Towards a Second Wave of Manipulative Design Research: Methodological Challenges of Studying the Effects of Manipulative Designs on Users

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Abstract

The pervasiveness of manipulative designs — i.e. dark patterns — in everyday applications and their impact on users is raising concerns among policymakers and scholars. These designs use techniques to nudge users to make decisions that they would not make if fully informed, causing them various types of harm. Yet, the ubiquitous mechanisms used are intertwined with other platform affordances, which makes it hard for users to perceive the manipulation. While understanding the effects of manipulative designs on users is key to the design of protective countermeasures, the academic community faces several methodological challenges. How can we investigate the effects of what is often not perceived by the users? In this paper, we reflect on the challenges inherent to the study of manipulative designs through three case studies. We describe key challenges and discuss methodological insights relevant to the empirical study of manipulative designs.

Keywords

dark patterns, user experience design, deceptive design, manipulative design, ethics, consumer protection

1. Introduction

Manipulative designs — i.e., dark patterns[1] — are design interface elements that try to steer, coerce, or manipulate users into decisions that, if well informed, they would not make [2]. Manipulative designs are a rising concern, given their potential impact and pervasiveness [3]. The issue has gained the attention of policymakers, who initiated actions to regulate their use [4, 5]. In academia, a nascent body of research is investigating the relationship between users and these designs [6, 7, 8, 9, 10, 11, 12]. While the body of knowledge on manipulative designs and their effects on users is growing, this highly context-dependent research problem entails specific methodological challenges — e.g., around validity [9, 10] and generalizability [13, 8, 14]. First, manipulative designs are embedded in a broader technological ecosystem

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[1]The research community studies this phenomenon using a variety of labels, including deceptive design, sludges, manipulative designs, and predominantly, "dark patterns." We use the term "manipulative designs", embracing the critics on the term "dark patterns" and following the ACM recommendations on diversity and inclusion [1]

that overlaps with other kinds of effects. For instance, where does the impact of the algorithm stop, and where does the one of the manipulative design elements start? The existence of highly contextual effects — i.e. the trade-offs that users make depend on the time, place, or context of the interaction — multiplies the potential factors at play in the effect of manipulative designs, increasing the challenges for researchers. Research is highly limited in this regard by the homogeneity of the contexts studied, the population sampled, and the methods used. A wide range of studies have been conducted in the context of cookie banners, but research on other contexts is lacking [15]. Similarly, the analysis of user interfaces by the researchers, without user involvement, has been the dominant research method used to date. Gray et al. [15] identified some of these challenges and voiced a need for more methods and reflections. We identify the following challenges inherent to the study of the effects of manipulative designs:

1. Contextual elements play a more significant role in manipulative designs, which are intertwined with other platform affordances and their impact is mediated by individual, technical, physical, temporal, social, and task-related contextual factors.
2. These effects and potential harms of manipulative designs can take several forms and are temporally situated.
3. Online manipulation is a phenomenon that (some) users are likely to be unaware of, and yet impact and harm on users is the main consequence.
4. Specific populations might be more impacted by manipulative designs and they are likely to be harder-to-reach when conducting research on technology

Hence, we argue for the necessity to assess the methodological implications underlying the study of manipulative designs to advance the field and support practitioners and policymakers with a solid body of knowledge to inform countermeasures. In this paper, we articulate the methodological challenges inherent to the study of online manipulation, through a brief review of the limitations of prior work. We illustrate these challenges through three case studies, reflecting on how each method we used embodied these challenges. We discuss these challenges with regards to the methodological choices we make. This paper contributes to methodological reflexivity in the context of manipulative design research, in particular when studying the effects of manipulative designs on users. We open a conversation in the community about how to creatively overcome methodological challenges inherent to manipulative design research.

