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Breaking the chain of deception

A multi-stakeholder perspective on deceptive advertising and the potential of blockchain as a solution

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CHAPTER 5

Can Blockchain-Based Authenticity Disclosures Increase Consumer Trust in Online Advertising?

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ABSTRACT

Fake advertising is a type of commercial disinformation which has profound negative implications for the online advertising ecosystem. However, it is often ignored in societal discourse and scientific research. While disinformation labelling literature suggests fact-checking labels to be an effective solution to minimise the effects of disinformation, they are not always trusted by users and may decrease belief in accurate information. In two studies conducted in different contexts (Instagram and Google search ads), this paper investigates whether using blockchain-based disclosures of advertising authenticity could help increase consumer perceptions of ad and brand credibility. It also examines whether such authenticity disclosures lead to more favourable attitudes. The results of both studies show that this is not the case: blockchain-based authenticity disclosures do not positively affect credibility or attitudes. However, further analyses of different disclosure communication strategies show that disclosures communicating the ad source without mentioning the use of blockchain are perceived as more understandable, translating to positive ad- and brand-related effects. These findings have significant implications for existing blockchain-based solutions that guarantee online information integrity and product authenticity, and for future implementation of the EU's Digital Product Passports.

Fake advertising – which we define as *any advertising that attempts to deceive a consumer into purchasing fraudulent or non-existent products or services, or sharing sensitive personal data for malicious purposes, usually by impersonating a legitimate brand or influential person* – is a critical problem in the current digital landscape. It affects all stakeholders in the online advertising ecosystem and can take many forms, including brand impersonation, celebrity baits, phishing attacks, or scam ads for counterfeit products, services, or investment schemes (see Chapter 3). For example, a recent report (Proofpoint, 2024) found that brand impersonation phishing attacks are a significant concern, with 68 million messages impersonating Microsoft *alone* sent in 2023. This problem affects not only technological brands but also major retail and service companies, such as Amazon and DHL. Furthermore, fake advertising affects individuals: several media personalities have been used in ads to endorse fake products, services and investment schemes without their consent, resulting in severe financial losses for the victims and reputation damage for the celebrities (Action Fraud, 2021; Skiba & Ianzito, 2021).

Social media scams seem to be the real culprit: The Federal Trade Commission (FTC) reported that from the beginning of 2021 to mid-2023, consumers lost \$2.7 billion to scams that started on social media (Fletcher, 2023). In the first six months of 2023, 44% of all reports concerned losses due to advertising. These ads mainly originated on Facebook (60%) and Instagram (24%) but also often appear in sponsored search engine results (Agius, 2024). This problem is further exacerbated by the recent popularity of generative artificial intelligence (AI) tools, which help malicious actors create high-quality realistic, fraudulent or imitated image, text and video content to fool their victims (Proofpoint, 2024) and make fake advertising more challenging to identify (Köbis et al., 2021; Skiba & Ianzito, 2021).

While anecdotal evidence for the prevalence of fake advertising is plenty (McEntee, 2023; Porter, 2023; Skiba & Ianzito, 2021), little academic research has been dedicated to this topic (e.g., Alzghoul et al., 2024; Banerjee et al., 2023), and mainly in the context of fake customer reviews (e.g., Anderson & Simester, 2014; Luca & Zervas, 2016). Furthermore, few studies have examined strategies for addressing deception in advertising, either by helping the consumer identify it (Banerjee et al., 2023; Karpinska-Krakowiak & Eisend, 2024) or by detecting it technologically (Alzghoul et al., 2024; Sharifi et al.,

2011). We address this gap by investigating an alternative solution to fake advertising: labelling authentic advertising.

Content labels warning users about the veracity of online (news) content are already widely used to combat disinformation on social media and have been studied extensively (e.g., Morrow et al., 2022; N. Walter et al., 2020). More recently, digital platforms like Google and Instagram have also introduced labels for promotional content, providing users with additional metadata on content sources, including sources of advertising (Google Search Help, n.d.; Instagram Help Centre, n.d.). However, research on ad labelling has been primarily concerned with sponsorship disclosures in social media advertising (Eisend et al., 2020), with few studies examining the impact of ad labelling in other contexts (e.g., search engine ads, Edelman & Gilchrist, 2012; deepfake ads, Karpinska-Krakowiak & Eisend, 2024). Furthermore, while labelling disinformation is generally effective at mitigating the adverse effects of such content (e.g., Koch et al., 2023; N. Walter et al., 2020), it can also reduce belief in accurate information (Clayton et al., 2020; Freeze et al., 2021). Therefore, we approach the issue from a different direction and investigate whether and how disclosing the authenticity of legitimate online ads could signal their credibility.

One problem is that content labels are not always perceived as trustworthy because their source and labelling criteria remain unknown (Ardèvol-Abreu et al., 2020): blockchain technology can help to avoid this issue. Blockchain's design ensures that the data stored on it is resistant to misuse while also providing an audit trail showing when, where and by whom data was created, and how it has changed over time (Yun & Strycharz, 2023). Using blockchain to disclose advertising authenticity could increase consumer perceptions of ad credibility by providing technological assurance that it came from a legitimate source. Blockchain-based disclosures are already widely used in practice to verify product sustainability claims, increase supply chain transparency, and provide certificates of authenticity for luxury goods (e.g., Aura Blockchain Consortium: Aura Blockchain Consortium, 2023a; Provenance: Herzberg, 2015). Furthermore, blockchain's capability for secure, tamperproof, and transparent data recording means that it is likely to be a key technology behind the European Union's (EU) Digital Product Passports (DPPs; Kumar, 2023). Yet, despite their relevance, no research has tested the effectiveness of such blockchain-based guarantees of authenticity for brands and consumers.

Applying literature on signalling theory (Connelly et al., 2011) and content labelling (Spradling et al., 2021), this paper explores what and how blockchain-based disclosures should communicate in order to be perceived by users as trustworthy communicators of advertising authenticity. To this end, it tests different disclosure communication strategies to identify those most effective at eliciting perceptions of credibility and positive attitudes.

This study offers several contributions. From a theoretical perspective, it defines the concept of fake advertising, differentiates it from other types of advertising deception, extends the application of signalling theory (Connelly et al., 2011) to the novel context of advertising disclosures, and empirically validates Spradling et al.'s (2021) framework of communication strategies for information labelling. From a societal perspective, it examines whether blockchain-based authenticity disclosures can empower consumers to determine the credibility of online advertising. Furthermore, it addresses fake advertising as one type of disinformation – a critical concern that has detrimental consequences on democratic values and the functioning of democratic societies (Capello, 2022; see also Chapter 3). From a managerial perspective, it offers evidence on the efficacy of using disclosures to communicate additional content source information – such as currently being implemented by Google (Google Search Help, n.d.) and Instagram (Instagram Help Centre, n.d.) – and in particular of using blockchain-based disclosures for communicating trustworthy product-related information. Finally, it offers insights into the effective implementation of new regulatory requirements, namely the DPPs.

LITERATURE REVIEW & THEORETICAL FRAMEWORK

Disinformation and fake online advertising

Disinformation has garnered much academic and societal attention in recent years (e.g., Ardèvol-Abreu et al., 2020; Clayton et al., 2020; Freeze et al., 2021). Yet, fake or deceptive advertising has rarely been examined in this context despite its prevalence and detrimental impact on the industry and consumers (Confiant, 2023; Spark Ninety, 2022). However, when considered as a type of disinformation, deceptive advertising threatens democracy by contributing to growing scepticism towards online information, increasing polarisation, and reducing the credibility of democratic societies (Capello, 2022; see also Chapter 3).

Legally, deceptive advertising refers to advertising with a high “likelihood of making a significant number of people believe something untrue about the product” (Richards, 2021). Definitions of deceptive advertising vary by jurisdiction but are similar in essence. For example, while FTC regulations use the term ‘deceptive advertising’ (Federal Trade Commission Act, 1914; Richards, 2021), the EU (Directive 2006/114/EC) and UK (The Business Protection from Misleading Marketing Regulations 2008) regulations refer to advertising that is ‘misleading’. Nevertheless, these regulations share the crucial aspect that consumers are misled into holding inaccurate product beliefs and making inadequate purchases as a result (Carson, 2010).

Such a broad definition can encompass a variety of tactics used by advertisers to deceive consumers (Your Europe, n.d.). Therefore, it is helpful to differentiate between various forms of deceptive advertising. For example, Ferreira and colleagues (2020) created a taxonomy of brand-related disinformation that can also be applied to deceptive advertising. They categorised disinformation into four types depending on the source (internal or external to the brand) and deception severity (disinformation based on actual events or completely untrue). These dimensions result in four types of brand-related disinformation: internally originating and based on actual events (*The White Lie*), internally originating and completely untrue (*The Pinocchio*), externally originating and based on actual events (*The Phantom*), and externally originating and completely untrue (*The Victim*). In this study, we distinguish between *false* advertising, whereby the brand itself is actively involved in the deception (*The Pinocchio*, *The White Lie*), and *fake* advertising, where an external actor is the creator of disinformation (*The Victim*, *The Phantom*). Furthermore, we categorise instances of fake advertising to include cases where brand-related information might be authentic (i.e., a real ad) but is misused by malicious actors for political or financial gain (e.g., brand impersonation). Likewise, we include advertising that is not strictly fraudulent by definition but, in practice, is predominantly used with malign intentions (e.g., advertising promoting get-rich-quick schemes or using celebrity likenesses without their consent, such as celeb-baits). This conceptualisation of fake advertising forms the focus of this study.

Content labelling disinformation

One way in which internet users can be alerted to the veracity of online information is through content labelling. Defined as “an attachment to a piece of content intended to contextualise that content for the viewer” (Morrow et

al., 2022, p. 1365), content labelling provides internet users with additional information about (product-related) content they are exposed to online. Most relevant for addressing fake advertising is the widely employed labelling of false or misleading information on social media (Morrow et al., 2022).

Generally, research has found warning labels to effectively reduce perceptions of mis-/disinformation accuracy and credibility (Clayton et al., 2020; Koch et al., 2023; N. Walter et al., 2020). Unfortunately, such labels are not without limitations and can suffer from unintended consequences (for a detailed discussion, see Morrow et al., 2022). For instance, generic warnings (Clayton et al., 2020) or incorrect labelling (Freeze et al., 2021) may decrease perceived accuracy of both, false and accurate, information.

Furthermore, while the veracity of social media content is relatively easy to verify through fact-checking, even for untrained laypeople (Allen et al., 2021), this is not the case for online advertising. This is due to an information asymmetry between the advertiser and the consumer where only the advertiser knows the true intentions behind the advertisement (Wiktor & Sanak-Kosmowska, 2021), making it challenging to identify when it is deceptive or fake (Yun & Strycharz, 2023). Therefore, rather than labelling advertisements that are false or misleading, it may be more beneficial to label those that come from a credible source.

A signalling theory perspective on labelling advertising

According to signalling theory, information asymmetry occurs when one party (the informed) has access to private information (positive or negative) that another party (the uninformed) would find useful in making more informed decisions (Connelly et al., 2011). This asymmetry is especially important when the information concerns a person's, product's, or company's quality or intent (Connelly et al., 2011; Stiglitz, 2000). To reduce information asymmetry, the informed party may communicate (favourable) information by sending signals to the uninformed party (Connelly et al., 2011). This usually occurs when the informed party seeks to gain from the actions undertaken by the uninformed party. Likewise, the ignorant party also benefits from the shared information.

