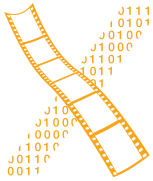

Chair for Computer Science 10 (Media Computing and Human-Computer Interaction)

RWTH AACHEN UNIVERSITY

The Effects of Deceptive Interface Design on Users With Autism

Master's Thesis at the
Media Computing Group
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Abstract

We are surrounded by an internet, where manipulative interfaces are never more than a few clicks away. Among these manipulative interfaces are deceptive patterns (DPs), which are design strategies that try to influence a user to act in a way that may not be in their own best interest. To achieve this, DPs use a number of tricks to achieve their goals, e.g., subversion of a user's expectations or hiding information. Such tricks might especially exploit vulnerable populations, such as people on the autism spectrum, who are characterized by differences in sensory processing and communication. To examine these vulnerabilities and potential strengths of autistic people, we conducted semi-structured interviews with 13 autistic participants, probing for their awareness of DPs, potential workarounds and mitigation strategies, as well as the emotional impact of DPs and potential effects they might have on isolation in social media. We found that our participants were familiar with DPs in concept and implementation, yet not so much with the term itself or the category in general. Common workarounds were usually focused on cognitive strategies, like an underlying categorization of internet use. The emotional consequences of DPs were diverse and often centered around negative sentiments and a long-term erosion of trust. This made participants expect more manipulations than they were able to detect, even when there was no clear sign of this. Often, participants talked about how DPs drained their personal resources, like time and energy, which might be linked, among other things, to spiteful behavior when trying to evade DPs. However, isolation as a result of DPs was not commonly found. We aim for our work to inspire further research into autistic people's online behavior and technological interventions to promote their well-being in a world designed for non-autistic people.

Überblick

Wir sind umgeben von einem Internet, in dem manipulative Interfaces nie mehr als ein paar Klicks entfernt sind. Zu diesen manipulativen Interfaces zählen Deceptive Patterns (DPs), also Designstrategien, die versuchen, Nutzer zu beeinflussen, auf eine Art zu handeln, die nicht in ihrem eigenen Interesse ist. Um dies zu erreichen, nutzen DPs eine Menge an Tricks, wie zum Beispiel Subversion der Erwartungshaltung der Nutzer oder das Verstecken von Information. Solche Tricks haben das Potenzial, für verletzliche Bevölkerungsgruppen besonders ausbeuterisch zu sein, so zum Beispiel für Menschen auf dem Autismusspektrum, welche sich unter anderem durch Unterschiede in der Verarbeitung von Sinneseindrücken und in zwischenmenschlicher Kommunikation auszeichnen. Um diese Verletzlichkeiten sowie potenzielle Stärken autistischer Menschen zu untersuchen, führten wir teilstrukturierte Interviews mit 13 autistischen Teilnehmenden durch, um ihr Bewusstsein für DPs, eventuelle Bewältigungsstrategien sowie die emotionalen Auswirkungen von DPs und Effekte, die sie auf Isolation in sozialen Medien haben, zu untersuchen. Unserem Teilnehmenden waren DPs als Konzept in ihrer Implementation bekannt, allerdings nicht als Begriff oder Kategorie. Bewältigungs- und Umgehungsstrategien fokussierten sich hauptsächlich auf kognitive Strategien, wie zum Beispiel eine interne Kategorisierung von Internetnutzungsszenarien. Die emotionalen Konsequenzen von DPs waren vielfältig und oft verbunden mit negativen Gefühlen und einer langfristig aufgebauten Erosion von Vertrauen in Services. Dadurch erwarteten Teilnehmende außerdem mehr Manipulationstaktiken als sie feststellen konnten, selbst wenn es keine klaren Zeichen gab, dass diese wirklich existierten. Oft redeten Teilnehmende auch darüber, dass DPs an ihren persönlichen Ressourcen, wie Zeit und Energie, zehren, was möglicherweise unter anderem mit verstärktem Trotzverhalten bei dem Versuch DPs zum umgehen zusammenhängt. Allerdings fanden wir keine Zeichen für Isolation als Folge von DPs. Unsere Arbeit hat zum Ziel, zukünftige Forschung zum Onlineverhalten autistischer Menschen und potenzielle Interventionen für ihr Wohlergehen in einer Welt, die für nicht-autistische Menschen konzipiert ist, zu inspirieren.

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First, I want to thank Prof. Dr. Jan Borchers and Prof. Dr-Ing. Ulrik Schroeder for examining this thesis.

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Additional thanks go out to the participants of my study. Thank you all for your time and energy - both of which you talked about at length in the interviews.

I would not have been able to finish this thesis without the ongoing support of my friends and family. My parents always stood behind me during my studies, and I am eternally grateful for that. Special thanks also to Nina for all your love and understanding during the past months.

Lastly, I want to thank my feline executive co-advisors, Pluto and Eris, for all the times they reminded me to take a break by demanding food and scratches.

Conventions

Throughout this thesis we use the following conventions:

- The thesis is written in American English.
- The first person is written in plural form.
- Unidentified third persons are described with singular they.

Short excursuses are set off in colored boxes.

EXCURSUS:
Excursuses are set off in orange boxes.

Where appropriate, paragraphs are summarized by one or two sentences that are positioned at the margin of the page.

This is a summary of a paragraph.

This text will regularly reference deceptive patterns, as they are described by Gray et al. [2024]. In each case, the name of the pattern will be stylized in italics, e.g. *Roach Motel*.

Chapter 1

Introduction

With more and more people using the internet, corporations have higher interests than ever in capitalizing on the opportunities this offers. Aside from advertisements, one way in which this manifests is via manipulation that aims to increase, among others, the money and time users spend on a platform [Mathur et al. [2021]]. These manipulations are known as deceptive patterns [Brignull et al. [2023]] and have proven to be effective despite the negative sentiments they elicit [Voigt et al. [2021]].

1.1 Deceptive Patterns

DECEPTIVE PATTERNS:
Deceptive patterns (DPs), also known as dark patterns, are design strategies that aim to influence a user to act in a way that is not in their own best interest.[1] [Brignull et al. [2023]]

Excursus: *Deceptive Patterns*

Deceptive patterns are ubiquitous in today's web landscape, as was shown by Lupiáñez-Villanueva et al. [2022]. There are various approaches to categorize them into ontologies and taxonomies, the most comprehensive and up-

Ubiquitous deceptive patterns

[1] `https://www.deceptive.design`, retrieved 11.02.2025

to-date being the one by Gray et al. [2024], which groups them into high-, meso- and low-level patterns, based on them being either general strategies (e.g. *Interface Interference*, manipulating the perception of which option is desired) or specific means to achieve them (e.g. *Complex Language*, which is aimed at confusing a user).

How do deceptive patterns work?

When it comes to the working mechanisms of deceptive patterns, some approaches have tried to dissect them further [Baroni et al. [2021], Mathur et al. [2021]]. Among these, Mathur et al. [2021] build upon their previous work [Mathur et al. [2019]] to present how deceptive patterns manipulate the choice architecture of a user to achieve their goals, i.e., by modifying the decision space or manipulating the information flow. In another approach, Baroni et al. [2021] tried to walk through the roach motel deceptive pattern from the point where a user perceives it to the point where they put it into a social context. They found a number of different mechanisms working together, e.g., that the pattern is taking advantage of physical structures to make it physically harder to engage with it.

Deceptive patterns and special needs groups

In recent years, there have also been approaches to map out how special needs groups interact and struggle with deceptive patterns. Schäfer et al. [2024] have found that children aged 10-11 are already able to recognize deceptive patterns and their intentions. Similarly, Mildner et al. [2025] have compared the capabilities of people with and without ADHD at recognizing and evading deceptive patterns, finding that, while both groups are equally able to recognize them, people with ADHD were able to evade them more reliably.

Deceptive patterns and autism

The issues people seem to be facing when interacting with deceptive patterns, as well as the mechanisms that enable deceptive patterns to be as effective as they are, however, seem to have at least some overlap with the problems that define autism spectrum disorders. To shine a light on these, we will first dive into some of the characteristics of autistic people and how that influences the way they interact with technology in general.

AUTISM:
Autism Spectrum Disorder (ASD) refers to a cluster of conditions that are characterized by atypical social interaction and communication, as well as difficulty switching activities and more. These usually start presenting in early childhood and persist throughout someone's life. It is thought to affect around 1 in 100 people. Further traits of people on the autism spectrum include: [2]

- Strong reliance on routines, as well as anxiety if those routines are interrupted
- Sensory differences (i.e., over- or undersensitivity to certain auditory, sensory, haptic, or other stimuli)
- Intense and specific interests

Excursus: *Autism*

1.2 Autism

Traditionally, research takes a medical approach to autism, focusing on symptoms of autism, while recently, a shift towards the recognition of autism under the umbrella of neurodiversity has gained traction, aiming to recognize not only the challenges autistic people face but also their strengths and valuable traits Spiel et al. [2019]. In the right social environment, namely one that affirms traits of autistic people, this can lead to them flourishing Russell et al. [2019]. However, today's world is designed for non-autistic people, leading to problems like autistic burnout Raymaker et al. [2020].

Autistic people and Social Media

There is a growing body of research in HCI that examines the needs of autistic people when interacting with technology. Considering social media, for example, some works

[2] `https://www.who.int/news-room/fact-sheets/detail/autism-spectrum-disorders`, retrieved 11.02.2025
`https://www.autistica.org.uk/what-is-autism/what-is-autism`, retrieved 26.02.2025

have examined how to support the needs of autistic people in social media platforms and which problems and opportunities they pose [Van Driel et al. [2023], Barros Pena et al. [2023]]. Common among these are dissatisfaction with social media, problems with overstimulating and addictive features, as well as the recognition that interest-based communities help autistic people connect with others.

Technological solutions for autistic struggles

Others have investigated how autistic people use technology to improve their functioning in everyday life [Williams and Park [2023]] or how to further support this [Kim et al. [2023]]. These works often point out how externalization of tasks, e.g., via reminders, is helpful yet can present an additional barrier if the intervention feels like it's presenting the user with additional work, like frequent popups or updates that warrant re-learning of an app's interface.

Triangulating autism-specific challenges with deceptive patterns

Works like these make it clear that autistic users face some sort of specific challenges in an online context. Moreover, a lot of the challenges described by them seem to map to deceptive patterns and the mechanisms they abuse. Looking for example at the sensory overload described by Barros Pena et al. [2023], they describe that this issue is exploited, e.g., by *Auto-play* features, which start playing a piece of content automatically, thus overwhelming the user. This is a common deceptive pattern, as described by Gray et al. [2024]. On another note, algorithmic news feeds create uncertainties by exploiting *Feedforeward Ambiguity*, i.e., the uncertainty of the precise effect a certain action (in this case, arbitrary interactions with a news feed) has.

Are there issues outside of social media?

Furthermore, these problems beg the question if problems related to deceptive patterns persist in other parts of the internet, i.e., outside of social media. If a pattern overwhelmingly exploits and disrupts autistic users in a social media context, then how does that pertain to other contexts, e.g., online shopping or media consumption? On the other hand, a strong sense of justice and reliance on routines might as well strengthen the will of a user to circumvent deceptive patterns in some contexts, like interacting with cookie banners, thus making autistic users more immune to certain types of manipulation.

1.3 Research Questions and Outline

The goal of this thesis is to gain some initial insight into the problems autistic people face when interacting with deceptive patterns. To that end, we want to address questions that related research, which already hints at such problems, has opened up yet hasn't been answered previously. We thus pose the following research questions:

RQ1: How aware are autistic people of deceptive design strategies?

RQ2: How do autistic people work their way around or live with deceptive design?

RQ3: Which emotional consequences do deceptive design strategies have for autistic people?

RQ4: Does deceptive design in social media influence how autistic people connect with others?