2. Challenges underlying the study of manipulative designs

In this section, we gather the main methodological limitations and challenges discussed by scholars in research papers on manipulative designs. Various methods from diverse perspectives — legal [16, 17], design [18, 19, 20, 21], or computer sciences [22, 2] — have been used to study manipulative designs, yet methods to understand the relationship between users and these designs are still limited [15]. A common method uses content analysis to evaluate the presence of manipulative designs on interfaces, but does not necessarily involve end-users. As Gray et al. [15] explains, although the community is equipped with some exploratory methods and experimental protocols, there is a need for *"more specific methodological guidance to support the next wave of scholarship"* (p.192). Without aiming to be exhaustive, we provide a brief overview

of the challenges, limitations, and trade-offs reported by authors of empirical studies on manipulative designs involving users. We did not consider studies whose primary focus is on the design process, the existence of manipulative designs on a platform, or the characteristics of manipulative designs without considering users. Although the objectives of each study vary, it is relevant to compile the limitations reported by the authors to understand the challenges researchers are navigating in the study of the effect of manipulative designs on users.

Out of 79 studies on manipulative designs reviewed by Gray et al. [15], a majority (45%) evaluated manipulative elements in user interfaces through content analysis without the involvement of the users. Empirical studies focusing on the effects of dark patterns on users were usually done through experiments (n=14) investigating the effects of particular design elements on user behavior [23, 9, 24, 25] or surveys (n=10) to gather users' attitudes, opinions, and reported behaviour [8, 26]. Other traditional methods such as observations (n=6) [27, 28, 26] and interviews (n=6) [29, 11] were used in prior work but to a lesser extent. We argue that the community needs more empirical research to better understand the experiences of online manipulation and the users' ecologies to inform design interventions. We review the methodological challenges reported in empirical studies on manipulative designs.

2.1. Translational Contexts and Validity Challenges

One of the biggest challenges in the study of manipulative designs is the search for ecological validity, to account for the situatedness of human action and contingency on contextual factors. Indeed, the specificity of every setting and context limits the transferability of insights into the effects of manipulative design. Bielova et al. [9] explained how their findings on cookie consent banners are hard to translate to other banners. The authors acknowledged their setting might be different from the usual settings in which users interact with consent banners, including the attentional limitations that users experience. The fact that fake experimental settings do not embody the same consequences that the actual interaction on the user experience is a known limitation [30]. With manipulative designs, Tuncer et al. [24] warn readers to take their results cautiously because the simulated e-commerce website used to test scarcity cues did not incorporate real financial incentives. Similar limitations are reported by van Nimwegen and de Wit [23]. To overcome this, Utz et al. [13] partnered with a company to study manipulative designs in a real context and Nouwens et al. [14] used a browser extension to test the manipulative designs in participants' everyday interactions. Moser et al. [31] envision industrial partnerships as a necessary step for future research on manipulative designs, given the complexity of the topic. We share some of their vision that underlies why ecological validity is key on this topic; while companies have the resources and real settings to test manipulative strategies on users as "attackers", researchers' resources as "defenders" are much more limited.

An additional problem arising from the dependency on context is the dissociation between the effects of manipulative designs and the rest of the platform's affordances. Bongard-Blanchy et al. [8] explained that when asked about felt manipulation, participants mentioned other intertwined affordances instead. Therefore, several studies acknowledge their results to be valid only in the specific contexts and with the specific manipulative designs studied [9, 32, 23, 31]

2.2. Populations and Sampling

Another reported limitation relates to the population and sample strategies used. Many studies on manipulative designs use crowdsourcing platforms to collect data on users. While these systems have some merits in some contexts, their use in the context of online manipulation might decrease the study's validity and lead to inconclusive results. Berens et al. [10] explained that by trusting the study, crowdsourced participants would increase the acceptance of cookies. Many studies report sampling limitations. While trying to sample a broad range of participants' profiles, Bongard-Blanchy et al. [8] and van Nimwegen and de Wit [23] fell short in including older adults. Avolicino et al. [27] even presented their oldest cohort as "above 35 years old". Several studies acknowledge limitations related to convenience samplings — via crowdsourcing platfoms or recruitment within universities – as leading to the inclusion of an overall younger and more tech-savvy population, even when the researchers aimed for generalisation [10, 8, 31]. Noteworthily, with the few aforementioned exceptions that included some diversity in age ranges, the set of literature that includes the analysis of other variables as mediators of the effects of manipulative designs is scarce Luguri and Strahilevitz [28], Bongard-Blanchy et al. [8], van Nimwegen and de Wit [23], Avolicino et al. [27]; and none of these included any population that embody vulnerabilities, which is often labelled as "hard-to-reach" Shaghaghi et al. [33].