Following this logic, brands can use advertising disclosures as a form of content labelling to reduce information asymmetry by sharing additional ad-related information. For example, something as simple as communicating the source of the advertising could signal to the consumer that the ad is

trustworthy. When consumers know the real source behind the ad, they can think more critically about whether this source – and, therefore, its ads – can be trusted. Furthermore, articulating the source behind the ad may signal to the consumer that the brand has nothing to hide and, therefore, can be trusted: it is unlikely that fraudsters would be willing to reveal their identity for fear of legal consequences. This way, brands can signal their credibility, quality, and positive intent, and gain from more positive consumer perceptions. Likewise, consumers benefit from having the additional information to make better-informed purchasing decisions.

While no research has been conducted on reducing information asymmetry in online advertising per se, research on native advertising indicates that consumers perceive an advertisement as more favourable and credible when its commercial intent is transparently communicated (Krouwer et al., 2020; Van Reijmersdal et al., 2023). Therefore, reducing information asymmetry by providing additional ad-related information may positively influence ad credibility and attitudes. In turn, when the advertisement is perceived as credible, it further signals the brand's credibility and reputation (Hussain et al., 2020). Therefore, using disclosures to provide additional ad-related information could lead to positive consequences for the brand, including more positive attitudes, increased purchase intentions, enhanced perceptions of ad and brand credibility, and higher brand loyalty (Hussain et al., 2020; Konuk, 2023; A. Wang, 2010). However, how can consumers be confident that these disclosures are trustworthy and are not simply used by fraudsters to deceive them?

Proving online advertising authenticity using blockchain-based disclosures

For advertising disclosures to effectively reduce information asymmetry between brands and consumers, the shared information must be trustworthy – and perceived as such by the consumer (Wells et al., 2011). For instance, users may dismiss fact-checking labels if they are unsure about the trustworthiness of the label's source (Ardèvol-Abreu et al., 2020). Blockchain technology can help to address this issue.

Blockchain is a type of digital ledger with several functionalities that ensure the information stored on it remains secure and trustworthy (Ruoti et al., 2019; Yun & Strycharz, 2023). For one, a blockchain ledger is distributed, meaning it exists within a network of participants who all have access to the stored

information (Ruoti et al., 2019; Yun & Strycharz, 2023). This makes it difficult to tamper with and ensures that information governance does not fall into the hands of one actor (Ruoti et al., 2019; Yun & Strycharz, 2023). Furthermore, recording new information onto the blockchain requires consensus among network participants, guaranteeing that stored information remains unsullied by removing the ability to add illegitimate transactions (Ruoti et al., 2019; Yun & Strycharz, 2023). Finally, the blockchain is immutable, meaning that information can only be added to the ledger, while previous records cannot be overwritten (Ruoti et al., 2019). This ensures transparency and traceability by providing an auditable history of all recorded information (Yun & Strycharz, 2023).

Drawing on these functionalities, blockchain can be used to provide ad-related information to consumers. At the most fundamental level, blockchain could record the advertising along with related metadata, such as its source, time and date of publication, and how it has changed over time (Pastor et al., 2021; Rejeb et al., 2020). Due to the features ensuring blockchain's security, consumers can be assured that this information at least has not been manipulated by a malicious actor. The question of whether the recorded information is truthful and legitimate in the first place can be ensured by using blockchain-based digital identities. Everything on the blockchain can have a stable digital identity, including individuals and brands (see Chapter 3). Regulatory bodies can verify these identities in advance to establish their legitimacy (see Chapter 3; Pastor et al., 2021). Then, every piece of information recorded on the blockchain can be associated with a specific digital identity – such as that of an advertiser or brand – including advertising creatives, which can be stored as non-fungible tokens (see Chapter 3; Pastor et al., 2021). Since the blockchain is transparent and digital identities are stable over time, consumers can historically check the integrity of the advertiser. This would reduce the incentive for malpractice in advertising in general, and the volume of fake advertising in particular, as fraudsters would not want fake advertising to be associated with their digital identity (see Chapter 3). At the same time, consumers would be empowered to make their own informed decisions about whether certain advertising can be trusted.

Although Google and Instagram already provide source-related metadata for advertising, incorporating blockchain technology would enhance this solution by adding an extra layer of security, transparency, and accountability. Given the vast number of ads on their platforms, it is impractical for Google and

Instagram to verify all advertising and sponsored content (and, as history shows, this isn't always reliable; Fox, 2021; Kroet, 2024) – all they can do is provide additional information. By leveraging blockchain, these platforms can add an extra layer of integrity and assurance to their existing disclosures, giving consumers access to information that cannot be altered or deleted, thus reinforcing trust.

The effectiveness of blockchain for communicating information trustworthiness has yet to be investigated empirically. However, research does show that blockchain's technological capabilities increase user trust, lead to higher perceptions of privacy, security, accountability, and transparency of the technology (D. Shin & Bianco, 2020), and allow blockchain-based business exchange ecosystems to be perceived as more trustworthy than its traditional counterparts (Tan & Saraniemi, 2023). Therefore, using blockchain for disclosures of advertising authenticity may increase consumer perceptions that an ad is more trustworthy.

Furthermore, from a signalling theory perspective, blockchain technology in itself can be interpreted as a signal of trustworthiness, as it serves to reduce information asymmetry between the information holder and receiver (Tan & Saraniemi, 2023). In fact, the mere presence of a disclosure can lead to positive effects: research shows that accompanying sponsored content with explicit disclosures can result in higher perceptions of ad trust, and more positive ad and brand attitudes (Campbell & Evans, 2018; A. Wang, 2010). Therefore, we expect that the presence of a blockchain-based ad disclosure will translate to higher perceptions of ad credibility and lead to more positive ad attitudes:

H1. Participants exposed to an ad with a blockchain-based disclosure will have a) higher perceptions of ad credibility and b) more positive ad attitudes, than participants exposed to an ad with no disclosure.

Since ad credibility has a positive effect on brand credibility (Hussain et al., 2020), while positive ad attitudes influence brand attitudes (A. Wang, 2010), we also hypothesise:

H2. Perceived ad credibility mediates the effect of blockchain-based disclosure on brand-related outcomes. Participants exposed to a blockchain-based disclosure have higher perceptions of ad credibility and,

in turn, a) higher perceptions of brand credibility and b) more positive brand attitudes, than participants exposed to an ad with no disclosure.

H3. Ad attitude mediates the effect of blockchain disclosure on brand-related outcomes. Participants exposed to a blockchain-based disclosure will have more positive ad attitudes and, in turn, a) higher perceptions of brand credibility and b) more positive brand attitudes, than participants exposed to an ad with no disclosure.

Furthermore, emphasising the brand responsible for the advertising might serve as additional confirmation to the consumer that the ad indeed comes from the specified brand. Research demonstrates that repetition increases belief in information (Dechêne et al., 2010), while source credibility has been shown to positively affect ad and brand attitudes (Singh & Banerjee, 2018). Since blockchain is a complicated technology that is difficult for the average consumer to understand (see Chapter 4), consumers might rely on other heuristic cues (such as brand mention) to signal the credibility of a disclosure (Metzger & Flanagin, 2013). However, when other cues are absent, consumers will be forced to rely on blockchain-related information. Therefore:

H4. Brand mention is a contributory convergent moderator of the effect of blockchain-based disclosure on ad-related outcomes. Exposure to a blockchain-based disclosure has a positive significant effect on a) perceptions of ad credibility and b) ad attitudes, but this effect is stronger for those exposed to a disclosure with no brand mention compared to a disclosure with brand mention.

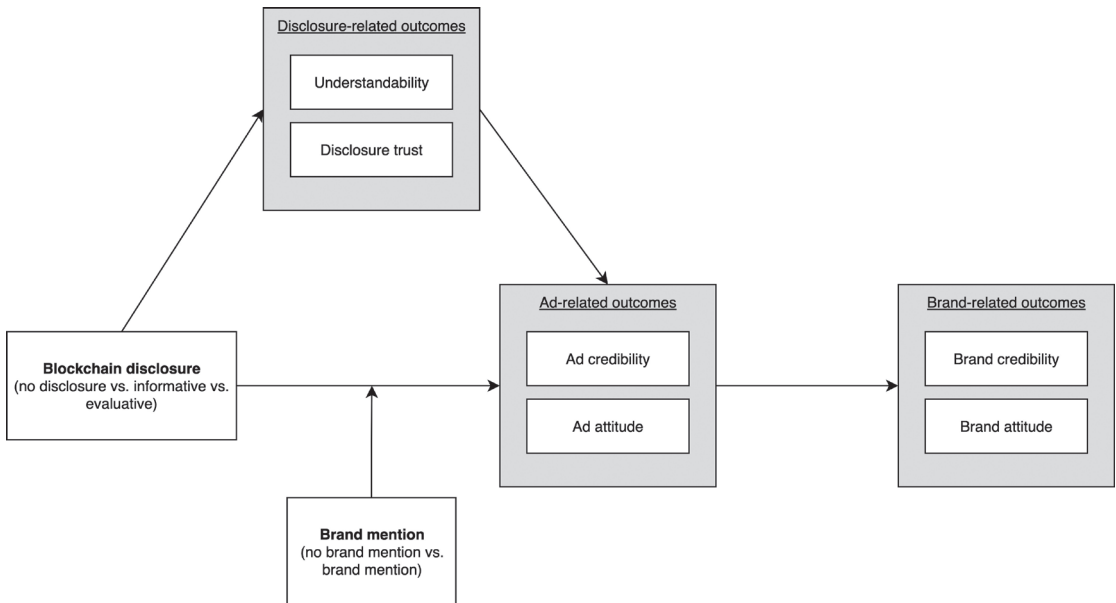
H5. Brand mention moderates the indirect effect of blockchain-based disclosure on perceived brand credibility via a) perceived ad credibility and b) ad attitude. Exposure to a blockchain-based disclosure has a significant positive effect on perceptions of ad credibility and ad attitude, which in turn positively influences brand credibility. The effect of blockchain-based disclosure on perceived brand credibility via ad-related outcomes is stronger for those exposed to a disclosure with no brand mention compared to a disclosure with a brand mention.

H6. Brand mention moderates the indirect effect of blockchain-based disclosure on brand attitude via a) perceived ad credibility and b) ad attitude. Exposure to a blockchain-based disclosure has a significant positive effect

on perceptions of ad credibility and ad attitudes, which in turn positively influence brand attitude. The effect of blockchain-based disclosure on brand attitude via ad-related outcomes is stronger for those exposed to a disclosure with no brand mention compared to a disclosure with a brand mention.

A complete overview of predicted relationships can be found in Figure 5.1.

Figure 5.1 Conceptual model



Strategies for communicating advertising authenticity using blockchain-based disclosures

Various content labelling practices exist depending on the context of the label and the goal at hand (Morrow et al., 2022). In this study, we follow the framework of Spradling and colleagues (2021), who suggest three strategies for labelling the veracity of online content: recommendation, informational, and hybrid labels. Recommendation labels suggest a specific course of action that an individual should undertake, usually without justification. Informational labels provide additional contextual information to the online content but allow

the viewer to decide how to use this information. Finally, hybrid labels provide both additional information and a recommendation for subsequent action.

In this study, we apply this framework to the context of authentic ad labelling and create three types of blockchain-based disclosures: brand-only, informative and evaluative. Like recommendation labels, brand-only disclosures simply recommend to a consumer that a specific brand indeed published an advertisement. Alternatively, and similar to informational labels, informative disclosures provide additional information that consumers can use to decide whether a particular advertising should be trusted, such as how blockchain technology was used to verify the ad source. Finally, like hybrid labels, evaluative disclosures provide consumers with additional information on how blockchain was used to verify the ad source with an additional interpretation that this ensures the ad's trustworthiness.

