

# Consumer Response to Digital Paywall Configurations: Choice vs. Quantity Restrictions

*Completed Research Paper*

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## Abstract

*In search of a sustainable revenue model in the digital age, news publishers explore online content monetization by means of digital paywalls. Most news publishers thereby follow freemium model paradigms, simultaneously offering free and paid content. The most prominent paywall configurations to distinguish between free and paid content are choice and quantity restrictions. While prior research examined how paywall introductions affect website traffic, there is little knowledge about the effectiveness of these paywall configurations in converting non-paying users into paying customers. The results of our online experiment suggest that restricting the choice of free articles is more effective in driving conversions than restricting their quantity. A mediation analysis reveals that two counteracting mechanisms in consumers' decision making contribute to explaining conversion interest: a positive effect of psychological reactance and a negative effect of product fit uncertainty. We conclude with design implications for optimizing digital paywall configurations.*

**Keywords:** digital paywalls, paywall configurations, sampling, freemium, content monetization

## Introduction

The news publishing industry's digital transformation has changed production, distribution, monetization, and consumption of the industry's core product: news content. News publishers have faced high losses in revenue from traditional sources, such as print subscriptions and print advertising (PricewaterhouseCoopers 2019). Furthermore, the prevalence of news publishers' initial free digital content offers on the Internet caused the formation of a free mentality among consumers (Dou 2004), resulting in low willingness to pay (WTP) (Chyi 2012). Since the revenue growth in online advertising is insufficient to offset these losses, news publishers explore online content monetization by means of digital paywalls. These instruments regulate users' access to (news) content by separating free from paid content (Chiou and Tucker 2013). Integrated in the news publisher's IT architecture, the underlying paywall system's core functionality is to identify users on the website and to decide whether these users are permitted to access content or not (Rußell et al. 2020). Monetizing the access to content provides sales revenues and limits the cannibalization of print content (Pattabhiramaiah et al. 2019). However, it also decreases the readership on the website and drives down advertising revenues (Chiou and Tucker 2013).

Most digital paywall configurations do not block access to all content for non-paying users but make use of sampling mechanisms. According to a recent Reuters Institute's study, 66% of the 124 largest news publishers in Europe and the U.S. apply freemium approaches, simultaneously offering certain free content while requiring a payment for other content (Simon and Graves 2019). Digital news content is particularly suitable for sampling because consumers need to experience articles before valuing them (Nelson 1970; Shapiro and Varian 1999). The two most prominent digital paywall configurations are quantity restriction (QR), i.e. consumers can access only a certain number of articles for free, and choice restriction (CR), which determines whether consumers themselves have the freedom to choose free articles or whether the news publisher selects a choice set of free articles for them (Halbheer et al. 2014). Both configurations are used in practice and have specific advantages in terms of publishers' control over free content, operating efforts, and in mitigating piracy concerns. However, it is not yet completely understood which of the two underlying restriction mechanisms is more effective in converting free users into paying customers.

Although information systems (IS) research has studied sampling and versioning strategies for digital information goods (e.g., Hoang and Kauffman 2016; Liu et al. 2014; Niculescu and Wu 2014), to our best knowledge only Aral and Dhillon (2020) investigate – in their study on decisions of The New York Times (NYT) about the free content's quantity and exclusivity, i.e. a choice restriction – how digital paywall configurations impact readership. From a value perspective, news publishers face the following trade-off: Giving away too much free content might devalue the remaining paid content and lower conversion rates. However, giving away too little free content prevents potential subscribers from becoming familiar with and valuing the overall content (Aral and Dhillon 2020). Therefore, it is important for news publishers to know how they can restrict their free content most effectively to gain and retain paying subscribers. Although studies provide evidence that both digital paywall configurations can drive conversions, we are not aware of a study comparing the configurations' effects and explaining how underlying mechanisms influence consumers' response behavior. Thus, we examine the following research question:

*RQ: Which digital paywall configuration, i.e. a quantity restriction or a choice restriction, is more effective in converting non-paying users into paying customers?*

In order to explain consumers' decision-making processes when confronted with a digital paywall, we build on theoretical predictions from (i) psychological reactance (Brehm 1966) and (ii) learning and uncertainty, particularly preference fit uncertainty toward digital news (Hong and Pavlou 2014). Psychological reactance is an unpleasant motivational arousal that can emerge when consumers experience a threat to their freedom, in our case the free contents' restriction by digital paywalls (Brehm 1966). From a user perspective, a paywall that allows sampling constitutes a double-edged sword. On the one hand, the paywall provides certain content free of charge. Conversely, the paywall inhibits access to further content. Combining psychological reactance and preference fit uncertainty theory allows capturing this dual nature of such a paywall and explaining how it affects consumer behavior. We tested our hypotheses about the effects of quantity and choice restrictions on conversion interest in an online experiment, using a stylized news website where one of the two paywall configurations restricted the available content. Our results contribute to a better understanding of conversion drivers in freemium models for digital information goods and provide insights for practitioners into the optimal configuration of digital paywalls.

The remainder of this paper proceeds as follows: First, we outline the conceptual and theoretical foundations of freemium revenue models in general and digital paywalls in specific, as well as derive our hypotheses. In the next section, we describe our experiment, which investigates consumers' decision making in evaluating free and paid content after actually consuming news articles on a stylized website. The methodology section contains an explanation of the experimental design and procedure, the measures, and a sample description. Subsequently, we present the experiment's results. Following a discussion, the paper presents theoretical contributions and implications for practice. The paper concludes with the study's limitations and an outlook for future research.

## **Conceptual and Theoretical Foundations**

### ***Freemium Revenue Models and Digital Paywalls***

Since consumers changed their news consumption behavior, news publishers changed their revenue models to capitalize accordingly (Pauwels and Weiss 2008). Revenue models for digital information goods have mainly been adjusted from being purely advertising-based to being freemium models (Simon and Graves 2019). Companies that follow a freemium model offer both a limited free version and a premium version of their products. However, the premium version requires consumers to pay in order to receive additional benefits (Anderson 2009). Offering a free version is reasonable, because the marginal costs of digital content distribution are close to zero, which means content providers can retain their advertising revenue (Chen and Seshadri 2007). According to the definition of freemium, the premium version needs to contain more functionality, content, or other features to provide additional value to consumers (Niemand et al. 2015). The value concept is vital for product evaluation and purchase decisions and refers to the tradeoff between perceived benefits and sacrifices, i.e. monetary or non-monetary costs (Zeithaml 1988). The value discrepancy in freemium models therefore describes the perceived value difference between the free and the premium version (Wagner et al. 2014). Research shows that consumers' value perception of specific features, for example, the discovery of new content, influences the intention to remain a paying customer, whereas consumers' perception of general benefits, for example, enjoyment, influences the conversion intention (Mäntymäki et al. 2020).