To give some context, chapter 2 will present more related work, especially on deceptive patterns, as well as the intersection of autism, HCI, and social media. We will then outline both the rationale behind and procedure of our study in chapter 3 and present its results in chapter 4. These results and their limitations will be discussed in chapter 5. We will conclude with a summary and ideas for further research of our approach in chapter 6.

Chapter 2

Related Work

In this chapter, we will present an overview of related research. For this, we will first discuss deceptive patterns and their prevalence, as well as relevant ontologies and research on specific populations. We will then go over some autism research, including its intersection with HCI research, especially in the area of social media. Lastly, we will elaborate on the topic of autistic burnout.

2.1 Deceptive Patterns

Research on DPs has grown in popularity

The term "deceptive pattern" is a development of the formerly used term "dark pattern", which was coined in 2010 by Brignull et al. [2023]. They built upon research by Conti and Sobiesk [2010], who formalized the notion of manipulative design. In the following years, it has gained traction in HCI research as well as in the broader public, e.g., with online communities such as the subreddit r/assholedesign[1].

Deceptive patterns are ubiquitous

Various studies have shown that deceptive patterns are ubiquitous across different devices and modes of interaction. In one study, Di Geronimo et al. [2020], who analyzed 240 popular mobile apps, found a total of 1787

[1] `https://www.reddit.com/r/assholedesign/`, retrieved 03.04.2025

deceptive patterns in 95% of them. Lupiáñez-Villanueva et al. [2022] found deceptive patterns in 73 out of 75 websites they analyzed. Another example, focused specifically on e-commerce websites, was Mathur et al. [2019], who analyzed 11000 shopping websites and found deceptive patterns in 11.1% of them, just scraping for text-based deceptive patterns.

User sentiment has no influence on DP efficacy

Many works have also assessed the effects of deceptive patterns, finding that they are effective despite annoying users and damaging their trust in the service provider Voigt et al. [2021]. In another study, Luguri and Strahilevitz [2021] compared the effects of mild and aggressive deceptive patterns, finding that users liked websites with milder deceptive patterns more. However, they were more likely to sign up for a (fictional) premium subscription when aggressive deceptive patterns were used.

2.1.1 Taxonomies & Ontologies

Various taxonomies exist for different research areas

The earliest attempts at formalizing different types of deceptive patterns were provided on the website formerly known as `darkpatterns.org` by Harry Brignull, which has since evolved to list a total of 16 different types of patterns, and Conti and Sobiesk [2010]. Over time, advances from research on deceptive patterns in different domains, such as e-commerce [Mathur et al. [2019]], social media [Mildner et al. [2023]], or augmented and virtual reality [Krauß et al. [2024]], have enhanced, yet further segmented the landscape of available taxonomies.

Mathur et al. [2021] further motivated the search for a unified vocabulary

Aiming to unify the language and research on deceptive patterns, Mathur et al. [2021] built a foundation for further deceptive pattern research. In this work, they aggregate how deceptive patterns manipulate choice architectures [building on Mathur et al. [2019]], analyze research based on this, and gather from other disciplines to, as they say, *"set the stage for researchers to develop a common language to discuss problematic practices"*.

Gray et al. [2024] presented a thorough ontology of deceptive patterns

More recently, Gray et al. [2024] have aggregated differ-

ent taxonomies from prior literature with the goal of creating a conclusive ontology and with that a new standard vocabulary. This ontology organizes 64 types of deceptive patterns in high-, meso-, and low-level patterns, with high-level patterns representing more general approaches, low-level patterns being more implementation- or application-focused instances of the high- and meso-level patterns, and meso-level patterns sitting in between these, presenting an angle of attack. The high-level patterns proposed are *Social Engineering*, *Obstruction*, *Sneaking*, *Interface Interference*, and *Forced Action*, while low-level patterns are e.g. *Privacy Maze*, *Cuteness*, *Auto-play*, or *Confirmshaming*. Moreover, each pattern includes a standardized description.

2.1.2 Deceptive Patterns and Specific Populations

In recent years, more research has focused on the needs of specific populations regarding deceptive patterns, e.g., children [Schäfer et al. [2024]], elderly people [Sánchez Chamorro et al. [2024]], and people with ADHD [Mildner et al. [2025]].

Children are already able to detect deceptive patterns

Among these are two recent approaches by Schäfer et al. [2024] and Renaud et al. [2024] studying the perception and mental models of children aged 10-11 and 11-12, respectively. The work of Schäfer et al. [2024] ran a study with fifth-graders with the goal of finding out if children at that age already were familiar with and able to deduce the manipulative intentions behind deceptive patterns. For this, the participants were tasked to judge and evaluate different deceptive patterns, draw a cookie consent banner, and analyze a screenshot for deceptive patterns. They found that most children were able to detect manipulations. However, the group was split between children who could and children who could not connect design elements with the decisions they elicit. Furthermore, when asked to draw a cookie consent banner, 86.4% of children drew one with a deceptive pattern, most commonly *False Hierarchy*, underlining their ubiquity.

Children tend to suspect more manipulations than are actually there

This was further supported by Renaud et al. [2024], whose

study, based on drawings by and interviews with children aged 11-12, found that children are able to detect deceptive patterns yet tended to overfit them onto, e.g., interfaces that were just sketchy or even included genuine warnings. While their participants were able to infer potential consequences of deceptive patterns, their understanding of the motivations behind them tended to be incorrect or exaggerated.

Elderly people demonstrated a lack of understanding of the motivations behind deceptive patterns

Older populations were studied by Sánchez Chamorro et al. [2024], who conducted a so-called magic machines workshop with participants aged 61 to 96. This is a creative approach, first described by Andersen and Wakkary [2019], that aims to let participants build a machine outside of technological constraints, just relying on the participant's imagination to elicit, in this case, a way to prevent a situation in which they did something unintended on the internet. They found that feelings of powerlessness are associated with a lack of understanding of motivations and ways to resist deceptions and that they lead to reliance on external parties, e.g., the help of relatives. Regarding technological interventions, they propose that this abstract understanding and feeling of powerlessness afford countermeasures designed in a way that doesn't offload more information on the user.

People with ADHD are better at evading deceptive patterns than people without ADHD

In another study, Mildner et al. [2025] investigated how reliably adults with attention deficit hyperactivity disorder (ADHD) could identify and evade deceptive patterns compared to adults without ADHD. To that end, they let their participants interact with different mockups of a fictional social network that either did or did not contain deceptive patterns and then evaluated their behavior and their responses on usability questionnaires. They found out that the detection of deceptive patterns was roughly equal in participants with and without ADHD, however, participants with ADHD were less likely to subscribe to the study's premium version, i.e. fall for the related patterns.

2.2 Autism

Around 1 in 100 children worldwide are diagnosed with autism [Zeidan et al. [2022]]. This is characterized by a number of things, including differences in sensory processing, communication, executive functioning, emotional regulation, and more. [2]

2.2.1 Autism, HCI, & Social Media

There is a growing body of research on autistic people in HCI. While some work focuses more on autistic children [e.g., Alon-Tirosh and Meir [2023]] or presents technological interventions aimed at assisting autistic users [e.g., Kim et al. [2023]], there is also research focused on assessing the different needs autistic people have when interacting with, for example, social networks, like Van Driel et al. [2023] or Wang et al. [2020].

Autistic people mention different shortcomings of social media platforms

In one such approach, Van Driel et al. [2023] examined the needs of autistic adults in social media platforms. For this, the social media usage of 34 people was monitored over a 3-month period and subsequently analyzed, with an additional interview being conducted afterward. They found a general dislike of the social media experience, citing reasons such as infinite algorithmic newsfeeds and sensory overload. Additionally, interaction was occasionally mentioned to be difficult due to a lack of low-effort interactions (going beyond likes and reactions) and a limited expressiveness of text. However, the ability to form interest-based communities was positively pointed out, which is in line with prior research conducted by Page et al. [2022].

[2] `https://www.autistica.org.uk/what-is-autism/what-is-autism`, retrieved 26.02.2025

Autism spectrum disorder is further listed in the ICD-11 [World Health Organization (WHO) [2019/2021]] as a lifelong disorder with symptoms such as deficits regarding social interaction, restrictive and repetitive behavior, and atypical and excessive interests. However, in line with the preferences of autistic people [Bottema-Beutel et al. [2021]], we will abstain from a disability-centered framing of autism.

Audience uncertainty, complicated privacy settings, and overuse are problematic

Similarly, Barros Pena et al. [2023] tried to imagine potential features of social media that are in line with autistic adults' needs. For this, 20 participants took part in a creative study, where participants were tasked to describe and reflect upon their experiences with social media usage and afterward create features for a hypothetical social media platform. Concerns mentioned here include audience uncertainty (i.e., not knowing who sees a given interaction), overly complicated privacy settings, compulsion to use and fear of missing out, and overuse at times of poor mental health. Furthermore, they also found problems with sensory overload in social media. Among the suggested features are personalized feeds containing a limited amount of items, better filters for groups of people or hashtags, and mental health check-ins to avoid doomscrolling.

2.2.2 Autistic Burnout

The term "autistic burnout" was first coined in autistic online communities before it was first described academically by Raymaker et al. [2020]. Later, Higgins et al. [2021] evaluated different characteristics of definitions of autistic burnout in a study with autistic adults, with the goal of condensing these into a conclusive definition.

Excursus: *Autistic Burnout*

AUTISTIC BURNOUT:
Autistic burnout is a state of significant mental and physical exhaustion, characterized by withdrawal from social life, as well as a reduction in important areas of functioning (e.g. social, occupational, educational, ...), difficulties with executive function, and intensified autistic traits, combined with a reduced capacity to mask. [Higgins et al. [2021]]

Autistic burnout differs from non-autistic burnout in some aspects

While it is similar to non-autistic burnout, it differs from that in several key characteristics. According to Higgins et al. [2021], the core characteristics of non-autistic burnout [see Maslach and Leiter [2016]], i.e., exhaustion, detachment and cynicism directed at their job, and a sense of ineffectiveness, are still present, yet manifest differently. For

example, cynicism in traditional burnout is directed at the affected person's job, while in autistic burnout, it's directed towards interactions with neurotypical people. Likewise, the ineffectiveness, instead of being directed at a person's job is directed towards aspects of everyday functioning. Additionally, non-autistic burnout lacks the notion of cognitive disruption and, in more extreme cases, dissociation.

Chapter 3

Methods

The research questions outlined in 1 are of a nature that lends itself well to qualitative research approaches. Being open-ended and not comparing groups of people (i.e., autistic and non-autistic users), they intend to peek behind the curtain to inquire about lived experiences of, as well as strategies implemented by autistic people when dealing with deceptive patterns.

3.1 Ethical Considerations

Studies with autistic people warrant special care to respect their needs

As our university does not have an IRB for the computer science department, the burden of ethically designing a study with autistic participants was an entirely self-monitored responsibility. To that end, we closely followed guidelines laid out by autism research organizations, namely the German Autismus-Forschungs-Kooperation[1] and the British organization "Autistica"[2]. In line with their recommendations, we took a number of steps to ensure the well-being of our participants:

[1] https://www.autismus-forschungs-kooperation.de/checkliste-autismusfreundliche-studien/, retrieved 12.02.2025

[2] https://www.autistica.org.uk/our-research/research-toolkit/interviews, retrieved 12.02.2025

- We offered our participants to do the study either remotely or in person. This was done to give them the opportunity to participate without leaving their personal space, where they might feel most comfortable. A hybrid setting was deemed appropriate due to the entirely qualitative nature of the study – we expected a potentially more stressful setting to have a more negative impact on users than different surroundings for different participants.

- The duration and general structure of the study were communicated beforehand, and any relevant progress was made clear. We gave this feedback to give a general orientation and make the course of the study more predictable.

- For participants who decided to take part in person, we made sure that the study space was appropriate. This included ensuring that it was private and quiet and that it, if necessary, had the chance to dim the lighting. We also offered a selection of stimming toys to support concentration and relieve any stress they might feel.

