

Theoretical-empirical article

# Privacy Signals: Exploring the Relationship between Cookies and Online Purchase Intention



Sinais de Privacidade: Explorando Relações entre Cookies e Intenção de Compra On-Line

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## ABSTRACT

**Objective:** This study examined the role of transparency in opt-in marketing strategies, assessing the influence of cookie acceptance and consumer perception of risks and benefits on online purchasing intention. **Theoretical approach:** Previous studies have shown that consumers are concerned about privacy but feel uncertain about the consequences of their online behaviors. Drawing upon signaling theory applied to consumer behavior, we analyzed the influence of privacy signals on purchasing intention. **Method:** We employed a quantitative methodology comprising a descriptive study and four experimental studies. **Results:** Cookie acceptance positively affects purchasing intention only when consumers accept cookie collection and have a need for the product, resulting in a greater perception of benefits. Risks do not exhibit significance in this process. However, providing more information on data collection proves advantageous as it increases purchasing intention, even for those who do not accept cookies. **Conclusions:** We contribute to signaling theory by demonstrating that the product need is a determining factor for cookie acceptance. Furthermore, both notice and choice options are insufficient in protecting consumer privacy in online purchases.

**Keywords:** consumer privacy; transparency; cookies; purchase intent; signaling theory.

## RESUMO

**Objetivo:** Este estudo investigou o papel da transparência nas estratégias de marketing *opt-in*, avaliando a influência do aceite de *cookies* e a percepção de riscos e benefícios do consumidor na intenção de compra on-line. **Marco teórico:** Estudos anteriores mostram que o consumidor se preocupa com privacidade, mas se sente incerto sobre as consequências de seus comportamentos on-line. Usando a teoria da sinalização aplicada ao comportamento do consumidor, analisamos a influência das sinalizações de privacidade na intenção de compra. **Método:** Utilizamos metodologia quantitativa com um estudo descritivo e quatro estudos experimentais. **Resultados:** O aceite de *cookies* influencia positivamente a intenção de compra apenas quando o consumidor aceita a coleta de *cookies* e necessita do produto, resultando em maior percepção de benefícios. Os riscos não são significativos nesse processo. No entanto, fornecer mais informações sobre a coleta de dados é mais vantajoso, pois aumenta a intenção de compra, mesmo para quem não aceita os *cookies*. **Conclusões:** Contribuímos para a teoria de sinalização ao mostrar que a necessidade do produto é determinante para o aceite de *cookies*. Além disso, tanto o aviso quanto a opção de escolha são insuficientes para proteger a privacidade do consumidor nas compras on-line.

**Palavras-chave:** privacidade do consumidor; transparência; *cookies*; intenção de compra; teoria da sinalização.

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## INTRODUCTION

Consumer data are valuable sources of information that help managers and businesses gain competitive advantage in decision-making (Bandara et al., 2019; Wedel & Kannan, 2016). They are also the currency of digital consumption via e-commerce, which experienced major growth during the COVID-19 pandemic (Brough & Martin, 2020; Nielsen, 2021). In parallel, the General Law on Personal Data Protection (LGPD) came into effect in 2021, as well as its sanctions, in an attempt to regulate companies on the need for transparency and consent in data collection (Law n. 13.853, 2019).

Asking for the consumer's consent before collecting data via cookies is a strategy known as permission or opt-in marketing (Godin, 1999). Digital cookies can be understood as text files that record information exchanged between a web server and the user via the browser (Palmer, 2005). Consumers, when impacted by cookie requests, perform a privacy calculation, which corresponds to an assessment of perceived risks and benefits associated with disclosing personal information with shopping websites (Beke et al., 2018).

Previous studies show that consumers care about privacy, but feel uncertain about the consequences of their behaviors related to online privacy preferences (Acquisti et al., 2020). Other studies, such as that of Schmidt et al. (2020), indicate that consumer consent about tracking increases their perceived fairness about dynamic pricing as well as purchase intention. Furthermore, Bornschein et al. (2020) studied the visibility of cookie requests and found that most shopping websites have low visibility on requests and give limited choices to the consumer, affecting their perceived power and risk perception, as well as purchase intention. However, what the studies have not yet shown is whether the architecture of the requests influences purchase intention as well as whether or not to accept cookies.

Accordingly, this study investigates the role of transparency in opt-in marketing strategies by assessing the influence of cookie acceptance and the mediating role of consumers' perception of risks and benefits on their online purchase intention through a quantitative experimental methodology. From a theoretical perspective, this study contributes to the consumer decision-making literature by investigating alternative signals and mechanisms that help explain the tension that exists between the use of consumers' personal information and online sales platforms (Thaichon et al., 2019), based on signaling theory as applied to consumer behavior (Al-Adwan et al., 2022; Boulding & Kirmani, 1993; Guo et al., 2020; Lu & Chen, 2021; Mavlanova et al., 2012; Mavlanova et al., 2016) and also contemplating the consumer privacy situational environment by identifying

possible external influences (context and the purchase need) on consumer decision-making about their personal privacy in e-commerce (Bandara et al., 2019). We also highlight that, although the effects of signals of various natures on purchase intention have been evaluated in previous studies regarding interactions in e-commerce, such as, for example, return policy signals (Oghazi et al., 2018), uncertainty reduction signals (Lu & Chen, 2021), customer service signals (Guo et al., 2020) or quality signals (Addo et al., 2022), no research has been identified in the literature that specifically assesses the effect of accepting cookies as a privacy and security signal on consumer purchase intention, thus increasing the theoretical contribution of this paper.

From a managerial perspective, we contribute to marketing managers to understand if, in the Brazilian context, the consumer is reactive to online privacy signals and issues. This study also highlights the importance of cookie infrastructure and the implementation of responsible and clearly signaled online privacy practices for users of e-commerce platforms (Schmidt et al., 2020). Furthermore, the research also brings insights for marketing and information managers to more assertively structure privacy requests on e-commerce platforms.

From a social point of view, this study contributes to investigating whether public privacy protection policies, such as the LGPD, are in practice effective for consumer protection, as we understand that public privacy protection policies play an important role in ensuring individual and social rights, and contribute in various ways to society and to more conscious marketing practices.

This paper is organized into the following sections: a theoretical framework with the presentation of the signaling theory; the deduction of hypotheses about transparency in opt-in marketing strategies; the need to purchase, transparency, purchase intention, and the acceptance of cookies as a form of explicit consent; and the perception of benefits and risks and their influence on the intention to purchase online. Next, we present a summary of the five conducted studies, their procedures, and their results. Finally, discussions and conclusions are carried out.