Freemium models are closely related to the sampling concept, i.e. a free trial to inform consumers about product attributes before the purchase decision, which previously focused on consumer goods (e.g., Bawa and Shoemaker 2004). With the digitalization, sampling research as well as research on versioning, i.e. the practice of offering multiple versions of a digital product, emerged (e.g., Chellappa and Shivendu 2005). While IS research intensively investigated sampling strategies of software, focusing on network effects and user expectations (e.g., Cheng and Liu 2012; Dey et al. 2013; Niculescu and Wu 2014), our work particularly contributes to sampling and versioning strategies for digital information goods in a non-networked setting. For instance, Oestreicher-Singer and Zalmanson (2013) show that the probability to subscribe for the premium service of the music website last.fm increases by content consumption and community participation. Liu et al. (2014) examine Google Play and find that highly rated free apps, which indicate a positive trial experience, increase the demand for paid apps. In line with these findings, Wagner et al. (2014) show that users of a music streaming service are more likely to convert to the premium version if the functional fit between the versions is strong. Arora et al. (2017) distinguish between hedonic and utilitarian apps on Google Play. These scholars find that the free versions' negative effect on the adoption of the premium version is stronger for hedonic apps and in later life stages of apps. Lastly, Li et al. (2019) investigate a book publisher's content samples and show that high-quality samples should be offered if the underlying content is highly popular and the functionality of the sample is low.

In the news publisher industry, the success of freemium models depends on the number of consumers who purchase paid content and the reach to those who consume free content and generate advertising revenue. While digital paywalls can restrict access to the entire content, we focus on the most prominent digital paywall configurations based on freemium models that offer certain content for free and require a payment for the right to access the remaining content. At the core of digital paywalls, two configuration parameters regulate the value discrepancy: the free content's QR and CR. The free content's QR is intuitive: It determines the number of free articles in a predefined period. The CR differentiates content according to its presumed value for the audience and can have different operationalizations, for example, restricting the access to specific sections or exclusive content (Aral and Dhillon 2020; Oh et al. 2016). Moreover, the QR

allows consumers to select the sample of their choice within a predefined quantity, whereas the CR allows news publishers to define the sample (Halbheer et al. 2014).

Despite the increasing diffusion of digital paywalls, our knowledge regarding their business impact and users' reactions toward them is limited. Most studies on digital paywalls empirically examined the consequences of a paywall introduction, finding a negative impact on website traffic, on advertising revenue (e.g., Chiou and Tucker 2013), and on the website's spread of word of mouth (Oh et al. 2016). However, Pattabhiramaiah et al. (2019) show that paywalls can have a positive overall effect on revenue by taking the positive spillover effect on print circulation into account. Furthermore, Halbheer et al. (2014) build an analytical model to show that advertising effectiveness can determine news publishers' optimal content monetization strategy, i.e. free content, paid content, or both. Recent studies also investigated the impact of digital paywall configurations on conversion behavior and resulting revenue. Lambrecht and Misra (2017) examine the configuration of the ESPN news website's paywall and show that media companies should offer more free content instead of more paid content in periods of high demand. Aral and Dhillon (2020) show how changes of the NYT's digital paywall configuration in the quantity and the exclusivity of free articles affect content demand, subscriptions, and total revenue. These scholars find an overall positive effect of digital paywall configuration changes on revenue.

### ***Psychological Reactance***

Although allowing a certain quantity or choice set of free articles gives consumers the opportunity to experience the content, these digital paywall configurations in the form of restrictions to the consumers' freedom could trigger an opposing negative force as well (Murray and Häubl 2011). This force is referred to as psychological reactance (PRC) (Brehm 1966). PRC is "an unpleasant motivational arousal that emerges when people experience a threat to, or loss of their free behaviors" (Steindl et al. 2015, p. 205) and serves as a motivator to restore freedom. Accordingly, PRC triggers cognitive efforts to reestablish one's freedom, i.e. the cognitive component, combined with negative emotions, such as anger or annoyance, i.e. the affective component (Dillard and Shen 2005). As a motivational state, PRC can result in behavior-directing properties to regain one's freedom (Brehm and Brehm 1981). With its origins in social psychology (Brehm 1966), researchers have examined the effects of PRC in different domains, such as taxation (Wicklund 1970) and reactions to product recommendations (Fitzsimons and Lehmann 2004). Applications of PRC in the IS discipline are scarce and limited to explain preferences for incumbent digital interfaces (Murray and Häubl 2011) or ad avoidance in social media (Youn and Kim 2019).

Either an internal or an external threat to an individual's perceived freedom can trigger PRC. An internal threat is perceived when an individual has to decide for an option, thereby rejecting another. An external threat can arise when an individual has no influence on the resulting choice set's composition or when social influence attempts affect the individual's selection process (Brehm 1966; Clee and Wicklund 1980). Freedom of choice is understood as the availability of a set of behaviors for a given person at a given time, any one of which the individual can engage with (Brehm 1966). Restricting the individual's freedom of choice therefore constitutes an external threat, while restricting the quantity of consumable alternatives constitutes an internal threat.

Research has identified several preconditions for PRC to arise. First, people must have perceived their state of acting as autonomous prior to the PRC triggering event, i.e. individuals do not expect a restriction of their freedom of choice (Brehm 1966). Second, the choice alternatives must subjectively differ in their attractiveness because if individuals perceive alternatives as equal, it is not important for individuals to have the ability to choose. Third, individuals need to have a priori established preferences among the alternatives within the choice set (Brenner et al. 1999), otherwise, the existence of restrictions could, instead of triggering PRC, reduce the costs of choosing, such as cognitive, emotional, or time costs (Botti and Hsee 2010; Botti and Lyengar 2004; Brenner et al. 1999).

Similar to previous PRC studies' settings in which the access to certain products, such as toys (Hammock and Brehm 1966) or the selection of desserts (Brehm and Rozen 1971) is manipulated, this study restricts consumers' access to content either by the quantity or the choice of free articles on a news website. Since the preconditions of PRC theory are met, i.e. an expectation of freedom of choice, differing choice alternatives, and a priori established preferences according to prior knowledge and content consumption experience (Chernev 2003; Kvalheim 2013; Oh et al. 2016), we propose that the PRC's influence is prevalent in consumers' decision making when being confronted with such digital paywall configurations.

## ***Product Fit Uncertainty and Consumer Learning***

While PRC has only been introduced to IS recently, research on uncertainty and consumer learning is well established. Uncertainty, stemming from information asymmetry among buyers and sellers, is a major impediment to online markets (Pavlou et al. 2007). Besides vendor uncertainty, i.e. the uncertainty about vendors' actual intentions and their opportunistic behavior (Ghose 2009), scholars identify product uncertainty as the second major uncertainty influencing transactions in electronic commerce (Dimoka et al. 2012). Hong and Pavlou (2014) distinguish product uncertainty in two components, namely product quality uncertainty (PQU) and product fit uncertainty (PFU). While PQU is the user's difficulty in evaluating the objective quality of a product, i.e. based on vertical product differentiation (Dimoka et al. 2012; Spiller and Belogolova 2017), PFU is the degree to which a consumer cannot assess whether a product's attributes match her subjective preferences, i.e. based on horizontal product differentiation (Hong and Pavlou 2014). Product uncertainty is therefore not limited to the quality aspect because products with the same quality level can be appreciated by certain users and avoided by others (Davis et al. 1995). Products' experience attributes, users' lack of product familiarity, and vendors' inability to describe a product accordingly are the main drivers of product uncertainty (Dimoka et al. 2012; Ghose 2009; Hong and Pavlou 2014).

