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Bachelor’s Programme in Engineering Psychology

Design Against Deception: Shifting Towards Wellbeing-Supportive Social Media Platforms

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Bachelor's Thesis 2025

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Title of thesis Design Against Deception: Shifting Towards Wellbeing-Supportive Social Media Platforms

Programme Engineering Psychology

Thesis supervisor Lauri Savioja

Thesis advisor(s) Henrik Lassila

Date 03.12.2025 **Number of pages** 21 + 5 **Language** English

Abstract

With the increased use of technology, concerns have been raised about its influence on user wellbeing. Many digital platforms use deceptive design patterns that steer user behaviour towards the platform's interests. These deceptive patterns commonly manipulate users into sharing excessive data, spending money or capturing their attention. Social media has been particularly associated with attention-capturing and behaviour-forming tactics. This thesis examines the wellbeing impacts of deceptive patterns through the lens of Self-Determination Theory and a contemporary model of user experience formation. By analysing how deceptive patterns frustrate basic psychological needs and how they affect the user experience, it identifies which patterns are especially detrimental to wellbeing. To address the harms of deceptive patterns, this thesis reviews wellbeing-supportive design literature, outlining guidelines, strategies, and design patterns that promote a more intentional and positive engagement with digital platforms. The thesis suggests that attention-capturing design patterns raise significant wellbeing concerns, and that a shift towards more positive digital environments can be achieved by grounding design practices in wellbeing-supportive principles and adapting design patterns accordingly.

Keywords Digital Wellbeing, Deceptive Patterns, Supportive Design, User Experience

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Titel Skiftet från vilseledande till stödjande designmönster i sociala medier

Utbildningsprogram Teknisk Psykologi

Ansvarslärare Lauri Savioja

Handledare Henrik Lassila

Datum 03.12.2025 **Sidantal** 21 + 5 **Språk** Engelska

Sammandrag

Med den ökade användningen av teknik har bekymmer väckts kring hur detta inverkar på användarnas välbefinnande. Flera digitala plattformar använder vilseledande designmönster som styr användarnas beteende i riktning mot plattformens intressen. Dessa designmönster manipulerar ofta användarna till att dela mera data, spendera pengar eller fånga deras uppmärksamhet. Sociala medier är särskilt förknippats med att vilseleda eller manipulera användare för att fånga uppmärksamhet och forma beteenden. Kandidatarbetet undersöker vilseledande designmönsters inverkan på användares välmående genom självbestämmandeteorin och en modell för användarupplevelsens utveckling. Genom att analysera hur vilseledande designmönster underminerar grundläggande psykologiska behov och påverkar användarupplevelsen, föreslås vilka mönster som är särskilt skadliga för användares välmående. För att motverka dess negativa effekter och istället främja användares välmående granskar kandidatarbetet litteratur om välmåendefrämjande design. Kandidatarbetetet presenterar riktlinjer, strategier och designmönster som kan främja ett mer medvetet och positivt engagemang i digitala plattformar. Kandidatarbetet föreslår att de uppmärksamhetsfångande mönstren bidrar avsevärt till problem för användares välmående, och att en övergång till mer positiva digitala miljöer kan uppnås genom att grunda designpraxis på välmåendefrämjande principer och anpassa designmönster därefter.

Nyckelord Digitalt Välmående, Vilseledande Mönster, Stödjande Design, Användarupplevelse

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1 Introduction

Technology is a big part of our lives, and the time we spend in the digital world is constantly increasing. Although technology offers several benefits – such as cultivating social connections and facilitating access to information and tools – wellbeing concerns have been raised regarding the increased usage. A central concern for wellbeing relates to social media platforms, which allow users to communicate, view and share content with others. Today, there are a total of 5,4 billion social media users, with an average daily use time of 143 minutes (Statista, 2025). Research indicates a growing number of intense and problematic use of social media (Boniel-Nissim et al., 2024; Lukoff et al., 2021; Pew Research Center, 2025), highlighting how social media have negative consequences on wellbeing for many users.

Like many digital platforms, social media is well known for using deceptive strategies in their interface design. Deceptive strategies commonly aim to manipulate users into sharing data, spending money, or capturing their attention (Narayanan et al., 2020). These interface designs are referred to as dark or deceptive patterns (Brignull et al., 2023). In the context of social media, deceptive patterns are often tailored to increase engagement by exploiting psychological vulnerabilities (Roffarello et al., 2023). Consequently, when these platforms become more engaging, the usage can become problematic if it becomes compulsive and uncontrolled. Problematic use of social media has been linked to a variety of negative effects on health and wellbeing, such as anxiety, stress, and attention deficit (Boer et al., 2020; Dhir et al., 2018; Hou et al., 2019;).

Despite these concerns, it is important not to categorise social media platforms as directly harmful to wellbeing. Social media can encourage creativity and enables connecting with friends (Pew Research Center, 2025). Social media can also support identity expression, collaborative learning, and access to communities (Riva et al., 2012; Vanden Abeele, 2021). Thus, social media has considerable potential to support wellbeing by enabling connectivity, inspiration, and learning. However, when users are manipulated, the resulting harms can outweigh the benefits.

To counteract the negative effects of social media use, new concepts of 'positive computing' and 'positive design' have emerged amongst researchers and designers. Drawing from psychological frameworks focused on wellbeing and human flourishing (Ryan & Deci, 2017), these concepts are defined as technology and design that support wellbeing and human potential (Calvo & Peters, 2014), Within this domain, design strategies and patterns have been introduced that promote more intentional and positive engagement, and support users' wellbeing (Calvo & Peters, 2014; Haliburton et al., 2024; Roffarello & De Russis, 2023b; Zhao et al., 2024).

This thesis reviews deceptive patterns on social media platforms that are linked to reduced wellbeing. It will then review design strategies and patterns that aim to create more positive user experiences and support user wellbeing. This thesis focuses mainly on interface design, and specific technical implementations and detailed algorithmic analyses are beyond the scope of this thesis.