## THEORETICAL FRAMEWORK

### Signaling theory

Signaling theory has its origin in the study of Spence (1973), who evaluated how the problem of information asymmetry in an interaction between seller and buyer could be solved with the use of signaling mechanisms (such as incentives, warnings, or guarantees) that indicated to the buyer (the party with less power in the relationship) who

were the good or bad sellers (Boulding & Kirmani, 1993). According to Mavlanova et al. (2012), in e-commerce, where it becomes impossible to physically evaluate products before a purchase, as well as difficult to accurately gauge how secure a transaction proposed by an e-commerce seller is, the use of website signals that help consumers trust and decide to do business with a company, reducing uncertainty, becomes a particularly important tool. In turn, Al-Adwan et al. (2022) point out that for online retailers, the use of website signals that help consumers make more accurate judgments of quality, security, and privacy can increase consumer trust and purchase intent. Among the possible signals to be used by e-commerce websites, we can list cookie acceptance notices, data collection, and privacy policies — also called regulatory compliance signals, according to Mavlanova et al. (2012), since many of these signals only occur after regulations (such as LGPD, for example) start requiring them. In a later study, Mavlanova et al. (2016) concluded that there are effects of signals present on websites on consumers' purchase intention, discussing, among several types of signals, signals of privacy policies and rules about the use of user information.

Mavlanova et al. (2012) point out that, within the three phases of online shopping (pre-purchase, during purchase, and post-purchase), signals such as cookie policy warnings, data management, and privacy would occur still in the pre-purchase phase, at the beginning of the browsing process in the online store, with warnings of this nature being able to indicate higher quality or reliability of the seller, potentially helping in the consumers' decision-making process and increasing their purchase intention, an effect also indicated by Guo et al. (2020), Addo et al. (2022), Al-Adwan et al. (2022) and Bhattacharya et al. (2023). However, the mere notice or acceptance by the consumer of the privacy conditions set forth does not necessarily guarantee that the seller will deliver on its promises (Mavlanova et al., 2012; Mavlanova et al., 2016).

Thus, given the relevance and adequation of signaling theory for the evaluation of the different types of signals present during the e-commerce experience and their potential influence on the purchase decision-making process, this study proposes to use this theory in the evaluation of the possible effects of transparency signals (warnings) about the collection of cookies and their eventual acceptance (or not) by the consumer on purchase behavior of users of e-commerce platforms.

### Transparency in opt-in marketing strategies

With the consumers at the center of organizational strategies, the collection and use of data have become

indispensable for understanding their online behavior. Martin et al. (2017) indicate that companies can use customer data to increase productivity and the success of their actions, making around 6% more profit than competitors that do not make such use. However, companies have come under pressure from regulations requiring transparency in the collection and handling of consumer data, particularly in e-commerce environments, as highlighted by Chawla and Kumar (2022). Under this aspect, transparency is a principle defined as “a guarantee, to data subjects, of clear, precise, and easily accessible information about the performance of the processing and the respective processing agents, subject to commercial and industrial secrets” (Law n. 13.709, 2018, p. 3). Opt-in marketing refers to the explicit permission requests that companies need to make to consumers regarding any action they wish to perform with them, including collecting data transparently via the use of cookies (Godin, 1999).

Previous studies have shown that companies that compromise their consumers' privacy through the use of tracking technologies, without prior communication about data collection, have experienced reduced consumer purchase intent in their e-commerce operations (Maseeh et al., 2021; Miyazaki, 2008; Scarpi et al., 2022). Bhattacharya et al. (2023), in a study in India, highlight that this privacy concern in digital environments is important in emerging economies, influencing consumer trust and purchase intent. Maseeh et al. (2021), in turn, conducted a meta-analysis of 158 journal articles on privacy concerns in e-commerce and concluded that privacy policies are able to reduce consumers' perceptions of risk and their trust in e-commerce platforms, thus increasing the intention to use these shopping channels. Thus, we argue that communicating to consumers about the collection of personal data through clear signals (such as cookie acceptance requests) is more advantageous for the company because it establishes a transparent relationship between consumer and company, which can generate greater trust in both the transaction and the company, potentially increasing purchase intention (Bornschein et al., 2020) and decreasing consumer perceptions of vulnerability regarding the company's use of their data (Martin et al., 2017). Scarpi et al. (2022) emphasize that the quest for transparency and consent over data use is particularly important in e-commerce platforms.

### Purchase needs, transparency, and purchase intention

People have needs that act as motivators and guide purchasing behaviors in pursuit of satisfying these demands, such as the physiological ones of food, clothing, and social interaction (Han et al., 2016; Maslow, 1943). According to Maslow (1943), every behavior is a means for a basic need to

be expressed or fulfilled. Thus, the behaviors that have taken hold amid the COVID-19 pandemic, such as home office and online shopping, have motivated purchasing behaviors due to the need to buy basic items such as clothing, food, office items, etc., remotely.

Thus, we propose that the changes in the forms of consumption caused by the COVID-19 pandemic have modified traditional ways of consumption and driven the construction of a broader digital consumer market. The perception of need associated with the online purchase of products acts as an important variable to diminish eventual consumer aversions to sharing data. The presentation of notices about cookie and data use policies is interpreted by consumers as a sign of transparency, privacy, and security (Mavlanova et al., 2016), since they are explicitly consulted about the processes of the pre-purchase stage and must actively choose to give (or not) permissions, which may lead to higher purchase intent (Bhattacharya et al., 2023; Guo et al., 2020). Several studies, such as Mavlanova et al. (2016), Oghazi et al. (2018), Guo et al. (2020), Al-Adwan et al. (2022) and Addo et al. (2022), directly or indirectly link perceived signals in e-commerce environments to consumer purchase intention. Therefore, we propose that transparency signals (through the request for explicit authorization to use cookies) are able to increase consumer purchase intention (Bornschein et al., 2020), to the extent that the consumer is actually in need of buying the product. Therefore, we present the following research hypothesis:

**H1:** The presence of transparency signals (*vs.* no transparency signals) about cookie collection on an e-commerce website increases (*vs.* decreases) the consumer's online purchase intention, keeping the need for the product constant.

Therefore, in this study, transparency plays a central role in evaluating different types of privacy signaling in an e-commerce context so that we can understand its influence on consumer purchase intention, as companies adopt different types of signaling. Moreover, the need to purchase is an important situational variable in this process, given the pandemic context that has altered traditional forms of consumption. Therefore, the need will be used for the situational and unintentional understanding of the results.

## Acceptance of cookies as a form of explicit consent

Consumers, as individuals, understand that their privacy in e-commerce corresponds to the protection of their own right to decide about purchasing activities (Beke et al., 2018; Bhattacharya et al., 2023). More than that, consumers have the perception that their private activities should be confidential (Altman, 1976) and access to their

data by companies implies a violation of privacy, particularly when there are no notifications about the access, permission or consent (Beke et al., 2018). Thus, in the face of the LGPD, companies have been required to record the consumer's express consent through clear regulatory compliance signals (Mavlanova et al., 2012).

We propose that when an individual is immersed in the online shopping context and perceives that the website is being transparent, through internal privacy and transparency signals (Guo et al., 2020; Mavlanova et al., 2016), such as warnings about the use of cookies, and the consumer accepts the use of such cookies, there is a tendency to increase his intention to purchase from that site (Scarpi et al., 2022), as the consumer understands that this is a sign that the company is compliant with the law and is clear about how it collects and uses customer data (Chawla & Kumar, 2022; Oghazi et al., 2018). The fact that consumers do not accept or simply ignore data collection notifications may be indicative of low purchase intent, as consumers who reject the collection are more resistant to the online relationship with the company and, therefore, less likely to purchase. Thus, we present the following research hypothesis:

**H2:** Consumers who accept (*vs.* do not accept) the collection and use of cookies have higher (*vs.* lower) online purchase intention.