2.3. Observing the Harm versus Understanding the Harm

Many methodological challenges in our subfield seem to arise from the quest for generalizability, as a major part of the community adheres to quantitative research approaches. Yet it is worth reflecting on whether that path is an adequate starting point and which research objectives are meaningful. The literature review by Gray et al. [15] shows a wide use of qualitative methods from a designerly perspective. Examples of qualitative methods to understand users include Maier and Harr [7]'s focus group study, providing first insights into the perceptions of manipulative designs on users. Gray et al. [6] elicited the notion of temporality of felt manipulation via card sorting methods. Chaudhary et al. [11] diaries and interviews data unveiled the nuances embodied in the interactation with capture attention deceptive patterns. While these studies do not seek generalisability, they inform specific aspects of the relationship between users and manipulative designs in ways other research designs do not. Borrowing science and technology studies terminology, manipulative designs are relational [34]: they are only perceived by the user when there is a negative impact. Gray et al. [3] already pointed out this phenomenon by defining manipulative designs as a mismatch between user expectations and the interface. Thus, many of the methodological challenges associated with this relationality.

3. Case Studies

We reflect on the challenges inherent to the study of manipulative designs, by reporting on three methodological approaches we have used. We describe key challenges and methodological insights leveraging their strengths and acknowledging their limitations given the specific nature of manipulative designs. These cases are not exhaustive and their selection relates to our research experiences. Our analysis emerges from a willingness to examine the choices we

knowingly or unknowingly make when studying manipulative designs. This analysis can be a useful resource for design scholars toward more reflexive methodological choices.

Looking back at our work, we started our empirical explorations on the experience of manipulative designs by using traditional research methods like interviews. These felt like a natural first step in exploring the topic from the users' perspective, with the opportunity to collect rich accounts of experiences and understand the contextual aspects involved. However, we quickly faced dilemmas around how to approach the topic with users, due to the sensitivity of the matter and their potential vulnerability, but also the exploration of an issue they might not be fully aware of. How to discuss the effects of something interviewees do not perceive? Is it even possible without prompting awareness, or is there an adequate amount of prompting? What are the implications - on the data and the participants - of bringing online manipulation to awareness through our studies? These questions led us to experiment with specific interview techniques, which we reflect on below. After these studies, we turned to other disciplines beyond social sciences, seeking different methodological lenses to approach online manipulation with users. Design methods and their underlying epistemologies appeared worthwhile in this regard, as reflected in our third case study on the use of magic machines workshops.

3.1. Critical Incidents

Critical incidents is an interview technique that explores moments in which the user has experienced a significant "problem" or an "incident" to understand the context of a particular phenomenon [35]. This technique is helpful for interviewees to be situated in a specific context.

We conducted interviews using the critical incidents technique to understand felt manipulation in the presence of manipulative designs online. We asked young adults at social exclusion risk (N=22) to describe situations in which *they did something they did not want to do online; they felt deceived or, ultimately, manipulated.* By using the laddering technique to investigate these incidents, we explored real scenarios in which manipulative designs impacted our participants. We employed a similar protocol in a study with teenagers (N=6).

Regarding manipulative designs, critical incidents are useful to understand felt manipulation as a proxy of the effects of manipulative designs, given their relationality [6]. Indeed, users exposed to manipulative designs evaluated their severity in relation to potential harm [7]. Some advantages of this method to study manipulative designs have been presented as a limitation in other methods, namely: (i) understanding the episodes of manipulation that have caused the most harm (from the users' viewpoint), (ii) studying potentially unfrequent events (depending on the internet use and type of use), (iii) gaining insights into contextual factors. Starting from the impact of the "critical incident", researchers can trace back elements of the interaction with manipulative designs. Considering how context-dependent these are, using a method that leverages contextuality is an asset. Our study with teenagers illustrates it: by discussing a situation that caused a participant emotional distress, we elicited a complex sneaking technique that added levels of urgency in e-commerce and caused financial impact.