Since no research has examined the effects of various communication strategies in the context of blockchain-based authenticity disclosures, we pose the following general exploratory research question (see OSF pre-registration for a detailed breakdown of research questions):

RQ1. What are the effects of disclosure type (brand-only vs. informative vs. evaluative) on disclosure-related variables (understandability and trust), and how do these affect ad- and brand-related variables?

STUDY 1

Method

Study 1 employed a 3 (blockchain disclosure: no blockchain disclosure vs. informative vs. evaluative) x 2 (brand mention: no brand mention vs. brand mention) between-subjects design in the context of an Instagram ad.

Procedure

The study was preregistered via OSF (<https://doi.org/10.17605/OSF.IO/UM3GQ>) and approved by the Ethics Review Board of the authors' institution. Data was collected through *Qualtrics* at two time points two weeks apart (henceforth, T1 and T2) to control for potential priming effects of the information provided and the variables measured at T1, on the variables measured at T2.

At T1, participants provided informed consent and completed screening questions: those who did not use Instagram, or whose English reading level was below four (on a seven-point scale) were screened out. The remaining participants completed demographic information, after which they were provided with an explanation of fake advertising and asked to estimate their past exposure to and perceived seriousness of this issue. Participants were introduced to fake advertising as advertising which actively aims to mislead consumers into a) buying fraudulent products/services, b) buying non-existent products/services, c) sharing sensitive personal information, and d) possibly by impersonating a legitimate brand or influential person. To ensure clarity and enhance participant understanding, an example was provided for each criterion with a manifestation of such fake advertising in the real world (for a full definition, see the T1 questionnaire on OSF¹²). Subsequently, participants were randomly assigned to one of the six conditions. Those in the disclosure conditions were given a short text explaining how such disclosures can help consumers be more confident that the advertising they see is authentic (for full text, see T1 questionnaire on OSF) and completed manipulation checks. Finally, all participants indicated whether their answers should be included in the analysis (see *Additional measures*).

Then, in T2, participants were assigned to the same experimental conditions as in T1 based on their anonymous participant ID. Those in the disclosure condition were exposed to an ad for Nike sneakers with the same disclosure as in T1, whereas those in the control condition saw the same ad without a disclosure. Participants then completed measures regarding disclosure-, ad-, and brand-related variables, covariates, manipulation, and attention checks. Finally, participants were thanked and debriefed.

Participants

A representative sample of 624 Dutch Instagram users (Dixon, 2023) was recruited at T1 via a large panel company in the Netherlands, out of which 25 were removed due to self-reported inadequate English language proficiency. Of the 599 participants invited back to T2, 445 completed the survey, resulting in an attrition rate of 25.7%. Additionally, participants were removed because they failed the attention check ($n = 26$), were unable to play the manipulation

12 Full versions of the questionnaires, pre-test results, manipulations, data, additional tests, and online appendices can be found in the project folder on OSF entitled *Effectiveness of blockchain-based timestamp disclosures* (<https://doi.org/10.17605/OSF.IO/CHP6B>).

video ($n = 9$), or their questionnaire completion time constituted an outlier ($z > 3.29$; $n = 6$). The final sample comprised 404 participants ($M_{age} = 37.1$, $SD = 13.2$; 56.7% female, 42.3% male; 47% higher educated).

Stimuli

Stimuli development. For the ad manipulation, sneakers were chosen as the product category as Europol (2023) and the Customs Administration of the Netherlands (2020) have reported shoes and sports goods to be some of the most counterfeited products in Europe and the Netherlands. Therefore, consumers are likely to be suspicious when seeing ads for such products. Furthermore, sneakers were deemed gender-neutral and more accessible to most consumers than other frequently counterfeited items, such as luxury goods.

Although to the best of the authors' knowledge, there are currently no blockchain-based disclosures of advertising authenticity being used in practice, the inspiration for the stimuli came from real-life blockchain-based disclosures for communicating other types of content authenticity, such as website content (e.g., WordProof, n.d.-d) and sustainability claims (e.g., Provenance, n.d.-b) – as well as empirical literature on content labelling (Spradling et al., 2021). We developed informative, evaluative, and brand-only disclosures. In this study, 'informative' means that the disclosure provides objective information, while 'evaluative' means that the disclosure provides a ready evaluation to the user. Therefore, the informative disclosure provided participants with factual information about blockchain being used to timestamp the ad using objective lexicon (e.g., "timestamped", "stores a record") and passive language (e.g., "this ad has been timestamped"). Evaluative disclosures contained the same informational content about blockchain as the informative disclosure, but also provided an evaluation of the ad's trustworthiness (e.g., "you can trust this ad") and included evaluative lexicon (e.g., "genuine", "trustworthy"). The brand-only disclosure re-stated that the brand published the ad without mentioning blockchain technology.

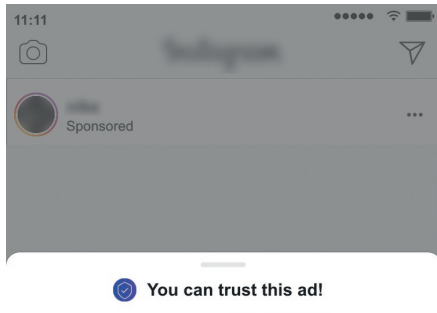
The initial disclosures were adjusted based on feedback from fellow researchers and laypeople, and pre-tested twice. More information about the pre-tests can be found on OSF, while the final versions of the manipulations are in Figure 5.2.

Measures

Dependent, mediating and control variables. All scale items, anchors, reliability results, means, and standard deviations for scales measuring dependent, mediating, and control variables can be found in Table 5.1. The initial scale reliability results for *brand credibility* were suboptimal (Cronbach's $\alpha = .68$), and a principal axis factor analysis found that the items loaded on two separate factors. One factor consisted of five positively-framed items (Eigenvalue = 3.20, 45.7% of variance explained), while the second factor consisted of two reverse-coded items (Eigenvalue = 1.51, 21.6% of variance explained). The reverse-coded items were removed, which improved scale reliability to an acceptable level (Cronbach's $\alpha = .85$). As additional control variables, demographics measured included age, gender, nationality, and education level.

Figure 5.2 Disclosure manipulations for Study 1

Fig. 5.2.1 Evaluative x Brand



[Brand] guarantees that it published this advertisement on **21-MAY-2023**.

What does this mean?

[Brand] recorded their advertising content on the blockchain. This is called 'timestamping'.

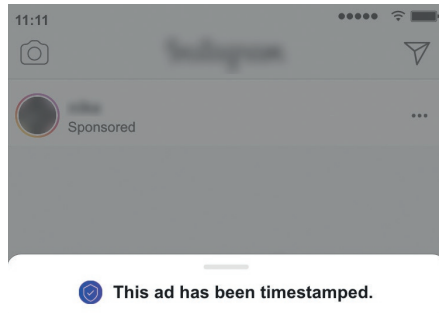
This means that this ad is more trustworthy because you can trace who posted the ad and when. You can also see whether the ad itself has changed over time.

[See the evidence for this ad on the blockchain](#)

Why is this important?

Deceptive advertising is a growing problem on the internet. Timestamps help brands show that their ads are genuine by increasing transparency and accountability.

Fig. 5.2.2 Informative x No brand



This advertisement has been timestamped on the blockchain on **21-MAY-2023**.

What does this mean?

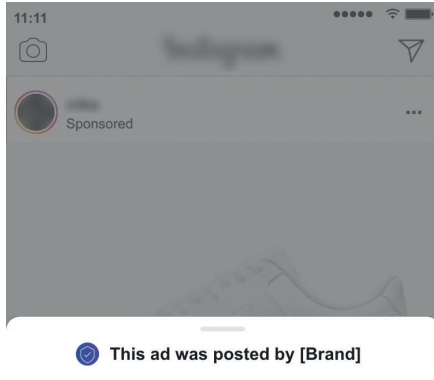
This brand stores a record of their advertising content on the blockchain. This is called 'timestamping'.

Timestamps record who posted the ad and when. You can also see whether the ad itself has changed over time.

[See the timestamp for this ad on the blockchain](#)

Why is this important?

Deceptive advertising is a growing problem on the internet. Timestamps provide extra information that can help consumers decide about whether an ad should be trusted.

Fig. 5.2.3 No blockchain x Brand (Brand-only)**What does this mean?**

This disclosure specifies that this ad was published by [Brand].

Why is this important?

Deceptive advertising is a growing problem on the internet. Knowing who published the ad can help consumers decide whether to trust an ad.



Note. All brand references have been blurred or removed to avoid copyright infringement.

Manipulation and attention checks. To ensure that the informative and evaluative disclosures were perceived as sufficiently different, we developed two manipulation check questions tapping into how evaluative and objective participants perceived the disclosures. Participants indicated on scales from 1 (*not at all*) to 7 (*very much*): “To what extent does the advertising disclosure try to convince that the ad is trustworthy?” and “To what extent does the advertising disclosure provide factual and objective information?”. As an attention check, participants indicated from a list of brands which one they saw in the disclosure, including a “No brand” response for the control condition.

Additional measures. To recruit Instagram users, participants indicated which social media platforms they used. They were also asked to estimate their *English language proficiency* on a scale from 1 (*poor*) to 7 (*excellent*) on four dimensions: reading, listening, speaking, and writing. At the end of T1,

Table 5.1 Scale items, reliability and descriptive statistics

Variable	Study 1		Study 2	
	α	M (SD)	α	M (SD)
Disclosure understandability ^{a,b} (Hildebrand et al., 2017)	.91	5.20 (1.17)	.93	4.96 (1.37)
Difficult to read/Easy to read				
Unpleasant to read/Pleasant to read				
Difficult to process/Easy to process				
Unpleasant to process/Pleasant to process				
Difficult to understand/Easy to understand				
Unpleasant to understand/Pleasant to understand				
Disclosure trust ^b (Atkinson & Rosenthal, 2014)	.89	5.01 (1.01)	.93	4.87 (1.16)
I can trust what the disclosure says.				
This disclosure is from a recognised organisation.				
This disclosure is honest.				
The organisation that posted this disclosure is honest.				
The organisation conducted rigorous tests before issuing this disclosure.				
This disclosure inspires confidence in me.				
Ad credibility (Lawrence et al., 2013)	.90	5.04 (1.11)	.92	4.88 (1.21)
I trust what this ad has to say.				
The ad is trustworthy.				
The claims made in this ad are credible.				
The ad felt authentic.				
Ad attitude ^a (Janiszewski, 1988)	.90	5.01 (1.11)	.95	4.76 (1.34)
Bad/Good				
Unappealing/Appealing				
Unattractive/Attractive				
Unpleasant/Pleasant				
Unlikeable/Likeable				
Brand credibility ^c (Erdem & Swait, 1998)	.85	5.17 (0.95)	.90	4.98 (1.03)
This brand delivers what it promises.				
This brand's product claims are believable.				
This brand has a name you can trust.				
This brand reminds me of someone who is competent and knows what he/she is doing.				
This brand doesn't pretend to be something it isn't.				
Brand attitude ^a (Janiszewski, 1988)	.93	5.39 (1.11)	.95	5.15 (1.32)
Bad/Good				
Unappealing/Appealing				
Unattractive/Attractive				
Unpleasant/Pleasant				
Unlikeable/Likeable				

Table 5.1 Continued

Variable	Study 1		Study 2	
	α	M (SD)	α	M (SD)
Perceived seriousness of fake advertising (adapted from Witte et al., 1996)	.81	5.41 (1.07)	.85	5.50 (1.07)
"I believe that the risk of fake advertising is _____."				
...severe				
...serious				
...significant				

Note. All items measured on Likert scales from 1 (= Strongly disagree) to 7 (= Strongly agree) unless otherwise stated. ^a Measured on a 7-point semantic-differential scale. ^b Excludes the control group. ^c Two items removed due to detrimental impact on scale reliability: "You just can't believe what the ads say about this brand" and "My experiences with this brand make me wary of their claims."

participants were also asked to indicate whether their answers should be used in the study based on their English language proficiency on a scale from 1 (*definitely not use them*) to 7 (*definitely use them*). *Prior experience with fake advertising* was also measured as an additional background characteristic. Participants were provided with explanations and asked to estimate how often they had experienced various types of fake advertising (ads for get-rich-quick schemes, phishing texts or emails, fake customer reviews, celeb-baits, ads for counterfeit products, and brand impersonation; for complete definitions as presented to participants, see OSF) on a 5-point scale ("Never", "Once", "A few times (2-3 times)", "Several times (4-5 times)", "Regularly (more than 5 times)") with an additional answer option ("I don't know").