## The structure of cookie requests

The format of the questions that make up a privacy application is important. The way the question is presented and the type of default option are relevant signals (Akdeniz & Talay, 2013) that will influence the consumer's decision-making (Johnson et al., 2002). There are many types of cookies and for many different functions (Palmer, 2005), but the most common cookies are session (essential) cookies, characterized as temporary data files that are deleted when leaving the browsing site (Kierkegaard, 2005) and used to log pages viewed and improve site navigation (Palmer, 2005).

Another type of cookie widely used for marketing purposes are persistent cookies (here called performance cookies) which, unlike session cookies, are only deleted when they expire or if the consumer manually deletes them from his or her computer (Kierkegaard, 2005). This type of cookie is widely used to track consumer behavior online, as well as remember preferences and establish patterns of behavior that will help improve the user experience on the site and set product suggestions and advertisements according to consumer behavior (Palmer, 2005).

Personalization of content, offers, and product suggestions are features that the use of consumer data provides (Bandara et al., 2019; Palmer, 2005). As such, we

propose that consumers who accept performance cookies get more benefits associated with disclosing their personal information with the website, as the associated potential gain is shown to be greater than compared to session cookies. In this way, we suggest that requests for performance cookies may positively influence consumer purchase intention, since consumers, when reflecting on their online privacy, see a perceived gain of convenience and personalization greater than the risks involved, thus tending to increase online purchase intention. Therefore, we present the following research hypothesis:

**H3:** Accepting the request for performance (*vs.* essential) cookies increases (*vs.* decreases) online purchase intention.

On another note, the study by [Bornschein et al. \(2020\)](#) investigated the structure of cookie prompts and provided results showing that most websites have low visibility for cookie warnings to the consumer and 36% simply did not provide any warning despite using cookies. Additionally, [Bornschein et al. \(2020\)](#) indicate that high visibility (*vs.* low *vs.* no warning) affects the perceived risk associated with the website, and the greater the consumers' power of choice over which information is collected about them, the greater the purchase intention.

Thus, we propose that the amount of information made available to the consumer in cookie requests (too much information *vs.* too little information) is likely to influence purchase intention. We believe that when the website provides signals related to its privacy policy, about what information will be collected and for how long it will be stored, giving the consumer the option of interaction and choice about sharing, the higher will be his intention to purchase on that website, even if he does not accept the cookies, because the signals issued help the seller to establish a relationship of trust and transparency with the buyer ([Boulding & Kirmani, 1993](#); [Mavlanova et al., 2012](#)). Therefore, we present the following research hypothesis:

**H4:** The greater the amount of cookie information to be collected, the greater the purchase intention, conditional on whether or not the cookie request is accepted.

## The perception of benefits and risks and its influence on the intention to purchase online

The literature on privacy in marketing shows that consumers perform a privacy calculation, equating the risks *vs.* the benefits related to making their personal information available to companies ([Culnan & Bies, 2003](#); [Dinev et al., 2013](#); [Kehr et al., 2015](#)). Thus, we understand that every

time consumers, when visiting online stores, have their personal data requested, they perform an analysis of perceived risks (data leakage, exposure, disruption with ads, lack of privacy, etc.) and perceived benefits (personalized browsing experience, additional content, advance information, product suggestions, etc.) that may be involved in data collection.

The perceived benefits formed by the consumer positively affect his actual behavior ([Culnan & Armstrong, 1999](#)). Furthermore, [Simon \(1955\)](#) stated that individuals usually make decisions with the objective of obtaining the greatest possible benefit, as well as having the lowest risk involved. Thus, we argue that when the consumer is in an online purchasing context and notices the compliance signals, where the company is requesting his personal information through cookies, he instantly initiates a conscious process of privacy calculation.

Previous studies show that regulatory compliance signals help consumers in the decision-making process ([Addo et al., 2022](#); [Bhattacharya et al., 2023](#); [Guo et al., 2020](#)), especially by increasing their perception of trust in the company ([Al-Adwan et al., 2022](#)). Thus, when faced with a cookie request, the evaluation process begins, and if there is a perception of trust and quality toward the website from the compliance signals, there is a tendency for the consumer to be more positive toward the website. Thus, we argue that if the perception of benefits is greater than the associated risks, it will positively influence the purchase intention. In other words, if the company is transparent and signals cookie collection to the consumer, the consumer will interpret transparency as a sign of trust and as a perceived benefit and thus have higher purchase intention ([Al-Adwan et al., 2022](#); [Culnan & Armstrong, 1999](#); [Martin & Murphy, 2016](#)). Therefore, we present the following research hypothesis:

**H5:** Acceptance of cookies leads to consumers' perception of more benefits, increasing their intention to purchase online.

However, there are many risks associated with disclosing personal information (lack of privacy). The literature shows that the perception of risks that consumers have negatively affected their actual behavior ([Culnan & Armstrong, 1999](#)). Given this, we propose that when performing the privacy calculation, if the consumer has a perception of risks greater than the perception of benefits, their intention to purchase online will decrease, since the risks associated with the transaction may generate aversion and fear. Therefore, low (*vs.* high) perceived associated risks make consumers accept (*vs.* not accept) cookies, and this increases (*vs.* decreases) their online purchase intention. Thus, we present the following research hypothesis:

**H5a:** Accepting cookies leads to lower perceived risks and higher online purchase intention.

## OVERVIEW OF THE STUDIES

Through five studies (one descriptive and four experimental), we tested our research hypotheses. The preliminary descriptive study was conducted with real e-commerce companies using secondary data from Google Analytics to understand actual consumer behavior regarding privacy signals. Next, Study 1 verifies the effect of transparency signals on consumer purchase intention (H1) through a fictitious online purchase scenario of a slipper. Study 2 brings evidence to corroborate hypothesis H1 by investigating the effect of transparency signals and cookie acceptance on purchase intention and tests hypothesis H5 through a fictitious scenario of buying a pair of pajamas.

Study 3 also manipulates transparency signals, via the type of cookie requested (essential *vs.* performance). Using a sock purchase scenario, the study tested hypotheses H2, H3, H5, and H5a. Finally, Study 4 investigated whether the amount of information made available from the cookie request influences consumer purchase intent, using a fictitious t-shirt purchase scenario.

Data from the experimental studies were collected from Qualtrics software. Due to the pandemic of COVID-19, data collection could only be conducted online, and therefore data was collected via Facebook, through sponsored ads to ensure the randomness of responses. The products used in the experiment scenarios were chosen because of the pandemic context, where the consumption of products used in the home increased to the detriment of superfluous or luxury products. The samples of the experiments respected the minimum criteria of 30 people in each experiment condition, as suggested by Hair et al.

(2009). Statistical analyses were done through IBM SPSS Statistics statistical software using the PROCESS macro, which is an extension created for SPSS for multivariate data analysis and mediation analysis, as well as integrated conditional process models (Hayes, 2018). Finally, we also used general linear model (GLM) in the analyses, as it is an extension of the linear regression model and indicated for cases of probability distributions other than the normal distribution, which makes it more flexible to handle the data (Hair et al., 2009).