The research questions guiding this thesis are:

1. What design patterns in social media are associated with reduced user wellbeing?
2. What design principles and patterns can promote user wellbeing?

To answer these questions, this thesis conducts a literature review from established scientific databases, including *ACM Digital Library, Google Scholar, Scopus, Directory of Open Access Journals (DOAJ),* and *Frontiers*. Key search terms include "digital wellbeing", "user interface", "user experience", "dark patterns", and "supportive design". The core literature is peer-reviewed and indexed in Scopus, complemented by select short papers, workshop proceedings, and case studies from reputable human-computer interaction (HCI) venues.

This thesis is structured as follows: Chapter 2 explains the theoretical foundations and frameworks related to digital wellbeing and interface design. Chapter 3 presents deceptive patterns and analyses their impact on the user experience and wellbeing. Chapter 4 introduces design guidelines, strategies, and patterns that support user wellbeing. Chapter 5 presents a summary of the key insights, along with limitations and suggestions for future research.

2 Background

This chapter introduces key concepts and theoretical frameworks that will guide the analysis of how design patterns affect the user experience and wellbeing.

2.1 Digital Wellbeing

Wellbeing is a multifaceted concept that has been given several definitions over the years. Early definitions take a hedonic view, focusing on subjective pleasure and absence of pain. The eudaimonic view links wellbeing to happiness, coping, high positive affect, low negative affect, and life satisfaction (Diener, 2009). The eudaimonic view defines wellbeing as living according to one's values, where the perceived autonomy and mastery, quality of relationships, self-acceptance, and growth are essential factors for wellbeing (Ryff, 1989). The structural view takes sociological and contextual conditions into consideration, focusing on how norms, politics and power relations influence wellbeing (Docherty and Biega, 2022). Wellbeing has also been defined as a balance between resources and challenges, shifting as external demands and personal strengths change (Dodge et al., 2012).

In the digital age, the concept 'digital wellbeing' has emerged as a response to the impact technology has on wellbeing. This concept adapts wellbeing theories to address how technologies influence psychological and social functioning. Digital wellbeing can be understood as the balance of connectivity that individuals experience with technology (Vanden Abeele, 2021). This balance shifts according to personal needs, technological contexts, and daily routines. Similarly, Zhao et al. (2024) define digital wellbeing as a state where a user's intentions and digital behaviours are aligned to enhance long-term wellbeing. Furthermore, Docherty and Biega (2022) highlight that digital wellbeing reflects the normative judgments about what it means to live well with technology. This acknowledges that using technology in accordance with one's values, goals, and intentions are essential for digital wellbeing.

Research on digital wellbeing encompasses several dimensions of how technologies impact wellbeing. Some directions within the domain are digital literacy, healthy online interactions, work-life balance, mindful technology use, mental and physical health (Uslu, 2025). For this thesis, the eudaimonic view is in primary focus, as research in this domain emphasises measuring wellbeing from the perspective of fundamental psychological needs (Peters, 2022; Roffarello et al., 2025), which lay the foundations for wellbeing and human flourishing (Ryan & Deci, 2017). The following section introduces the frameworks that will be adopted to interpret technology's impact on user wellbeing.

2.2 Self-Determination Theory

Designing for digital wellbeing in technology has become a key aim in human-computer interaction (HCI) and user experience (UX) research. Within this domain, Self Determination Theory (SDT) is one of the most influential frameworks for understanding human flourishing (Ryan & Deci, 2000, 2017). SDT examines how social, biological, and cultural conditions influence psychological growth, motivation, and wellbeing (Ryan & Deci, 2017). Central to the theory are the three basic psychological needs that must be satisfied for optimal functioning: autonomy, competence, and relatedness. Autonomy refers to acting in alignment with one's values, goals, and interests. Competence refers to feeling mastery over tasks and challenges encountered, and relatedness refers to feeling connected to others and a sense of belonging (Peters et al., 2018). Satisfying these needs promotes motivation, engagement, and wellbeing, whereas their frustration may lead to decreased motivation, psychological distress, and reduced wellbeing (Ryan & Deci, 2017).

These psychological needs help guide principles for designing technology. Autonomy can be supported by ensuring users experience a sense of agency, meaning they perceive they can intentionally use and control their actions (Lukoff et al., 2021). Competence can be supported by ensuring the user interfaces are usable and learnable (Peters et al., 2018; Peters, 2022). Relatedness can be supported by enabling communication and opportunities for meaningful social connection. By grounding design practices with SDT, technologies can help support user wellbeing. Therefore, the basic psychological needs provide a valuable lens for examining how technology design may either support or undermine wellbeing (Peters et al., 2018; Ryan and Deci, 2017).

Another central part of SDT is motivation, which is considered the driving force behind action and engagement. SDT emphasises that there are different types of motivation, and that the quality of motivation determines the outcomes of behaviour (Ryan & Deci, 2017). Autonomous motivation arises when actions are self-endorsed, meaning they are motivated by the enjoyment of doing something or by internalising that an action aligns with meaningful personal values. This type of motivation is associated with creativity, engagement, and wellbeing (Ryan & Deci, 2017). In contrast, controlled motivation occurs when behaviours are driven by external factors such as rewards, social pressures, or fear (Ryan & Deci, 2017). Even though controlled motivation can regulate behaviour in the short term, it often undermines engagement and wellbeing in the long term. When basic psychological needs are frustrated across many levels, individuals may experience amotivation, characterised by a lack of energy and motivation to act (Ryan & Deci, 2017). The basic psychological needs are important for motivation, as supported needs increase autonomous motivation, whereas frustrated needs increase controlled motivation.

It is important to consider context and individual differences, such as motivational orientation and internalisation behaviours, as they shape how people perceive and are affected by a given environment. Digital environments that support psychological needs are more likely to support flourishing and wellbeing of the users, whereas environments that frustrate needs are more likely to harm them (Ryan & Deci, 2017). Recognising this complex nature is important when analysing impacts of design and for supporting behavioural change. In the following section, a framework for applying SDT will be presented to build an understanding of how technology design affects the user experience.