- The questions posed to the participants were aimed to be formulated in a way that was as unambiguous as possible. Additionally, participants were encouraged to ask questions if they were unsure about a question, in which case previously prepared further explanations were provided.

- The interview schedule was planned in a way that allowed for extensions of the interview. This allowed participants as much processing and answering time as they needed, as well as making space for a potential break. While, in general, no break was planned, we offered one to participants whose studies took longer than anticipated.

We did not require participants to prove a formal diagnosis

We also did not require participants to provide a formal diagnosis to register for the study; instead, we just asked them if they had ever received one via the demographics questionnaire. This was done to lower the barrier of entry

to our study as participants did not have to provide medical records, which would have also constituted a significant invasion of their privacy.

Another goal of the interview was for it not to be entirely deficit-focused, i.e., explore not only the potential struggles of autistic people but also their strengths. This is in line with the preferences of autistic people regarding the framing of autism and the language surrounding it, as described by Bottema-Beutel et al. [2021]. To that end, we aimed to phrase our briefings and questions in a way that doesn't take the perspective of autism as a disability or suggests that being autistic gives them an inherent disadvantage. This excludes the final question, i.e., the question inquiring about specific autistic characteristics, which will be further discussed in Chapter 5.5.

Autistic communities prefer language that does not frame autism as a disability

3.2 Protocol

After greeting a participant, they were briefly introduced to the general topic of the study. As we didn't want to introduce them to the notion of deceptive patterns beforehand, we simply phrased the topic as being about "manipulative online experiences of people with autism." We then walked them through an informed consent form (see Appendix A.1) and let them fill in a demographics questionnaire, asking them about general information like their age, gender, field of work, and if they had ever received a formal autism diagnosis. Finally, they were offered the choice between having the interview conducted either in German or English.

After making sure that the participant felt well, we first asked them to talk about a situation in which they felt manipulated by a website or app. This was followed by what they thought tipped them off to mistrust the website.

We then introduced the notion of deceptive patterns, first asking them if they were familiar with deceptive patterns and, if so, what they understood to be one. If they weren't familiar, we asked them what they thought a deceptive pat-

tern might be. In all cases, this was followed by an introduction to the topic, i.e., a general description of deceptive patterns, followed by some examples they might be familiar with, like cookie banners.

After this introduction, they were asked to interact with two Figma mockups, both depicting a number of deceptive patterns. Following each of these two interactions, we asked if they were familiar with similar interactions and how safe they felt while interacting with such types of manipulations. To finalize the introduction, we asked them for a last time if they could think of other types of similar manipulations that they might have encountered. This was done with the goal of giving participants the chance to talk about such experiences after they had learned about the topic of deceptive patterns, so they had the chance to recall experiences they might not have contextualized as such before.

We then started inquiring about their reactions to deceptive patterns and their way of counteracting them, first by asking them how they react in situations where they run into manipulations. This was followed by questions about potential avoidance of services, workarounds they might have in place, and if they felt like they were even aware of most manipulation attempts they encounter.

To go further into the way they felt about deceptive patterns, we proceeded to ask if they had ever taken measurable damage from such an interaction, as well as more explicit questions about their feelings about deceptive patterns and if this made them feel like they behaved differently online. After this, we inquired about who they felt was at fault for deceptive patterns and about their potential feelings of isolation.

Lastly, participants had a chance to talk about what types of problems they struggled with relating to autism, with the goal of finding possible confounding factors and gaining more insight into common problems. Here, we made it especially clear that this part is optional and that they did not have to disclose any information they didn't feel comfortable sharing. We finished the interview by giving par-

ticipants the chance to ask further questions on the topic and the interview off the record.

The full catalog of questions can be found in appendix A.2. It should be noted that due to the semi-structured nature of the interview, this was merely a guideline, and it doesn't reflect all questions that were asked in the end, as improvised questions to probe deeper into certain answers might have also been asked. In line with the ACM recommendations on problematic language[3], we largely tried to refrain from using the formerly popular term ("dark pattern"). However, as the integrity of the results occasionally relied on participants recognizing the concept behind this, we occasionally included this term in the interview.

3.3 Mockups

To help illustrate what deceptive patterns are, we let our participants interact with two mockups. These contained a number of different deceptive patterns and were inspired by a number of real-world counterparts. Screenshots of these mockups can be found in appendix B.

Mockup 1: privacy settings

One mockup showed privacy and notification settings modeled after those of social media apps like Instagram and Twitter. Instead of being able to deactivate all settings with one button, they had to be deactivated one by one, showing an instance of *Obstruction*. Additionally, the names of the settings were often named unclearly to depict an instance of *(De)contextualizing Cues*.

Mockup 2: ticket purchase

The other mockup simulated a ticket purchase. First, a box with long and complicated text with unnecessary negations had to be checked not to sign up for a newsletter, presenting an instance of *Trick Question* and *Complex Language*. Then, participants could either buy the ticket with insurance via a big blue button or do without the insurance via a smaller, gray text in the corner of the page. This is an example of

[3] `https://www.acm.org/diversity-inclusion/words-matter`, retrieved 08.04.2025

Interface Interference. After choosing one of these options, they were presented with shipping costs that were hidden before in an instance of *Hidden Costs*.

To counterbalance order effects, the order of the mockups was altered after each participant.

3.4 Analysis

Data was transcribed with OpeneAI Whisper and coded in MAXQDA

From the audio recordings obtained during the studies, we generated rough timestamped transcripts with the help of a locally running instance of OpenAI Whisper [4]. These transcripts were then manually tagged with the respective speaker and fixed where the automatic transcription failed or was missing. The final transcripts were then manually coded in MAXQDA 2022[5]. The quoted segments in this thesis were later manually translated in a way that best preserves the original content, wording, and sentiment of the original statement.

We used thematic analysis

To analyze the transcripts, we mostly used thematic analysis as per the guidelines of Braun and and Clarke [2006]. Following the process described there, we started with a familiarization with the data, which was followed by an initial coding phase. Here, we mostly stuck with what participants explicitly expressed and only on occasion lightly interpreted what was said. We then went through the codes to generate potential themes and distribute the codes among them, adjusting further until the final themes emerged. After this, we took the liberty of further generating sub-themes within the final themes with the goal of having a better overview of the data and making it easier to report on them. From this, we selected all significant themes to report on. A list of all codes and themes can be found in Appendix C.

Some more quantifiable results were counted separately

To analyze the more quantifiable aspects of our study, i.e., those dependent on counting how many participants iden-

[4] `https://github.com/openai/whisper`
[5] `https://www.maxqda.com`

tified certain deceptive patterns in the mockups or were familiar with deceptive patterns, we occasionally deviated from thematic analysis. While these sections were also coded like the rest of the transcripts were, they were additionally cataloged to count or list the participants who exhibited a specific behavior. This applies largely to the results presented in Chapter 4.2.

Chapter 4

Results

4.1 Demographics

In total, 13 participants took part in our study. Their ages ranged from 23 to 37 years (M = 26.6 years, SD = 3.52). Out of these, 5 participants were female, 3 non-binary, 2 agender, 1 male, and 2 others. Furthermore, 5 participants named the Abitur or something similar as their highest level of education, 5 others named different bachelor's degrees, 2 named master's degrees, and one participant had completed an apprenticeship. A detailed listing of our participants can be found in table 4.1.

When inquiring about other symptoms or conditions our participants experience, both related and unrelated to their autism, 9 participants claimed to struggle with overstimulation in some capacity, while 3 were diagnosed with depression. Additionally, a total of 8 participants mentioned being diagnosed with or at least strongly suspecting they had ADHD.

4.2 Awareness

When asked if they knew about deceptive patterns, 6 par-

6 participants had heard of deceptive patterns

ID	Age	Diagnosed	Profession/Area of Study
1	26	yes	Education science
2	26	no	Computer science
3	25	yes	Computer Science
4	28	no	Computer Science
5	26	yes	Civil engineering
6	27	no	Firmware Engineer
7	25	yes	Humanities
8	24	no	Sociology
9	29	yes	Mechatronic
10	24	yes	Coputer Science
11	23	yes	Student
12	37	no	Tax agent
13	26	no	Network DevOps

Table 4.1: Detailed list of our participants, presenting their anonymous ID, their age, if they have a formal autism diagnosis, and their profession or area of study.

ticipants (P2, P4, P6, P10, P11, P13) said yes, four of whom (P4, P10, P11, P13) even were able to properly define them. The other two (P2, P6) provided definitions that partially applied but were still a bit off (P6, for example, outlines *Interface Interference* specifically). Three other participants (P1, P7, P8) claimed to have at least heard of deceptive patterns, while the remaining four (P3, P5, P9, P12) had not. None of the latter two groups were able to provide a correct definition based on the name alone, even though three (P3, P7, P9) tried. Despite most of the participants not having prior knowledge about the term, not a single participant was unfamiliar with the concept after the notion was explained to them.

Deceptive patterns from the mockups were known to the participants

Additionally, all participants were familiar with at least some of the practices presented in the mockups. In the SETTINGS prototype, the manipulations that were pointed out most often were the *Adding Steps*, i.e. the missing "unselect all" button (P1, P3, P4, P7, P8, P9, P10, P11, P13) and the *Bad Defaults* of the settings (P1, P3, P5, P6, P7, P8, P12, P13). Moreover, 5 participants pointed out the *Privacy Maze* (P1, P2, P4, P6, P8). Two participants (P3, P4) pointed out that, while deactivating all settings was tedious, having detailed

control over their notification settings was generally a good thing. P3 elaborates:

> I like having a very detailed set of options, which types of notifications I get, so I get exactly the notifications I want and nothing else.

Interface interference was commonly detected by participants

For the TICKET SALE prototype, the manipulation that was described most often was *Interface Interference* (P1, P3, P4, P5, P6, P7, P9, P10, P12, P13), followed by the inverted checkbox (P4, P6, P8, P11) and *Hidden Costs*, i.e. the hidden shipping cost (P1, P6, P10, P13). Two participants also mentioned the *Complex Language* of the text next to the checkbox (P3, P7). Despite noticing the overcomplicated nature of this text, multiple participants (P5, P9, P10, P12, P13) did end up accidentally signing up for the newsletter.

Some participants associated "manipulation" with algorithmic manipulation in social media

While the concept of deceptive patterns was known to all participants in at least some capacity, some of them, when initially prompted to talk about manipulative online experiences they had, interpreted this differently. In particular, some participants talked about algorithmic manipulations they had experienced on Instagram (P1), Twitter/X (P7, P8), or YouTube (P10), as well as via targeted content and ads (P5). P1 commented on their experience with personalized Instagram comments:

> It really stuck out to me that this is really sorted by who you are and that the algorithm tries to find out which comments you would like or read. I find that creepy, to be honest.

To them, the motivations are clear, and the method is effective, stating that

> I noticed that I read many more comments because of this because I somehow don't really trust the first comments anymore. [...] Someone who doesn't exist in this realm of knowledge might perceive the comments differently, like a form of bubble thinking.

4.3 The Themes

With our thematic analysis, we settled on 8 final themes. These are as follows:

- *Use Cases*, where participants describe how they use the internet
- *Mitigation Strategies and Workarounds* that are implemented by participants
- *What would help* against deceptive patterns, but isn't implemented
- *Shadyness Signifiers*, collecting what participants reported as being suspicious
- *Changed Behavior* when participants expect a deceptive pattern
- *Consequences and Emotional Fallout* from interaction with deceptive patterns
- *Resource Management*, i.e., how personal resources are spent and drained
- *Blame* and to whom it was assigned

For the report, we added the *What would help* codes to the *Mitigation Strategies and Workarounds* section and the *Resource Management* codes to the *Consequences and Emotional Fallout* section while still making the distinction clear.

4.3.1 Use Cases

This theme captures the ways people stated that they used the internet. While not directly relevant to the research questions, this still gives some useful context for interpreting the rest of the results.