Results

The means and standard deviations for all conditions are in Table 5.2. Statistical results are reported in figures unless otherwise stated.

Descriptives

The results demonstrate a reasonably high incidence of prior experience with fake advertising in our sample. A majority have personally experienced the following types of fake advertising at least once in their lifetime: ads for get-rich-quick schemes (87.6% of sample), phishing texts or emails (84.9%), fake customer reviews (76.5%), celeb-baits (75.0%), ads for counterfeit products (67.0%), and brand impersonation (59.9%).

Table 5.2 Means and standard deviations (Study 1)

Variable	Condition						
	No disclosure (control)	Brand-only	Blockchain x No brand mention	Blockchain x Brand mention	Informative blockchain disclosure	Evaluative blockchain disclosure	Any blockchain disclosure
Disclosure understandability	–	5.74 ^{a,b} (1.08)	4.89 (1.21)	5.26 (1.08)	5.04 ^a (1.16)	5.11 ^b (1.17)	5.07 (1.16)
Disclosure trust	–	5.14 (1.03)	4.86 (0.95)	5.09 (1.06)	4.96 (0.95)	4.99 (1.07)	4.98 (1.01)
Ad credibility	4.90 (1.04)	5.25 (1.07)	4.97 (1.13)	5.10 (1.14)	5.08 (0.99)	4.98 (1.28)	5.03 (1.13)
Ad attitude	4.86 ^a (1.13)	5.37 ^{a,b,c} (1.05)	5.01 (1.13)	4.93 (1.09)	4.99 ^c (1.04)	4.95 ^b (1.18)	4.97 (1.11)
Brand credibility	5.01 (0.91)	5.40 (0.87)	5.15 (0.97)	5.17 (0.97)	5.13 (0.88)	5.19 (1.06)	5.16 (0.97)
Brand attitude	5.23 (1.19)	5.56 (1.08)	5.35 (1.07)	5.43 (1.12)	5.37 (1.00)	5.41 (1.21)	5.39 (1.10)
Perceived seriousness of fake advertising	5.21 (1.25)	5.49 (0.94)	5.52 (1.09)	5.37 (0.99)	5.43 (0.99)	5.46 (1.10)	5.44 (1.04)
<i>n</i>	77	63	133	131	142	122	264

Note. Standard deviations are in parentheses. All measured on 7-point scales unless otherwise stated. ^{a, b} Means differ significantly between groups.

^c Mean difference approached significance ($p < .10$).

Manipulation checks

Since the purpose of the informative disclosure was to provide objective and factual information (i.e., to inform) and the purpose of the evaluative disclosure was to provide both objective information and a ready evaluation of what this information means, the manipulations were successful if both disclosures were perceived to be equally informative, but the evaluative disclosure was perceived to be more evaluative. At T2, the disclosure manipulations were successful only at the $p < .10$ level. Participants in the evaluative condition perceived the disclosure as slightly more evaluative ($M = 5.39$, $SD = 1.29$) than in the informative condition ($M = 5.10$, $SD = 1.24$), $t(262) = -1.89$, $p = .060$, 95% CI $[-0.60, -0.01]$. They also perceived the evaluative disclosure ($M = 4.76$, $SD = 1.38$) to be equally objective as the informative disclosure ($M = 4.91$, $SD = 1.18$), $t(240.2) = 0.92$, $p = .361$, 95% CI $[-0.17, 0.46]$.

Randomisation and covariation checks

Randomisation between conditions was successful by age, $F(5, 398) = 1.14$, $p = .341$, English language proficiency, $F(5, 398) = 0.85$, $p < .516$, and gender¹³, $\chi^2(5) = 8.99$, $p = .109$. Perceived seriousness of fake advertising correlated significantly with disclosure understandability (Spearman's $\rho = .12$, $p = .031$), disclosure trust ($\rho = .18$, $p = .001$), ad credibility ($\rho = .18$, $p < .001$), brand credibility ($\rho = .15$, $p = .003$), and brand attitude ($\rho = .16$, $p = .001$), and is therefore included in all subsequent analyses as a covariate.

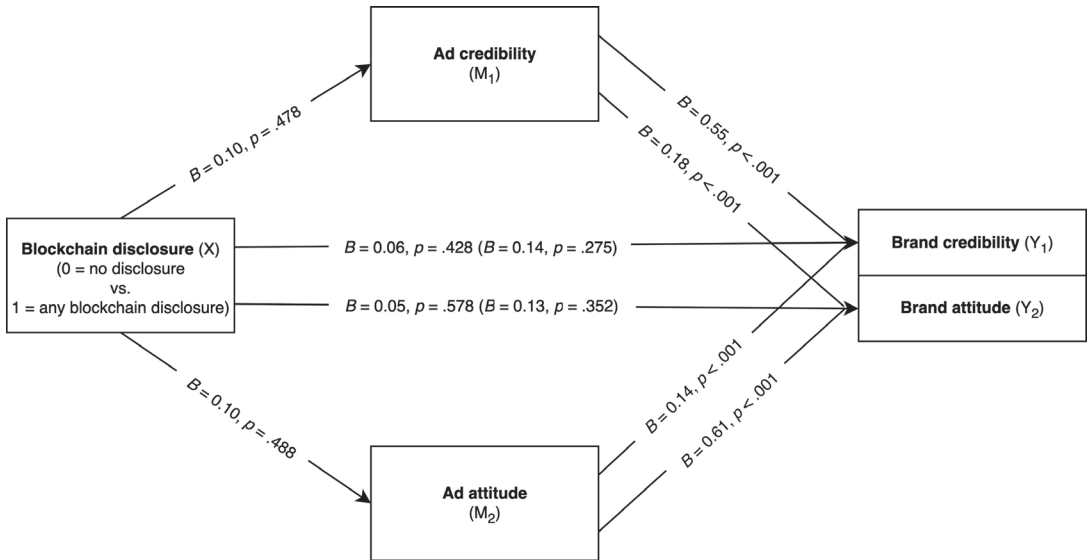
Effects of blockchain-based disclosures on brand credibility and brand attitude

To test H1-H3, two Hayes' (2022) PROCESS Models 4 were estimated¹⁴. The full statistical results for all paths and indirect effects can be found in Online Appendix B, Table B1. As visualised in Figure 5.3, exposure to an ad with any blockchain disclosure had no significant effects either on participant perceptions of a) ad credibility or b) ad attitude compared to participants exposed to an ad with no disclosure. H1 was not supported. Furthermore, the indirect effects of blockchain disclosure on brand credibility or brand attitude via ad credibility and attitude were not significant. H2 and H3 were also not supported.

13 Four participants were excluded from gender randomisation checks (three participants who indicated "Non-binary/Third gender" and one participant who indicated "Prefer to self-describe") as the small number of participants in these categories violated the expected counts assumption of a chi-square test of independence.

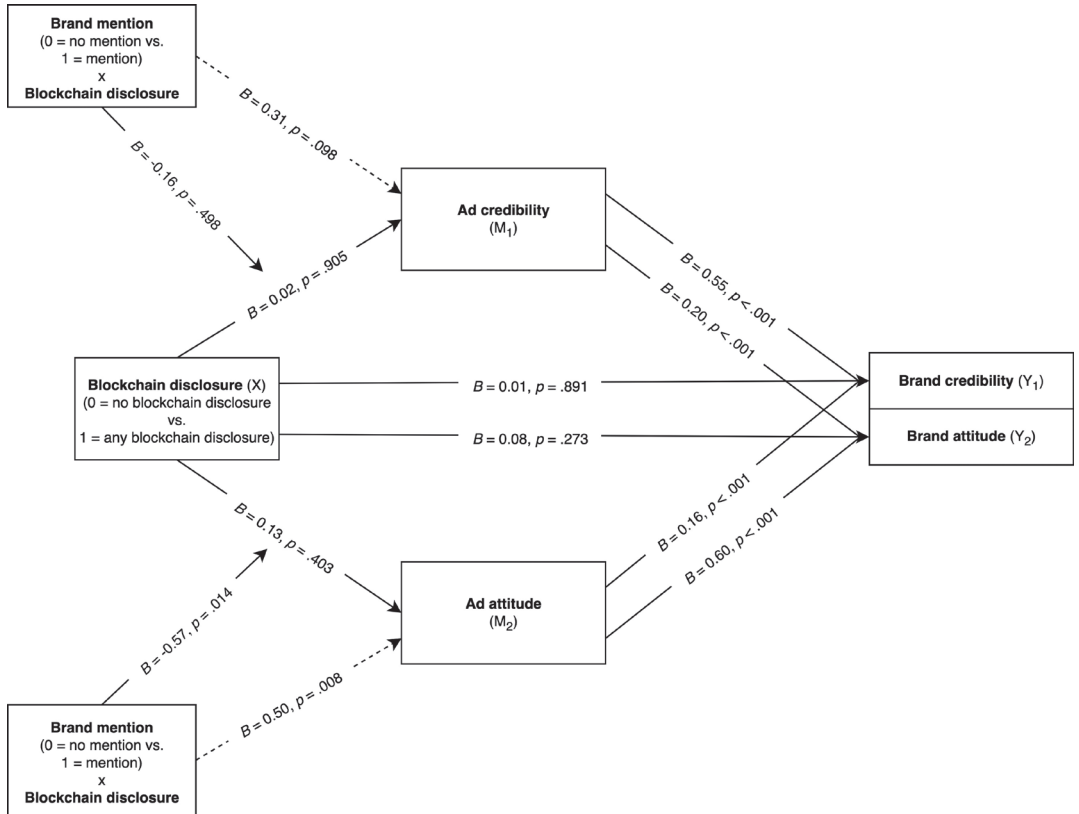
14 The brand-only condition was excluded from this analysis as it can neither be considered a control condition (participants were exposed to a disclosure) nor a blockchain disclosure (did not describe the use of blockchain).