2.3 Motivation, Engagement and Thriving in User Experiences

Motivation, Engagement, and Thriving in User Experiences (METUX) is a model that builds on SDT, offering a way to evaluate technologies and how engagement, motivation, and wellbeing can be either frustrated or supported through design (Peters et al., 2018).

The METUX model helps understand how the user experience —the relationship a user has with a company or product —develops across the different stages of interaction. For this purpose, the model identifies six spheres for evaluating the user experience: adoption, interface, task, behaviour, life, and society. Adoption refers to the experience an individual has before becoming a user. The Interface sphere refers to the experience when a user directly interacts with a technology. The task sphere focuses on activities or goals that a user wants to complete by using a technology. The behaviour sphere covers what behavioural patterns a technology supports and reinforces, and how users experience these behaviours. The life sphere covers how a technology influences the users' overall life satisfaction. Finally, the societal sphere considers the impact that a technology has on the broader social and community levels, even non-users.

The METUX model emphasises that wellbeing cannot be fully understood by only examining interface-level interactions. For example, an interface may appear supportive and engaging at the time of use, but if it encourages compulsive behaviours that disrupt sleep or negatively affect social relationships, the technology will ultimately undermine wellbeing in the life sphere. The METUX therefore provides a practical framework for analysing how technologies impact users, and how they may frustrate or support basic psychological needs on different spheres. The following chapter will examine deceptive patterns, their mechanisms and use in social media, and analyse their effects on user experience and wellbeing.

3 Deceptive Patterns

This chapter presents deceptive patterns in interface design. First, it will present previous research and taxonomies of deceptive patterns. Second, it will present common deceptive patterns on social media. Third, it will present how design patterns affect the user experience and wellbeing.

3.1 Background

Deceptive patterns are implemented in the design of digital interfaces and aim to influence user behaviours (Gray et al., 2024; Brignull et al., 2023; Mathur et al., 2021). The concept of deceptive patterns, often referred to as "dark patterns", was first introduced by Harry Brignull et al. (2010), who identified that websites trick their users into doing something unintended. For example, hiding a cancel button to get user to agree to something. These patterns are intended to benefit the platform, often at the expense of the user (Brignull et al., 2023; Bösch et al., 2016; Gray et al., 2024; Mathur et al., 2021; Mildner et al., 2021; Roffarello et al., 2023). The intent of using deceptive patterns is often to gain money, data, or to capture attention (Narayanan et al., 2020). In this thesis, deceptive patterns primarily refer to intentional interface design strategies employed by platforms to manipulate user behaviour. However, still recognising that some of these patterns are reinforced and operationalised through algorithmic systems that personalise and amplify their effects.

Deceptive patterns have gained increased recognition amongst researchers, regulators, and designers during the last decade (Brignull et al., 2023; Grey et al., 2024; Mathur et al., 2021; Mildner et al., 2023). Brignull et al. (2023) published a taxonomy comprising 16 deceptive patterns, and Gray et al. (2018) present a taxonomy of five deceptive pattern categories. Furthermore, Nie et al. (2024) present an extensive 64-item taxonomy identifying five categories: Forced Action, Social Engineering, Interface Interference, Obstruction, and Sneaking. These categories were also proposed in a 3-level ontology by Gray et al. (2024), and describe the different strategies and mechanisms used to deceive users.

Forced action refers to forcing a user towards an action that was not originally intended by the user. A famous example of this is privacy zuckering, where privacy settings are hidden or made complicated, which pushes users to share excessive data (Gray et al., 2024). Another common pattern is the autoplay function, where content automatically plays a new video after a previous video is finished, limiting the user from making an active choice in viewing content. Figure 3.1 illustrates the mechanism of forced action and how it affects the user.

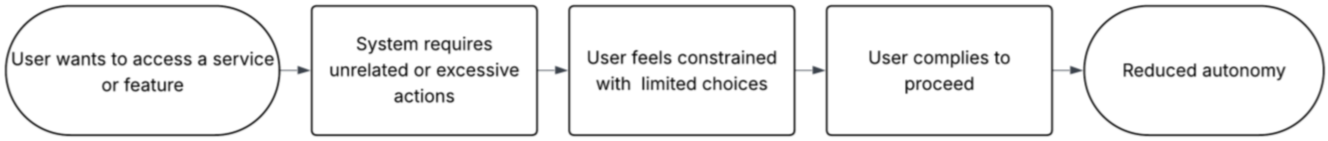

Figure 3.1 *Forced Action Mechanism*

Social engineering uses social pressure or social cognitive biases to steer the user towards a predicted outcome (Gray et al., 2024). Social cognitive biases are common thinking patterns, often irrational and subjective, that people use to process information, influencing how we perceive ourselves and others. For example, platforms may use social proof, which is a social phenomenon where people tend to copy other people's actions. Social proof can be leveraged through displaying for example "X likes this" to steer the user towards interacting. Another set of patterns under this category include urgency cues, which means pressuring users to engage to not miss out on something, exploiting our fear of loss (Mathur et al., 2021). For example, Instagram's expiring stories can form a sense of urgency that the user must watch them before they disappear. A key aspect of social engineering patterns is the use of personalisation, where different content is displayed depending on the user and their previous behaviour on the platform (Gray et al., 2024; Ekstrand & Willemsen, 2016). An example of how the social engineering mechanism work and how it affects users is shown in Figure 3.2.

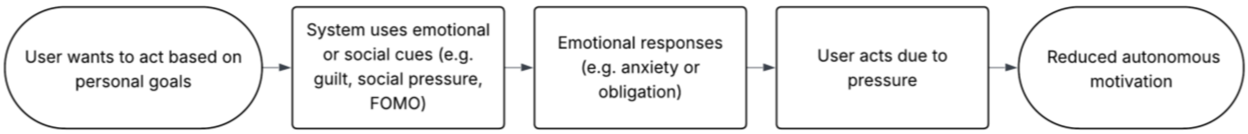

Figure 3.2 *Social Engineering Mechanism*

Interface interference refers to manipulating some aspects of the interface to promote certain actions over others Manipulating choice architecture is one common example, where options are structured in a certain way or where some options are made more visible than others, which often mislead users and steers their behaviour (Gray et al., 2024). Other patterns in this category are bad defaults, which means deploying default settings that are in the platforms best interest instead of the users' (Gray et al., 2024) or manipulating users through positive or negative framing of text to shape decision-making (Gray et al., 2024). The mechanism of interface interference patterns is illustrated in Figure 3.3.

