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ORIGINAL ARTICLE

On packaging and product returns in online retail—Mailing boxes or sending signals?

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Abstract

Considerable research on merchandise returns has looked at marketing elements of the sales process (e.g., product display) and how they influence returns. However, marketing and order fulfillment processes are temporally decoupled in remote purchase situations such as online retail. While both are intricate parts of the overall sales transaction, it is logical to believe that elements of order fulfillment may also be influential in explaining and controlling merchandise return. This study focuses on the packaging aspect of the order fulfillment process to explore how it may influence return incidents in online retail. Following insights from Signaling Theory, we propose that a product's package is a signal that communicates valuable information about the product to the buyer. We partner with an online retailer to study the outcome of a natural experiment involving product packaging during order fulfillment. Our results show that packaging influences returns, reducing them most significantly if the signaling is consistent across packaging levels.

KEY WORDS

merchandise returns, natural experiment, online retailing, packaging, signaling theory

INTRODUCTION

It is a common occurrence in online retailing for a product to be picked, packed, and delivered to a customer, only to be sent back by the customer shortly thereafter. This may trigger a series of transactions for the retailer, including product receipt, sorting, processing, and restocking (Rao et al., 2018). All of this costs time and money, outbound delivery costs being over US\$ 5.00 for the average retailer and returns processing twice as much (Asdecker, 2018; USPS, 2018). It is,

therefore, no surprise that sellers see returns as an onerous cost of business (Bernon et al., 2016; Min & Ko, 2008).

However, customers say that return policy is a key factor in deciding whether to buy from a seller (Janakiraman et al., 2016; Petersen & Kumar, 2009; Rao et al., 2018). And about 70% of online shoppers hesitate to buy from sellers who charge for return shipping or impose other gatekeeping fees for activities such as restocking (Narvar, 2018). Customers see substantial value in returns and expect them to be hassle-free (Janakiraman et al., 2016), 92% of them reporting that

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they are “likely” or “highly likely” to award their business to sellers who offer easy options for returning merchandise (Rudolph, 2016). Product returns are, therefore, a conundrum, expensive on their own but less so than backfired attempts at avoiding them, which lead to unhappy customers taking their business elsewhere (Griffis, Rao, Goldsby, & Niranjan et al., 2012). This dilemma has sometimes made sellers wonder whether, to attenuate the likelihood of returns, anything can be done *ex ante*—that is, *before* the customer requests a return.

While prior studies in logistics and supply chain management (LSCM) have provided various insights for returns management, they have left several gaps in our understanding. For example, marketers have long recognized that presentation is critically important in product evaluation (e.g., Koivumäki, 2001; Kracklauer et al., 2001; Park et al., 2005). It influences purchases (Spreer and Kallweit, 2014), emotional responses (Constantinides, 2004), and customer expenditures (Jeong et al., 2009). However, the influence of presentation on merchandise returns has seen limited investigation.

Consider, for example, product presentation in order fulfillment. In online retail, several elements of order fulfillment are visible to the customer (Rao et al. 2014), and important in making sure the sale “sticks.” Trade reports show that these elements include both packaging and fulfillment cycle time (Earl, 2020). However, sellers do not fully control the fulfillment cycle time because it usually involves third-party delivery companies (Rabinovich et al., 2007; Rao et al., 2014). Yet, they may have direct influence on the packaging in which the item is shipped. This packaging is an element of product presentation at the time of order fulfillment, which constitutes a moment of truth for the seller (Earl, 2020). Yet, while much research has investigated order fulfillment through the lens of cycle time or fulfillment cost (Gawor & Hoberg, 2019; Griffis, Rao, Goldsby, & Voorhees et al., 2012; Koufteros et al., 2014; Rao et al., 2011), little (if any) research has investigated it through the lens of product presentation.

Because of this lack of detailed investigation, presentation-related innovations have often been treated as afterthoughts in online retail supply chains (Barnes, 2016; Earl, 2020). More broadly, packaging (and its presentation potential) is given little attention in LSCM research (Rundh, 2013). Historically, there was good reason for this. In business-to-business supply chains, for example, product presentation has little value during distribution; therefore, packages are mostly designed for low-cost and damage-free shipment, rather than for appearance (Hellström & Sagir, 2007). Yet, in business-to-consumer online retailing, the appearance of the package may indeed be of relevance in the consumer's overall assessment of the item's quality and value (Ampuero & Villa, 2006; Orth & Marchi, 2007). Despite this, substantial numbers of online purchases continue to be shipped in plain brown cardboard boxes with plain void fill, serving the

utilitarian role of protecting the shipped item, with limited visual appeal in presentation.