Figure 5.3 Relative direct and indirect effects of blockchain disclosure on brand credibility and brand attitude via ad credibility and ad attitude (Study 1)



Note. Results for two PROCESS models with brand credibility and brand attitude as DVs. Total effects are in parentheses. Unstandardised path coefficients. Perceived seriousness of fake advertising included as covariate. $N = 341$. Indirect effects: $X \rightarrow M_1 \rightarrow Y_1$: effect = 0.06, BootSE = 0.07, 95% BootCI [-0.09, 0.20]; $X \rightarrow M_1 \rightarrow Y_2$: effect = 0.02, BootSE = 0.03, 95% BootCI [-0.03, 0.08]; $X \rightarrow M_2 \rightarrow Y_1$: effect = 0.01, BootSE = 0.02, 95% BootCI [-0.03, 0.06]; $X \rightarrow M_2 \rightarrow Y_2$: effect = 0.06, BootSE = 0.09, 95% BootCI [-0.11, 0.24].

Figure 5.4 Conditional relative direct and indirect effects of blockchain disclosure type on brand credibility and brand attitude via ad credibility and ad attitude (Study 1)



Note. Results for two PROCESS models with brand credibility and brand attitude as DVs. Unstandardised path coefficients. Perceived seriousness of fake advertising included as covariate. $N = 404$. Conditional indirect effects: $X \rightarrow M_1 \rightarrow Y_1$: index = -0.09, BootSE = 0.12, 95% BootCI [-0.33, 0.15]; **No brand mention**: effect = 0.01, BootSE = 0.08, 95% CI [-0.15, 0.17]; **Brand mention**: effect = -0.08, BootSE = 0.09, 95% CI [-0.26, 0.10];

$X \rightarrow M_1 \rightarrow Y_2$: index = -0.03, BootSE = 0.05, 95% BootCI [-0.13, 0.06]; **No brand mention**: effect = 0.003, BootSE = 0.03, 95% CI [-0.06, 0.07]; **Brand mention**: effect = -0.03, BootSE = 0.04, 95% CI [-0.10, 0.04];

$X \rightarrow M_2 \rightarrow Y_1$: index = -0.09, BootSE = 0.04, 95% BootCI [-0.18, -0.02]; **No brand mention**: effect = 0.02, BootSE = 0.03, 95% CI [-0.03, 0.08]; **Brand mention**: effect = -0.07, BootSE = 0.03, 95% CI [-0.13, -0.02];

$X \rightarrow M_2 \rightarrow Y_2$: index = -0.35, BootSE = 0.14, 95% BootCI [-0.61, -0.08]; **No brand mention**: effect = 0.08, BootSE = 0.10, 95% CI [-0.10, 0.28]; **Brand mention**: effect = -0.27, BootSE = 0.10, 95% CI [-0.45, -0.07].

Effects of brand mention

To test H4-H6, two Hayes' (2022) PROCESS Models 7 were estimated (see Online Appendix B, Table B2 for full results). The results are visualised in Figure 5.4. Only brand mention had a significant direct effect on ad attitude, while no other direct effects were significant. There was also no significant interaction effect between blockchain disclosure and brand mention on ad credibility, but there was a significant interaction effect on ad attitude. When the disclosure mentioned the brand, there was a negative conditional direct effect of blockchain disclosure on ad attitude ($B = -0.44$, $p = .010$), however this effect was not significant when the brand was not mentioned ($B = 0.13$, $p = .403$). While exposure to an ad with a brand-only disclosure positively influenced ad attitudes, exposure to a blockchain disclosure with brand mention had a negative effect. H4 was not supported.

There was also a negative moderated mediation effect of the interaction between blockchain disclosure and brand mention on brand credibility via ad attitude, but not via ad credibility. Comparable results were observed for brand attitude via ad attitude and ad credibility. When a blockchain disclosure mentioned the brand, it resulted in more negative ad attitudes, which in turn lowered brand credibility and attitude. No other conditional indirect effects were significant. H5 and H6 were not supported.

Effects of disclosure understandability and credibility on brand-related variables

The results of a preliminary multivariate analysis of covariance (MANCOVA) showed that a brand-only authenticity disclosure was, on average, perceived to be more understandable and resulted in more positive ad attitudes than either of the two blockchain-based disclosures (see Preliminary MANCOVAs on OSF). Therefore, subsequent analyses used the brand-only condition as the reference category.

Two serial mediation models were estimated using Hayes' (2022) PROCESS Model 82 (see Online Appendix C, Table C1) and are visualised in Figure 5.5. The indirect effect results show that disclosure type was a significant indirect predictor of brand credibility via disclosure understandability and ad attitude. Both informative and evaluative blockchain disclosures significantly reduced participants' disclosure understandability, leading to lower ad attitudes and subsequently to lower brand credibility than the brand-only disclosure. There was also a significant indirect effect of blockchain disclosure type on brand

Figure 5.5 Relative direct and indirect effects of blockchain disclosure type on brand credibility and brand attitude via disclosure understandability, disclosure trust, ad credibility, and ad attitude (Study 1)

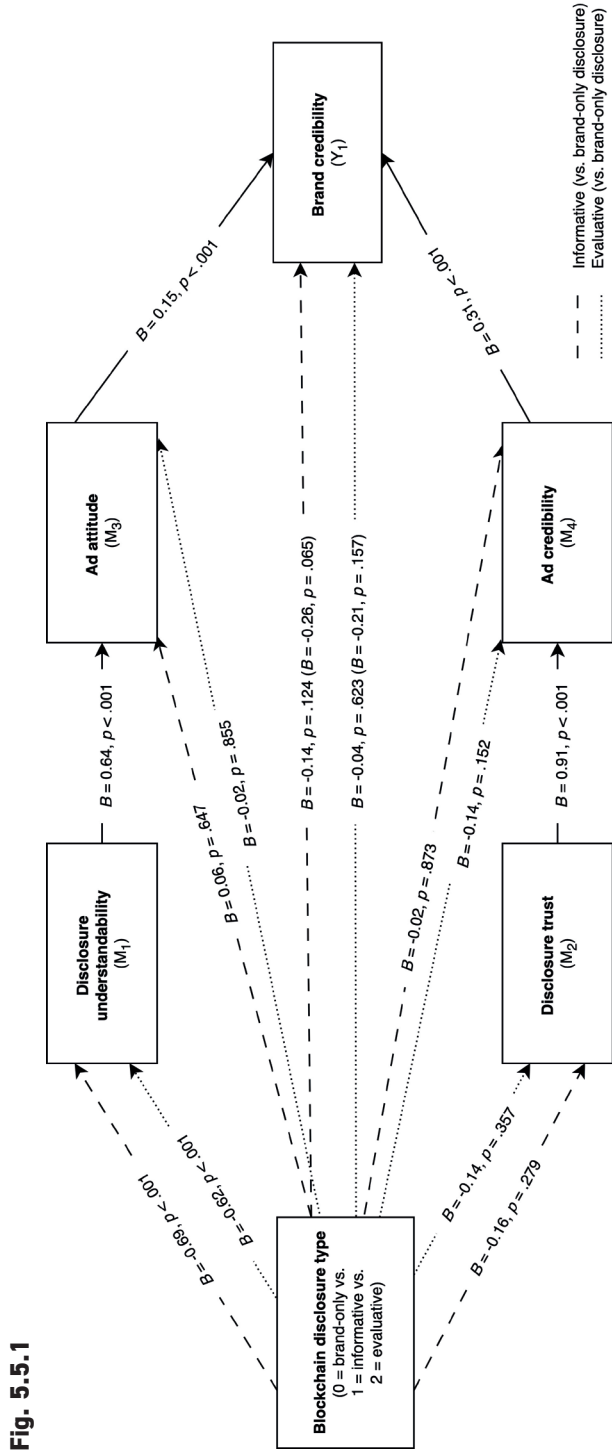
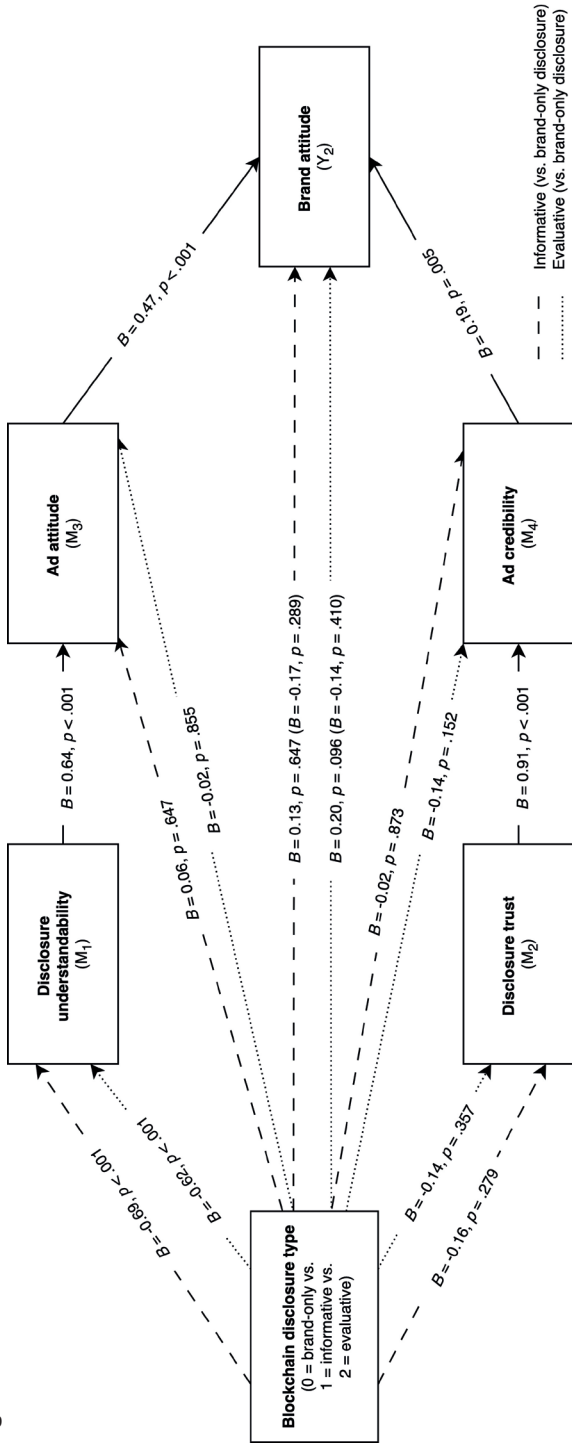


Fig. 5.5.2



Note. Unstandardised path coefficients. Total effects are in parentheses. Perceived seriousness of fake advertising included as covariate. $N = 327$. Only significant indirect effects which are relevant for answering the research question are reported: $X \rightarrow M_1 \rightarrow M_3 \rightarrow Y_1$; **Informative**: effect = -0.07, BootSE = 0.02, 95% CI [-0.12, -0.02]; **Evaluative**: effect = -0.06, BootSE = 0.02, 95% CI [-0.11, -0.02]; $X \rightarrow M_1 \rightarrow M_3 \rightarrow Y_2$; **Informative**: effect = -0.21, BootSE = 0.06, 95% CI [-0.33, -0.10]; **Evaluative**: effect = -0.19, BootSE = 0.06, 95% CI [-0.32, -0.08].

attitude via disclosure understandability, and a serial mediation through both disclosure understandability and ad attitude. Compared to a brand-only disclosure, informative and evaluative blockchain disclosures lowered disclosure understandability, resulting in more negative brand attitudes. The negative indirect effect of blockchain disclosure type became stronger when ad attitude was included as a serial mediator: both blockchain disclosure types resulted in lower understandability, which led to more negative ad and brand attitudes.