Participants prefer familiar websites

Multiple participants (P1, P2, P5, P7, P12, P13) state that they try to use only a set of websites they are familiar with

and feel comfortable leaving these known paths. These include services they claim are *"trusty"* (P1) or *"established"* (P7). P7 for example states that

> Especially in a social media context it's like, I just have my established platforms, which do what I want from them.

To them, using platforms in a determined way is important:

> I approach this in a very determined way, and it rarely happens that I [...] just passively stumble upon something and then just try that out.

Some participants use social media primarily for entertainment needs

Another thing some participants kept pointing out was the way they differentiated between using social media for entertainment needs as opposed to social ones. P3 states that, even knowing the addictive nature of infinite scrolling mechanisms, they find that it *"doesn't feel like infinite scrolling just wants to keep my attention, instead it just feels like this is why I'm here: I want to be distracted by this"*.

4.3.2 Mitigation Strategies and Workarounds

When it comes to mitigation strategies, i.e., strategies implemented beforehand to avoid running into or make it easier to interact with a deceptive pattern, people have implemented various different strategies. While many participants initially claimed to have no workarounds in place (P1, P4, P5, P8, P11, P13), many of them later mentioned such workarounds in one way or another.

Browser plugins were the most popular technical workaround

One way people tried improving their situation was via technical solutions, most notably browser plugins that automatically decline cookies. This works to varying degrees of success: P7, for example, states that their plugin *"worked very well three years ago, but these days, I think, in like 5% of cases or so"*. Other plugins, e.g., ad blockers, were also presented as an alternative by P12, who claims that this *"blocks ads and by that, also apparently blocks trackers"*.

Another approach was presented by P7, who uses different browsers:

> I have, for example, three different browsers on my laptop, which I use for three different things. [...] And this is what helps me most, I think, to just consciously have it at the top of my head which one exists for what and how that is classified and sorted for me.

In the same way, they use different mail addresses for different use cases, even incorporating throwaway addresses like 10-minute mail services into their workflow, to not have to confront confusing newsletter signup forms:

> I can just not care if I switch [newsletters and notifications] off or not. It's just not a thing I have to care for anymore.

Similarly, P4 defaults to websites instead of apps, claiming that

> I feel like apps tend to have more of [patterns] than corresponding websites, probably because most people these days just use the app, and then the focus is more on them, while the website gets neglected a bit.

Technical solutions were also a key factor in regulating usage times, i.e. countering *Attention Capture* and similar patterns. P1 states that *"I have app-timers, etc., and set up my phone to turn off at 1 am, which for me is doom scrolling prime time, so I can't use these apps anymore"*.

Some participants have also described how they use services differently to avoid interaction with deceptive patterns. P4 tries to avoid *Auto-play* and ad banners by using website previews generated via Google AMP, which is a framework that can provide a simplified snippet of a website within the Google search results: *"And this Google*

preview is kept very simple; it's mostly just the text. And this circumvents autoplay".

Attentive use is the preferred workaround for most participants

Despite all these approaches, a lot of participants defaulted to either just trying to ignore deceptive patterns or stating that using the website attentively is the best safeguard against falling for patterns. This has been stated in one way or another by almost all participants (P1, P2, P3, P4, P5, P7, P8, P11, P12, P13), e.g. by P2 who said they try to *"just concentrate"* in such situations. Participants were especially focused on this once the stakes of an interaction were higher, e.g., during online shopping. P11 states that *"Usually spending extra money doesn't happen to me because I start to double- and triple-check everything once money is involved"*.

What Would Help

On top of the strategies they already have implemented, some participants imagine additional safeguards against deceptive patterns.

Some participants, sometimes citing already existing laws, call for more regulation and standardization. P11, for example, says:

> I find, for example, these EU-wide regulations that streamlined all these [deceptive patterns] [...] were a very correct step in the right direction, and I would wish for more such regulations. It's just customer protection to prevent something like that because I think that if there are no regulations, then people will keep doing this because it's just more profitable.

Meanwhile, on standardization, P6 wishes that *"all sites have a consistent design, which are designs such that you aren't pressured in a certain direction"*.

Participants ideated very specific technical solutions

When it comes to other technical solutions, participants present a host of individual approaches and wishes. P4, for

example, proposes *"sometimes I'd like to have a button that is like 'I know what I want' and then all these things disappear and it lets me do what I want"* in reference to deceptive patterns in shopping processes that e.g., try to sell them related products. P13, on the other hand, struggles with contrast on websites and says that *"I've always wanted to do this, a browser plugin that automatically improves contrast, especially to make it so there is no gray-on-gray text, etc."*.

Forced click rate reduction as a means against inattentive clicking

Another solution, which was proposed by P10 concerns multi-step processes and notifications. Referencing a game that forces them to read new notification types before making them easily deletable, they say:

> I think it would help if I had a plugin that prohibits clicking a lot because that might make me think more about the clicks instead of clicking through the process until I'm at the end, where I want to be while missing 5 manipulation tactics on the way. But I'm too impatient for that.

Deceptive pattern knowledge as a form of media literacy

One participant (P7) even went so far as to claim that competence with deceptive patterns is a form of media literacy that needs to be actively learned. This need for learning and thinking about deceptive patterns was further supported by other participants, e.g. P8, who states:

> I feel like [deceptive patterns are] something I don't really think about and that it would probably be good to be more conscious about this in my everyday life.

Deceptive patterns are inevitable

Despite all motivated approaches and ideas to avoid deceptive patterns, some participants talked about how, in the end, accepting the existence of deceptive patterns is inevitable. On this, P8 says:

> I don't have the impression that this is a thing that I could realistically avoid and so it's a thing I just accept, that I am somehow confronted with it.

4.3.3 Shadyness Signifiers

When asked about how participants detected a website's shady intentions, we got different opinions ranging from corporate-feeling websites to a more abstract feeling of general shadiness.

Websites by bigger companies feel suspicious

P3 and P4 especially were insistent on the feeling they got from the websites of bigger companies, as opposed to those of, e.g., governments or small local shops. In particular, P4 notes:

> If it's a website that, for example, has no interest in getting something from me, like websites by state institutions, I don't know, for example, destatis or so, [...] they always have these 'only necessary [cookies]', 'reject all, and 'accept all', in that order, with all the buttons being large, well clickable and most of the time very neutral.

Meanwhile, other statements underline a more vibes-based approach to this. While P4 states that *"sensory overload, having as much stuff as possible on the website"* to be a *"red flag in that regard"*, P2 names, among others, sketchy forms as an indicator that something is off:

> I think it's a general vibe of, you have to register, you've got a weird form with 50000 check boxes and blanks for information where I don't feel like they have to know it.

For P1, official certifications and the lack thereof can be an indicator if a website is or isn't shady:

> [I'd rather trust a service] if I knew that it's a trusted shop, so like, a shop that reliably delivers and has reliable customer service and reliably refunds. One that doesn't stress about this whole purchase and processing process and where everything is generally chill.

For other participants, the lack of certain information was perceived as suspicious. P13, while interacting with the SETTINGS mockup, noticed how the sections in the advertiser settings are unclearly named, saying that *"you could interpret this any way you want to"*. However, when asked if they would agree if the names were clearer, they denied it.

4.3.4 Changed Behavior

In situations where they expect deceptive patterns, participants reported that they sometimes tend to adjust their behavior. This includes, for example, taking precautions within the services they use, or modifying their usage patterns.

In a more drastic instance, some people report leaving a service for the moment or even stopping to use a service altogether. An example of this is P1, who mostly stopped using food delivery services due to frustrating *Sneaking* practices. They say:

> During Covid, this got a lot worse. They added a lot, like a service fee here, another one there, then there's also the delivery fee, and in the end, you pay like 10€ on top of it. [...] With these food delivery services, I truly felt fooled. I don't even really order via them anymore, and if I do, it's with groups of people, because it's no longer worth it alone.

Trying new services is stressful

On a similar note to stopping to use services, some participants mentioned that they stopped trying new services whenever possible. The example mentioned most often (by P1, P7, P9) in that regard is Tiktok. P1 explains how on Tiktok *"multiple of these [deceptive] strategies are applied, and for some reason, my brain thought that it's way worse than, for example, on Instagram"*.

Returning to Amazon because it's the familiar option

Additionally, shopping websites were mentioned in this context. Some participants (P1, P10) talked about resorting

to Amazon again and again, as they were familiar with the ordering process and felt secure about their return policy. About this, P10 says:

> I feel like Amazon is way more simple [...] because I am familiar with it, and I know how the ordering process works, and I know that it works well, and so on, that, just to avoid dealing with new manipulative patterns and making new accounts, finding new ways to deal with it, [...] that I just buy on Amazon, even if that isn't something I want to do.

Procrastination because of annoyance with interfaces

The consequences of deceptive patterns even reach into the offline world of some participants. P4 talks about how they have *"extremely high inhibitions to do things in the first place"* and that any further complications, one of which being deceptive patterns, make them procrastinate things they have *"for months or years because I'm so annoyed by it"*.

Apps have a time overhead to set them up

When trying new apps or services, multiple participants (P2, P3, P5, P7, P12) mention the work they invest in setting them up. This is especially true in relation to settings concerning privacy and notifications. On this, P7 says that *"depending on how important this is to me, I might spend multiple minutes with all the damn settings, all that I don't want from them because it's all switched on in the first place"*. While talking about these setups, most participants seem annoyed, and some even verbalize this, for example, by calling processes like these *"very annoying"* (P05).

High-stakes situations when money is involved

Especially in situations where the stakes are high, i.e. when money is involved, some participants report being especially aware and careful. P8, for example, states:

> I think that obviously, it [deceptive patterns] somehow influences my behavior in a way that you adjust yourself to circumvent it, so, for example, that you're more careful, etc.

P6 entered such a careful state while interacting with the TICKET SALE prototype:

> I had to click 'purchase' first, but after the experience with the first [page], where the big button was the one with the insurance, I was very careful if the blue button was referring to exactly that offer or if I'd be breaking something again.

In order to simplify their interaction with deceptive patterns, some participants talk about their habit of just pushing through these patterns. This is reflected by statements like *"I'm trying just to move past it instead of dealing with it"* (P4) or *"I'm indeed an irrational person and click, like, yes, whatever, because it's not that important to click through 20 things instead"* (P2).

Clicking through interfaces to simplify interaction

Related to this, some participants (P4, P5, P6, P10) report to inattentively clicking through interfaces. This was already briefly touched on in the context of the click rate reduction tool proposed by P10 in 4.3.2. Talking about a newsletter they wanted to unsubscribe from, P6 mentions how one time, they *"just half-looked at the buttons and ended up signing up for more newsletters"*. Similarly, P4 describes how *"when I'm annoyed by something or just don't care in a particular moment, I just don't read and just click, trying to just click the "proceed" button as often as possible"*.

Exploiting social media algorithms to reach goals

Another tactic employed by some participants is related to trying to figure out how a system expects its users to act. P3 and P9 talk about their experiences with social media recommendation algorithms and how they are trying to shape them to achieve the results (i.e., the content) they desire by consciously exploiting the mechanism. For P3, this means sending content they like to friends to improve the likelihood of seeing similar content:

> The TikTok algorithm [...] isn't made to give you a good experience and show you the content you want, but instead to make more of your friends use the app by showing you things you are more likely to forward.

Conversely, and counteracting how they want to use the app in the first place, P9 avoids closing the app after seeing a video they like:

> I heard that they count when you leave the app, so you get shown similar videos less often. But intuitively, I would rather close the app after seeing a video I liked.

Deceptive patterns erode trust in websites

A lot of the awareness, conscious or not, that is displayed by participants seems to be related to a sort of erosion of trust they had for services over a long time period. Participants describe this as something like an *"unwell feeling"* (P12), voice explicitly that they have learned to mistrust from experience (P13), or shroud their mistrust behind mere persisting assumptions that services will betray them on some level, e.g. by using their data (P5). Even when websites show them positive influences, like when P10 recollects having seen an interaction time reminder on TikTok and suspects an ulterior motive, calling it an *"alibi, more so than an actual plan"*.