However, some online retailers have recently started what Moreau (2020, p. 156) refers to as a “doorstep branding strategy” by using premium packaging to make their parcels more appealing. This premium packaging may include improved sensory appeal of the exterior shipping package (i.e., the secondary packaging) by way of enhanced color, design, and feel. In this respect, Kim et al. (2018) outline the potentially positive esthetic experience connected to the unboxing of the merchandise. To improve presentation at the time of order fulfillment, the interior (primary) packaging may also be enhanced via measures like elegant void fill, visually appealing paper wrapping, or premium greeting cards with personalized messages (Business Insider, 2019; Moreau, 2020). Given how improved presentation at the time of sale has been associated with diminished merchandise returns (e.g., De et al., 2013; De Leeuw et al., 2016; Kostyra et al., 2016), it is conceivable that the same is true at the time of order fulfillment. This is the motivation behind our research question: *Does visually enhanced packaging influence merchandise return likelihood?*

For this research, we collaborate with a major European online retailer of fashion accessories to answer this research question. We capitalize on a natural experiment wherein the retailer sequentially enhanced the packaging of their shipped products, first by providing a highly visually appealing inside packaging and, subsequently, by adding a premium shipping package (i.e., shipping box). We argue that these enhancements serve as a signal of product quality and appeal and, based on Signaling Theory, derive specific hypotheses regarding the return likelihood of said products. They are tested in a logistic regression framework (e.g., Rao et al., 2014).

LITERATURE REVIEW

The online retailing supply chain

Researchers in LSCM (e.g., Peinkofer et al., 2015; Rabinovich & Evers, 2003; Rao et al., 2011; Rao et al., 2018) have devoted considerable effort to investigating the supply chain implications of online retailing. Historically, retailers were experienced in moving large lots to central locations for storage and shipping, but online retail entailed a completely new challenge: delivering small pack sizes cost-effectively to geographically dispersed customers (Boyer et al., 2009; Rabinovich et al., 2007). This became known as the last mile challenge, and the defining problem for the future of transportation (Boyer et al., 2009; Esper et al., 2003). At the same time, the various aspects of this last-mile delivery (e.g., cycle time, cost, customer service) were thought to be crucial aspects in the customer's decision to buy from an online retailer

(Xing et al., 2010). Thus, it was argued that the boundaries between logistics and marketing would become blurred in online retail.

Consistent with this guidance, much of the subsequent focus of LSCM research in online retail has been on the *downstream* supply chain linking the retailer and the consumer (Griffis, Rao, Goldsby, & Voorhees et al., 2012; Nguyen et al., 2019; Peinkofer et al., 2016; Tokar et al., 2020). Nguyen et al. (2018) suggest that the last mile challenge can be broken down into three interdependent elements: inventory management, order fulfillment, and returns management.

From an inventory-management standpoint, literature has focused on the disclosure of inventory information—such as availability (Allon & Bassamboo, 2011; Peinkofer et al., 2016; Rao et al., 2014), discounts (Aydinliyim et al., 2017), and quantity (Yin et al., 2009)—and how this information affects online purchase behavior. In terms of order fulfillment, Esper et al. (2003) indicated that buyers might pay more for items if given some control over the last-mile delivery circumstances. Moreover, Rao et al. (2011) suggested that delivery options may contribute to increased consumer satisfaction, and that a glitch in order cycle time increases the anxiety that customers have for subsequent orders. Similarly, Xu et al. (2017) suggested that for certain product categories, exceedingly short cycle times (e.g., <24 h) increase customer satisfaction substantially. Finally, while total price has emerged as the most important attribute of order fulfillment in online retail, delivery cycle time is a close second (Gawor & Hoberg, 2019; Nguyen et al., 2019).