Some limitations of the critical incidents technique are common to interview methods in general. They rely on interviewee's memory and tend to highlight the most prominent or recent experiences. The interview guide is likely to prompt users on a topic. Factors of social desirability might also play a role, with either a desire to provide the interviewer with the

information they seem to expect or to silence some experiences to avoid the embarrassment of reporting having been manipulated online. For instance, a teenager explained he experienced nagging techniques with pop-ups having a hidden close button (X) while watching movies online. He sometimes "failed" to close the pop-up and has to "endure" the forced advertisement because *he* failed. He said he does act to cope with it and should *"learn to pay more attention the next time"*. Feelings of embarrassment, self-blame, and social desirability are frequently triggered by online manipulation. Reporting that one has been manipulated is sensitive, even more so when invited to report the most 'critical instances' and when the research focuses on non-normative collectives and populations in situations of vulnerability.

3.2. Interviews with Probes

The use of probes is a common method to gain insights into a particular phenomenon by showing artefacts to participants to react and reflect on. For manipulative designs, probes have been proven useful given the subtlety of the mechanisms that make users unaware of the influence. Maier and Harr [7] explored students' perceptions by showing them manipulative designs during a focus group. Bongard-Blanchy et al. [8] used fake interfaces in a survey to understand users' perceptions. Similar to Bhoot et al. [26], Di Geronimo et al. [36] exposed participants to manipulative designs to analyse their "blindness" towards these elements.

As a follow-up of our study described in 3.1, we used interface screenshots including manipulative designs as probes to gain insights into the relationship between participants and manipulative designs. We selected the interfaces by contexts according to the ontology of manipulative designs by Gray et al. [37] and to represent a variety of mainstream platforms and manipulative elements. They were shown simultaneously on a digital board: *"I provide you with the following images. Please have a look and tell me what you think"*. As participants reacted to the probes, the interviewer followed up with multiple "why?" questions to elicit participants' awareness (or lack of) of manipulation. The interviewer then asked "What do you do when you encounter such an interface?" (to understand the behavior and potential vulnerability to the manipulative element) and "What happens after?" (to understand the potential harms).

The use of probes allows participants to reflect on the effects of those interfaces, by commenting on the specific context they find them in and in which specific ways they interact with these elements, sometimes in other contexts. This has been useful to document new contexts of online manipulation affecting specific groups. For instance, we showed teenagers e-commerce interfaces with nagging — continuously asking the user to make decisions they already took [37]— and changing the hierarchy of choice architecture [37]— but they recognised the strategy as very common in other contexts closer to their routines — e.g., offline fast-food kiosks and pirated-content websites. Without showing the probes and relying on critical incidents, we might not have elicited these contexts that add new knowledge to the community. Probes are also helpful with populations in which psychological harm may arise easily (e.g., low self-esteem). We observed how low-educated young adults experienced nervousness when asked about online manipulation using the critical incident technique. The subtlety of these mechanisms made participants feel embarrassed: a researcher was asking them about things they had not considered until that moment. Using probes of manipulative designs changed that feeling and created relief, as they recognised almost all the interfaces presented.

Only relying on probes of manipulative designs has some important limitations. Directly showing manipulative designs to participants can have a priming effect, possibly leading to participants not reporting their actual encounters or perceptions about these patterns. Thus, the researcher's ability to avoid priming into the aspects of the interface that can be manipulative is key if the intention is to elicit perceptions of manipulative designs. We thus suggested combining it with another method to triangulate data.

3.3. Magic Machines Workshops

Magic machines workshops [38] are speculative co-creation methods, which place the participants in a "magical context" so they do not face the hurdles of talking about technology, while expressing their needs freely. This method can be used to understand users' experiences with manipulative designs. We conducted three "magic machines" workshops with older adults (N=31) to understand their experiences with online manipulation. As a warm-up activity, the participants introduced themselves briefly by sharing a superpower they would like to have. In the setting stage, we invited participants to recall moments in which they were manipulated online. We mentioned different contexts and specific examples of felt manipulation: *"When was the last time you were on internet/phone and did something you did not want to, did not expect or perhaps even regretted? (...) Maybe you gave your privacy unintentionally? Subscribing for an unexpected service or newsletter (...) you could spend more money than you expected, paying unexpected extra fees or buying something in a rush you didn't really need. (...)"*

We used sentence completion [39] to facilitate a spontaneous elicitation of an experience of manipulation: *"The last time I did something I did not want to or did not initially intend to do on the internet was... because..."* Participants were then asked to create a magic machine to protect themselves from the manipulative experience they reported, using craft material. The instructions emphasised that participants are in control and there are no limits to their imagination. Participants are invited to explain their machines and answer questions.