We also noted regular occurrences of people talking about avoiding certain things because of deceptive patterns. In the case of P3, this is directly linked to avoiding the deceptive pattern, i.e., subscriptions they suspect to be a *Roach Motel*:

> I have to weigh the pros and cons every time. My first reaction, most of the time, is usually like, 'Okay, I guess I can't do this now.'

P6 refers to news websites that push subscriptions when saying:

> In the future, when I see this site on Google, and I remember that this has happened, then I'd think, 'No, I won't click on this now; I'd rather look for another result from the list.'

4.3.5 Consequences and Emotional Fallout

One topic we inquired about was that of emotional consequences. We will report on those starting with visceral feelings and shifting into more complex and reflective statements over time. In this context, participants often brought up the topic of resource management, which will be treated in detail in the end.

Participants often expressed negative feelings

The most immediate consequence participants talked about are general negative or unwell feelings. This was expressed in ways like *"it's quite unpleasant"* (P9), *"the internet has become less enjoyable because of [deceptive patterns]"* (P3), or *"I find this to be fundamentally annoying and stupid when websites do this [employ deceptive patterns]"*.

Especially in the context of *Attention Capture* deceptive patterns, some participants report feeling overwhelmed or stressed. To this, P11 reports:

> Like I said, I'm a bit overwhelmed and strained, like my brain is groaning at me that it really doesn't want to do this at the moment.

But even other patterns were characterized in a similar manner. One example of this was Facebook's *Privacy Maze*-type settings, as experienced by P1:

> I'm not on Facebook anymore, but when I was on Facebook the last time, I got completely overwhelmed when going through the settings because there were so many sub-settings, so many things you could and couldn't change.

Deceptive patterns are insulting

Aside from general negative feelings, some participants report feeling insulted or even dehumanized: While P1, for example, reports feeling *"ripped off"*, e.g., by their problems with delivery services, P6 at some point mentioned feeling *"like a lab rat"*. In the context of unwanted shopping recommendations, P4 says *"I find that a bit insulting because it feels*

condescending from the website that, instead of trying to help me, it assumes that I don't know better".

Annoyance with deceptive patterns

Most participants (P1, P2, P3, P4, P5, P7, P8, P13) express a lingering feeling of annoyance at deceptive patterns of different sorts. In one such instance, P3 reports on persistent and obvious manipulation attempts:

> Sometimes, it doesn't feel like subtle manipulation, but like someone puts stilts in my way, and I'm tripping over them the whole time, and that makes it super annoying to go the way.

This anger, for some participants, grows to become frustration. P3 angrily expresses this in the context of cookie consent banners:

> This is only acceptable if you accept that the internet experience becomes total shit if you have to click 5 things every time so you don't get cookies. Like, either you sell your soul, or the internet is shit now.

Some participants avoided social media due to deceptive patterns

Evading deceptive patterns, in some cases, is mentioned to promote forms of isolation. About this, P10 states:

> I have been talking earlier about how I uninstalled apps like TikTok and Instagram, mostly because of this endless scrolling content. I have also uninstalled YouTube from my phone, but I have a substitute app that doesn't show me YouTube Shorts. And I feel like that makes me miss out on things, especially on Instagram, because aside from this short-form content, there are interesting updates from friends, which I just don't see now.

Normalization of deceptive patterns makes participants expect them everywhere

Some participants mention a growing normalization and with that, also a feeling of breaking down after long-term

manipulations. Considering their expectations, participants often mentioned that they *"expect everything to just be designed in a customer-unfriendly way"* (P2) or that they *"expect this and that it's stupid but it's consistently like this with all apps and you just live with it and it's shit"* (P3). P7 says:

> Somehow, you've just gotten used to it. Just like that. It also hasn't just been like that since yesterday.

Noticing the long-term effects of being surrounded by manipulation, P8 further supports this:

> Now that we're talking about it, like, it might be possible that I'm just underestimating such risks, because I've been numbed to them and because I think that I already know it more or less.

Participants expect manipulations even when there are none

Through long-term experience with the internet, participants seem to suspect that, no matter how many deceptions they can clock, there must be even more hidden from them. This comes in two shapes, the first being the users who are aware of being manipulatable with only some understanding of the topic, like P7, who notes that they *"only know top-of-the-iceberg stuff about this, and that is enough to just be able to suspect that the things that do happen, happen most of the time without me noticing them"*. However, when asked if they notice most attempts at manipulating them, P7 notes that *"If I did, they would be very bad [manipulation attempts], and I don't think that happens"*. At the same time, P10, who has a relatively high expertise on the topic, still assumes the same, saying that *"the fact that I see so much makes me expect that there's even more"* and *"maybe clicking away two manipulation tactics should suggest the feeling of having won against the manipulation while there's 20 more which I haven't noticed"*.

Endless Scrolling affects autonomy

Some forms of manipulation appear to even affect participants' perceived autonomy. In the context of endless scrolling mechanisms, this loss of autonomy even leads to participants being angry at themselves, to which P13 says:

> [I'm angry at myself because] once I'm in there [endless scrolling feeds] for a few minutes, that I fell for it or however that may be. That I let myself get distracted.

An aspect of this that is less so related to deceptive patterns is a feeling of being surveilled constantly, which is described by P1 as *"creepy"* in the form of targeted ads and whose existence P11 tries to just accept:

> I try to live with it that some decisions I don't want to make are taken away from me, for example, that my data is being collected.

Bonding with others over shared negative experiences

Despite all negative sentiments, two participants voiced different aspects of deceptive patterns being a type of bonding material, if merely a topic of discussion. For P5, who reported using multiple Chinese social media services, this is expressed in a relatively subdued way, i.e. in their friends complaining about the respective apps resetting their privacy settings after each update. On the other hand, P11 voices a more positive outlook on this when asked about feelings of isolation associated with social media deceptive patterns:

> I think [isolation] indeed isn't something that's happening here. I rather get the feeling that this is one of those things that a lot of people somehow have to deal with, with whom you can bond very well about having had a bad experience with a website that does such a thing.

Participants feel in control regarding some manipulations

Most users (except P1 and P12), however, at some point mention feeling in control in certain situations, e.g. with social media settings like those in the SETTINGS mockup (P4, P5, P10), or mention a perceived immunity to doomscrolling, like P3:

> I feel like I don't really tend to fall for doomscrolling because I'm just pretty good at doing

> things because I have fun doing them and seeing even more posts that I actually like, which is also why I tend to use social media specifically.

Resource Management

In various contexts, almost all participants at one point talked about deceptive patterns draining their resources (i.e., mental energy, time, etc.) and their management thereof.

Environment and devices can influence how draining an interaction is

One factor in resource management is environmental factors, which influence how exhausting an interaction is perceived to be and how many resources a given participant has available in the first place. While slow devices, a slow internet connection, or interactions on mobile devices in general are mentioned to make dealing with deceptive patterns more difficult, being in a controlled environment, like their home, gives them more energy to deal with manipulations. P11 sees a connection between this and their tendency for overstimulation:

> The act of concentration when I'm, for example, outside on my phone can just lead to there just being too much stimulation at once. And this is why I need a space to retreat to, where I have the tranquility to deal with it.

Additionally, P3 talks about how a stressful situation can make things even worse:

> I think most of the time when I'm already stressed and then I have to check things on a website, and I have to go through 3 more websites, and I'm doing it on my phone, and the phone is slow, and if I then disable all the cookies, then that amounts to 5 extra steps. This, to me, is very draining and makes it so that if I am above a certain level of irritation, I want to just toss my phone away and not continue.

Resources are time and (mental) energy

The resources to be managed are mostly the participants' time and their mental energy. P7 pictures their wasted time, spent in settings to deal with, among others, *Bad Defaults*:

> This is time that cumulates. And if I picture this like I have a timer hovering above my head, showing how much unnecessary lifetime I've spent with these things, I'd assume that it's probably days, and it just doesn't necessarily have to be like this.

These two types of resources can even be linked, as described by P3, who finds especially short waiting periods to be *"very exhausting when I really want to do something quickly"*, which assigns some sort of energy cost to the small time periods they have to spend waiting. This is further supported by P11 and P13, who spend the effort to try and explicitly take time to cancel subscriptions, about which P13 says:

> With complicated subscription canceling processes, you take extra time. If you want to quickly do something online, you know that this sometimes just doesn't work this quickly, so you assign more time for it to your daily plan.

The energy aspect of this is mentioned even more often. P3 describes this as follows:

> To me, this energy aspect means staying emotionally well and not getting overwhelmed by the amount of steps needed

While participants sometimes just call interaction with deceptive patterns *"exhausting"*, many of them speak in detail about energy management. Key factors that participants mention to influence the energy a particular interface drains from them are:

- number of steps

- small waiting periods
- reading text
- number of options

Trading resources for comfort

For P3, the tradeoff between spending their own resources and keeping comfortable while interacting with deceptive patterns is perceived as particularly unfair:

> What I find especially bad are manipulative patterns that trade my personal resources against comfort. For example, these things with a one-click-button to accept cookies versus, when I don't want to accept, I have to wait half a minute and click 5 different things. [...] This just costs me resources every time, and I think that is so unfair because I find that exhausting. I can't do that all the time; I'm impatient and these manipulative practices that just drain my resources are horrible.

Participants share feelings of spite and resignation

Some participants at some point mentioned how their actions regarding deceptive patterns are often motivated by spite (P3, P4, P7, P9, P10, P12, P13) or, in other cases, resignation (P2, P3, P4, P6, P11, P12). This manifests in many different ways. For P7, this is based purely on the platform inconveniencing them, in this case with cookie consent banners:

> I try to refuse everything, even if it takes a while. Just out of principle, because I don't begrudge them my data all that shit if they annoy me with it.

To P9, on the other hand, privacy concerns seem to play more of a role:

> I know, for example, that the app wants as much data from me as possible because they earn

> money with it. So, I know that if I refuse as much as possible, this is worse for the app, and it doesn't want that.

P4 relates this to their autonomy needs:

> I especially don't like when someone tells me what I should do. These are things that very strongly make it so I don't want to do the thing. Even if I'm going to do it at some point in the end, I'm a person who just doesn't do it out of principle to be able to do it on my own terms.

Instances of this were alluded to relatively ubiquitously in different ways, e.g. when participants just accept manipulations they encounter. P6 describes:

> [There's] sometimes this point where I just let it happen because it would cost too much energy to say something against it or counteract it if it's too persistent.

Resignation when resources are spent

For some participants, resignation seems to kick in mostly when their resources are spent. This is mentioned, for instance, by P11:

> This makes me so impatient, which is why I am more resigning than I am resisting it. I just think that resisting it affords way more patience and force from me, which I just don't have.

As with spite, resignation presumes recognition of the pattern. The difference lies in the motivation to evade this, i.e., in the participant asking themselves, "Do I have and want to invest the energy to evade this, or do I just go the easy route."

4.3.6 Blame

Under this code, we collected all instances of participants assigning blame for situations where they fall for deceptive patterns. Participants mostly ended up falling into one of three non-exclusive categories:

- Blaming themselves (P1, P2, P7, P8, P10, P13)
- Blaming the website, service provider, or another stakeholder (P2, P4, P5, P11, P12)
- Blaming no one specifically, instead blaming systematic failure (P3, P4, P6, P8, P9, P10, P11)

Self-blame was common

Of the participants who blamed themselves, all of them mentioned knowing that it's technically not their fault that they are being exploited. Yet, they admit to still feeling like it is, if only impulsively in the first moments. One of these is P8:

> I think [the service providers] are at fault that the subscription model is this predatory and that it is designed so as to trap people. But I also think that as a person who should know better, based on my experiences, etc., I see myself as responsible for watching out better.