Discussion

The purpose of Study 1 was to examine whether blockchain-based authenticity disclosures positively affected ad and brand credibility and attitudes, and whether brand mention moderated these effects. It also aimed to identify which authenticity disclosure type (brand-only vs. informative vs. evaluative) was most effective at inducing positive ad- and brand-related effects by exploring which disclosure was perceived as the most understandable and trustworthy. The results demonstrate that in the context of an Instagram ad, exposure to a blockchain-based authenticity disclosure did not increase perceptions of ad or brand credibility, or result in positive ad or brand attitudes. There was, however, an effect of brand mention: attitudes towards the ad were significantly higher when participants were exposed to an authenticity disclosure which mentioned the source of the advertising (but not blockchain), compared to an ad with no disclosure. However, when a blockchain disclosure was paired with brand mention, this led to more negative ad attitudes, which subsequently translated to more negative brand attitudes and lower perceptions of brand credibility. Further analyses revealed that disclosure understandability might explain these results: participants rated the brand-only disclosure as significantly more understandable than the informative or evaluative disclosures. In turn, both blockchain-based authenticity disclosures led to more negative ad and brand attitudes, and lower perceptions of ad and brand credibility than the brand-only disclosure.

These results suggest that brand-only disclosures are most effective for communicating the authenticity of Instagram ads. However, the effectiveness of disclosure type may differ depending on the context in which the ad appears to the consumer. For instance, research shows that media format congruence between advertising and the context in which it appears influences ad recognition, comprehension, and persuasion (Bishop et al., 2017). To demonstrate the robustness of the findings in Study 1 and to

examine whether these results are reproducible in an alternative context (Van Bavel et al., 2016), we try to replicate these results in Study 2 in the context of Google search ads.

STUDY 2

Method

As in Study 1, Study 2 employed a 3 (blockchain disclosure: no blockchain disclosure vs. informative vs. evaluative) x 2 (brand mention: no brand mention vs. brand mention) between-subjects design but in the context of a Google search ad.

Participants

A sample of 631 participants representative of the Dutch population in terms of age and gender was recruited for Study 2 at T1 through the same panel company as in Study 1. Out of these participants, 25 were removed due to inadequate English language comprehension. Of the 606 participants invited back to T2, 486 participants completed the questionnaire (attrition rate of 19.8%), and 51 were subsequently removed: 28 failed the attention check, 20 were unable to play the manipulation video, 3 were outliers in questionnaire completion time ($z > 3.29$). The final sample consisted of 435 participants (50.6% female, 49.2% male; $M_{age} = 47.6$, $SD = 15.1$; 44.8% higher educated).

Stimuli, procedure, and measures

The procedure and measures for Study 2 were identical to Study 1, except that participants in Study 2 were not asked about their social media use. For the stimuli, the ad and disclosure content were identical to Study 1 but presented in the context of a Google search ad (see Figure 5.6). A principal axis factor analysis showed again that *brand credibility* loaded on two factors, whereby five positively-framed items loaded onto one factor (Eigenvalue = 3.57, 51.0% of variance explained), and two negatively-framed items loaded onto a separate factor (Eigenvalue = 1.37, 19.5% of variance explained). These items were removed, improving the scale's reliability (Cronbach's $\alpha = .74$ vs. $\alpha = .90$ when items removed).

Results

Descriptives

As in Study 1, prior experience with fake advertising was relatively high in the sample. Many indicated that they had been exposed at least once to the following types of fake advertising: ads for get-rich-quick schemes (83.7%), phishing emails or texts (83.4%), fake customer reviews (74.5%), celeb-baits (68.5%), ads for counterfeit products or services (61.2%), and brand impersonation (60.7%).

Manipulation checks

The disclosure manipulations were only partially successful at T2. The informative disclosure was perceived equally as objective ($M = 4.72, SD = 1.20$) as the evaluative disclosure ($M = 4.66, SD = 1.36$), $t(274) = 0.37, p = .708$, 95% CI [-0.25, 0.36]. However, although the evaluative disclosures were perceived

Figure 5.6 Disclosure manipulations for Study 2

Fig. 5.6.1 Evaluative x Brand

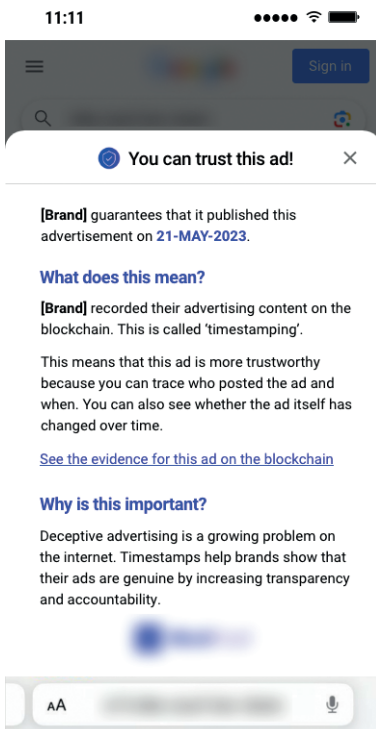


Fig. 5.6.2 Informative x No brand

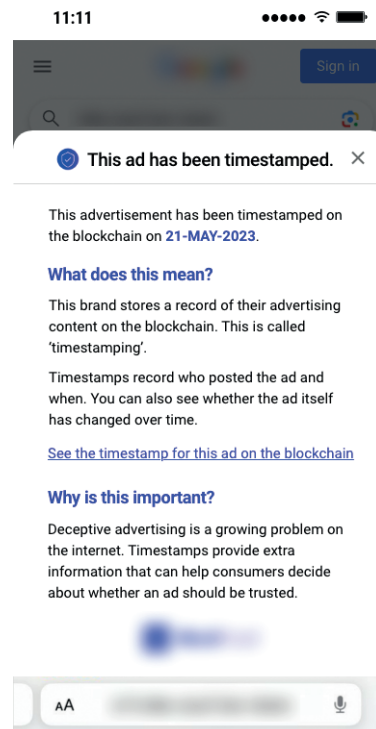
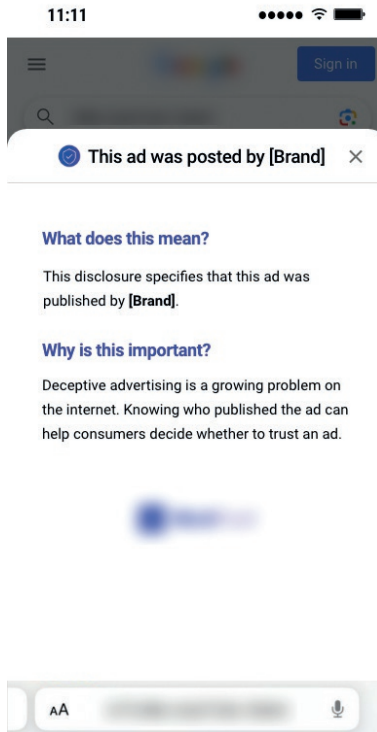


Fig. 5.6.3 No blockchain x Brand (Brand-only)

Note. All brand references have been blurred or removed to avoid copyright infringement.

to be somewhat more evaluative ($M = 5.32$, $SD = 1.28$) than the informative disclosure ($M = 5.10$, $SD = 1.29$), this difference was not statistically significant, $t(274) = -1.42$, $p = .156$, 95% CI [-0.53, 0.09].

Randomisation and covariation checks

Randomisation between conditions was successful by age, $F(5, 427) = 0.85$, $p = .518$, English language proficiency, $F(5, 429) = 1.22$, $p = .300$, and gender, $\chi^2(5) = 2.09$, $p = .836$. Perceived seriousness of fake advertising correlated significantly with ad credibility (Spearman's $\rho = .14$, $p = .003$) and is included in all subsequent analyses. Means and standard deviations for all conditions are in Table 5.3.

Table 5.3 Means and standard deviations (Study 2)

Variable	Condition						
	No disclosure (control)	Brand-only	Blockchain x No brand mention	Blockchain x Brand mention	Informative blockchain disclosure	Evaluative blockchain disclosure	Any blockchain disclosure
Disclosure understandability	–	5.30 ^a (1.47)	4.79 (1.34)	4.95 (1.32)	4.70 ^{a,b} (1.38)	5.06 ^b (1.25)	4.87 (1.33)
Disclosure trust	–	4.96 (1.21)	4.86 (1.10)	4.83 (1.19)	4.68 ^a (1.12)	5.03 ^a (1.14)	4.84 (1.14)
Ad credibility	4.64 ^b (1.12)	4.99 (1.25)	4.89 (1.21)	4.94 (1.23)	4.77 (1.21)	5.08 (1.22)	4.92 ^b (1.22)
Ad attitude	4.66 (1.18)	4.99 ^a (1.41)	4.78 (1.30)	4.66 ^a (1.43)	4.59 (1.42)	4.87 (1.30)	4.72 (1.37)
Brand credibility	4.95 (0.96)	4.99 (1.19)	4.98 (0.99)	5.00 (1.01)	4.86 (1.00)	5.14 (0.98)	4.99 (1.00)
Brand attitude	5.18 ^c (1.15)	5.35 (1.43)	5.12 (1.27)	5.06 (1.39)	5.00 (1.41)	5.19 (1.23)	5.09 ^a (1.33)
Perceived seriousness of fake advertising	5.49 (0.89)	5.52 (1.17)	5.57 (1.06)	5.43 (1.12)	5.45 (1.08)	5.56 (1.11)	5.50 (1.10)
<i>n</i>	83	76	136	140	146	130	276

Note. Standard deviations are in parentheses. All measured on 7-point scales. ^a Means differ significantly between groups. ^b Mean difference approached significance ($p < .10$).

Data analysis

The data analysis procedure for Study 2 is identical to Study 1. Therefore, the results of each model are reported below in brief.

Effects of blockchain-based disclosures on brand credibility and brand attitude. The results for H1-H3 in the context of a Google search ad are visualised in Figure 5.7 (full statistical results are in Online Appendix E, Table E1); blockchain disclosure¹⁵ neither significantly predicted ad credibility nor ad attitude. Blockchain disclosure had a significant positive indirect effect on brand credibility via ad credibility; however, this effect was minuscule. No other indirect effects were significant. H1-H3 were not supported.

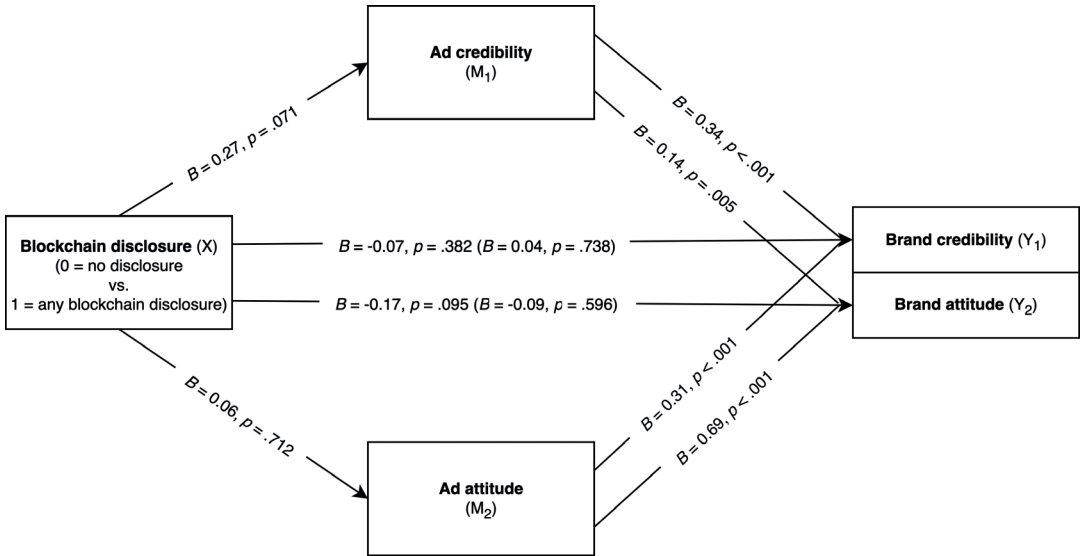
Effects of brand mention. The results of the parallel moderated mediation models predicting brand credibility and attitude are visualised in Figure 5.8 (see Online Appendix E, Table E2 for full results). There were no significant direct effects of blockchain disclosure, brand mention, or interaction effects on ad credibility or attitudes. H4 was not supported. There were also no significant indirect effects of blockchain disclosure conditional on brand mention via ad credibility or attitude, either on brand credibility or attitude. H5 and H6 were likewise not supported.