Merchandise return incidents and return policies

Many researchers have discussed reverse supply chains in online retail (Nguyen et al., 2018; Xing et al., 2010), because of their substantial impact on revenues and operational costs. These discussions include customers' merchandise return experiences and sellers' return policies. Here, Rao et al. (2018) argue that merchandise return policies have more impact than return experiences because policies potentially influence *all* customers, not just the subset who return products. Similarly, clear and friendly returns policies presented on online retail websites have shown to influence purchase intentions (Bart et al., 2005; Dadzie et al., 2005). Further, customers adjust their purchase and spending patterns after a return incident (Bower & Maxham, 2012; Griffis, Rao, Goldsby, & Niranjan et al., 2012) because of the decreased purchase risk that comes with knowing that an item can be returned if its purchase does not work out (Janakiraman et al., 2016; Petersen & Kumar, 2009). Nevertheless, much of the extant research continues to take the view that because returns are expensive,

sellers should prevent them as much as possible (Asdecker, 2015). Accordingly, there are two ways in which retailers may attempt to prevent product returns: avoidance and gatekeeping (Rogers et al., 2002).

Gatekeeping imposes barriers to keep a customer that is inclined to return a product, from actually returning it (De Leeuw et al., 2016; Rogers et al., 2002). This may include rejecting return requests, as well as rejecting products sent back because they have been used, damaged, or returned too late (Rogers et al., 2002). Research on gatekeeping has investigated the effectiveness of lenient versus restrictive return policies (e.g., Bower & Maxham, 2012; Lantz & Hjort, 2013; Petersen & Kumar, 2009), and the operational costs of decentralized versus centralized gatekeeping (De Leeuw et al., 2016). In general, gatekeeping as a return-reduction strategy appears to receive limited support from researchers (Janakiraman et al., 2016) as online shoppers are attracted to sellers that offer more liberal return policies than their competitors (Rao et al., 2018).

Avoidance, on the other hand, reduces the return likelihood by mitigating reasons customers may have to return an item (Rogers et al., 2002) and is the more favored approach in extant literature. The goal is to sell products so that return intentions do not develop (De et al., 2013). Researchers have tried to understand return patterns and, in the hope of avoiding them, situations of high return likelihood (Foscht et al., 2013; Hjort et al., 2013). For example, Petersen and Kumar (2009) identify certain product and purchase characteristics (e.g., purchases during the holiday season or for gifting) with lower or higher return likelihood. Other researchers follow the premise that returns originate from instances where products underperform compared to expectations (Hong & Pavlou, 2014; Minnema et al., 2016; Rao et al., 2014).

Some of this research has suggested that elements of product presentation influence these expectations, and therefore impact returns. For example, retailers are recommended to improve product descriptions, so that customers will not buy products that fail to match their needs (Foscht et al., 2013; Shulman et al., 2015). Similarly, customer reviews have proven to be helpful in avoiding returns (De et al., 2013; Kostyra et al., 2016). Further, incorporating "zooming" technology so that online shoppers are able to get close-up views of the product (De et al., 2013), online fitting rooms (McFarland, 2014; Walsh et al., 2014), and size charts (De Leeuw et al., 2016) may reduce merchandise return incidents as well.

Overall, avoidance-related research has focused on issues involving product presentation at the time of sale. However, limited attention has been paid to presentation at the time of order fulfillment. This is the motivation behind our study, as in online retail, the order fulfillment is seen as a natural extension of the overall sales process (Hübner et al., 2016; Mena et al., 2016). Therefore, if presentation at the time of

sales can influence returns, it would be logical to conclude that the same may also be true at the time of order fulfillment.

Such product presentation may be enhanced by improving the item's appearance through visually appealing primary and secondary packaging. The secondary packaging (also called transport packaging) is intended to protect the products and their primary packaging (Hellström & Saghir, 2007). In online retailing, this is the exterior shipping package, the outer carton (Moreau, 2020; Pålsson, 2018). By contrast, the primary packaging, including that typically seen on a retail shelf, is found inside the secondary packaging. In online retail, it may extend to include any packaging that is inside the outer shipping carton—for example, visually appealing gift paper or other similar wrapping around the items. While in most traditional retail settings, consumers will not see the secondary packaging, in online retail they will, since it is the physical box delivered to the buyer's address.