## PRELIMINARY DESCRIPTIVE STUDY

**Objective and sample:** this study aimed to describe the actual behavior of e-commerce consumers regarding the influence of privacy requests on the conversion rate of the site. To do so, secondary data from Google Analytics were collected from two companies, an online bookstore and a training site for contests, during six days. The bookstore had 30,729 accesses, and the training site had 125,772 thousand accesses during the analyzed period, totaling 156,501 thousand accesses.

**Method:** to record the information of users' clicks on the privacy request, a click event was set up within Google Analytics of the companies so that subsequent actions could be recorded. The websites had different cookie request formats, as shown in Table 1. On the bookstore website, the cookie request was located in the lower-left corner of the website in a square format. The training site, on the other hand, presented the request with a horizontal strip in the footer. Neither request was mandatory, i.e., the consumer was not prevented from browsing the site by not clicking on the cookie request. Therefore, the total sessions also include those consumers who ignored the cookie request and continued browsing the site.

**Table 1.** Format of cookie requests from the analyzed websites.

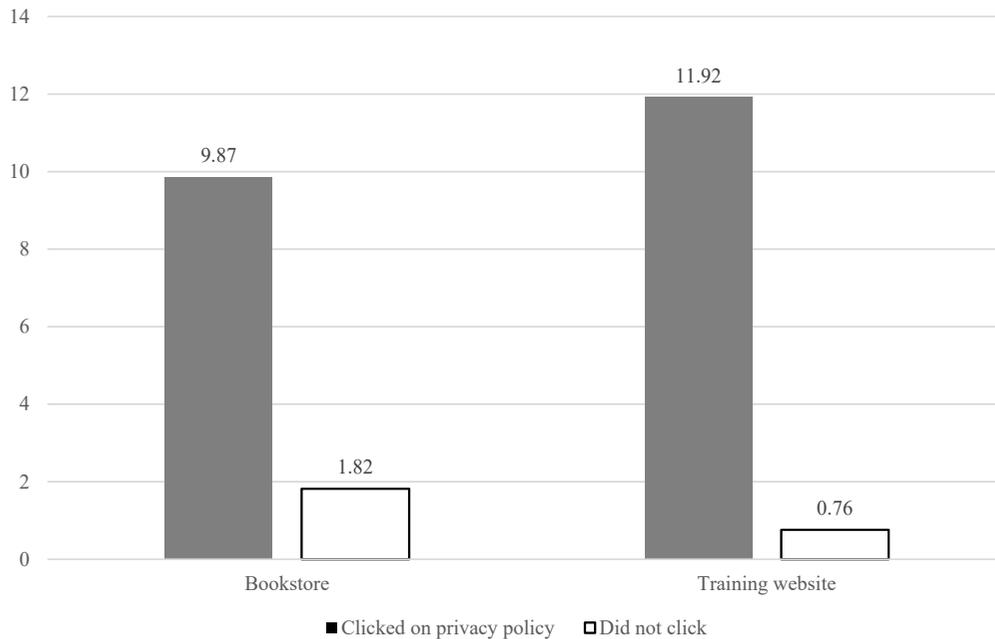
Website	Text	Click buttons	Privacy policy	Terms of use	Opt-out option
Book e-commerce	Take control of your privacy. Our site uses cookies to improve navigation.	My Options/ I accept	Yes	Yes	Yes
Training e-commerce	To optimize your browsing experience, we make use of cookies. By continuing on the site, we consider that you are in agreement with our Cookies Policy.	Ok, continue browsing	Yes	No	No

**Note.** Source: Survey data.

## RESULTS

**Conversion rate:** aggregated Google Analytics data from the companies analyzed shows that during the period, the bookstore's conversion rate was 9.87% for consumers who

clicked on the privacy policy, compared to 1.82% conversions for those who did not click. The training website showed similar results, where the conversion rate was 11.92% for consumers who clicked on the privacy policy, compared to 0.76% conversions for those who did not click, as Figure 1 shows.



**Figure 1.** Sales conversion rate of the analyzed websites.

Source: Secondary data from Google Analytics of the companies studied.

Average purchase ticket: the average amount spent by bookstore consumers was also higher for those who clicked on the privacy request (R\$ 233.82) when compared to those who did not click (R\$ 207.71). For the training site, the same behavior was repeated, with the average ticket value being R\$ 81.70 for those who clicked and R\$ 54.42 for the others.

## DISCUSSION

From real data, we observe that the conversion rate and average ticket are higher for consumers who click on privacy requests. These descriptive results meet hypotheses H1 and H2, showing that the presence of transparency signals in the cookie request is relevant in influencing higher sales rates and average tickets. These data are relevant and raise curiosities and questions about why there are differences in company conversions between those who click and those who do not click on the cookie policy. Moreover, this study also points ways to understand how best to present signals of regulatory compliance to the consumer (Al-Adwan et al., 2022; Mavlanova et al., 2012; Mavlanova et al., 2016), since the actual websites analyzed presented privacy requests with little information, reduced visibility (Schmidt et al., 2020), no obligation, and still did not specify the type of cookie collected. Therefore, subsequent studies should further investigate the different formats of transparency signaling of privacy requests in order to verify whether the format and

acceptance of cookie requests can influence online purchase intention.

## STUDY 1

**Objective and participants:** The purpose of this study was to verify the effect of transparency signals on consumer purchase intention and to test hypothesis H1. The study was conducted with 142 consumers (62% between 36 and 60 years old, 78.9% female). The experimental design was single factor with three randomized between-subjects conditions on the independent variable (transparency), these being (a) warn that you will collect cookies; (b) warn that you will not collect cookies; and (c) control.

**Procedures and measurements:** participants were exposed to a situation scenario of buying a slipper on a fictitious shopping website in all conditions. In condition 1, the site warned about the collection and use of cookies. In condition 2, the site signaled that it would not collect data and that the participant was anonymous. Condition 2 was created to see if signaling to the consumers that they are anonymous could have a positive influence on purchase intent. In the control condition, there was no signaling at all about data collection. The independent variable manipulated in this study was website transparency, manipulated based on adaptations from the study by Schmidt et al. (2020). The dependent variable (purchase intention) was measured on a seven-point Likert scale, via a question adapted from Ku

et al. (2012): 'My interest in buying from the website I was browsing is high.' Manipulation check was measured via a binary question about awareness of data collection. Finally, demographic and control questions (measured binary) were asked about the need for the product.

## Results of study 1

Transparency manipulation check: the manipulation check was calculated using Pearson's chi-square test of the binary item of awareness of data collection [ $X^2(6, N = 142) = 12.914; p = 0.044$ ], which showed that there is an association between awareness of data collection and perceived transparency of the website.