In particular for digital information goods with experience characteristics such as news content, product uncertainty is prevalent due to imperfect information on quality and fit to taste (Matt and Hess 2016). For products that are evaluated based on objective measures, i.e. the product itself is the source of value and the superiority of one product over the other is a matter of fact, product quality is dominant. For products that are evaluated based on subjective measures, i.e. the match between the product and the consumer's preference is the source of value and consumers do not necessarily agree on the product's superiority, product fit is dominant (Kwark et al. 2014; Spiller and Belogolova 2017). Scholars have shown that the consumers' perceived value of experience goods (vs. search goods) is more subjective on the basis of the fit to individual users' preferences (Arora et al. 2017; Hong and Pavlou 2014). Furthermore, while other signals, such as brand or reputation, could also reduce PQU, consumers must use a product to reduce PFU (Shapiro and Varian 1999). Accordingly, although PQU plays a role, we expect that PFU is the most critical component of product uncertainty in the evaluation of digital news content.

The process of updating prior expectations about a product through experiencing it is known as consumer learning (Halbheer et al. 2014). However, learning in itself is not necessarily positive, because a negative experience can result in less favorable beliefs about the product (Sriram et al. 2015). Sampling of digital information goods facilitates consumers' learning by providing free access to part of the content and therefore reduces or even eliminates PFU. However, the degree to which users perceive that the sampled content provides them with resourceful and helpful information could differ according to the users' consumption experiences (Pavlou et al. 2007). If PFU is still present after experiencing the sample, consumers face difficulties in determining their WTP (Matt and Hess 2016), which could result in avoiding transactions (Davis et al. 1995).

While external sources can reduce PQU, consumers have difficulties in reducing PFU if they are not able to sample the product prior to a purchase decision. Digital paywalls allow consumers to read part of a news website's content before making a conversion and thereby reduce PFU. However, we propose that the paywall's configuration has an effect on consumers' learning because the underlying mechanisms change the sampling experience in different manners, namely restricting the choice or the quantity of the free content.

## **Hypotheses**

### ***Effects of Digital Paywall Configurations on Conversion Interest***

In this study, we focus on the effectiveness differences between digital paywall configurations, namely QR (i.e. the number of available free news articles) and CR (i.e. whether the consumer or the news publisher determines the range of free news articles). Both digital paywalls' QR and CR decrease consumers' perceived value of the free content compared to the paid content's value (Aral and Dhillon 2020). A value discrepancy between the free and the paid content is a necessary condition for digital paywall configurations based on freemium models to drive consumers' conversion intention (Wagner et al. 2014). The costly version's perceived benefits therefore particularly influence the interest to convert to the premium version

(Mäntymäki et al. 2020). If, on the other hand, users perceive the news publisher's free content offering as sufficiently satisfying, consumers stay with the free content, i.e. a high value of free content deteriorates consumers' conversion intentions (Arora et al. 2017).

A CR is a strong lever to differentiate between free and paid content. While consumers tend to prefer delegating difficult decisions to others (Steffel and Williams 2018), they prefer to choose for themselves when preferences are established (Botti and Hsee 2010). Furthermore, the advantages of a pre-selected choice set, such as the reduction of consumers' time costs and cognitive efforts during the selection process (Bettman et al. 1998; Botti and Hsee 2010) are expected to be low due to consumers' established preferences in the news consumption context. Hence, a CR configuration prohibits strategic behavior of choosing free content that best matches consumers' preferences and consuming other content elsewhere. Accordingly, we expect that the CR increases the perceived value of the paid content compared to the free content, leading to a higher conversion interest with CR than without CR. Furthermore, receiving the additional benefit of freedom of choice only after a costly conversion could motivate consumers even further. Thus, we hypothesize:

*H1a: Restricting the choice of free content increases users' conversion interest.*

Consumers read news content to satisfy certain needs, such as regularly seeking information or enjoyment (Lee 2013). However, if the quantity of free content is insufficient to satisfy these needs, the perceived value of the free content compared to the paid content should decrease. Accordingly, a higher QR, i.e. less free news articles, should foster consumers' conversion interest to access the news articles that are behind the digital paywall, because the website's free content is less likely to satisfy consumers' demand. Thus, we hypothesize:

*H1b: Restricting the quantity of free content increases users' conversion interest.*

### **Mediating Roles of Psychological Reactance and Product Fit Uncertainty**

We propose that the effects of digital paywall configurations on conversion interest can be explained by two distinct theoretical lenses, namely PRC (Brehm 1966) and PFU (Hong and Pavlou 2014). First, whenever a news publisher restricts consumers' freedom on the website, the consumers perceive these restrictions as threats (Brehm 1966; Brehm and Brehm 1981). Consumers could react negatively, i.e. in the form of emotions such as anger, and experience PRC against this threat to their freedom of choice (Brehm 1966; Murray and Häubl 2011). PRC research has found that eliminating or threatening a choice alternative increases its attractiveness (Brehm et al. 1966), resulting in consumers' efforts to access these hard-to-obtain alternatives (Clee and Wicklund 1980). Consequently, PRC should have a positive effect on conversion interest in the context of paywall configurations based on freemium models because consumers perceive the restricted content as more attractive. Second, we expect that the restriction of free content fosters PFU because consumers are only able to experience part of the digital information good (Halbheer et al. 2014). Research has shown that consumers generally perceive (product fit) uncertainty as negative (e.g., Davis et al. 1995) and that it decreases purchase frequency (Matt and Hess 2016). Consequently, we expect that PFU has a negative effect on consumers' conversion interest when being confronted with a digital paywall.

The digital paywall's CR configuration limits the consumer's freedom of choice by determining the composition of the choice set. Consumers therefore perceive this restriction as an external threat (Brehm 1966) because the news publisher exogenously selects the range of free content. Consequently, consumers react by revealing an unpleasant state of PRC against this threat to their freedom (Brehm 1966; Murray and Häubl 2011), thereby subsequently increasing the interest to access the restricted paid content. Furthermore, providing a predetermined set of news articles should also increase PFU because consumers are not able to sample their preferred content. Contrary to the RCT's positive effect, we expect the resulting increase in PFU to influence consumers' conversion interest negatively. Thus, we hypothesize that both PRC and PFU mediate the effect of CR on conversion interest.

*H2a: Psychological reactance mediates the effect of choice restriction on users' conversion interest.*

*H2b: Product fit uncertainty mediates the effect of choice restriction on users' conversion interest.*

On the other hand, we expect the digital paywalls' QR configuration to induce an internal threat to the consumer's freedom because by choosing a specific alternative (i.e. a news article), consumers reject another free alternative (Clee and Wicklund 1980). Similar to the CR, the resulting PRC should increase consumers' conversion interest. In addition, we expect that limiting the quantity of free content increases PFU because consumers are less able to experience the free content, which reduces learning opportunities (Foubert and Gijsbrechts 2016) and thus content familiarity (Hong and Pavlou 2014; Murray and Häubl 2011). The digital paywall's QR configuration therefore limits consumers' ability to evaluate whether the range of the content matches their preferences (Hong and Pavlou 2014; Murray and Häubl 2011) because the QR reduces the number of free articles that consumers can access. Similar to the CR, we expect that the increase in PFU by QR to have a negative effect on conversion interest. Accordingly, we hypothesize that both PRC and PFU mediate the effect of QR on conversion interest.