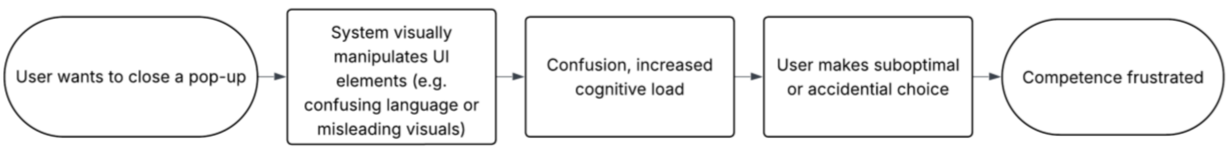

Figure 3.3 *Interface Interference Mechanism*

Obstruction refers to leading users through unnecessarily complex paths to complete basic actions (Gray et al., 2024), often referred to as labyrinth navigation (Mildner et al., 2023). A classic example is the roach motel pattern, where platforms make it easy to sign up, but hard to leave or delete the account. This is often done through burying the account deletion under several layers of menus. This pattern is one of the main reasons a third of account deletion attempts on Facebook fails (Schaffner et al., 2022). The mechanism of obstruction is demonstrated in Figure 3.4.

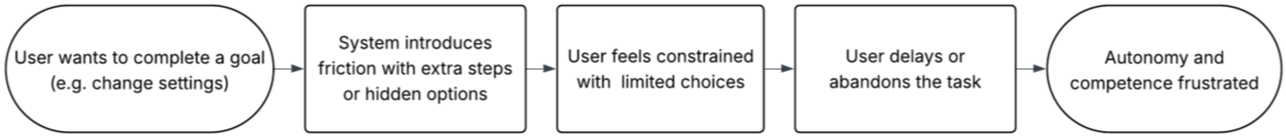

Figure 3.4 *Obstruction Mechanism*

Sneaking is another category of deceptive patterns and refers to hiding information or certain actions from users (Gray et al., 2024). The intent of such patterns is to deceive the users on what data is being collected, shared or promoted. For example, covert data practices, such as using shadow profiles that collect information without users knowing is a form of sneaking. Another pattern for sneaking is displaying advertising or sponsored content without visible labels (Gray et al., 2024). The sneaking mechanism is illustrated in Figure 3.5.

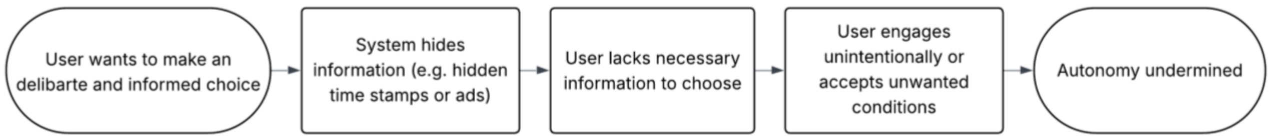

Figure 3.5 *Sneaking Mechanism*

The last category in the taxonomy is nagging, which refers to repeated notifications and prompts that urge users to return to the platform or enable specific features or settings (Nie et al., 2024). These patterns use repetition to create pressure and frustrate users to steer behaviour. For example, a recurring pop-up asking users to consent to something is a nagging pattern. An example of the nagging mechanism and user outcome is shown in Figure 3.6.

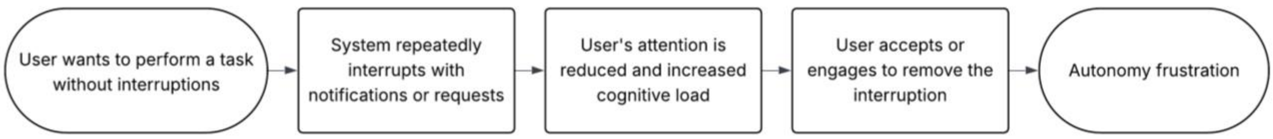

Figure 3.6 *Nagging Mechanism*

These categories help establish a common understanding of deceptive patterns. However, these patterns may overlap and operate across multiple domains. For example, privacy zuckering may involve sneaking through hiding information about data collection, while also involving complicating actions relating to interface interference (Gray et al., 2024; Mildner, 2023). This highlights how the distinct patterns together function as a system. As shown in figures 3.1-3.6, illustrating the mechanisms of each category, they reveal that autonomy is the primary need that is frustrated. While each category relies on different strategies, they collectively form a system that restricts the user from making informed and self-directed actions.

Understanding and labelling the deceptive design patterns is important for incorporating them into regulatory work. Regulations have addressed several patterns through the General Data Protection Regulation (GDPR), and Digital Markets Act (DMA). However, these regulations mainly address financial and privacy-related harms. To address digital wellbeing concerns related to social media, more context-specific work has emerged to identify more specific deceptive patterns on social media platforms.

3.2 Deceptive patterns in social media platforms

Recent research has identified deceptive patterns on social media platforms. For instance, in the thematic analysis by Mildner et al. (2023), common patterns were identified and categorised into engaging and governing strategies. The engaging strategies intend to entertain the user and capture attention, whereas the governing strategies intend to control or shape user behaviour and decisions (Mildner et al., 2023). The engaging strategies are closely related to Forced Action and Social Engineering, whereas the governing patterns relate to Obstruction and Interface Interference (Mildner et al., 2023; Grey et al., 2024). Moreover, Roffarello et al. (2023) identify a set of eleven Attention-Capture Damaging Patterns (ACPD), that further bridge wellbeing concerns relating to social media use. The ACDPs are interface design patterns that exploit psychological vulnerabilities, such as social validation and variable rewards, to capture the users' attention and prolong interaction.