Purchase intention: variations in consumer purchase intention were verified from a univariate general linear model (GLM) that showed marginal significance results of the transparency signals on purchase intention ( $F(1.142) = 3.504; p = 0.063$ ) and the need for the product as a covariate and uncontrolled explanation of the model ( $F(1.142) = 50.628; p = 0.000$ ). Mean purchase intention scores were higher for condition 1 ( $M = 5.14; SD = 1.78$ ) when compared to condition 2 ( $M = 4.84; SD = 1.67$ ) and control ( $M = 4.69; SD = 1.77$ ), partially corroborating hypothesis H1, showing that need is a determinant for individuals to perceive website transparency and have higher purchase intention.

## Discussion of study 1

The main objective of this study was to calibrate the manipulation of the independent variable and test hypothesis H1. The results were marginal and point to a trend that when the consumer really needs to buy a certain product, transparency signals influence online purchase intention, and the difference is greater for the condition that collects consumer data (Maslow, 1943; Mavlanova et al., 2012). This result meets what Brough and Martin (2020) warned about the consumers' vulnerability in the face of the need not to leave home during the COVID-19 pandemic while continuing to buy products for their survival and satisfaction of basic needs (Maslow, 1943). This study had the chosen manipulation itself as a limitation, and the results cannot confirm the tested hypothesis. The next study should reinforce the direct relationship and bring explanatory mechanisms that reinforce the model, as well as explore another type of product that is more relevant at the time of the pandemic when people reduced the purchase of superfluous products or without latent need. Additionally, the next study should explore consumer choice to investigate whether purchase intention increases as consumers have the option to opt out of data collection.

## STUDY 2

Objective and participants: the purpose of this study was to examine the effect of transparency signals on consumer purchase intention by testing hypothesis H1 and hypotheses H5 and H5a on the mediation of the privacy calculus on online purchase intention. The study was conducted online with 325 participants ( $M_{age} = 27.3, SD = 13.8, 76.3\%$  female). The experimental design was single factor with two randomized between-subjects conditions on the independent variable, these being (a) no transparency; and (b) with transparency.

Procedure and measurements: participants were exposed to a situation scenario of buying pajamas on a shopping website. In the transparency condition, the website requested the use of cookies, and participants had to choose whether to accept them, via a specific question just below the stimulus asking if they would accept the cookie collection (this variable will be used as a predictor by coding it together with transparency). In the no transparency signal condition, the shopping site did not feature any data prompts. The independent variable manipulated in this study was website transparency, which worked on the basis of adaptations of the study by Schmidt et al. (2020). The dependent variable is the consumer's online purchase intention, measured by a question based on Ku et al. (2012), 'the probability that I will buy from the website I was browsing is high.' Privacy calculation mediation was measured by Dinev et al. (2013) perceived risks and benefits scale with alphas of 0.814 0.804, respectively. The scales used were measured using a seven-point Likert scale. The manipulation check was measured by means of a question related to website transparency on a seven-point Likert scale. Finally, demographic questions and a control question (measured in binary form) were asked about the need for the product.

## Results of study 2

Transparency manipulation check: a new variable was coded, uniting transparency and cookie acceptance. The verification was calculated from an ANOVA test and showed significant results for the transparency check item ( $F(2.325) = 3.92; p = 0.021$ ), indicating those who accept cookies see more shopping site transparency ( $M_{transparent\ and\ accept\ cookies} = 3.95, SD = 1.90; M_{transparent\ and\ not\ accept\ cookies} = 3.02, SD = 1.81; M_{not\ transparent} = 3.79, SD = 2.05; F(2.325) = 3.92; p = 0.021$ ).

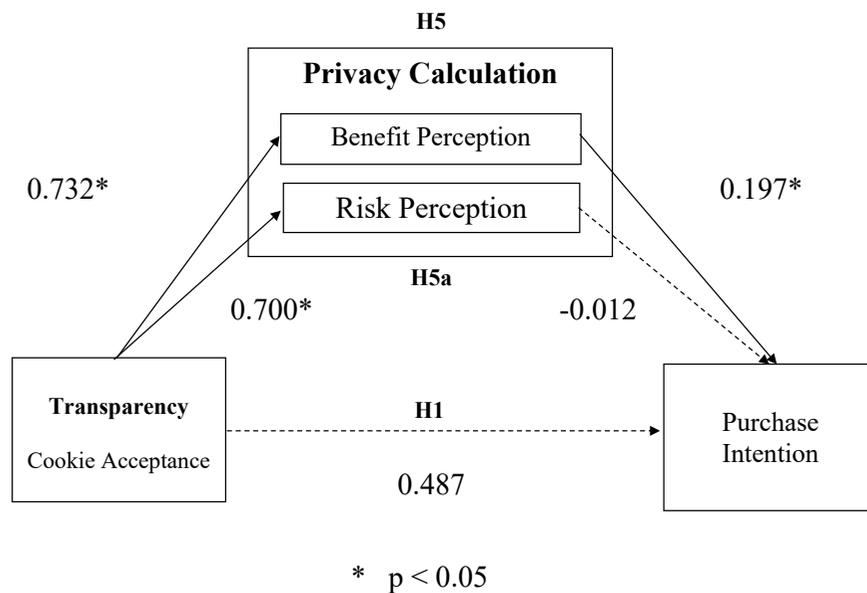
Purchase intention: using the variable that was coded uniting transparency and cookie acceptance, a GLM test was conducted and showed significant effects of cookie acceptance on purchase intention ( $F(2.325) = 3.603; p = 0.028$ ) and need as an uncontrolled explanation of the model ( $F(1.325) = 45.776; p = 0.000$ ). The means were

higher in the transparent condition and accepting cookies ( $M = 4.70$ ;  $SD = 1.70$ ) compared to those who did not accept cookies ( $M = 4.06$ ;  $SD = 1.73$ ) and the non-transparent condition ( $M = 4.43$ ;  $SD = 1.80$ ;  $F(2,325) = 3.603$ ;  $p = 0.028$ ). Thus, the results prove hypothesis H1, showing that need is a determinant of whether individuals perceive website transparency signals and reflect on privacy.

**Benefit perception:** a univariate GLM model was conducted to check the effect of transparency and cookie acceptance on perceived benefits and showed significant results ( $F(2,325) = 3.912$ ;  $p = 0.021$ ). The mean scores of perceived benefits were higher for the transparent condition and those who accepted cookies ( $M = 2.99$ ;  $SD = 1.72$ ), compared to those who did not accept ( $M = 2.26$ ;  $SD = 1.31$ ;  $F(2,325) = 3.690$ ;  $p = 0.026$ ) and the no transparency condition ( $M = 2.70$ ;  $SD = 1.57$ ). For the mediation analysis of benefit perception and testing of hypothesis H5, we used only the transparent condition ( $N = 172$ ) in PROCESS via Hayes (2018) model 4 for simple mediation analysis, and the results show that transparency and acceptance influence

benefit perception (Coef = 0.732;  $p = 0.009$ ;  $CI = [0.183; 1.128]$ ) and perceived benefits positively influence consumer purchase intention (Coef = 0.197;  $p = 0.014$   $CI = [0.039; 0.354]$ ), proving hypothesis H5, as illustrated in Figure 2. The direct effect did not occur (Coef = 0.487;  $p = 0.099$ ;  $CI = [0.094; 1.069]$ ), the total indirect effect obtained a coefficient of 0.1443 ( $p = 0.0145$ ) and the total effect of mediation showed a coefficient of 0.632 ( $p = 0.032$ ;  $CI = [-1.211; -0.053]$ ).