*H2c: Psychological reactance mediates the effect of quantity restriction on users' conversion interest.*

*H2d: Product fit uncertainty mediates the effect of quantity restriction on users' conversion interest.*

### **Comparison of the Effects of Digital Paywall Configurations**

Whereas both CR and QR should affect users' conversion interest via PCR and PFU, the strength of their effects are likely to differ. The degree of PRC depends on the threatened freedom's importance and the threat's perceived magnitude (Steindl et al. 2015). The perceived threat to users' freedom that triggers PRC stemming from the digital paywall's CR and QR configuration should therefore differ. Specifically, consumers perceive a threat to the freedom of choice (i.e. external) as stronger than a threat to the quantity of accessible alternatives from a choice set (i.e. internal). The CR prohibits consumers from choosing their preferred alternatives and its reduced choice set decreases the probability, that the free content matches consumers' preferences (Lancaster 1990). In addition, the QR allows consumers to cherry-pick their preferred alternatives, decreasing the magnitude of PRC by a QR in contrast to a CR configuration, where the news publisher restricts the choice set exogenously. Rains's meta-analysis (2013) confirms that PRC in form of anger increases disproportionately as a perceived freedom threat intensifies. Thus, we hypothesize:

*H3a: Restricting the choice of free content increases users' psychological reactance more than restricting the quantity.*

Furthermore, we expect differences in the resulting PFU with the news content when consumers are being confronted with either a CR or a QR configuration. While both configurations should increase PFU, we expect that a CR has a stronger effect on PFU than a QR because consumers receive less resourceful and helpful information from the consumption experience (Pavlou et al. 2007). Specifically, consumers are not able to sample and evaluate the most critical part of the content, namely the preferred articles or sections. Furthermore, it has been argued that smaller assortments to choose from (i.e. a CR) influence consumer preferences by increasing the uncertainty of whether the (pre-selected) choice set at hand adequately represents all potentially available options (Chernev 2003). We therefore hypothesize:

*H3b: Restricting the choice of free content increases users' product fit uncertainty more than restricting the quantity.*

Returning to our main research question, we expect differences in the effectiveness of a digital paywall's CR and QR on conversion interest. On the one hand (see *H3a*), we expect that the positive effect of PRC, i.e. an increase in the unavailable alternatives' attractiveness (Brehm et al. 1966), on conversion interest is stronger in case of an external threat (CR) than in case of an internal threat (QR). On the other hand (see *H3b*), we also expect that the negative effect of PFU on conversion interest is stronger when the choice (vs. the quantity) is restricted because the consumers' sampling experience provides less helpful information (Chernev 2003; Pavlou et al. 2007). However, we expect that the magnitudes of these opposing effects on the paywall configurations' effectiveness on conversion interest differ. Owing to established preferences in digital news consumption, we expect that the arising positive effect of PRC on conversion interest outweighs the negative effect of PFU on conversion interest. Since we propose a CR configuration to have a stronger effect on PFU and PRC than a QR configuration, we expect that a CR configuration is more effective than a QR configuration in increasing conversion interest to access the paid content. Thus, we hypothesize:

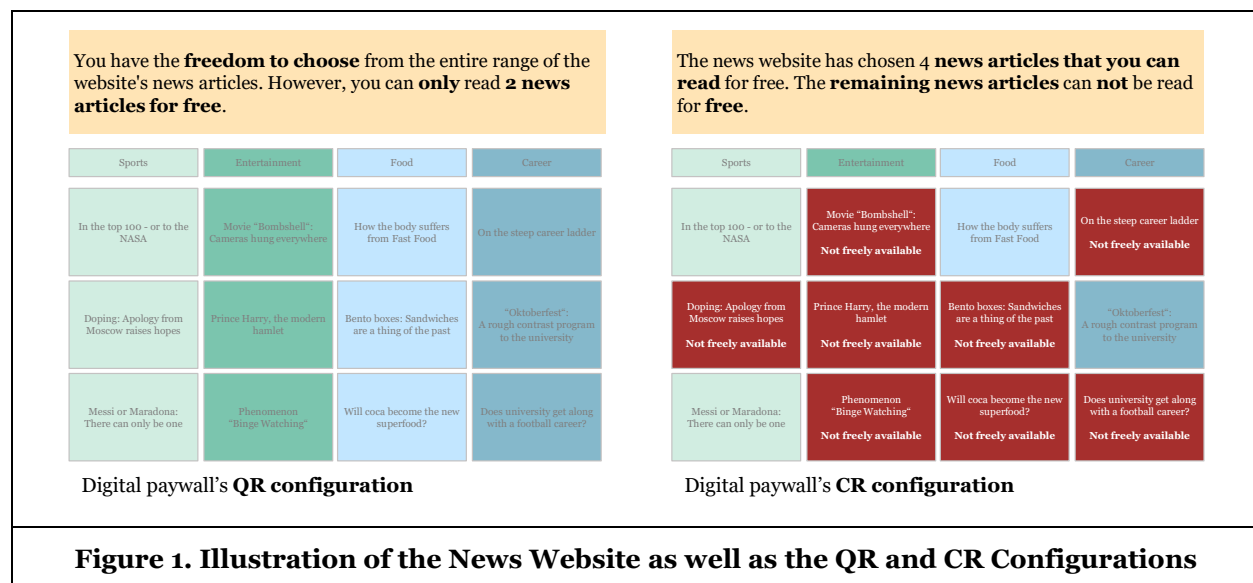
*H4: Restricting the choice of free content increases users' conversion interest more than restricting the quantity.*

## Methodology

### Experimental Design and Procedures

We conducted an online experiment to examine whether a digital paywall's QR or CR configuration is more effective in encouraging non-paying users to become paying customers. In this experiment, the participants read news articles on a stylized news website that featured a digital paywall. To create the website and implement the different paywall restrictions, we used the open-source platform for social science experiments, oTree (Chen et al. 2016). The study's news website offered a total of 12 news articles, three in each of four sections: sports, entertainment, career, and food. We selected timeless news articles of comparable length ( $M = 348.33$  words,  $SD = 3.68$ ) from a renowned publishing house. Hereby, we wanted to ensure that the articles were relatively interesting in terms of the variety of sections and topics, assuming that the news articles are objectively similar in quality but differ in their fit to the participants' heterogeneous preferences. However, in order to exclude unwanted influences such as established brand-related associations, we did not mention the publishing house's name. The experimental setup therefore allowed us to examine the effects we hypothesized and ensured internal validity, while enabling quasi-real news consumption experiences and thus higher external validity compared to laboratory experiments.