One of the most well-known ACDPs is *infinite scroll,* a design that continuously loads new content and creates the illusion of endless content. Another common pattern is *autoplay*, where content automatically plays a new video after a previous one finishes. *Time fog* is another pattern that diminishes users' ability to track how long they have spent on the platform, achieved by hiding timestamps or through not showing the duration of video content. Some other attention-capturing patterns include guilty-pleasure recommendations, that suggest content based on a user's preferences or past behaviours, and fake social notifications that aim to increase use by misrepresenting social activity. The basic mechanism of the ACDPs and their effects is illustrated in Figure 3.7.

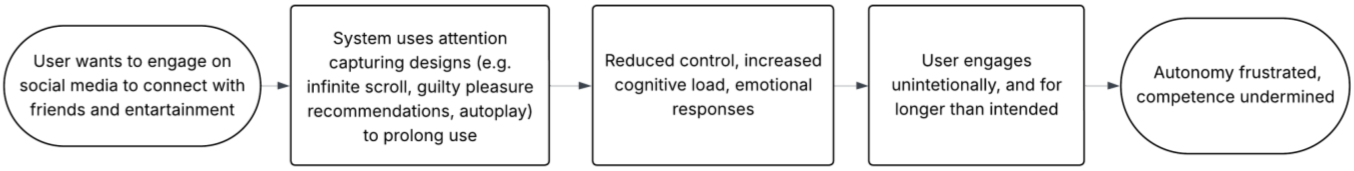

Figure 3.7 The *ACDP mechanism*

The ACDPs can be linked to the different categories of deceptive patterns. For example, autoplay is a forced action pattern, whereas infinite scrolling relates to interface interference (Nie et al., 2024). Furthermore, some of the patterns may involve multiple categories. For example, fake social notifications is primarily a social engineering pattern, as they exploit social biases through motivating actions through social approval. However, fake social notifications may also link sneaking, as it hides that the notification is not from people that the user follows. Furthermore, the ACDPs combined can increase the effectiveness of capturing the user's attention. For example, infinite scroll and autoplay may support each other in forcing users to engage more than intended. Together, these patterns cause users to lose control over what they view, for how long, and how often they engage with social media (Roffarello et al., 2023). Consequently, the ACDPs often lead to users feeling regret and loss of autonomy, which may often lead to intense and compulsive use (Lukoff et al., 2021; Roffarello et al., 2023).

The prevalence of attention-capturing designs stems from platforms' business models, which are based on the attention economy, meaning they make a profit out of their users' attention (Roffarello et al., 2023). Thus, social media and entertainment platforms are under constant competition over capturing their users' attention and keeping them engaged for as long as possible (Bhargava & Velasquez, 2021). This competitive dynamic incentivises the adoption of deceptive patterns. Given these commercial incentives, regulators must incorporate these patterns to limit their usage. The Digital Services Act (DSA) was approved by the European Council in 2022, which forbids design patterns that frustrate autonomy, decision-making, and choice (European Parliament, 2022). However, enforcement remains uncertain as deceptive patterns are still common, and companies may find regulatory loopholes (Brignull et al., 2023). This emphasises a need for a more strict and detailed regulatory work to efficiently restrict the use of deceptive patterns that cause attentional, and wellbeing harms. While regulation provides one way to address the problems with deceptive design, it is also important to understand how design patterns affect wellbeing to find alternative solutions. The following section will explore how deceptive patterns impact the user experience and wellbeing.

3.3 The Cascading Effects of Deceptive Patterns on Wellbeing

The common denominator of the deceptive patterns on social media is that they tend to undermine the user's autonomy (Lukoff et al., 2021; Mathur et al., 2021; Mildner et al., 2021; Roffarello et al., 2023). As mentioned earlier, autonomy refers to the ability to act in accordance with one's values and goals and feeling in control over one's actions (Ryan & Deci, 2017). Amongst the deceptive patterns, the ACDPs are particularly detrimental to users' autonomy (Lukoff et al., 2021; Roffarello et al., 2023), as they steer users away from their intentions and make users lose control of time and where they direct their attention. The ACDPs therefore induce compulsive and addictive behaviours (Roffarello et al., 2023). To further understand how the users are affected by these patterns, it is helpful to examine the user experience across different spheres.

For an individual to use a service or platform, they usually have some sort of intention or motivation behind it. The type of motivation and internalisation behaviours the individual has – whether it is autonomous or controlled – will already influence the experience (Ryan & Deci, 2017). When users feel competent in using the platform, and are autonomously motivated to engage with it, the experience is more likely to have a positive effect on wellbeing (Peters et al., 2018). Contextual and individual factors, such as individual vulnerabilities or social pressures can also influence the experience and how the user will react to deceptive patterns (Ryan & Deci, 2017). For instance, if individuals with low self-esteem use social media to seek social validation, this may shape the experience negatively as vulnerabilities make individuals more susceptible to manipulation (Ryan & Deci, 2017; Marino et al., 2018). Other factors that may influence the extent of which deceptive patterns affect users are the user's digital literacy and the awareness of being deceived (Lu et al., 2024).

In the interface sphere, users engage directly with the elements of the interface. This is where deceptive patterns and ACDPs have the most immediate psychological effect on users (Peters et al., 2018). In this sphere patterns reinforce engagement by, for example, triggering reward mechanisms or common biases through infinite scroll or autoplay. These patterns remove natural stopping cues and make it difficult to regulate engagement (Lukoff et al., 2021). Similarly, default notifications and forced engagement cues can create a sense of urgency and pressure to engage (Mildner et al., 2023). These features can make the user lose control by steering the user's attention away from their intention or goal. Even though these features may create a positive experience at the time of use, these patterns often have considerable effects on the following spheres.