**Risk perception:** the same tests were conducted for risk perception, but the results were not statistically significant for risks under consumer purchase intention (Coef = -0.012;  $p = 0.889$ ;  $CI = [-0.209; 0.184]$ ). The effect of cookie acceptance on risk perception was significant (Coef = 0.700;  $p = 0.023$ ;  $CI = [0.253; 1.136]$ ). The total indirect effect showed a coefficient of -0.008 ( $p = 0.032$ ;  $CI = [-0.189; 0.147]$ ) and the total effect a coefficient of -0.632 ( $p = 0.032$ ;  $CI = [-1.211; -0.053]$ ), thus rejecting hypothesis H5a, as Figure 2 shows.



**Figure 2.** Analysis of benefit mediation on purchase intention. Source: Elaborated by the authors.

## Discussion of study 2

The main objective of this study was to test hypotheses H1, H5, and H5a. The results indicate that when the consumer really needs to buy a certain product, transparency signals combined with cookie acceptance influence the consumer’s purchase intention. Risk perception was not significant, and H5a was rejected. The perception of benefits,

on the other hand, showed full mediation, so when the individual perceives that the website is transparent, he/she sees greater benefits tied to the use of cookies and therefore has higher purchase intention (Al-Adwan et al., 2022), since the perception of benefits that consumers have positively affected their actual behavior (Culnan & Armstrong, 1999). The next study should investigate possible variations in the type of cookie requests that websites make to the consumer.

### STUDY 3

**Objective and participants:** the aim of this study was to test the influence of cookie acceptance (H2) and types of cookie requests on purchase intention (H3), also replicating mediation (H5 and H5a). The study was conducted online with 168 participants (63.7% between 26 and 45 years old, 83.9% female). The experimental design was single factor with three randomized between-subjects conditions on the independent variable (transparency: type of cookie requested), the conditions being: (a) essential cookies (N = 53); (b) performance cookies (N = 58); and (c) control (N = 57).

**Procedures and measurements:** participants were exposed to a situation scenario of buying a sock on a shopping website, where in condition 1, the website requested the use of essential cookies, and participants had to choose whether to accept them or not, via a specific question just below the stimulus (used as a predictor of transparency). Condition 2 asked for performance cookies, and the control condition said nothing about data collection. The independent variable manipulated in this experiment was again the transparency of the site, reflected in the types of cookies requested (essential *vs.* performance). The dependent variable was measured based on [Ku et al. \(2012\)](#). The mediating variable was measured by [Dinev et al. \(2013\)](#) risk and benefit perception scale with alpha of 0.840 for risks and alpha of 0.853 for benefits. Manipulation checks were measured in a question about website transparency and measured on a seven-point Likert scale. Finally, demographic and control questions (measured in binary form) were asked about the need for the product.

### Results of study 3

**Transparency manipulation check:** a univariate GLM was calculated and presented results indicating that for consumers who accepted cookies, the perceived transparency of the shopping site is higher (M = 4.48; SD = 2.07) when compared to individuals who did not accept cookies (M = 3.17; SD = 1.72;  $F(2.168) = 5.210$ ;  $p = 0.006$ ). The control condition (non-transparent) showed no significant difference compared to the other conditions (M = 3.68; SD = 1.95).

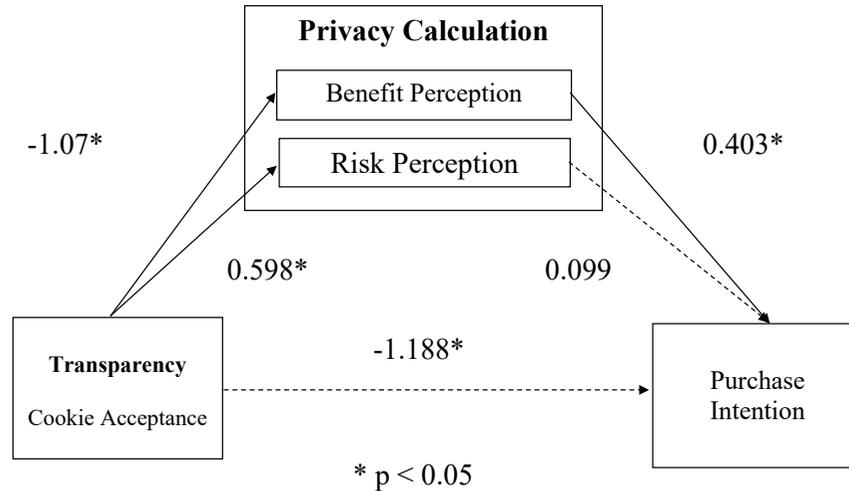
**Purchase intention:** a GLM model was estimated to verify the relationship between purchase intention and cookie acceptance, used as a predictor variable of transparency. The results show that mean consumer purchase intentions were higher for individuals who accepted the cookie collection (M = 5.01; SD = 1.67;  $F(2.168) = 6.505$ ;  $p = 0.002$ , respectively) when compared to those who did not accept cookies (M = 3.39; SD = 1.53), thus confirming hypothesis H2 and rejecting H3 and need for the product as a covariate in the model ( $F(1.168) = 34.894$ ;  $p = 0.000$ ).

**Benefit perception:** a univariate GLM model was conducted and found significance within the transparent conditions (N = 111) for the influence of accepting cookies on consumer perception of benefits ( $F(1.111) = 6.523$ ;  $p = 0.012$ ). The mean scores of perceived benefits were higher for the transparent condition and accepting cookies (M = 3.97; SD = 1.78), compared to those who did not accept (M = 2.89; SD = 1.82;  $F(1.111) = 6.523$ ;  $p = 0.012$ ). The same was observed for consumer purchase intention and, therefore, those who accept cookies tend to purchase more (M = 5.01; SD = 1.67) than those who do not (M = 3.39; SD = 1.53;  $F(1.111) = 17.595$ ;  $p = 0.000$ ). For the mediation test of hypothesis H5, a regression analysis on PROCESS was conducted using [Hayes \(2018\)](#) simple mediation model 4, and the results show that cookie acceptance influences consumers' perceived benefits (Coef = -1.07;  $p = 0.012$ ; CI = [-1.902; -0.239]) and perceived benefits in turn positively influence purchase intention (Coef = 0.403;  $p = 0.000$ ; CI = [0.245; 0.561]), reinforcing the findings of Study 2 with the replication of hypothesis H5. There was also a direct effect of cookie acceptance on consumer purchase intention (Coef = -1.188;  $p = 0.001$ ; CI = [-1.900; -0.476]), corroborating H2. The total mediated effect was: Coef = -1.620;  $p = 0.001$ ; CI = [-2.385; -0.854].

**Risk perception:** the same tests were conducted for the effect of cookie acceptance on risk perception, but the results were not statistically significant (Coef = 0.598;  $p = 0.059$ ; CI = [-0.023; 0.219]) and the effect of risk on purchase intention also did not occur (Coef = 0.0999;  $p = 0.399$ ; CI = [-0.334; 0.134]), again rejecting hypothesis H5a. Figure 3 illustrates these relationships.