Effects of disclosure understandability and credibility on brand-related variables. The results of a preliminary MANCOVA demonstrated that a brand-only authenticity disclosure was perceived to be more understandable, while an evaluative blockchain-based disclosure was perceived to be more trustworthy – than an informative blockchain-based disclosure (see Preliminary MANCOVAs on OSF). Therefore, subsequent analyses used the informative blockchain-based disclosure as the reference category.

As can be seen in Figure 5.9, the results of two serial parallel mediation models (see Online Appendix F for full results) show that there was a positive indirect effect of the evaluative blockchain disclosure on brand credibility via disclosure trust, and a positive indirect effect of both, evaluative and brand-only, disclosure types on brand attitude via disclosure understandability. Furthermore, the serial indirect effects results show that both disclosure types positively affected brand credibility and attitude via

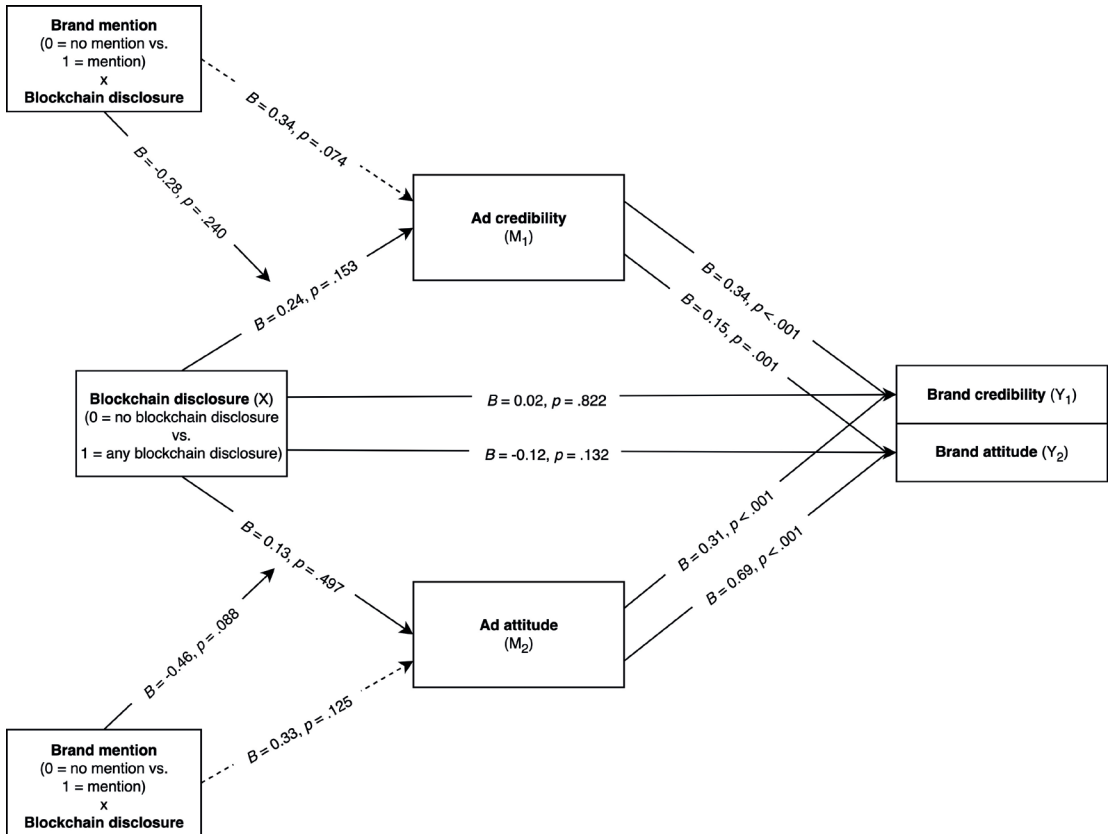
15 As in Study 1, the brand-only condition was excluded from this analysis.

Figure 5.7 Relative direct and indirect effects of blockchain disclosure type on brand credibility and brand attitude via ad credibility and ad attitude (Study 2)



Note. Results for two PROCESS models with brand credibility and brand attitude as DVs. Unstandardised path coefficients. Total effects are in parentheses. Perceived seriousness of fake advertising included as covariate. $N = 359$. Indirect effects: $X \rightarrow M_1 \rightarrow Y_1$: effect = 0.09, BootSE = 0.05, 95% BootCI [0.001, 0.19]; $X \rightarrow M_1 \rightarrow Y_2$: effect = 0.04, BootSE = 0.03, 95% BootCI [-0.003, 0.09]; $X \rightarrow M_2 \rightarrow Y_1$: effect = 0.02, BootSE = 0.05, 95% BootCI [-0.07, 0.12]; $X \rightarrow M_2 \rightarrow Y_2$: effect = 0.04, BootSE = 0.11, 95% BootCI [-0.17, 0.25].

Figure 5.8 Conditional relative direct and indirect effects of blockchain disclosure type on brand credibility and brand attitude via ad credibility and ad attitude (Study 2)



Note. Results for two PROCESS models with brand credibility and brand attitude as DVs. Unstandardised path coefficients. Perceived seriousness of fake advertising included as covariate. $N = 435$. Conditional indirect effects: $X \rightarrow M_1 \rightarrow Y_1$: index = -0.10, BootSE = 0.08, 95% BootCI [-0.26, 0.06]; *No brand mention*: effect = 0.08, BootSE = 0.05, 95% CI [-0.02, 0.19]; *Brand mention*: effect = -0.01, BootSE = 0.06, 95% CI [-0.14, 0.11]; $X \rightarrow M_1 \rightarrow Y_2$: index = -0.04, BootSE = 0.04, 95% BootCI [-0.13, 0.03]; *No brand mention*: effect = 0.04, BootSE = 0.03, 95% CI [-0.01, 0.09]; *Brand mention*: effect = -0.01, BootSE = 0.03, 95% CI [-0.06, 0.05];

$X \rightarrow M_1 \rightarrow Y_1$: index = -0.14, BootSE = 0.09, 95% BootCI [-0.32, 0.02]; *No brand mention*: effect = 0.04, BootSE = 0.05, 95% CI [-0.06, 0.16]; *Brand mention*: effect = -0.10, BootSE = 0.06, 95% CI [-0.23, 0.02];

$X \rightarrow M_1 \rightarrow Y_2$: index = -0.32, BootSE = 0.18, 95% BootCI [-0.68, 0.05]; *No brand mention*: effect = 0.09, BootSE = 0.12, 95% CI [-0.14, 0.32]; *Brand mention*: effect = -0.23, BootSE = 0.14, 95% CI [-0.51, 0.05].

Figure 5.9 Relative direct and indirect effects of blockchain disclosure type on brand credibility and brand attitude via disclosure understandability, disclosure trust, ad credibility, and ad attitude (Study 2)

Fig. 5.9.1

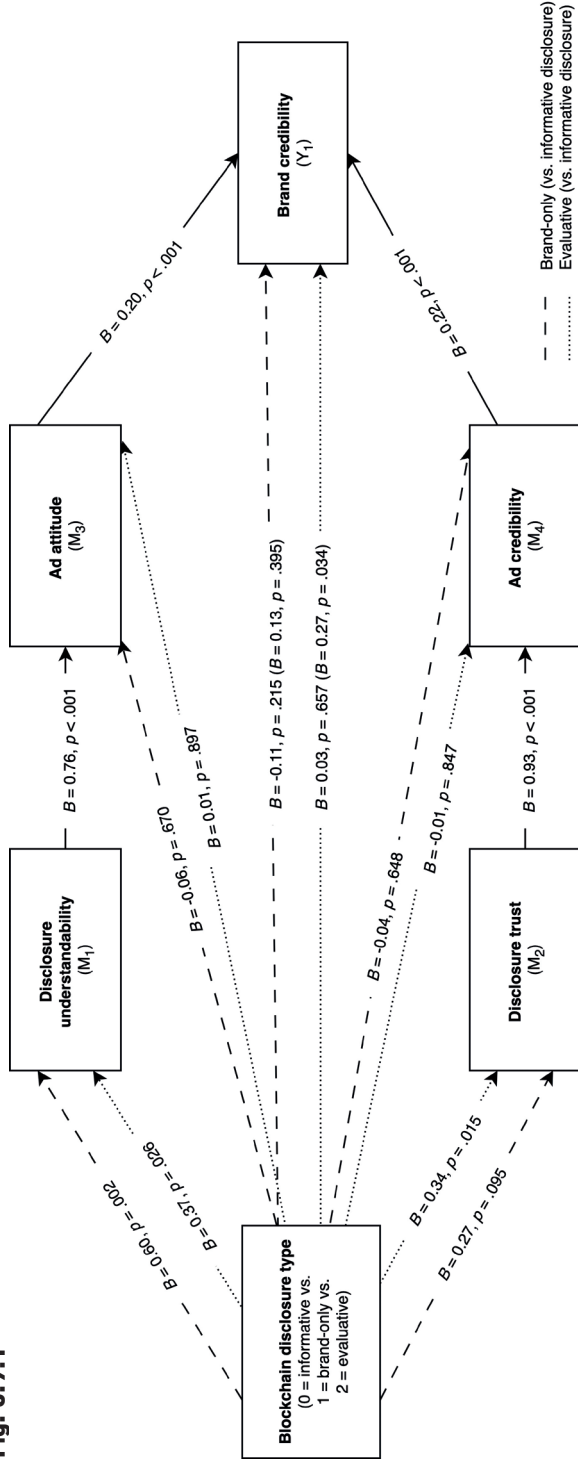
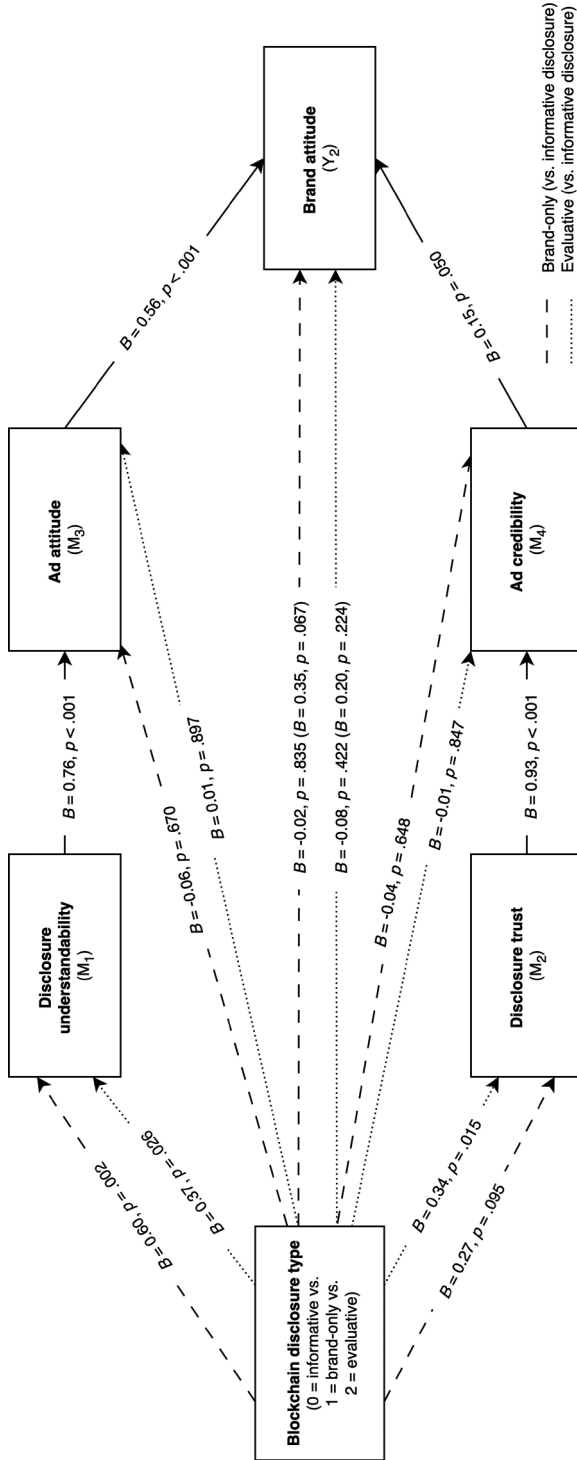