In the context of manipulative designs, the low-tech and seemingly not-so-serious aspects of the method helped avoid the hurdles of interacting with a platform and, more broadly, talking about technology, which could be problematic for populations with less self-efficacy levels. As the method aims to empower users, participants are more at ease and less prone to social desirability biases. We aimed to shift the power dynamics and bring the magical atmosphere as early as the warm-up, asking them to choose a superpower. With older adults, we observed how the session's dynamic helped them talk about their experiences. Participants created a magic machine that protects them on their own terms. Through this group activity, participants recognised themselves in other stories and provide their perspectives.

This technique, applied as a user research method, tend to reveal major issues encountered by participants when interacting with manipulative designs, rather than specific issues at the interaction level. On some occasions, participants talk about usability problems rather than the effects of manipulation. For this reason, the onboarding of participants and prompt into the problem is key. While introducing manipulation as part of the workshop instructions might look like a limitation, we aimed to situate participants into moments of felt manipulation (and avoid having them build machines to overcome off-topic usability-related issues).

4. Towards a Second Wave of Manipulative Design Research

The evolution in the discourse on manipulative designs around 2018 [40] suggests the existence of a first wave of methodological approaches in our field. Researchers initially focused on understanding what manipulative designs were, how they were used, and where they were found; after all, studying the effect of a phenomenon requires first scoping and defining it. Therefore, the first wave of papers set the ground with analyses of artefacts [41, 42], taxonomies [3, 43, 44, 45], and first empirical explorations with users [36, 7]. Contingent with the growth in the number of studies in recent years [15], we argue for a natural evolution in the field towards a second wave of research approaches. Based on the challenges to the study of manipulative designs effects on users, we argue that this second wave could flourish by striving for:

Adopting a systemic view by using ecologically valid methods studying manipulative design in-situ, in a variety of contexts. The effects and harms of manipulative designs are situated and contextual and call for in-situ approaches and the documentation of a wider range of contexts of online manipulation, beyond the widely studied cookie banners, e-commerce, and social media contexts. In our case studies, we gave participants the freedom to choose the context of manipulation they wished to comment on, either by leaving it entirely open (critical incidents and magic machines) or by offering a variety of choices (probes). This made sense when considering manipulative designs from a user- or harm-centered perspective. We want users to talk about their lived experiences, so inquiring about a context/platform they do not use is irrelevant. Sometimes, researchers will prefer to narrow down a study to a specific context and population, which is an equally valuable endeavor. This aspect also calls for a systemic view to understand people's ecologies. Beyond mentioning widely known field methods drawing from ethnographic or sociological approaches, our case studies brought reflections on the engagement of the researcher in the topic. For instance, the prior knowledge required to conduct and analyse the data of studies on manipulative designs. To prepare for our interviews, we got acquainted with the platforms that embedded manipulative designs. It felt essential to engage in inquiry and to know how to disentangle elements in the subsequent analysis.

Long-term evaluation paradigms, to understand the antecedents, correlates, and consequences incurred by manipulative designs. The understanding of the antecedents, correlates, and consequences of manipulative designs calls for a temporal perspective in our approaches, beyond the main paradigm focusing on momentary interactions. While not all methods in our cases afforded to talk about antecedents or long-term effects, the critical incidents or magic machines used a retrospective approach for participants to vividly recall and discuss these aspects. Using probes or fake experimental material is less likely to inform temporal aspects of the relation between users and manipulative designs.