### Discussion of study 3

Experiment 3 tested hypotheses H2, H3, H5, and H5a. The results point out that only the type of cookie requested (essential or performance) is not able to increase consumer purchase intention, rejecting H3. Once the consumer accepts cookie collection, they tend to perceive greater associated benefits, which shows that privacy signals can help the consumer associate the website with quality and security, as [Al-Adwan et al. \(2022\)](#) and [Bhattacharya et al. \(2023\)](#) indicated. Benefit perception showed full mediation, replicating the findings of Study 2 and reaffirming H5. As limitations of this study, we have the manipulation cut chosen, as there was no effect of the type of cookies, but rather of cookie acceptance on purchase intention. It is unclear whether the effect is coming from the type of choice option or whether it is the nature of the acceptance that is affecting the direct relationship. Therefore, the next study should explore whether the amount of transparency information signaled to the consumer in cookie requests is influencing the relationships.



**Figure 3.** Mediation analysis of benefits in purchase intention.  
Source: Elaborated by the authors.

## STUDY 4

**Objective and participants:** the purpose of this study is to examine whether the amount of information given to the consumer can influence online purchase intention and thus test hypothesis H4. The study was conducted online with 130 participants (63.1% between 36 and 60 years old, 80.8% female). The experimental design was a single factor with three randomized between-subjects conditions on the independent variable (transparency: the amount of information), the conditions being: (a) less information (N = 40); (b) more information (N = 44); and (c) control (N = 46).

**Procedures and measurements:** participants were exposed to a situation scenario of buying a t-shirt on a shopping website, where in condition 1, the website showed little information about cookie collection, and participants should choose whether to accept cookies through a specific question just below the stimulus (this variable will be used as a predictor of transparency). In Condition 2, participants were exposed to a greater amount of detailed information about data collection and then had to decide whether to accept the cookies. The control condition said nothing about data solicitation. The independent variable was manipulated through the number of transparency signals provided by the website, based on the study by Schmidt et al. (2020). The dependent variable (purchase intention) was measured based on Ku et al. (2012). The manipulation check was done by means of a question related to the perceived amount of information and measured on a seven-point Likert scale. Finally, demographic and control questions (measured in binary form) about the need for the product were asked.

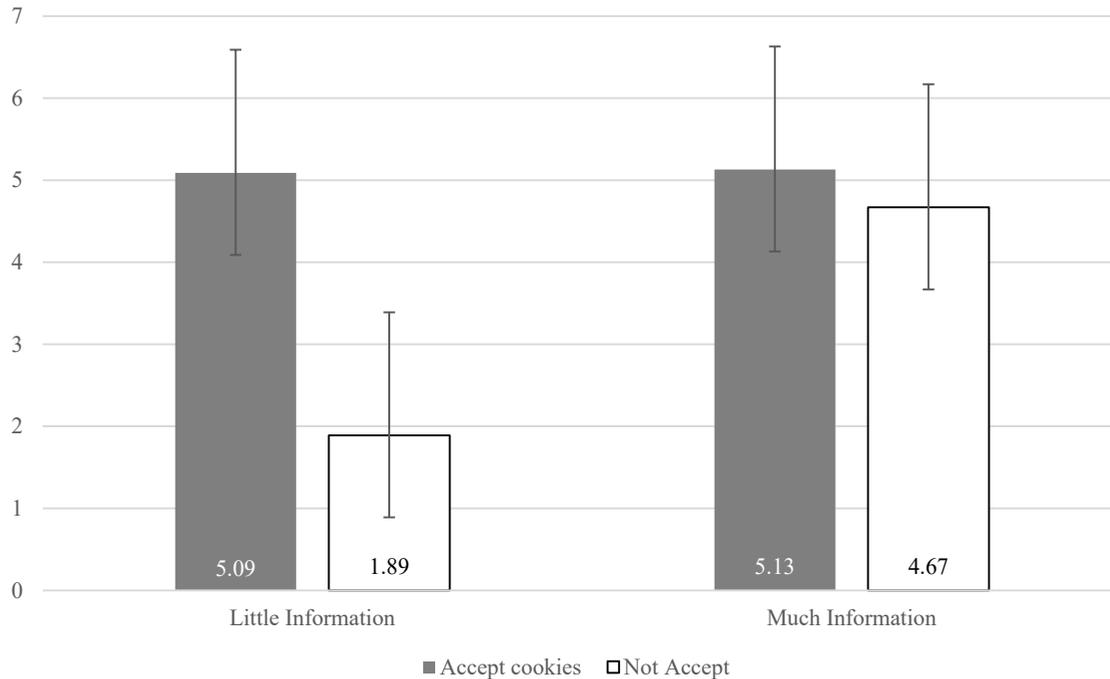
## Results of study 4

**Transparency manipulation check:** a univariate GLM was calculated using cookie acceptance as a predictor. The results were significant, and participants who accept cookies perceive a greater amount of information made available by the shopping site (M = 5.01; SD = 2.09) compared to people who do not accept cookies (M = 3.85; SD = 2.25; F(1.89) = 4.625; p = 0.034). In other words, for individuals who do not accept cookies, the perceived transparency signal, reflected in the amount of information, is lower when compared to people who do.

**Purchase intention:** an ANOVA showed significant results within the transparent conditions (1 and 2) for the effect of cookie acceptance on consumer purchase intention (F(1.84) = 7.642; p = 0.007), with the effect being larger for those who accept (M = 5.10; SD = 1.61) than for those who do not accept (M = 3.82; SD = 2.03). A univariate GLM model was conducted to test hypothesis H4, and the results show a significant effect of the amount of information on consumer purchase intention (F(1.84) = 9.388; p = 0.003), when combined with cookie acceptance (F(1.84) = 15.583; p = 0.000). In turn, the interaction of the amount of information with cookie acceptance was also significant (F(1.84) = 8.887; p = 0.004). The results reinforce hypothesis H2 and partially verify H4, because for people who accept cookies, the amount of information made available does not interfere with purchase intention (M<sub>little information</sub> = 5.09; SD = 1.50; M<sub>much information</sub> = 5.13; SD = 1.75), but for people who do not accept, making more information available about data collection is important to keep purchase intention

high ( $M_{\text{much information}} = 4.67$ ;  $SD = 1.72$ ), as illustrated in Figure 4. Conversely, people who see little information

and do not accept the cookies have low purchase intention ( $M_{\text{little information}} = 1.80$ ;  $SD = 1.09$ ).



**Figure 4.** The influence of the amount of information and cookie acceptance on consumer purchase intention. Significant values for little information condition  $p = 0.003$ . Source: Survey data.

### Discussion of study 4

This study tested whether the amount of information signaled to the consumer about data collection can influence purchase intention. The results point out that when the amount of information made available to the consumer is greater and more detailed, purchase intention tends to be higher, even if the consumer does not accept the cookies. This finding can be explained by Mavlanova et al. (2012) indicating that regulatory compliance signaling generates a higher perception of the quality or reliability of the seller, helping in the consumers’ decision-making process and increasing their purchase intention. Moreover, these regulatory compliance signals on websites help consumers make more accurate judgments of quality, security, and privacy, increasing consumer trust and purchase intention (Al-Adwan et al., 2022). Finally, the result shows that the amount of information can be associated with the amount of visibility of compliance signals that Bornschein et al. (2020)

proposed in their study and that both of them influence online purchase intention.