Moving to the task sphere, social media may support meaningful tasks such as connecting with friends, finding communities, or sharing information. These activities can strengthen connectedness, competence, and autonomy (Riva et al., 2012; West et al., 2025). However, patterns such as the ACDPs frequently make users lose their intended goal by directing their attention away from the task (Roffarello et al., 2023; West et al., 2025), for example, through hiding time stamps or showing guilty pleasure recommendations. Users may even experience dissociation during prolonged use, where users forget the content, they have seen (Baughan et al., 2022). As a result, users often report feeling a lack of control and feelings of frustration or regret (Baughan et al., 2022; Lukoff et al., 2021). Over time, these experiences can also undermine competence and relatedness. For example, if users repeatedly fail to act in accordance with their intentions and spend excessive time online, they may feel incompetent and spend less time connecting in real life.

The design patterns that technologies employ reinforce certain behaviours (Peters et al., 2018). In social media, deceptive patterns influence user engagement and consumption behaviours (Al Tabakhi et al., 2024). Especially the ACDPs have been linked to prolonged screen time, but also induce compulsive purchasing behaviours (Al Tabakhi et al., 2024). These patterns often exploit users' vulnerabilities, and these are often further reinforced through collecting data and using personalisation systems. By tailoring content to users' preferences and behavioural patterns, platforms can further heighten these vulnerabilities to encourage engagement, which can be seen from showing guilty pleasure recommendations, for example (Roffarello et al., 2023). Consequently, users may become trapped in problematic use patterns, where interactions no longer feel autonomous (Ryan & Deci, 2017). Over time, these behavioural patterns may negatively impact the user on a broader level, impacting the user's life.

While many digital platforms–particularly social media–create engaging and often positive user experiences at the time of use, their impact on a user's life can become serious. When use becomes intense and problematic, this time will naturally take up time from other meaningful activities, which may lead to a loss of sleep, productivity, and social opportunities (Caplan, 2010). This may consequently lead to emotional, social, and professional challenges (Cham et al., 2019). For example, low self-esteem (McNamee, 2019), reduced focus and attention, and harmed relationships (Al-Tabakhi et al., 2024). Hence, while the deceptive patterns tend to frustrate autonomy, over time, they may also frustrate the need for relatedness and competence.

On a societal level, the consequences of deceptive design can extend individual wellbeing. Social media plays an increasing role in forming interaction, public discourse, and information consumption. While they can both help build communities and connect people, they can also contribute to polarisation (Qureshi & Bhatt, 2024; Levy, 2021), amplify disinformation (Hajli et al., 2022; Diaz Ruiz & Nilsson, 2023), and erode trust at a large scale (Bösch et al., 2016; Al-Tabakhi et al., 2024; Qureshi & Bhatt, 2024). However, while these effects may be primarily driven by the algorithmic workings, deceptive design patterns influence these dynamics by maximising engagement rather than promoting quality of content. Considering that social media is used by almost two-thirds of the world population (Statista, 2025), the societal impacts can be profound.

This overview of the cascading effects of deceptive patterns provides an overview of how patterns affect user's wellbeing and even social dynamics. While autonomy is often the first need frustrated in the cascade, competence and relatedness can become frustrated through the reinforced behaviours of excessive and unintentional use. As a result of these frustrations, users are becoming aware of the negative impact social media usage has on their lives and wellbeing (Cheng et al., 2019), which has led to a growing number of users leaving social media entirely (Baumer et al., 2018; Marino et al., 2018). This highlights the importance for platforms to improve the design practices and internal mechanisms. A clear issue is that social media companies might not be incentivised to make changes to the platforms, as changes may reduce engagement and lower the business profits. However, it may be a short-term downfall if user loyalty and trust is increased in the long term (Roffarello et al., 2023). Additionally, the increased awareness and discourse about the negative impact of social media might also motivate them to make changes to the design. Building on this analysis, the next chapter explores supportive patterns that aim to counteract the harms of deceptive patterns by supporting psychological needs, attention and thus, support digital wellbeing.

4 Supportive Patterns

A growing body of work has emerged to counteract the deceptive patterns and harms related to social media use. This chapter will investigate work that can promote more positive user experiences and support user wellbeing.

4.1 From Self-Control Tools to Supportive Patterns

There have been several products and tools designed to help users control their digital behaviours, with a lot of emphasis on Digital Self-Control Tools (DSCTs). The DSCTs are a set of tools that let users track their time spent on devices and help them define interventions, such as lock-out mechanisms and timers (Lyngs et al., 2019; Roffarello & De Russis, 2023a). The DSCTs have been proven to help control usage to some extent, although they often remain ineffective in the long term (Delaney & Lades, 2017; Roffarello & De Russis, 2019). This is partly because the tools place responsibility on the user, relying heavily on self-control and self-awareness (Lukoff et al., 2021). Furthermore, they are primarily focusing on reducing screen time and does not consider what the user engages with and how they use it. Lukoff et al. (2023) suggest to also measure the quality of engagement and to consider whether the usage is aligned with the user's goals and values. The limitations of DSCTs are why a growing body of work is now shifting from external self-control tools towards integrated supportive designs, proposing internal changes to the platforms (Lukoff et al., 2021; Lukoff et al., 2023; Roffarello & De Russis, 2023b; Zhao et al., 2024).

4.2 Heuristics for Wellbeing-Supportive Design

To support the shift towards supportive design, research-based guidelines or heuristics have been developed, that help designers translate wellbeing theories into practice. These heuristics build on previous research on wellbeing and are grounded in SDT and HCI research.

Peters (2022) has proposed a set of 15 heuristics for supporting wellbeing in technology design. These heuristics are grouped under the three basic psychological needs from SDT. The wellbeing heuristics highlight supporting autonomy through practices such as applying accessibility practices and empathising with users' feelings, values, and goals. Some strategies for these are complying with the Web Content Accessibility Guidelines (WCAG) and using human-centred methods in the design process such as co-design, testing, and qualitative research. Some other guidelines for supporting autonomy include providing meaningful and informed choices and communicating with a non-controlling language that encourages reflection and supporting attention through minimising distractions in the interface. For supporting competence, Peters (2022) suggests applying usability practices such as Nielsen's (1994) usability heuristics and providing feedback that highlights progress rather than assessment. To support relatedness in technologies, Peters (2022) proposes supporting meaningful connection, caring for others, and supporting a sense of belonging by creating opportunities to contribute and interact with others. While these heuristics provide a general understanding of how to establish supportive technologies, they do not target the specific technologies that use Attention Capturing Designs, which Roffarello et al. (2025) have addressed with the Digital Attention Heuristics.