Conscious methodological choices around the "unawareness" of online manipulation, which is often pervasive and subtle. Online manipulation is a phenomenon that (some) users are likely to be unaware of. This potential unawareness is a key challenge, which calls for a reflective and creative approach to research. Related fields face similar challenges, in particular usable security and privacy [46, 47]. On the one hand, we can choose to prompt the

participants about the specific context of manipulation. This approach has been dominant in the qualitative inquiries proposed by our community so far, and we do not deny its merits in investigating specific research questions. In our case studies, we initially tried hard to resist prompting participants to not influence the types of experiences they would share. In our instructions, we used the harms as an entry point and proxy for detecting and framing online manipulation, e.g., *When is the last time you did something you did not want to or did not initially intend to do on the internet?*. While successful to some extent, our pilot tests have shown that the ambiguity of this prompt created confusion or led to off-topics conversations (e.g., on usability-related issues), which would unethically waste the time of the participants and the researchers alike. Eventually, we added examples to support framing the topic of the interviews or workshop sessions. In the probe study, we did not label the screenshots of interfaces as manipulative, and used the laddering technique to unveil the awareness of manipulation.

At times, prompting the participants on the topic of manipulative designs triggered negative feelings of embarrassment, shame, or guilt. Imagine how uncomfortable it can be to realise during an interview that you have been manipulated regularly without being aware? How can we acknowledge the sensitivity of this topic and "prompt" with care? On the other hand, attempts to study manipulative designs without bringing them to the awareness of the participants were mostly made in experimental settings [9, 10, 24], and often reflected various uses of deception as a research mechanism. Here again, various ethical implications are at stake, and we will discuss in section 4.1.4 why they are more salient in the context of manipulative designs. In other domains, the "invisible" or "intimate" aspects that are hardly accessible to the researcher can be researched through first-person methodologies like auto-ethnographies [48, 49]. While it can be used to address some research questions to manipulative designs, these approaches do not support overcoming the "unawareness" challenge nor is the researcher usually representative of populations likely to be more vulnerable to online manipulation.

Caring about the populations most impacted by online manipulation. Due to their nature, specific populations might be more impacted by manipulative designs and likely more vulnerable and harder to reach when researching technology. Our case studies all engaged with populations at risk of vulnerability, which led to invaluable insights into the experience of manipulation that prior work did not address. We argue for a focus on care to conduct research that goes beyond observing generalisable causes. Some methods can help create a nuanced knowledge of the impacts rather than solely proving a change in behaviour caused by manipulative designs. To generate this knowledge, the study of manipulative designs not only requires knowledge of the contexts but also interest and sensitivity towards the populations that are more vulnerable: they are more likely to be impacted and with fewer resources to recover from those impacts. The choice of methods should account for the more vulnerable populations because they are more impacted. As an illustration, while deception studies are worthwhile in many domains related to usable security (e.g., phishing interventions [50]), deception also entails the risk of harming research participants - a consideration that cannot be avoided when working with vulnerable populations and "practicing what we preach". Adopting the posture of a sensitive researcher [51], making efforts to include the voices of hard-to-reach populations, and seeking methodologies that balance the power between researchers and participants (e.g., magic machines workshops) should be key elements informing our methodological approaches.

5. Conclusive remarks

Naturally, some of these considerations are not novel and resonate with prior work in the user experience domain [30], in particular, the situatedness of experiences [52] or the need for long-term evaluation paradigms [53]. Others are particularly salient in research on manipulative designs, like unawareness or vulnerability. We hope these considerations can inspire and support designers in making instrumental judgments [54] about the methods used and the value of the insights they bring forth. In future work, we encourage the community to leverage the interdisciplinary strengths of HCI, combining forces and drawing inspiration from social sciences, design, computer sciences, and legal sciences – to only name a few relevant disciplines. We also encourage the community to rethink how companies take part in our research endeavors and to make them active actors in investigating the effects of manipulative designs over time, in situated contexts, and with special care to foster the empowerment of vulnerable populations. Naturally, there is no one-size-fits-all approach to overcome all the challenges we shed light on. Reflecting on these considerations and making them transparent is an important step forward. While limited, the reflections we shared illustrate how to think of research trade-offs as well as our positionality as researchers in this field. By caring and tackling the uneasy, by making efforts to include hard-to-reach populations and acknowledging the vulnerability aspects involved, we can create a more robust body of knowledge on the effects of manipulative designs on users.

Acknowledgments

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