The last category, i.e. people who blame societal structures, involves mentions of a number of abstract stakeholders, like the government, corporations, executives, and even capitalism. Explaining their stance on this and the clashing of corporate interests and UX, P4 says:

> I think it's mostly a consequence of the interests of corporations and their limitations with regards to having other goals than making as much money as possible or optimizing retention or so, and that dark patterns, in my opinion, are mostly a result of trying to encourage a

> behavior that [improves] an easily measurable metric that seems vaguely appropriate to measure success.

Chapter 5

Discussion

After laying down the results of our study, it remains to connect different elements of what participants talked about with existing literature to form a coherent image of what our results build upon. We will do this in the context of the research questions posed in 1.3.

5.1 RQ1: Awareness

Familiarity of participants with deceptive patterns underlines their ubiquity

Concerning the question of how aware autistic people are of deceptive design strategies, we get a mixed image. On one hand, only around half of the participants had heard of the term in such a way that they could properly define it. However, when presented with the definition or examples for some common manipulation tactics, all participants could describe encounters with them, underlining once again the ubiquity of deceptive patterns, as was pointed out, e.g., by Lupiáñez-Villanueva et al. [2022].

Scope of deceptive patterns is tough to assess, see deceptive pattern iceberg

Despite this general familiarity with deceptive patterns, participants had trouble assessing their scope. This is evident in the way many participants tended to suspect a lot of manipulation happening without them noticing it. In line with what some participants alluded to, we call this the *deceptive pattern ice berg*. We suspect that this fear of a de-

ceptive pattern ice berg, which consists of a number of perceived manipulations and an even larger amount of hidden ones "below the surface", while likely not exclusive to autistic people, might be more pronounced in autistic populations. More of the conception of a deceptive pattern iceberg will be discussed in Chapter 5.3 with regards to expected manipulation and its implications.

Participants grew up with the internet and learned some awareness

As our participants were fairly young (between 23 and 37 years old), it is, however, likely that they were exposed to the internet from a relatively young age and thus grew up around deceptive patterns. Consequently, it was noted by multiple participants that they learned to be careful when interacting with the internet. As one participant mentioned, this is connected to a form of media literacy, focused not only on the content of the media but more so on the way it is being presented. This conceptualization also implies a responsibility for broader public education on the topic of deceptive patterns, which has been shown to make users more resilient against deceptive patterns [Naheyan and Oyibo [2024]].

5.2 RQ2: Workarounds

Some participants employ workarounds, some employ coping strategies

Our participants described a set of different workarounds for deceptive patterns, which mostly fall into one of two categories. Some are a set of solutions, technical or not, employed to improve their user experience by alleviating the effect of deceptive patterns, including, for example, plugins to combat cookie consent banners or categorizing how they use the internet. On the other hand, some participants implement workarounds that sound more like coping strategies than they do like workarounds but are still a way to deal with deceptive patterns. Part of this category is, among others, trying to just be careful or implementing spiteful strategies.

Categorization of internet use might give additional cues for behavior

We often noticed participants categorizing their internet use, both explicitly (e.g., by using different browsers for different tasks) and implicitly (e.g., by framing different situations as high- or low-stakes situations, depending on per-

ceived potential losses or trusty vs untrusty websites). It is possible that this framing gives them a sort of environmental cue to take better care of their decisions and be more aware of potential manipulations.

Attentive use is at odds with ADHD

A set of participants stated that cautionary and attentive use was their main evasion tactic. This is contrasted by diminished trust in their ability to spot deceptive patterns and the fact that many participants mentioned they had ADHD, i.e., a condition that is characterized, among other things, by issues with attentiveness [World Health Organization (WHO) [2019/2021]].

Avoidance behavior and self-preservation

Participants also occasionally admitted to using services differently from the way they were intended by the provider, stopping to use them altogether or avoiding trying them in the first place. This might work as a sort of self-preservation mechanism, e.g., keeping them from spending too much time on social media or spending money on a subscription they expect they might forget to cancel.

Not switching services to evade risks associated with unfamiliar ones

In other cases, the opposite is true, and participants mentioned not switching services because they are familiar with one service's manipulations, e.g., not switching from Amazon to another e-commerce platform because they have learned where to expect deceptive patterns on Amazon and how to ignore or evade them. Not only does this constitute a form of repetitive and restrictive behavior, which was already presented as a central characteristic of people on the autism spectrum, but it also has implications for the opposite tactic of switching services. Depending on the alternatives to a service, the switch itself might induce additional stress in presenting an unfamiliar environment, so the threshold to do so might be higher than it is for non-autistic users.

Lowering the stakes with tracker blockers

Some participants even mentioned having methods in place that do not have a direct effect on deceptive patterns, most prominently the use of ad blockers that also block trackers. We suspect that, while not influencing deceptive patterns directly, it might help participants to know that the impact of falling for privacy deceptive patterns is dampened somewhat. After all, if the ad blocker blocks track-

ing cookies, the interaction with the cookie consent banner does not matter as much anymore. The actual impact of this is questionable, though. While the blocking of trackers indeed works relatively well under certain circumstances, the data gathered by the services themselves or the underlying content delivery networks is potentially only slightly or not at all impacted [Merzdovnik et al. [2017]]. Despite this, it is likely that implementing this strategy has a positive impact on a user's mood and might give them a feeling of empowerment, which, again, has the danger of giving a false sense of security. This is further pronounced as Merzdovnik et al. [2017] showed that ad block plugins are less effective at blocking trackers than dedicated tracker blockers are.

5.3 RQ3: Emotional Consequences

Inquiring about the emotional consequences of deceptive design strategies on autistic people was the most fruitful task of our study, as participants openly and extensively talked about ways in which they were annoyed by such strategies. In that context, they included a number of negative sentiments, ranging from simply being annoyed at specific elements to openly voicing their anger at themselves, for instance, when falling for endless feeds for too long.

Trust erosion in services is supported by literature

Participants often stated that they had lost trust in a lot of services that employ deceptive patterns, which is further supported by prior work, like Voigt et al. [2021], indicating that the issue isn't specific to users with autism. This sort of trust erosion often resulted in frustration and even anger with the service providers, leading some of our participants to critique profit motivations.

Another theme that was frequently mentioned was possibly related to trust erosion, i.e., participants expecting manipulation, even when there is none. Should this be a recurring theme for autistic people, it might have profound implications beyond just keeping them aware at all times. This is not the first time that deceptive patterns have been shown to make users expect even more manipulation than

they see. In the study done by Renaud et al. [2024] with children aged 11-12, it was found that their participants tended to overfit manipulative intentions to interfaces that were just sketchy or even benign. As a sort of protective mechanism, this might be helpful in a way that it makes people more aware and thus potentially resilient against deceptions. However, this is also likely to cost even more energy and prevent users from reaching certain goals they might have.

Overfitting manipulative intentions to interfaces was shown to happen to children as well

BRIGHT PATTERNS:
Bright Patterns are design strategies that prioritize a user's needs over the service provider's goals [Sandhaus [2023]].

Excursus: *Bright Patterns*

This also hints against the efficiency of so-called bright patterns and fair patterns (see excursus). While this might seem contradictory at first, as bright patterns have been shown by others [Bielova et al. [2024], Graßl et al. [2021]] to have a positive impact on users' actions and sentiments, it paints the picture of a potential underlying mistrust against such measures, i.e., by autistic users expecting a manipulation attempt in some way (if not suspecting an "ulterior motive"), no matter what a given interface states or appears to try and do. However, the notion of bright patterns and the related research is still fairly new, having been coined by Graßl et al. [2021], with research thus far mostly concentrating on comparing the effects of deceptive and bright patterns outside of usage contexts, i.e. the reality of an internet full of deceptive patterns. The existing research, in that sense, lacks the external validity to apply here and isn't extensive enough yet to have generated something to conclusively imply a difference between autistic and non-autistic users.

Bright patterns might be less effective due to expected manipulations

To get into the reasons behind the curiously conscious nature of how participants handled their personal resources affords a prior look into its origin, which means asking the question if autistic people are actually more susceptible to having their resources drained by deceptive patterns than non-autistic people are or if they simply have learned to be more mindful about spending their limited resources, thus

Consciousness about resource management due to stronger resource drain or heightened awareness

being more sensible to outside influences that drain them. Looking at related literature and other behaviors displayed in the study, both sides somehow might be playing a role.

Autistic burnout supports heightened awareness

Supporting the suspected heightened awareness and mindfulness about spending resources of autistic people, we can put this in a context with autistic burnout, which was introduced in chapter 2. It should be noted that none of our participants explicitly described suffering from autistic burnout. However, the notion and the research behind it are still relatively young, so it is likely that some participants have experiences aligned with autistic burnout but haven't considered it to apply to themselves. In a situation where a user is actively in autistic burnout, characteristics of autistic people, like reduced executive function, might be detrimental to their interaction with deceptive patterns. Our participants spoke of states that might be attributed to this, e.g., in the context of rapid clicking to get through a process they don't have the energy to properly engage in. On the other hand, time spent on what they perceive to be unnecessary interactions steals time that could otherwise be used for recovery from a state of autistic burnout.

Multiple reasons for resource drain, e.g., behavioral rigidity

Participants often described specific energy-draining situations, which gives further information on the nature of their resources and their management thereof. Examples of this would be processes with a large number of steps (e.g., many check boxes that need un-checking) or the interrupting nature of cookie consent banners. Especially these interrupting elements create distractions, which might be more prevalent for autistic people due to the behavioral rigidity (i.e., the difficulty with switching tasks) associated with the condition, as described by, e.g., Poljac et al. [2017].

Spiteful behavior drains resources and might be more pronounced in autistic people

One contributing factor might be spiteful behavior, which participants frequently described as a reaction to encountering a deceptive pattern. While to our knowledge, no work directly examining connections between spitefulness and autism has been published, there's evidence for negative correlation between spitefulness and theory of mind [Ewing et al. [2016]], as well as between theory of mind and autism [Rodgers and Dahling [2018]], implying a possible positive correlation between autism and spitefulness. With

the cost associated with spite (in this case, mental effort), an autistic person thus might experience situations that drain them more so than these would drain a non-autistic person.

THEORY OF MIND:
Theory of Mind is the ability to predict and reason about the mental states of others [Premack and Woodruff [1978]].

Excursus: *Theory of Mind*

Even if the outcome of spiteful behavior ends up being favorable to a participant, e.g., concerning their privacy, they might be more inconvenienced by it than necessary, investing more effort than they otherwise would have into evading the deceptive pattern. All of this obviously presumes that a participant not only recognizes a manipulation but also knows about (or is at least able to assume) the goals of a particular service so they can spitefully evade them. This also means that a participant who is fueled by spite and who is more aware of deceptive patterns might spend more of their limited resources on trying to spite the platform.

Spiteful behavior requires inferring the service provider's intentions

Especially in low-energy states, however, participants often talked about their feelings of resignation towards services and expressed their frustration with them. This is very much in line with previous research that has been done on generalized populations, e.g., by Maier and Harr [2020], where participants talked about resignation in the face of deceptive patterns. In their work, similar to ours, participants pointed out that they had no alternatives to or depended on the websites that tried to manipulate them. Moreover, the frustration directed at the companies pushing deceptive patterns was enforced by both their and our participants.

Resignation and low-energy states

Despite all these negative effects, we hypothesize that there are certain interactions between them that have the chance of making autistic people even more resilient against deceptive patterns. Particularly in situations where interaction isn't subject to additional pressure, like time constraints, there are signs that point towards autistic users being aware of the dangers associated with deceptive patterns

Certain interactions between negative effects might strengthen resilience against deceptive patterns

in a way that motivates them to evade these even more. If a critical mass of perceived manipulation is crossed, however, there's a chance that this motivation turns into spite, which, while still potentially effective in fueling the evasion of deceptive patterns and their goals, drains more energy from the users than the interaction would otherwise do.