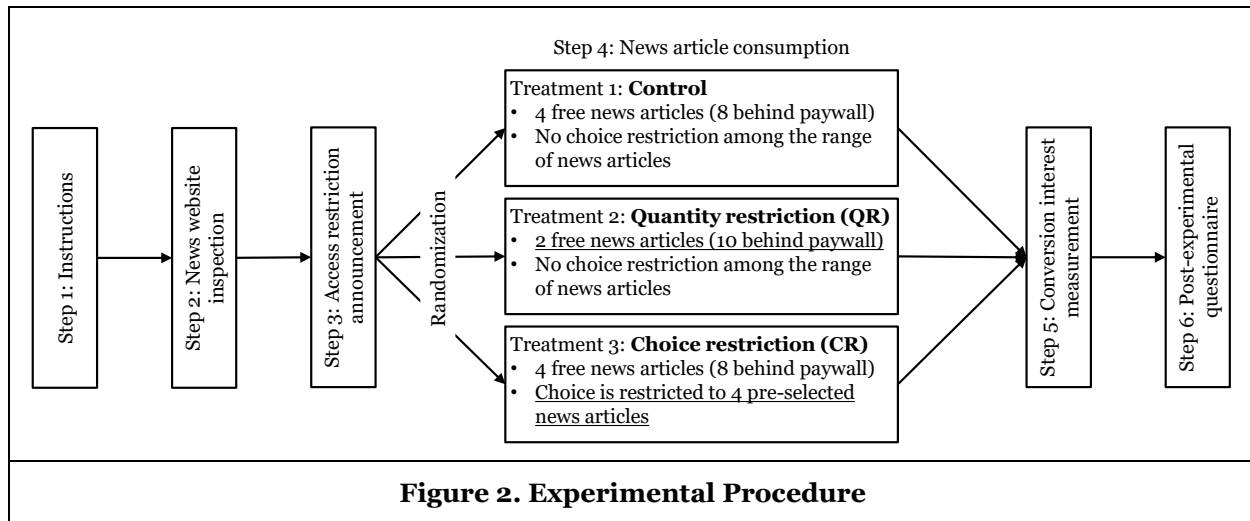
Our experiment employed a between-subjects design with three experimental treatments: *control* vs. *QR* vs. *CR*. In the control group, the participants had the freedom to choose four news articles from the entire range of 12 news articles. This treatment group with its particular paywall configuration functioned as a baseline to analyze the configurations' effects, i.e. decreasing the quantity of free articles or introducing a choice restriction. In the second treatment, the QR group, the participants could also choose news articles from the entire range of 12 news articles. However, we reduced the quantity of free news articles by 50%. Therefore, the participants could only read two news articles. In the third treatment, the CR group, the participants could read four news articles, i.e. the same amount as in the control group. However, their choice set of four news articles was predetermined. We randomly drew these news articles from the entire range of 12 news articles for each participant. News articles that were not accessible to the participants were displayed in red and tagged with the statement "Not freely available". The QR and CR treatments correspond to the most widely used digital paywall configurations in the news publisher market. While the metered model allows consumers to choose a relatively small number of freely accessible news articles from the entire range of the website's news content, the premium model allows consumers to access a relatively large number of freely accessible news articles from a pre-determined choice set (Chiou and Tucker 2013). Figure 1 depicts the stylized news publisher's website and the relevant digital paywall configurations.



The experiment consisted of six steps (see Figure 2). In step 1, the participants read through the instructions of the experiment. In step 2, we disclosed the range of the website's news articles, i.e. sections and titles, prior to the participants being able to access them. This step was intended to familiarize the participants



with the website's range of news articles. In step 3, we showed a reactance-arousing message (Dillard and Shen 2005), which informed the participants that the entire range of the news website's content could only be accessed after a costly conversion and that only a restricted part of the content was freely available. Prior to the news article consumption (step 4), we randomly assigned the participants to one of the three treatment groups, i.e. the control group, the QR group, or the CR group. In step 4, the participants could read news articles within the boundaries of their paywall restriction. At the end of each article, we asked the participants to voluntarily rate the article as negative or positive. After the participants had consumed all free content provided by their particular paywall configuration, we asked them for their interest in accessing the remaining news articles (step 5 of our experiment). Participants who were unwilling to read all free news articles, had the chance to jump to step 5 at any point during the news consumption. The experiment ended with a post-experimental questionnaire including the measurements of our mediator and control variables (step 6), which we describe in the next section.



In conclusion, our experiment was designed to enable causal inferences about the two digital paywall configurations' effectiveness (compared to a control group) on the participants' conversion interest.

## Measures

In the post-experimental questionnaire, we used validated constructs and adapted these to the context of digital news consumption.

Directly following the participants' news consumption part, we measured conversion interest (CI) on an 11-point scale, anchored only at the scale's endpoints, by adapting Höffler's (2003) purchase interest scale. While PRC is a motivational state (Brehm 1966), that according to Brehm and Brehm (1981), cannot be measured directly, we used three items of anger as a measure for PRC (Dillard and Shen 2005). Although PRC is conceptually defined as negative cognitions and anger, i.e. the cognitive and the affective component, research has shown that anger is a stronger sub-construct of PRC (Kim et al. 2017; Quick and Kim 2009), particularly in the case of severe threats to freedom (Rains 2013). Furthermore, we believe that the motivating properties of psychological reactance resulting from the affective component (Brehm 1966) are most important in the digital paywall context. Moreover, we measured PFU using four items of the scale by Hong and Pavlou (2014). The latter two constructs were rated on seven-point Likert-type scales anchored at 1 (strongly disagree) and 7 (strongly agree). In addition, we used scales by Franke et al. (2009) to measure preference insight, i.e. the ability to express preferences, and product involvement, which bases on a reduced version of Zaichkowsky's (1985) personal inventory scale, as control variables after adapting the scales to the context of digital news websites. For manipulation check purposes, we included measures of perceived freedom of choice and perceived quantity of free news articles using seven-point Likert-type scales anchored at 1 (strongly disagree) and 7 (strongly agree). Apart from the constructs, we asked the participants how much money they spend on digital media products and whether they are currently news outlet subscribers. We also collected the participants' age, gender, education, profession, and net income. Table 1 provides a detailed depiction of the study's key variables.

Construct	Reference	Scale	Wording	$\alpha$
Psychological reactance (PRC)	Dillard and Shen (2005)	7-point scale (1 = strongly disagree, 7 = strongly agree)	"The free contents' restriction ... ... makes me feel frustrated." ... makes me feel angry." ... makes me feel annoyed."	0.850
Product fit uncertainty (PFU)	Hong and Pavlou (2014)	7-point scale (1 = strongly disagree, 7 = strongly agree)	"I am uncertain that the website's news articles match my requirements." "I am uncertain that the website's news articles match my tastes." "I am uncertain that the website's news articles fit my preference." "I am uncertain that the website's news articles with these characteristics are what I am looking for."	0.919
Conversion interest (CI)	Höffler (2003)	11-point scale (1 = not interested, 11 = very interested)	"Based on your experience with the free content, how interested are you in getting unrestricted access to the entire news website's content?"	-
Additional measures: demographics; preference insight and product involvement (Franke et al. 2009)				

**Table 1. Measurement of Key Variables**

### **Data Collection and Sample**

Before we carried out the experiment, we conducted seven thinking aloud pre-tests to ensure that the manipulations worked according to the experimental design and to ensure the questionnaire's comprehensibility. Based on the feedback, we adjusted the website's design and revised the wording. The final experiment took place in March 2020. We collected the sample by using the mailing list of a large European university composed of 5,677 subscribers and by publishing the survey link on the platform SurveyCircle. As an incentive, we announced that three shopping vouchers worth €50 each were to be drawn in a raffle among all participants. Overall, 403 subjects entered the survey. Out of this sample, we received 324 completed questionnaires, which were included for analysis. This resulted in the following treatment group sizes: control group,  $n=102$ ; QR group,  $n = 117$ ; CR group,  $n = 105$ .