Fig. 5.9.2



Note. Unstandardised path coefficients. Total effects are in parentheses. Perceived seriousness of fake advertising included as covariate. $N = 352$. Only significant indirect effects which are relevant for answering the research question are reported: $X \rightarrow M_1 \rightarrow M_3 \rightarrow Y_2$; **Brand-only**: effect = 0.09, BootSE = 0.04, 95% CI [0.02, 0.19]; **Evaluative**: effect = 0.05, BootSE = 0.03, 95% CI [0.01, 0.12]; $X \rightarrow M_2 \rightarrow M_4 \rightarrow Y_2$; **Evaluative**: effect = 0.07, BootSE = 0.04, 95% CI [0.01, 0.16]; $X \rightarrow M_1 \rightarrow M_3 \rightarrow Y_2$; **Brand-only**: effect = 0.16, BootSE = 0.08, 95% CI [0.02, 0.32].

disclosure understandability and ad attitude. The evaluative blockchain disclosure also positively affected brand credibility via disclosure trust and ad credibility. No other indirect or serial effects were significant. These results demonstrate that the positive effects of brand-only and evaluative disclosures on disclosure understandability, and the effect of the evaluative blockchain disclosure on disclosure credibility, resulted in positive spill-over effects onto brand credibility and attitude, via ad credibility and attitude.

Discussion

The purpose of Study 2 was to replicate the results of Study 1 in the context of a Google search ad. Like Study 1, the results of Study 2 showed that disclosing advertising authenticity using blockchain disclosures did not have any positive effects on ad and brand credibility or attitudes. A brand-only disclosure also had no significant effects on ad- and brand-related variables in Study 2. Nevertheless, exploratory analyses suggest that in terms of communication strategy, brand-only and evaluative blockchain disclosures were perceived as significantly more understandable than the informative disclosure, while the evaluative disclosure was also perceived to be more trustworthy. In turn, disclosure understandability and credibility positively affected ad- and brand-related outcomes.

GENERAL DISCUSSION

The overarching goal of this study was to investigate whether blockchain-based authenticity disclosures could help consumers distinguish between real and fake advertising by providing more legitimacy to authentic ads. More specifically, it tested whether exposure to blockchain-based authenticity disclosures would increase consumer perceptions of ad and brand credibility, and lead to more positive ad and brand attitudes. It also aimed to identify which disclosure communication strategy is most effective at informing the consumer by examining which type of disclosure was judged to be the most understandable and trustworthy.

The results showed that exposure to a blockchain-based authenticity disclosure did not lead to positive ad- or brand-related effects: consumers perceived the advertising as neither more credible nor likeable. There could be several explanations for this result. On the one hand, participants may become suspicious of disclosures which openly try to convince them of

advertising authenticity. Indeed, several participants indicated at the end of the survey that this would be the case if they were faced with such disclosures in reality. This suggests that consumers may perceive the disclosures as yet another persuasion attempt by the brand rather than a helpful guide. In line with this idea, previous research has demonstrated that advertising disclosures can increase consumer resistance by activating persuasion knowledge that individuals then use to cope with persuasion attempts (Eisend et al., 2020).

On the other hand, consumers may ignore the disclosure because they perceive it as an unwelcome intrusion in their online browsing experience, which would explain the lack of positive effects on ad and brand attitudes. This situation is similar in the context of website privacy and terms of service disclosures, which are often ignored (Obar & Oeldorf-Hirsch, 2020). Finally, it is quite possible that participants did not understand how blockchain can ensure advertising authenticity, or may even be distrustful of the technology itself, which may be exacerbated by blockchain's association with cryptocurrency and non-fungible token fraud (Phan et al., 2019). Yet, research shows that trust is essential for consumer adoption of blockchain-based applications (Albayati et al., 2020). Therefore, it is essential to investigate the general sentiments towards blockchain technology, how these sentiments influence attitudes towards blockchain-based technological solutions, and the steps required before blockchain-based solutions that solve important societal problems can be widely adopted.

In terms of communication strategy, simple disclosures reaffirming which brand published the ad or evaluative blockchain-based authenticity disclosures with a contextual explanation of what it means for the consumer, were the most effective at informing the participants of the ad's authenticity in terms of understandability and trustworthiness. These findings confirm previous research showing that individuals prefer evaluative over informative labels when making purchasing decisions as they help reduce cognitive load (Talati et al., 2016).

Theoretical implications

This study makes several theoretical contributions to the fields of advertising, disinformation, and consumer empowerment. First, this study draws on theoretical and legal definitions of similar constructs to introduce and define the concept of fake advertising. In doing so, it helps to identify and

differentiate fake advertising from other forms of advertising deception, enhancing conceptual clarity. In turn, this forms the foundation for guiding policy and practical solutions to address this type of advertising deception, expands our understanding of disinformation – calling for a theoretical reconceptualization of extant disinformation taxonomies – and opens new avenues for research on advertising deception and how it can be addressed. As our findings on participants' previous experience with fake advertising demonstrate, fake advertising is prevalent in the current digital landscape and beyond, thereby highlighting the importance of dedicating research to investigating how the harmful effects of this issue can be minimised.

Second, this study takes the first steps in extending the application of signalling theory to the novel context of advertising disclosures. Since measures of information (a)symmetry were not included in the study, we cannot make definitive conclusions about the effects of disclosures on this variable. Rather, we apply signalling theory as an enabling lens to interpret our findings. In this light, our results may have several implications for signalling theory in this context. For one, they suggest that reducing information asymmetry by communicating additional ad-related information may not always be the best strategy for signalling a firm's quality, credibility, and benign intent. Alternatively, it could be that certain pre-requisite conditions must be met before information asymmetry can be reduced effectively and its positive effects can be realised. For example, it may be that consumers must perceive the information asymmetry in the first place. However, it may also be that in contexts when technology is used as a tool to reduce information asymmetry, consumers must believe in the trustworthiness of the technology. Therefore, in addition to applying signalling theory to a new context, this study also contributes to its further refinement by helping to clarify the potential boundary conditions and circumstances under which the premises of this theory do (not) hold in the context of new technologies (MacInnis, 2011).

Finally, this study also empirically validates the framework of communication strategies for labelling online information developed by Spradling et al. (2021). Our findings reveal that an evaluative communication strategy, or strategy which combines both informative and evaluative elements, is most effective at enhancing perceptions of information credibility via increasing the understandability of the label. Therefore, our study contributes to research on advertising disclosures by demonstrating this framework's applicability for developing disclosures of advertising authenticity – and information

labelling more broadly – showcasing its relevance beyond its original setting. Furthermore, the study broadens the framework's scope to developing strategies for communicating the use of a complex and poorly understood technology.

Practical implications

Although this study focused on using blockchain-based disclosures to communicate ad-related information to consumers, the findings may also have implications for firms already utilising blockchain-based labels for communicating other types of commercial (e.g., product- or brand-related) information – and for regulators in relation to the future implementation of the EU's DPPs. It seems that, from a consumer perspective, blockchain-based disclosures may not be the most effective way of communicating this information. Therefore, firms and regulators must carefully evaluate the efficacy of such solutions to bring added value to consumers.

Currently, Instagram and Google have already implemented disclosures that communicate basic ad source metadata to their consumers. Our results support the efficacy of this practice, demonstrating that simple disclosures providing a contextual explanation of how the information should be interpreted seem to be the best way to communicate ad provenance information to consumers. Future research could investigate whether this also applies to communicating other types of commercial information, such as product-related information, as required by the DPPs.

Furthermore, the high incidence of previous experience with deceptive advertising and high perceptions of the seriousness of this issue in our samples suggest that deceptive advertising is a societal problem requiring urgent attention alongside other forms of disinformation. However, our results also suggest that consumers do not see blockchain as a viable solution to this problem. As mentioned earlier, this could be attributed to a need for more trust in blockchain technology. Yet, practitioners should be cautious about disposing with blockchain for information integrity altogether: indeed, simply stating the source origin of an advertisement or other piece of content without verification may encourage fraudsters to do the same. Therefore, we recommend that practitioners continue to implement blockchain-based solutions for information integrity, albeit on the back end at present. Such an approach is successfully adopted by various blockchain-based information

integrity solutions (e.g., Provenance). In the meantime, we encourage regulators to develop educational campaigns about blockchain's true characteristics and possibilities. These will increase consumer understanding, trust and adoption of blockchain (see Chapter 4), allowing this technology's full potential for information integrity to be realised.

Limitations and suggestions for future research

From a signalling theory perspective, this study did not measure consumer perceptions of information asymmetry or blockchain trust. It may be that for blockchain-based authenticity disclosures to signal ad credibility effectively, consumers must first perceive an information asymmetry between themselves and the brand, that blockchain-based authenticity disclosures help to reduce this asymmetry, and that they trust blockchain technology in this context. Therefore, future research could examine whether blockchain-based authenticity disclosures help reduce information asymmetry and which types of information help to facilitate this. Furthermore, future research could investigate whether technological trust is a necessary pre-condition for reducing information asymmetry, in order to extend the application of signalling theory to technological contexts.

From a methodological perspective, disclosure understandability and trust were measured prior to ad and brand credibility and attitude variables, which may have primed participants to question their perceptions of understandability and trust towards the disclosure. This may have led to a suppression effect, resulting in less favourable perceptions of ad and brand credibility and trust than they had initially, and could explain the lack of significant positive effects of blockchain-based disclosures on these variables. Therefore, future studies should avoid the potential effects of priming by carefully considering question-order effects. Furthermore, this study tested the efficacy of blockchain-based disclosures in the context of ads for one product category. It may be that the risks of fake advertising are higher in other product categories, such as health or luxury goods, which could influence the effectiveness of blockchain-based disclosures in such contexts. Therefore, replication studies are needed to generalise the results to other product categories. Ultimately, this study tested just one solution to address fake advertising; future research must continue investigating alternative solutions to reduce its impact.