5.4 RQ4: Isolation and Social Media

Discussing isolation is problematic if participants used social media mostly for entertainment needs

Discussing our results relating to instances of felt isolation in social media does not come without caveats, which are due to the ways in which our participants use social networks. Many of them talk about how they tend to use social media as a means to satisfy entertainment needs instead of social ones, which often makes their social media experiences not reflect isolation. This is, however, at odds with existing literature on how autistic people use social networks. In a study done by Mazurek [2013], 64.9% of participants mentioned using social media primarily for social connectedness, whereas only 22.1% used it primarily for entertainment or information. Considering the age of this study, dating back to a time before TikTok and sophisticated content recommendation algorithms, as well as the rapidly evolving landscape of social media [Bhandari and Bimo [2022]], this might not reflect the current reality. This is further supported by some statements from our study, e.g., P5, who resorts to mostly using more private channels, like Discord servers and chats.

Addictive features in social media make participants avoid social media

However, some participants mention the avoidance of social media as a consequence of, among others, its addictive nature, which is at least partially due to deceptive patterns like endless feeds [Montag et al. [2019]]. This avoidance then is mentioned to have an isolating effect, making it harder for them to keep up with updates and memes from other people.

In general, however, participants mostly did not attribute any strong isolating capability to deceptive patterns.

5.5 Limitations

To further contextualize our findings and work towards future work, it is important to note some shortcomings of our approach.

Participant demographics limit our findings

A major caveat lies in the demographics of our participants. Not only were they relatively young (ages 23-37), but they were mostly also highly educated and employed in scientific fields, mostly computer science and social sciences. Additionally, 8 of our 13 participants mentioned they were diagnosed with or at least strongly suspected of having ADHD, which may well be a confounding factor in our data. It should, however, be considered that it is debatable whether trying to filter out participants with ADHD in a study on autistic people is necessary or even desirable, considering the high rates of comorbidity and interaction between the two conditions and their characteristics. A meta-analysis by Rong et al. [2021] suggests that around 40% of people with autism also fulfill diagnostic criteria for ADHD, which is still lower than was reported in our study (i.e., 8 out of 13, or 61.5% participants). At the same time, others, like Hours et al. [2022] and van der Meer et al. [2012], have argued about the very nature of the double diagnosis, stating instead that ADHD and ASD might be manifestations of the same condition.

Negative experiences might be over-pronounced due to negative framing in the context of manipulation

The design of our study, while done with the intention of not approaching autism from a disability angle, has also likely had various effects on the outcome that skew towards a disability-focused result. Since our participants were often asked about experiences they had with manipulations, it can't be ruled out that they were more likely to remember and talk about negative experiences that they had. Situations like these, however, likely involved the participant being deceived in some way, priming them to focus more on situations in which they were deceived more. Then again, recalling a situation where they merely got agitated for noticing and subsequently evading a manipulation potentially also has a negative emotional effect while not leaving the participant deceived.

One question in our study was formulated in a disability-centered way

Despite the motivation not to medicalize autism, we did not succeed in all aspects. The last question of our study, which inquired about potential comorbidities and symptoms of autism, should not have been framed in such a disability-centered way. We added it to gain further insight into potential characteristics of people on the autism spectrum that could influence how they managed certain situations, as well as investigate potential confounding factors. This specific phrasing was initially chosen to specify what exactly we were asking for. However, a better way to phrase the question, according to Bottema-Beutel et al. [2021], would have involved asking about characteristics they experience instead of problems and comorbidities they struggle with. This phrasing would have also prompted positive and non-medical characteristics and might have ultimately yielded better responses. We decided, nonetheless, to include the data we gained from this, as it proved to be insightful.

Quantitative comparisons with non-autistic populations are not possible

Another thing to be noted is that, while developing hints at possible autism-specific problems, we did not gather any data that would make proper comparisons between autistic and non-autistic individuals possible. All such comparisons, as stated, merely hint at gaps between our data and what similar literature has presented.

Chapter 6

Summary and Future Work

To find out basic information on how autistic people interact with, are affected by, and evade deceptive patterns, we invited 13 participants to an interview-based study. We then analyzed the qualitative data and found a number of common issues within our participant base. Deceptive patterns were a known problem to all participants, though most of them hadn't heard about the term before. Despite this, they were able to detect and converse about a number of manipulations from both our mockups and their everyday lives.

Workarounds against deceptive patterns include a number of technical interventions, e.g., automatic cookie reject plugins, as well as general strategies to stay careful. Despite this, some participants resorted to just stopping to use certain services, like TikTok, to evade their manipulation attempts entirely.

Among the emotional consequences are a number of negative sentiments, from general annoyance to anger directed at oneself. Deceptive patterns were mentioned to erode trust in websites in such a way that participants generally just expect to be manipulated, even if they don't actively notice it, evoking the image of a type of manipulation iceberg. Most notably, however, participants frequently talk

in-depth about their resource management, i.e., how deceptive patterns can consume their time and energy. This might be deeply entwined with a participant's emotional response to deceptive patterns and might even be connected to concepts like autistic burnout.

6.1 Future Work

As a basic investigation into the interaction of autism with deceptive pattern awareness and mitigation, as well as their effect on the emotional states of autistic people, we identified a number of possible future research topics, going beyond using bigger and more diverse groups of participants to validate and enhance our results.

Differences between autistic and non-autistic users could be examined

While we established that there may be certain areas of concern with regard to how autistic people perceive, evade, and interact with deceptive patterns, it would be interesting to know more about the precise differences between autistic and non-autistic people. Research into this could take many approaches, e.g., compare how many deceptive patterns in a given interface are detected by these groups, how likely the respective groups are to fall for them, etc. It would also be insightful to map out these differences across different categories of deceptive patterns, investigating, for example, specific differences between autistic and non-autistic people for *Interface Interference* or *Obstruction*.

On top of this very symptomatic approach, which tries to underline how damaging deceptive patterns are, it would be helpful to see more research directed at how to navigate a world full of deceptive patterns.

How does expecting to be manipulated influence a user's behavior?

A central finding of ours was that many participants mentioned being in a constant state of heightened awareness for fear that they might be manipulated. However, it is not clear how that actually influences their behavior. While it was occasionally mentioned to be draining and stressful, it is unclear how exactly these expected manipulations shape a user's behavior. Future research could examine this in

more detail and also compare how much of this state is present in non-autistic people.

Countermeasures designed for and with autistic people

Furthermore, while we inquired about potential workarounds and methods to assist in dealing with deceptive patterns, it wasn't within the scope of this work to go in-depth on this. However, some form of assistance is likely to be welcomed by autistic users. This goes beyond the form of simple countermeasures against deceptive patterns, though an evaluation, e.g., of those proposed by Schäfer et al. [2024] on autistic people, would probably yield insightful results. Creative approaches like the workshop held by Barros Pena et al. [2023] or Sánchez Chamorro et al. [2024] might also help elicit ideas that correspond to what autistic users actually want and would prefer instead of relying on measures designed to work for neurotypical users.

Appendix A

Study Materials

A.1 Informed Consent Form

The informed consent form that was shown to participants of our study can be seen in Figure A.1

A.2 Question Catalogue

The following questions were posed to our participants:

- Can you recall a situation in which you felt like websites or apps were trying to mislead or trick you?
- What made you mistrust the platform in that situation?
- If this references a deceptive pattern:
  - How did you react in that situation?
  - How did that situation make you feel?
- Can you think of any other types of manipulation?
- Have you heard of dark patterns or deceptive patterns before?

Informed Consent Form

Study on manipulative online experiences of people with autism

Principal investigator: Lea Emilia Schirp
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Purpose: The goal of this study is to learn about how autistic people perceive and feel about manipulative practices in apps and websites.

Procedure: The participant will be interviewed with a variety of questions regarding online manipulation. At one point, they will also interact with a selection of manipulative elements.

Risks/Discomfort: There are no known risks associated with participation in the study. However, if you feel exhausted or if answering the questions become distressing to you, it is possible to add breaks or terminate the study. Additionally, you may ask for alone time, dimming of lights, or other things to ensure your comfort.

Alternatives to Participation: Participation in this study is voluntary. You are free to withdraw or discontinue the participation.

Collected Data: The following data is collected during the study and stored pseudonymously:

- Audio recording of the whole interview (to be transcribed and coded later)
- Notes taken by the principal investigator by hand and on their computer
- Any information provided in the demographic questionnaire

Cost and Compensation: Participation in this study will involve no cost to you. There will be snacks and drinks for you during and after the participation.

Confidentiality: All information collected during the study period will be kept strictly confidential. You will be identified through anonymous identification numbers. No publications or reports from this project will include identifying information on any participant.

If you agree to join this study, please sign your name below.

□ I have read and understood the information on this form.

□ I have had the information on this form explained to me.

□ Optional: I agree to be contacted for potential follow-up studies

Participant's Name	Participant's Signature	Date
	Principal Investigator	Date

Figure A.1: The informed consent form that was used in our study.

  - If yes: What do you understand to be a dark pattern?
  - If no: What do you think that could be?

At this point, the participant was introduced to deceptive patterns and interacted with the mockups. After each mockup, they answered the following questions:

- What did you notice during the interaction?
- Have you ever encountered something similar?
- How safe do you feel while interacting with it?

After both mockups and the following questions were done, the following questions were asked:

- Does this remind you of any other manipulations you have encountered?
  - If so, which?
- How do you react in situations in which you encounter such manipulations?
- Can you recall a situation where you avoided an interaction, website, or app because of a deceptive pattern?
- Do you have any special workarounds for such situations?
  - If yes: Can you tell me more about that?
  - If no: Have you ever thought about doing something against that?
- What do you think might help you in situations like that?
- Do you think you notice most manipulation attempts you encounter?
- Did you ever fall for a deceptive pattern in a way that caused you measurable harm?
- How do you feel interacting with deceptive patterns?
- Do you think that deceptive patterns influence your behavior online, and if so, how?
- Who do you blame when you fall for a deceptive pattern?

- Especially in the context of social media, have you ever felt isolated because of the problems you have with deceptive patterns or because of your workarounds?
- Optional: What problems or comorbidities related to autism do you struggle with?

Appendix B

Mockups

This appendix presents screenshots from the mockups we presented to our participants.

B.1 Mockup 1: Privacy Settings

Figures B.1, B.2, B.3, and B.4 show the SETTINGS mockup.

B.2 Mockup 2: Ticket Purchase

Figures B.5, B.6, B.7, and B.8 show the TICKET SALE mockup.

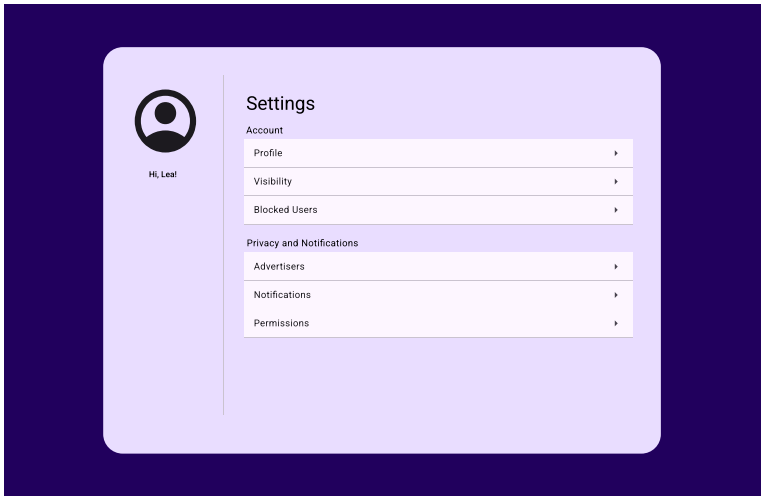

Figure B.1: Landing page of the privacy settings mockup. The bottom 3 menu points (Advertisers, Notifications, and Permissions) were selectable.