The gender ratio of this final sample was 66.04% female, 33.64% male, and 0.32% diverse. The average age was 25.38 years ( $SD = 6.74$ ), ranging from 16 to 69. 82.01% of the respondents were students. 99.39% of the respondents had a high school diploma, and 52.88% had at least one university degree. 80.55% of all the respondents who disclosed their income had an income of less than €1,500 per month. 9.57% of the respondents chose not to disclose their income. Regarding their media consumption behavior, the respondents stated that they spend, on average, a total of €12.37 ( $SD = 16.27$ ) per month on digital media products. 37.65% of the respondents reported to have at least one digital or print news subscription and 23.77% at least one digital news subscription. Across all treatment groups, the respondents indicated that they knew their preferences among news content quite well ( $M = 5.36$ ,  $SD = 0.98$ ) and that news content was relevant to their needs, preferences, and interests ( $M = 5.66$ ,  $SD = 1.13$ ).

## **Results**

### **Randomization, Manipulation Checks, and Measurement Validation**

Based on the results of chi-square tests, we concluded that there are no significant differences between the three treatment groups in terms of gender, educational background, profession, and net income (all  $p > 0.1$ ). Furthermore, a series of one-way ANOVAs revealed no significant differences between the three treatment groups regarding age ( $F = 0.139$ ,  $p > 0.1$ ), consumers' preference insight ( $F = 0.942$ ,  $p > 0.1$ ), and consumers' product involvement ( $F = 1.189$ ,  $p > 0.1$ ). We therefore concluded that the participants' demographic and personal characteristics were balanced across the three treatment groups.

The manipulation checks supported the intended effects of the manipulations by revealing significant differences in the perceived freedom of choice ( $F = 145.235$ ,  $p < 0.01$ ) between the control group ( $M = 5.17$ ,  $SD = 1.45$ ) and the CR group ( $M = 2.23$ ,  $SD = 1.09$ ) and significant differences in the perceived quantity of

free articles ( $F = 42.106$ ,  $p < 0.01$ ) between the control group ( $M = 4.04$ ,  $SD = 1.65$ ) and the QR group ( $M = 2.54$ ,  $SD = 1.50$ ).

While we measured CI as a single-item scale, we used summated scales based on the average scores of the multi-item constructs PRC and PFU (Zhu et al. 2012). The constructs were assessed for reliability using Cronbach's alpha (see Table 1). With alpha values above 0.8, both constructs indicate adequate reliability (Nunnally 1994).

### Hypothesis Testing

Before testing our hypotheses, we first analyzed whether the stylized news website actually engages participants to read articles by checking the number of articles read per treatment group. While most of the participants in the control group read four articles (53.92%,  $M = 2.99$ ,  $SD = 1.31$ ) and most of the participants in the QR group read two articles (83.76%,  $M = 1.76$ ,  $SD = 0.58$ ), the participants in the CR group exhibited more heterogeneity in their reading behavior ( $M = 1.86$ ,  $SD = 1.45$ ). While only 20.95% read four articles, 45.72% read less than two articles. In conclusion, the results demonstrate the participants' intrinsic motivation to read the articles on our experimental news website.

In order to test our hypotheses, we (i) ran linear regressions to examine the digital paywall configurations' total effects on CI, PRC, and PFU, (ii) performed a mediation analysis to shed light on the psychological mechanisms underlying the configurations' effectiveness, and (iii) tested whether the regression coefficients of QR and CR differed significantly in the linear models specified in (i). Table 2 reveals the summary statistics of our key variables.

Construct	M	Median	SD	Min	Max
Conversion interest (CI)	4.250	4.000	2.697	1	11
Psychological reactance (PRC)	3.364	3.333	1.588	1	7
Product fit uncertainty (PFU)	4.918	5.250	1.511	1	7

Note:  $N = 324$

**Table 2. Summary Statistics of Key Variables**

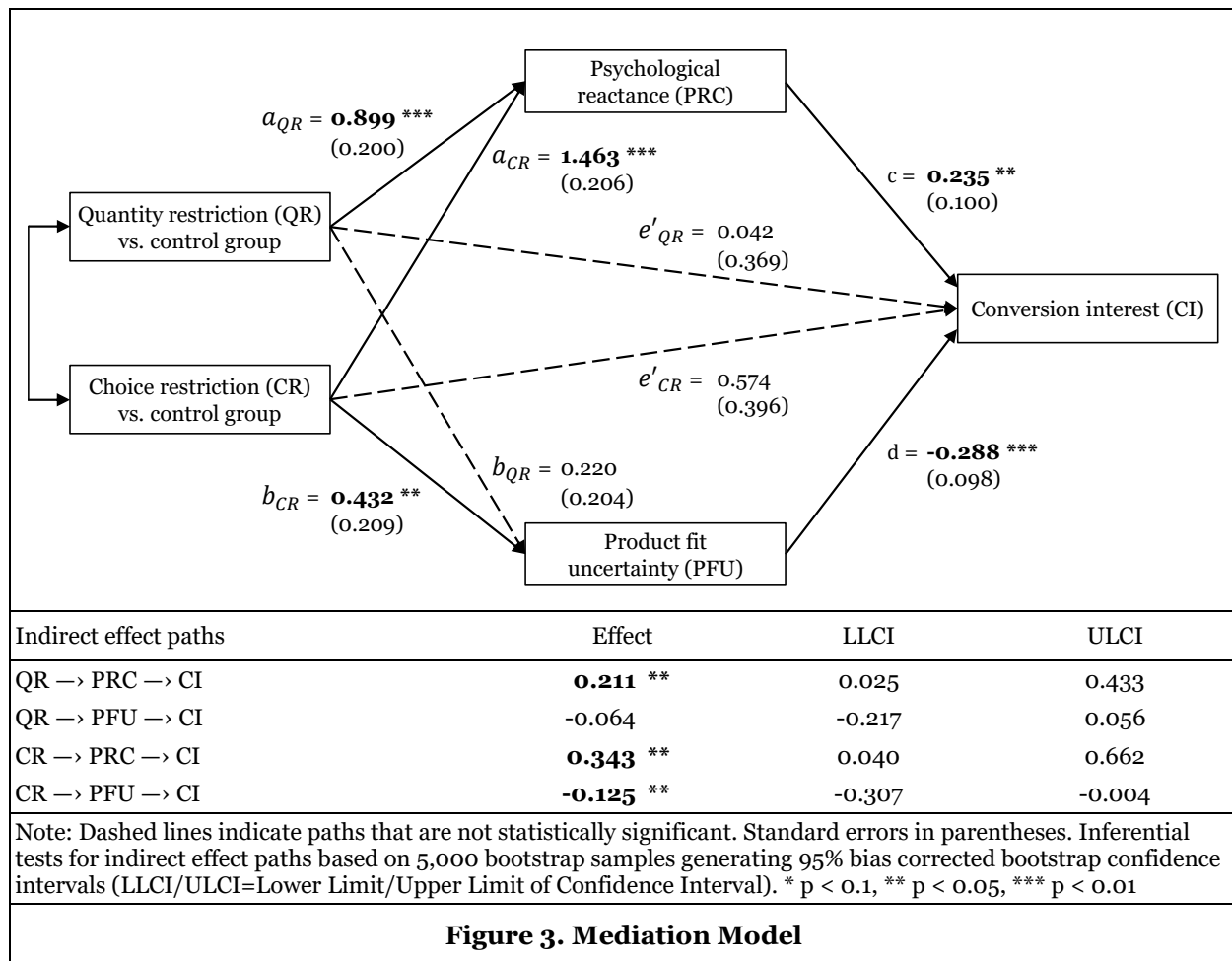
First, Table 3 depicts the linear regressions' results of CI, PRC, and PFU on CR and QR. We coded the QR dummy as 1 in the case of the QR group ( $n = 117$ ) and the CR dummy as 1 in the case of the CR group ( $n = 105$ ). If both the QR and the CR dummy equal 0, this refers to the control group ( $n = 102$ ). The regression of CI on CR and QR revealed that while the CR dummy significantly predicted CI,  $e_{CR} = 0.793$ ,  $t(321) = 2.124$ ,  $p = 0.034$ , the QR dummy was not statistically significant,  $e_{QR} = 0.190$ ,  $t(321) = 0.521$ ,  $p > 0.1$ . Thus, we found support for a positive effect of CR on CI ( $H1a$ ) but not for a positive effect of QR on CI ( $H1b$ ).