In a recent paper, Roffarello et al. (2025) propose the Digital Attention Heuristics, a set of 8 design heuristics that directly target the ACDPs. These heuristics follow the structure Peters (2022) proposed for wellbeing heuristics, grouping them under the three psychological needs: autonomy, competence, and relatedness. The Digital Attention Heuristics highlight supporting autonomy by promoting a sense of agency, designing for focused and mindful experiences, and allowing customisation options and possibilities to maximise the quality of time spent on a platform (Roffarello et al. 2025). Competence can be supported by informing users about digital wellbeing and other activities and knowledge that support wellbeing and healthy activities (Roffarello et al., 2025). Relatedness can be supported by promoting real-world connections and meaningful connections, for example through tools or guidance. The digital attention heuristics can thus be used to guide the design work of digital platforms to ensure users' attention is respected. In addition to the heuristics proposed, there have been general guidelines and proposals for wellbeing-supportive design, which will be presented in the following section.

4.3 Guiding Wellbeing-Supportive Design

Researchers have proposed a range of strategies and principles to counteract deceptive patterns and promote digital wellbeing. These supportive design approaches aim to restore users' attention, psychological needs, and encourage intentional and positive use of digital platforms.

One central strategy in wellbeing-supportive design is to give users more control over the interface. Customisation options have been shown to be effective in promoting autonomy and empowerment (Lu et al., 2024). By enabling users to disable features such as autoplay, infinite scroll, and notifications, users can align their digital environments with personal preferences and goals (Lukoff et al., 2021; Roffarello et al., 2023). Allowing this control and flexibility of the interface can strengthen the users' control over how they use it. However, it is important to balance user control and machine autonomy, meaning that designers should weigh the user autonomy and complexity to avoid overwhelming users (Zhao et al., 2024).
To support intentional use, researchers suggest enabling planning ahead and setting intentions prior to use (Lukoff et al., 2021; Roffarello et al., 2023). This can be incorporated through features such as queueing or saving content, creating playlists, or allowing users to set intentions or goals before use. These mechanisms can reduce the sense of urgency to consume content that is often induced by

attention-capturing interface designs (Roffarello et al., 2023). Another important strategy for supportive design is to allow intervention systems integrated to the platforms. These systems should be context-aware and user-centric, to reflect individual differences in goals and behaviours (Zhao et al., 2024). For example, a platform could use behavioural data to guide users toward healthier usage behaviours (Ekstrand & Willemsen, 2016), or platforms could allow users to plan intervention or nudging systems on their own. Platforms can also promote self-awareness and healthy behaviours by offering nudges or offline activity suggestions and tools (Zhao et al., 2024; Peters, 2022).

Promoting transparency and informed choices are other key aspects of supportive design. Platforms should help users maintain awareness of how they spend their time on them. This can be supported by showing the time investment of new content and by making advertisement distinguishable from other content. This way, users can become more aware of their interactions and can direct their attention where they want to (Roffarello et al., 2023). To support autonomy, it is also important that users feel they make informed choices and give active consent, rather than being controlled or guided by the interface and algorithmic recommendations (Lukoff et al., 2021).

These suggestions and guidelines align closely with the wellbeing and digital attention heuristics and offer valuable guidance on how to incorporate and develop supportive patterns in technology. Table 4.3 summarises principles and strategies adapted from these heuristics (Peters, 2022; Roffarello et al., 2025) and synthesises these with the strategies and suggestions discussed in this section.

Table 4.3

Wellbeing-Supportive Principles, Strategies and Primary Supported Psychological Needs

Principle	Strategies	Need Supported
Promote user control	Allow users to control features such as autoplay, notifications, and recommendations; support interface personalisation	Autonomy
Promote intentional and mindful use	Use autonomy-supportive language; support intention-setting and pre-use planning.	Autonomy
Promote transparency and informed use	Display time-investment and behaviour visualisations; be transparent about data practices and system defaults	Autonomy
Provide contextual interventions	Provide nudges such as timers, pause reminders, and reflective prompts at appropriate moments	Competence
Provide educative information	Provide guidance and information to improve digital competency and wellbeing.	Competence
Support meaningful connections and real-world interactions	Provide tools for meaningful social connections and supportive interactions; encourage offline engagement	Relatedness

Building on this, the following section will present case studies that investigate specific implementations of supportive design patterns.

4.4 Proposals for Wellbeing-Supportive Design

Researchers have developed tools and supportive patterns, and investigated their effects in case studies. Some of this work will be presented in this section. The case studies focus on addressing the ACDPs with different mechanisms in social media environments.

In a case study by Roffarello and De Russis (2023b), the tool *InControl* was evaluated on Facebook and YouTube. They evaluated two approaches: one nudging strategy that darkens the background when a user scrolls infinitely, and another with a minimalist interface. The nudging strategy reduced time spent by 34% on YouTube and 57% on Facebook, whereas the redesign strategy reduced time spent by 64% on Facebook, but increased time spent on YouTube by 5% (Roffarello & De Russis, 2023b). These results highlight how nudging patterns and redesign of interfaces can help to reduce screen time for some cases. Although the time on YouTube slightly increased with the redesign, it still increased the user's sense of control and autonomy. Both strategies showed indications of more intentional and active use of the platforms, suggesting that they can help support user autonomy and quality of engagement. These patterns provide valuable insights for integrating supportive patterns into social media platforms.