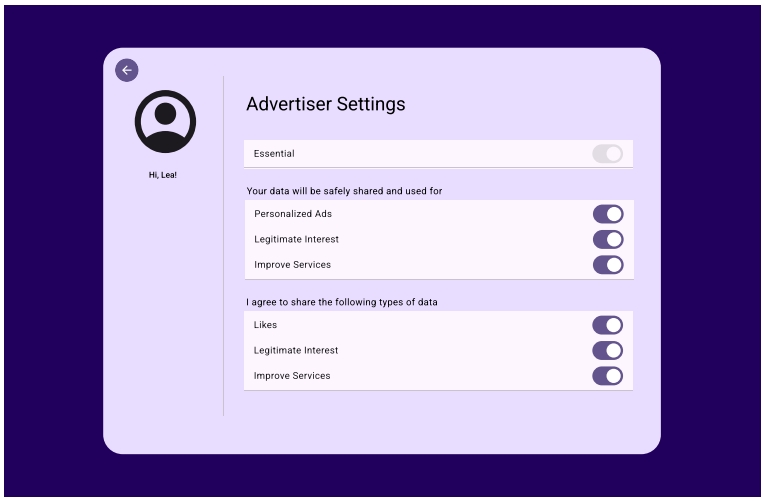

Figure B.2: The advertiser settings of the privacy settings mockup. The switch corresponding to "Essential" was grayed out and not clickable. All settings were activated by default.

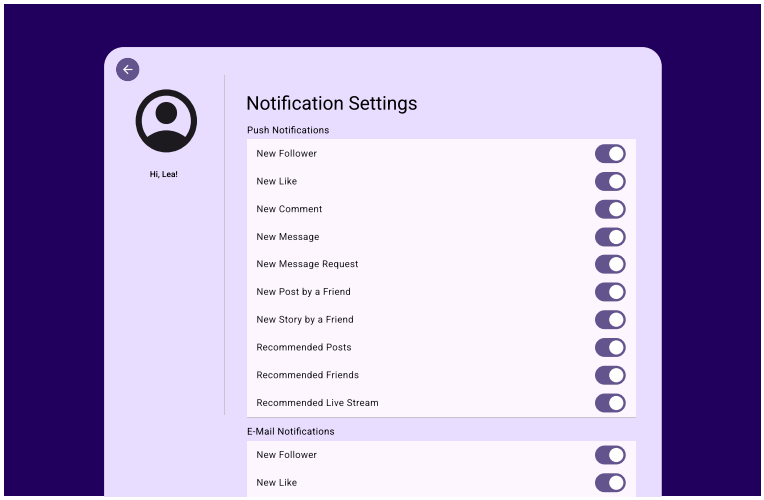

Figure B.3: The notification settings of the privacy settings mockup. This consists of a long list of individual and very granular notification settings for push- and e-mail notifications, all of which are activated by default. The lists are the same, and the mockup was scrollable to reach its bottom.

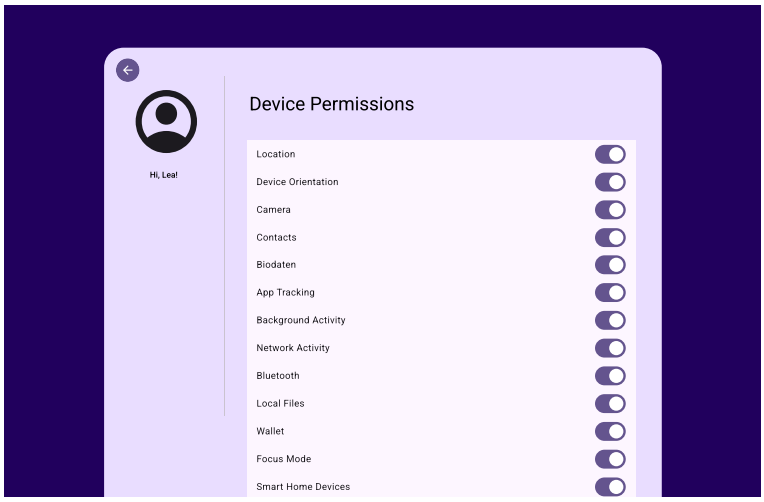

Figure B.4: The device permission settings of the privacy settings mockup. Similar to the notification settings, consists of a long list of very granular and, in this case, potentially unnecessary settings, all of which are activated by default.

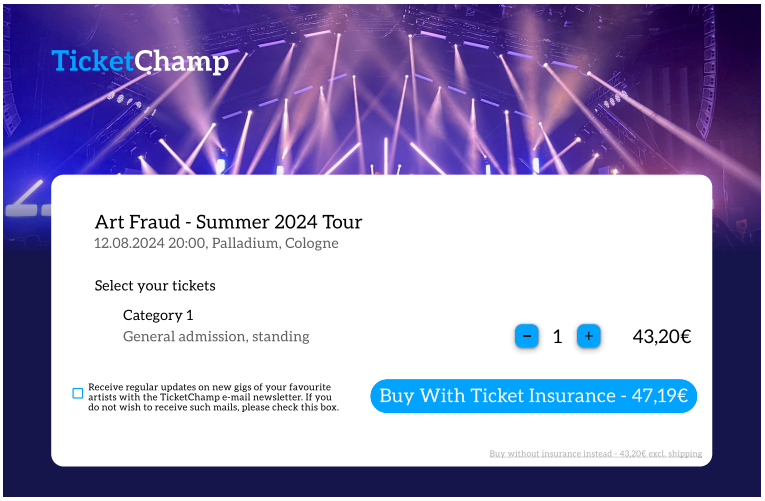

Figure B.5: The landing page of the ticket sale mockup. Participants could choose to tick the box to opt out of the newsletter. They were also offered to either buy the ticket with or without insurance, buying it with insurance with the big button and without insurance with the small gray text in the bottom right corner.

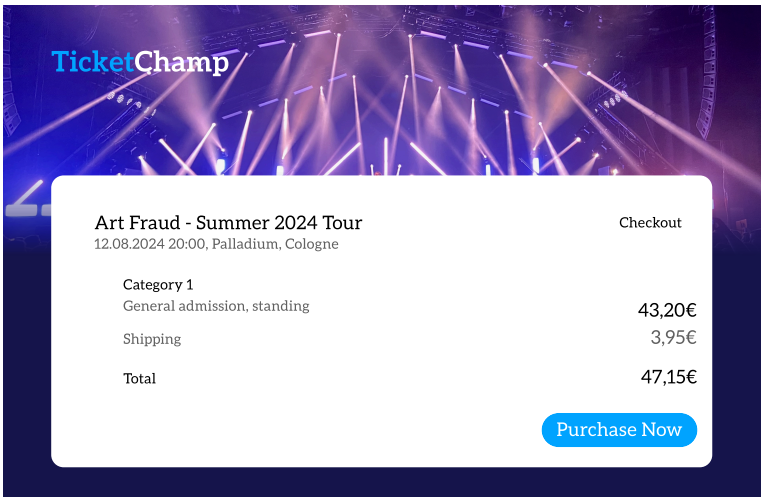

Figure B.6: The checkout page of the ticket sale mockup. This was shown if a participant chose the smaller text, i.e., chose not to buy the insurance. In this step, the shipping cost was disclosed without being mentioned previously.

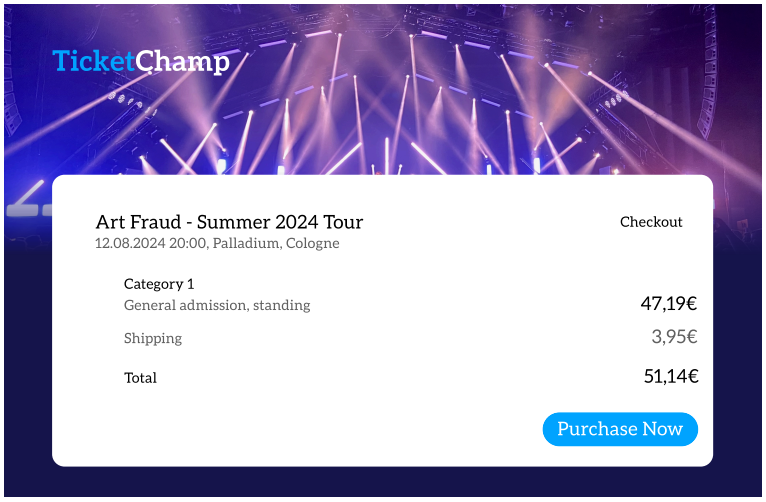

Figure B.7: The alternative checkout page of the ticket sale mockup. This version was shown if a participant chose the big blue button, i.e., chose to buy the ticket with insurance. Again, the previously unmentioned shipping fee was added here.

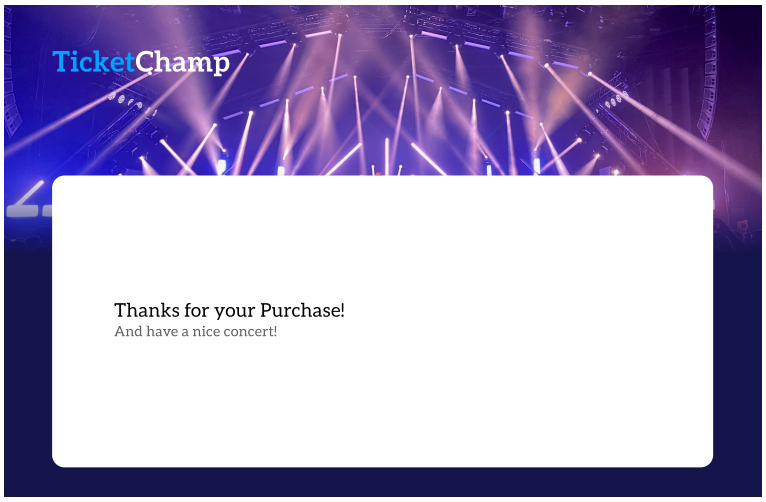

Figure B.8: The final page of the ticket sale mockup was to signify to participants that they were done with the purchase.

Appendix C

Code Book

This appendix presents the themes and subthemes from our thematic analysis. The brackets behind the themes denote the number of occurrences.

- Use Cases (75)
  - About specific social networks
  - Staying on known paths
  - Use "in the moment"
  - Entertainment needs vs social needs
- Mitigation Strategies and Workarounds (114)
  - Emotional regulation and coping strategies
  - Plugins
  - Deactivating Notifications
  - Using the service differently
  - Attentive use
  - App timers/Time restrictions
  - Hiding algorithmic suggestions
  - Dedicated usage modes
  - Has none (or claims to)
  - Exploiting or using bugs or similar
  - Gathering information beforehand

  - Trying to ignore deceptive patterns and problems

- What would help (47)
  - Regulation/Standardisation
  - Media literacy
  - Accepting and moving on
  - Forcing behavior
  - Various technical solutions
- Consequences and Emotional Fallout (229)
  - Unspecified negative sentiments
  - Hating change
  - DPs feel insulting or dehumanizing
  - Stress vs overwhelm
  - Frustration
  - Isolation by missing out on updates and memes
  - DPs as bonding material
  - Loss of autonomy
  - Annoyed
  - Not really affected
  - Feels in control
  - Breaking down long-term
  - Tricks "in the dark"/Manipulation iceberg
  - Unwell feeling
  - Normalization
  - Accepting minor losses or risk thereof
- Resource Management (143)
  - Resignation or spite
  - Thresholds and barriers
  - Environment factors
  - Time
  - Energy
  - Resources vs comfort

  - Unfair
  - Ignoring intangible consequences
- Changed Behavior (144)
  - Stopping to use a service
  - Stopping to try out new services
  - Procrastination of real-life things
  - App setup work overhead
  - Heightened awareness in high-stakes situations
  - Pushing through interfaces
  - Gaming the algorithm
  - Long-term mistrust
  - Avoidance
  - Not caring about data or privacy
- Blame (43)
  - Website
  - Self
  - Structural
  - Dependent on type of DP
- Shadyness Signifiers (17)
  - Corporate feeling
  - General vibe
  - Data leeching
  - Missing information

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