Dependent variable	CI		PRC		PFU	
	Coef.	SE	Coef.	SE	Coef.	SE
CR dummy	<b>0.793</b> **	(0.373) $\uparrow$	<b>1.463</b> ***	(0.206) $\uparrow$	<b>0.432</b> **	(0.209) $\uparrow$
QR dummy	0.190	(0.364) $\downarrow$ *	<b>0.899</b> ***	(0.200) $\downarrow$ ***	0.220	(0.204) $\downarrow$ n.s.
Constant	3.922 ***	(0.266)	2.565 ***	(0.146)	4.699 ***	(0.149)
R <sup>2</sup>	0.015		0.138		0.013	
Adjusted R <sup>2</sup>	0.009		0.133		0.007	
F Statistic (df = 2, 321)	2.489 *		25.731 ***		2.133	

Note: CI = Conversion interest; PRC = Psychological reactance; PFU = Product fit uncertainty; Coef. = Coefficient, SE = Standard error; \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; n.s. = not significant;  $N = 324$   
 We conducted additional regression analyses including all control variables. The inclusion of preference insight, involvement, reported media consumption behavior, and demographics does not affect the configurations' impact on CI, PRC, and PFU significantly.

**Table 3. Linear Regressions**

Second, we conducted a mediation analysis, simultaneously testing whether PRC and PFU mediate the effect of CR and QR on CI. For this purpose, we used the PROCESS macro, a regression-based approach developed by Hayes (2013). We performed bootstrapping analyses for estimating the effects based on 5,000 subsamples and used the linear regression's coding logic for the QR and CR predictors. To test our proposed mediations, we were particularly interested in the indirect effect paths. Regarding CR, the mediation analysis revealed that the indirect effect of CR on CI through PRC ( $\beta = 0.343$ , 95%-CI [0.040, 0.662]) and the indirect effect through PFU ( $\beta = -0.125$ , 95%-CI [-0.307, -0.004]) were statistically significant. Therefore, we found support for a mediating effect of PRC ( $H2a$ ) and a mediating effect of PFU ( $H2b$ ). Regarding QR, while the indirect effect on CI through PRC ( $\beta = 0.211$ , 95%-CI [0.025, 0.433]) was statistically significant, the indirect effect through PFU ( $\beta = -0.064$ , 95%-CI [-0.217, 0.056]) was not. Thus, we found support for a mediating effect of PRC ( $H2c$ ), but the results do not support the mediating effect of PFU ( $H2d$ ). Besides these findings, the direction of the direct effects of PRC ( $c = 0.235$ ,  $t(321) = 2.357$ ,  $p = 0.019$ ) and PFU ( $d = -0.288$ ,  $t(321) = 2.357$ ,  $p = 0.003$ ) on CI revealed two counteracting effects. Figure 3 visualizes the results of our mediation model.



**Figure 3. Mediation Model**

Third, we compared the total effects of the QR and the CR configuration on PRC, PFU, and CI. Using F-tests, we therefore tested whether the regression coefficients of QR and CR differed significantly from each other (Table 3). We found support for a stronger (positive) effect of CR ( $a_{CR} = 1.463$ ,  $F(1, 321) = 7.660$ ,  $p = 0.006$ ) than QR ( $a_{QR} = 0.899$ ) on PRC. This finding is in line with our prediction and supports  $H3a$ . In contrast to our second prediction, we found no significant difference between the effect of CR ( $b_{CR} = 0.432$ ,  $F(1, 321) = 0.930$ ,  $p > 0.1$ ) and QR ( $b_{QR} = 0.220$ ) on PFU. Accordingly, the results do not support  $H3b$ . Lastly, comparing the total effects of CR and QR on CI revealed that CR has a marginally stronger effect ( $e_{CR} = 0.793$ ,  $F(1, 321) = 2.760$ ,  $p = 0.097$ ) than QR ( $e_{QR} = 0.190$ ). Consequently, our results weakly support  $H4$ .

## **Discussion**

This study sought to achieve two main objectives: (i) to examine the effectiveness of quantity-related and choice-related digital paywall configurations in encouraging non-paying users to become paying customers and (ii) to find theoretical explanations for potential differences in the configurations' effectiveness. To achieve these two objectives, we made use of the literature on freemium models, sampling mechanisms, and digital paywall research. Furthermore, we identified psychological reactance and product fit uncertainty as potential mechanisms underlying consumer behavior in paywall contexts. We tested our theorizing in an online experiment with 324 participants.