### GENERAL DISCUSSION

Four experimental studies and one descriptive study bring empirical evidence that transparency signals alone are not shown to be effective in increasing or decreasing consumer purchase intention, but rather combined with cookie acceptance and need for the product. This revalidates an important finding for the literature, showing that compliance signals are only interpreted as a form of transparency, privacy, and security by consumers as they become aware of them (cookie acceptance) and are in need of buying something. As such, the results show that privacy signals influence online purchase intention in line with previous studies (Addo et al., 2022; Al-Adwan et al., 2022; Guo et al., 2020; Mavlanova et al., 2016; Oghazi et al., 2018). Table 2 brings together the results found in this study.

**Table 2.** Summary of the main results.

Hypotheses	Proposed relationship	Decision	Experiments
H1	Signals of transparency → purchase intention	Accept	Studies 1 and 2
H2	Acceptance ( <i>vs.</i> not acceptance) of cookies → purchase intention	Accept	Studies 3 and 4
H3	Type of cookies accepted → purchase intention	Reject	Study 3
H4	Amount of signaled information → purchase intention	Partially accept	Study 4
H5	Acceptance of cookies → increased perception of benefits → purchase intention	Accept	Studies 2 and 3
H5a	Acceptance of cookies → lower risk perception → purchase intention	Reject	Studies 2 and 3

Note. Elaborated by the authors.

Initially, the preliminary study aroused curiosity about the importance of compliance signals, and its actual findings bring indications that compliance signals help the consumer in online decision-making by reducing insecurities regarding the shopping website and increasing results for the company (Addo et al., 2022; Al-Adwan et al., 2022; Bhattacharya et al., 2023; Guo et al., 2020; Maseeh et al., 2021).

Study 1, on the other hand, points out that when the consumer really needs to buy a certain product, transparency signals influence purchase intention, but that the need for the product is determinant in this process, as the literature pointed out (Han et al., 2016). Study 2 reinforces these results and brings further evidence to support hypothesis H1, where the effect of the presence of transparency signals increases purchase intention and need as a determinant for individuals to perceive website transparency signals and reflect on privacy (Mavlanova et al., 2012; Mavlanova et al., 2016).

The results of Study 3 indicate that the architecture of the cookie request is not relevant for consumers. However, it shows that for consumers who accept cookies, purchase intention is higher than for those who do not, using product need as a covariate in the model. In addition, it also corroborates the mediation of perceived benefits. The results of Study 4 point out that the amount of information is not relevant in the purchase intention of consumers who accepted cookies, but it is relevant for individuals who did not accept cookies, demonstrating that giving more decision-making power to the consumer can influence their purchase intention, in line with Bornschein et al. (2020). Furthermore, we find that making more information available to the consumer appears to be effective in keeping purchase intention high in cases where the consumer does not accept cookies. The finding is in line with Bornschein et al. (2020), showing that the more information consumers have available, the higher their online purchase intention. Regulatory compliance signals generate better perceptions about the website (Guo et al., 2020; Mavlanova et al., 2016).

The results found are important for marketing managers not to take the risk of not being compliant with LGPD, out of insecurity that the consumer will stay away

from the website. On the contrary, the preliminary study shows that the conversion rate is higher when the person views the privacy policy and Study 4 reinforces this idea by highlighting that making more information available to the consumer is better for keeping the purchase intention high, especially in cases where there is no acceptance of cookies. Regulatory compliance signals are an important way for e-commerce to convey security, transparency, and reliability to the consumer (Addo et al., 2022; Al-Adwan et al., 2022; Bhattacharya et al., 2023; Guo et al., 2020; Mavlanova et al., 2016).

## CONCLUSIONS

This study achieved its objectives of studying the influence of changes in transparency signals and the format of cookie requests on consumer purchase intention, helping to understand the situational and contextual influence that interferes with privacy decision-making (Bandara et al., 2019). From a theoretical point of view, we contribute to signaling theory through four studies that show the positive effects of accepting cookies as a privacy and security signal on consumer purchase intention. Furthermore, the results add findings by showing that the consumer’s need for the product is important for cookie acceptance as well as for increasing purchase intention (Han et al., 2016; Maslow, 1943). In this respect, we contribute to the debate on notice *vs.* choice (Acquisti et al., 2015), by suggesting that in the current online shopping context, both notice (Study 1) and choice (Studies 2, 3, and 4) alone prove insufficient for consumer privacy protection.

From a managerial perspective, this study has contributed to marketing managers investing in regulatory-compliant opt-in marketing strategies, i.e., using cookies, forms for newsletters, sign-ups for exclusive offers, etc., in accordance with the LGPD. However, the results show that it is important to provide users with clear and accurate information about data use and how they can opt-out of the mailing list if they wish. This will help establish a perception of benefits, trust, and respect in the public. In addition, the findings help marketing and information

managers by highlighting the importance of investing in cookie infrastructure, i.e., collecting primary cookies to understand and improve the user experience on the website, helping to manage their marketing strategies effectively and in regulatory compliance. The findings highlight that cookie acceptance is key to increasing consumer perceived benefits and, consequently, purchase intent (Maseeh et al., 2021; Mavlanova et al., 2012), which demonstrates that in addition to improving consumer perception of the website, it can still be used as a means for segmentation strategies and personalization of the shopping experience. In this sense, future studies have much to contribute by investigating consumer perception of marketing analytics, automation, and personalization practices, considering that the use of artificial intelligence in data-driven marketing practices is a growing practice and needs to be continuously studied.

From a public policy perspective, this study reinforces that consumers are vulnerable as they have a need to purchase a product (Brough & Martin, 2020; Han et al., 2016). Creating a public policy that acts in favor of consumer privacy literacy is critical, as privacy-literate consumers share less information (Chawla & Kumar, 2022; Park, 2011). Future studies can investigate naïve consumer beliefs

regarding the online shopping context, as well as understand how consumer relationships happen in environments with information asymmetry.

Regarding the limitations of this study, given the breadth of privacy discussions (Martin & Murphy, 2016), the very delimitation chosen for the selection of study manipulations was a limitation, given that in the experimental design of the studies, the mediator was not manipulated, only measured. The collection of data on only one online platform due to the COVID-19 pandemic may have compromised external validity, in addition to the predominance of mostly female samples, which may also have influenced the results. Therefore, future studies should investigate other situational and external influences on consumer privacy decision-making (Bandara et al., 2019) and better understand how consumers perceive the use of their data for analytics and personalization strategies. The endless possibilities of exploiting artificial intelligence in marketing strategies pose ethical and regulatory challenges, changing consumer behavior. The presence of marketing algorithms in decision-making brings new challenges to privacy and encourages future studies to bring effective answers to managers and society.

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## Data Availability

The authors claim that all data used in the research have been made publicly available through the Harvard Dataverse platform and can be accessed at:



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