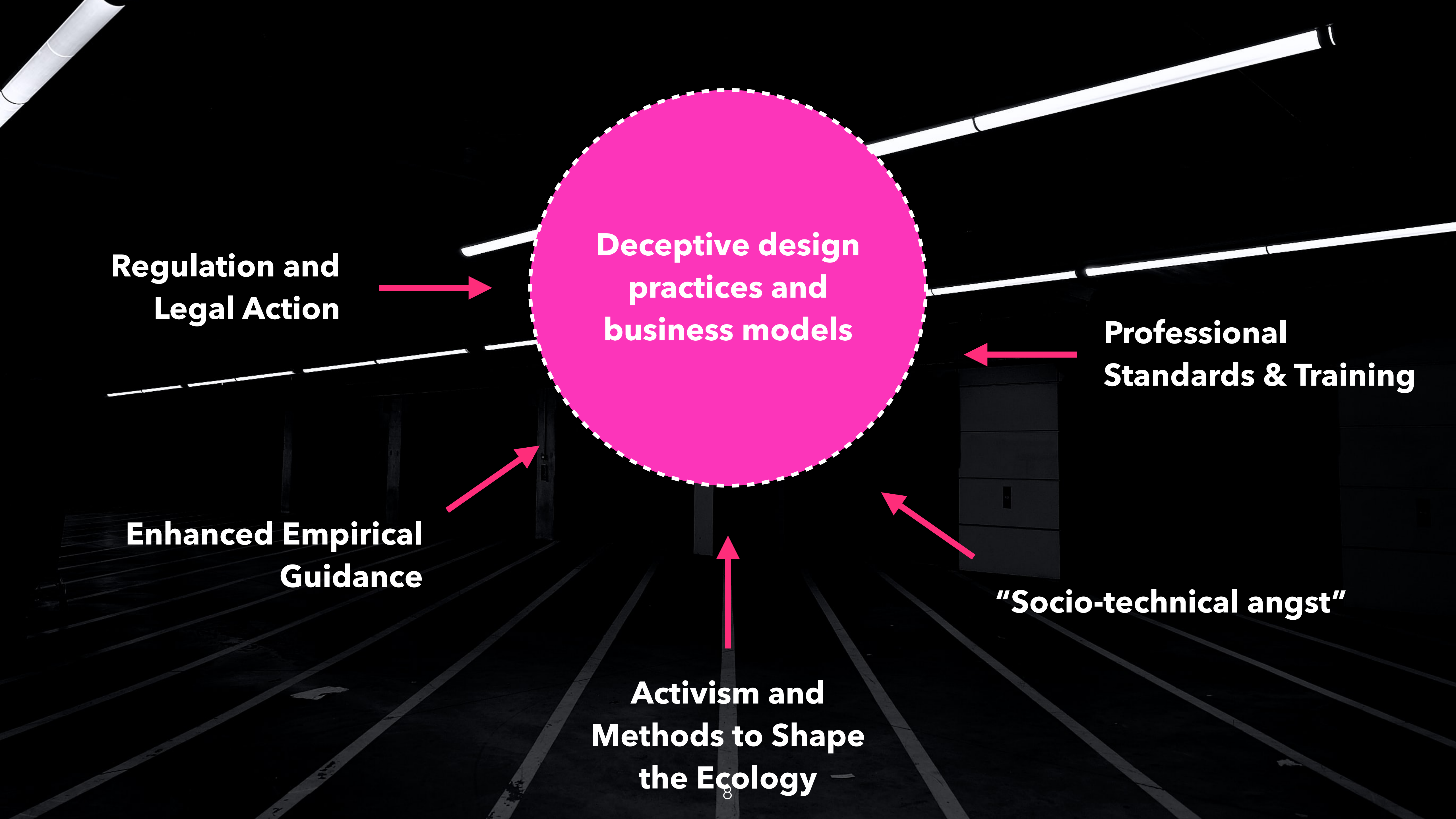
*interface
interference*



*manipulating the
visual choice
architecture*



false hierarchy



Deceptive design practices and business models

Regulation and Legal Action

Professional Standards & Training

Enhanced Empirical Guidance

"Socio-technical angst"

Activism and Methods to Shape the Ecology

DARK PATTERNS **METHODOLOGY**