Our results demonstrated that restricting consumers' choice in digital paywall configurations based on freemium models fosters conversion interest, while increasing quantity restrictions does not. The mediation analysis revealed underlying mechanisms in consumers' decision-making processes, which help explain the digital paywall configurations' effectiveness. Two counteracting mechanisms mediate the choice restriction's effect on conversion interest: While a choice restriction strongly induced psychological reactance, which motivated consumers to access the hard-to-obtain paid content (Clee and Wicklund 1980), this restriction also increased consumers' perceived uncertainty about matching their preferences with the news publisher's content. In line with theoretical predictions, these opposing effects may explain why the choice restriction's total effect on consumers' conversion behavior is rather small but still positive. On the other hand, the quantity restriction's effect on conversion interest is only mediated through psychological reactance. Although this indirect effect is rather small, the finding revealed that consumers indeed perceive an internal threat of selecting articles and therefore reject the possibility to access other news articles. However, we did not find an indirect effect through product fit uncertainty. A potential explanation is that being able to read only a few, i.e. two, of the most preferred out of 12 news articles of choice, could be sufficient to evaluate the website's range of content, particularly for a product category that consumers have previously experienced. Since these indirect effect results should favor a quantity restriction's positive total effect on conversion interest, the absence of such an effect is surprising. A possible explanation for this finding could be the zero-price effect, i.e. the participants perceiving the value of the free content as irrationally high (Shampanier et al. 2007), which could have discouraged the participants' conversion interest to access the remaining, less preferred, news articles.

Moreover, we found initial evidence that the choice restriction is more effective in driving the participants' conversion interest than the quantity restriction. The two identified underlying mechanisms provide theoretical explanations. The choice restriction configuration induced more (positive) psychological reactance than the quantity restriction configuration. According to theory, the amount of psychological reactance depends on the importance of the threatened freedom (Brehm 1966). Accordingly, the perceived external threat (choice restriction) may be perceived as more critical to consumers than the perceived internal threat (quantity restriction). However, the choice restriction configuration did not trigger more (negative) product fit uncertainty than the quantity restriction configuration. While the choice restriction's effect on product fit uncertainty was relatively small but significant, we identified no significant effect of the quantity restriction. An explanation is that the quantity-related configurations allow consumers to cherry-pick their most preferred news content and therefore the underlying restriction mechanism did not influence consumers' uncertainty perception, whereas a choice-related configuration transfers the selection power to the publisher, which resulted in a small increase in consumers' perceived uncertainty (Halbheer et al. 2014). In conclusion, the results indicate that the reactance effect is more powerful in driving conversion interest than the uncertainty effect is in reducing conversion interest. Furthermore, although the choice restriction is associated with greater product fit uncertainty, the choice restriction invokes more psychological reactance than the quantity restriction, explaining the configurations' indicated effectiveness differences.

## **Theoretical Contributions and Practical Implications**

Adding to the literature on digital paywall research (e.g., Aral and Dhillon 2020), we studied consumer responses to digital paywalls' two most prominent configurations: restricting the choice or the quantity of a news website's free content. More specifically, we compared the effectiveness of these two digital paywall configurations in encouraging non-paying users to access paid content. Our research thereby makes a two-fold contribution to existent theory.

First, our study contributes to the literature on the effectiveness of freemium revenue models in attracting paying customers (e.g., Arora et al. 2017; Liu et al. 2014; Mäntymäki et al. 2020) and also to the sampling literature (e.g., Halbheer et al. 2014; Hoang and Kauffman 2016; Li et al. 2019). Our findings suggest that a choice restriction can balance the trade-off between creating a high value discrepancy and letting the user become accustomed to the product more successfully than a quantity restriction can. Accordingly, letting consumers sample less of their own choice creates less interest in the remaining product than letting consumers sample more of a predetermined choice. Users can apparently better satisfy their existing demands for a heterogeneous good by consuming few but highly preferred units compared to more but less preferred units. These insights advance our understanding of users' sampling behavior and conversion behavior in freemium models.

Second, we shed light on the psychological mechanisms that can be triggered by restrictions of free versions within freemium models and explain subsequent user behavior. For this purpose, we combined a psychological reactance perspective (Brehm 1966) with the established (product fit) uncertainty lens (Hong and Pavlou 2014). Specifically, we explain rather small configuration-related total effects in fostering consumers' conversion interest by two counteracting mechanisms in consumers' decision making: a positive effect of psychological reactance, which motivates consumers to access the hard-to-obtain paid content, and a negative effect of product fit uncertainty, which inhibits free users from becoming paying customers. Our results indicate that both mechanisms may be drivers of conversion behavior but that both quantity and choice restrictions induce more psychological reactance than product fit uncertainty.

Our findings also have important design implications for freemium models in general and for news publishers' digital paywall configurations in particular. Overall, our results should encourage companies employing freemium models to make use of choice restrictions to differentiate between free and paid versions. Nevertheless, following a choice restriction approach also comes with challenges. While it gives providers of heterogeneous products control over the product sample, it also requires them to identify which sampling strategy works best. While we employed a random sampling strategy in our experiment, this strategy might be suboptimal in real-world settings. Moreover, our results suggest that companies employing freemium models may wish to increase their free users' perceived psychological reactance. Emphasizing consumers' restrictions in their freedom of choice and showing reactance-arousing messages may be a strategy to trigger conversions (Dillard and Shen 2005). Finally, providers of digital information goods should try to decrease consumers' perceived uncertainty. Although we found product fit uncertainty to have a rather weak negative effect on conversion interest, transparently communicating advantages and disadvantages of the free content compared to those of the paid content (e.g., exclusive authors, topics) may strengthen this effect.

## **Limitations and Opportunities for Further Research**

We acknowledge a few limitations that provide avenues for future research. First, our experiment used a stylized news website where participants had the task to read news articles. As such, participants were not, at least not initially, intrinsically motivated to consume the provided news content, which is usually the case in regular news consumption situations and thus reduces external validity. However, the participants were not forced to consume the content because they could always skip the news consumption part in the experimental procedure. Furthermore, our experiment enabled us to examine the effects of the two digital paywall configurations on consumers' reactions in a tightly controlled environment. We are therefore positive that our results are applicable to real news consumption behavior. Nevertheless, future research could validate our results by conducting field experiments to investigate actual news consumption and conversion behavior on a real news website. Second, we manipulated the quantity restriction mechanism by reducing the number of sampled content from four news articles to two news articles. While we needed a baseline to investigate a quantity-related configuration, selecting two news articles from a range of 12 news articles could be sufficient for participants, especially in the context of an online experiment. Although the manipulation check supports that the quantity restriction worked as intended, future research could advance our understanding of this mechanism by extending the range of the quantity dimension. Third, we investigated sampling mechanisms in the context of digital paywall configurations and news consumption. It would be interesting to apply our experimental setup and theoretical explanations to other freemium contexts and digital information goods (e.g., streaming of movies) in which a digital paywall can also be used.

## Conclusion

While consumers' willingness to pay for news content on the Internet is still low, the right configuration of a digital paywall increases consumers' interest to access paid content. This might lead to growth in revenue from digital sources. Our study (i) provides initial evidence that restricting the choice of free articles might be more effective in driving conversions than restricting their quantity and (ii) identifies two counteracting psychological mechanisms in consumers' decision making to explain the configurations' indicated effectiveness differences. Although the choice restriction is associated with more product fit uncertainty, this restriction invokes more psychological reactance than the quantity restriction, thus eliciting a higher conversion interest. In a broader sense, our work contributes to the freemium literature by theoretically explaining which mechanisms drive conversion interest toward premium offers.

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