Another case study that builds on interface redesign is SwitchTube, presented by Lukoff et al. (2023). Switch tube is an adaptable commitment interface designed to serve as a countermeasure against ACDPs on social media platforms. SwitchTube lets users switch between two interface versions: Focus and Explore. The focus mode is designed to limit distractions and help guide the user toward a specific goal. The interface of the focus mode has a search-first display, meaning the interface does not have an autoplay feature or show recommendations. The Explore mode is designed to entertain the user and has an interface showing recommendations and includes the autoplay feature. By testing the three options where a user was shown either a focus mode, explore mode, or the adaptable commitment interface, Lukoff et al. (2023) found that the adaptable commitment interface received the highest score of sense of agency, satisfaction, and goal alignment. While time spent was not reduced with the adaptable interface, users experienced higher wellbeing outcomes through improved autonomy and goal alignment. These findings demonstrate how wellbeing-supportive design can improve the quality of engagement by supporting user needs and helping users align their intentions with their behaviour.

Another digital wellbeing intervention that has been proposed is PauseNow (Zhao et al., 2024). PauseNow is a conceptual design meant to align behaviour with intentions on digital platforms. Zhao et al. (2024) propose a three-step approach: 1) Habit Recognition, 2) Intervention Co-Design, and 3) Intention Alignment. This approach aims to promote mindful use of social media. The habit recognition step to detect a user's digital behaviour pattern, the intervention co-design to customise interventions together with the user, and intention alignment to provide interventions when relevant for the user. The habit recognition step could use profiling or computer vision analysis techniques. This step aims to raise self-awareness and lay the foundation for targeting interventions by showing users their actual user behaviours (Zhao et al., 2024). The intervention co-design step maps the users' needs and preferences, to then let the user view their behavioural patterns so that they can create customisations and nudging options accordingly. This could help ensure that the user is aware and can control what interventions they want and need, which can help preserve autonomy and ensure the user's goals are aligned (Zhao et al., 2024). The third step, intention alignment, monitors the context and behaviours of the user, to then detect when the user drifts from their intentions. This would allow the platform to nudge the user back to their original intention.

These case studies present concrete examples of supportive design patterns in practice. The proposed design patterns showcase user-centric design that preserves user agency and control over engaging with the system and demonstrate how quality of engagement can be improved. Importantly, these studies reveal that wellbeing-supportive design can promote quality of engagement, not only time reduction. While the time spent on the platform did not always show a significant difference, these patterns still contribute positively to fundamental needs of the user, promoting wellbeing in the long term.

Furthermore, the case studies highlight that interventions and changes in the design should not be forced upon users. Aligned with SDT, sustainable behavioural change requires that users are autonomously motivated and not feel controlled or forced. The system must therefore support users through nudges, customisation options and other design elements that promote reflection, self-awareness and intentional engagement.

This chapter presents recent work towards shifting design practices towards wellbeing-supportive alternatives. From adopting external self-control tools that often offer more temporary solutions, a shift towards addressing the underlying mechanisms of persuasive technologies has started. These principles and approaches for wellbeing-supportive design can help users regain their control over attention, help them align their behaviours with their goals, and support long-term wellbeing – all important factors for creating positive engagement with digital platforms, as also mentioned by Zhao et al. (2024).

5 Summary

This thesis identified common deceptive patterns on social media platforms and analysed how design patterns affect user wellbeing. The main purpose of this thesis was to investigate: 1) What design patterns in social media are associated with reduced digital wellbeing? and 2) What design patterns can support digital wellbeing?

To answer the first research question, the thesis highlights that the attention-capture damaging patterns are the most directly influential patterns on wellbeing as they encourage continuous engagement to an extent where users often lose control over usage. These patterns primarily frustrate the psychological need for autonomy. When autonomy is frustrated, usage can become intense or compulsive, taking time from other meaningful activities. In the long-term, this autonomy frustration may lead to frustration of competence and relatedness, resulting in diminished long-term wellbeing.

To answer the second research question, this thesis reviewed heuristics, guidelines and design patterns for wellbeing-supportive design. The supportive patterns aim to help users regain attention, support psychological needs, and guide them towards more intentional and meaningful engagement. This thesis presented wellbeing and digital attention heuristics for technology design, along with strategies and patterns proposed by researchers. Key principles for wellbeing-supportive design include promoting user control, supporting intentional and mindful use, promoting transparency and informed use, and supporting meaningful connections. An example of wellbeing-supportive patterns includes letting users choose between versions of the interface, such as in the Adaptable Commitment Interface with a focus mode and an explore mode. Another proposal is to incorporate contextual and co-designed nudging and intervention patterns. Other suggestions include adding more customisation options to the interface, such as disabling autoplay, setting time preferences or customising notification and recommendation systems. These proposed patterns aim to support user needs, reduce compulsive and unintentional use and thus promote positive engagement and user wellbeing.

This thesis has some limitations that should be acknowledged. First, the thesis is a literature review, limiting the ability to confirm direct links between design patterns and wellbeing outcomes. Although patterns can be linked with frustrated needs, we cannot demonstrate the direct impact on wellbeing, since wellbeing is a subjective and dynamic concept. The concept of wellbeing was captured through SDT and METUX frameworks and does not represent all aspects of wellbeing. This thesis also had time constraints, meaning some relevant studies may not have been fully captured or included. Furthermore, the field of digital wellbeing is a relatively new and constantly emerging, limiting the amount of literature available. Some of the included literature is recent work, especially regarding supportive patterns and conceptual suggestions. Thus, these patterns may not yet be validated at large-scale or in the and long-term.

Suggestions for future directions include continuing and expanding research on digital wellbeing and design patterns. This includes continuing the work on identifying deceptive patterns, developing wellbeing-supportive patterns, as well as evaluating design patterns impact on users at a larger scale, and measuring long-term effects on user experience and wellbeing. However, as discussed earlier in this thesis, there is a strong need to incentivise platforms to change, which requires broader systemic changes. Updated regulatory work is needed to ensure user wellbeing, which can be supported through further research suggested. Alternative business models and organizational guidelines that balance wellbeing with financial goals are also needed in this shift. Additionally, raising public awareness and educational measures are also needed to support this shift, as they can increase public pressure and digital literacy, and strengthen ethical standards for designers. With these efforts, we can work toward digital environments that support wellbeing and enable human flourishing.

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