THEORY, RESEARCH MODEL, AND HYPOTHESES

Theoretical background

The presentation and appearance of an item has often been associated with the fourth “P” of marketing: promotion (DeBono et al., 2003; Hellström & Nilsson, 2011; Rundh, 2013; Silayoi & Speece, 2007). Indeed, most impulse buying occurs because of product displays and the physical appearance of items (Bitner, 1992; Bloch, 1995; Wang, 2013). For example, Veryzer and Hutchinson (1998) showed that alterations in products' visual design are predictive of differing product evaluations across various product types. Presenting a product as “healthy” influences preference for the food, whether it is healthy or not (Raghunathan et al., 2006). Brain scanning studies have shown that consumers are influenced by the way items are presented, with more “premium” product presentation associated with higher evaluations (Van der Laan et al., 2012). For these reasons, major retailers spend considerable resources on display formats, flyers and banners, shelf-slotting decisions, and other visual cues (Clement, 2007).

A leading element of product presentation is packaging (Kauppinen-Raisanen et al., 2012; Silayoi & Speece, 2004). It is an extrinsic cue that consumers experience even before experiencing the product itself (Chung et al., 2006; Orth & Marchi, 2007), and it is therefore a key marketing lever that affects how consumers perceive an item's quality (Honea & Horsky, 2012; Venter et al., 2001). This is especially true in online retail, where the package is the very first chance for a buyer to have a fully sensory experience of the product (Heller et al., 2019; Peck & Childers, 2003). Packaging may therefore not only be a logistics element that ensures

damage-free delivery; it may also serve as a key tool for messaging regarding the seller and the product (Pålsson, 2018). As such, the package may serve as an extrinsic *signal* of the product's intrinsic quality (Alevizou et al., 2018; DeBono et al., 2003).

The value of such signals is especially salient in online retail because of the buyer's inability to physically inspect items prior to purchase (Kim & Lennon, 2008; Wells et al., 2011). In such environments, factors like reputation, warranties, and return policies may serve as signals of sellers' services and products (Wang et al., 2004; Biswas and Biswas, 2004; Rao et al., 2018), supporting buyers' quality assessments (Dawar & Parker, 1994). While attention has been focused on how these signals influence the buyer's *pre-purchase* assessments, they are also a valid foundation for studying *post-purchase* behavior (Hu et al., 2015; McCollough & Gremler, 2004). Our study focuses on post-purchase behavior (keep vs. return) and uses Signaling Theory as a theoretical base to develop research hypotheses.

Theory and hypotheses

Grounded in the domains of information economics (Eastbrook, 1959; Olson, 1972), Signaling Theory focuses on how market exchange is facilitated by signaling properties about one party to one other (Connelly et al., 2011; Spence, 2002). Consider a typical exchange between a seller and buyer. The seller has access to the item, and information that the potential buyer desires but may not have (e.g., information regarding the item's durability). The buyer is more likely to carry out the exchange if the item has these favorable properties. Here, sellers may try to use observable properties to signal information about the unobservable quality of their products (Rao et al., 1999; Kirmani & Rao, 2000; Basuroy et al., 2006). These signals aim to decrease the information asymmetry, with the aim of ultimately facilitating the transaction. Obviously, since by sending such signals, sellers seek to decrease the friction that buyers may feel in transactions (Mittra & Fay, 2010), only high-quality sellers will seek to proactively send such signals (Rao et al., 2018). A detailed discussion of these intricacies in Signaling Theory can be found in Connelly et al. (2011).

Signaling Theory has been used in the online retail domain to study customer responses to return policies (Rao et al., 2018), trust of online sellers (Ray et al., 2011; Wang et al., 2004), and complaint intentions (Hu et al., 2015). Outside online retailing, LSCM researchers have also used Signaling Theory to study driver behavior (Saldanha et al., 2013), sustainability (Brockhaus et al., 2013), and disruptions (Cheng et al., 2019).

Per Signaling Theory, good signals are extrinsic to the product (Wells et al., 2011). In other words, they are attributes

related—but not inherent—to the product being evaluated, and changes to these attributes will not alter the fundamental nature of the product (Richardson et al., 1994). The focus of our study is on product packaging, which meets this criterion because it is product-related but is not part of the physical product (Underwood et al., 2001). We posit that packaging can serve as a signal in online retail, just as a store's environment can serve as a signal of the quality of the store's products (Baker et al., 1994). This is because in most online retail situations, the product package is the first visual and haptic outcome that the customer receives from the exchange (Heller et al., 2019; Peck & Childers, 2003). The package may serve as a surrogate for the store layout and ambience. Therefore, in online retail the product's packaging is likely to be seen by the consumer as an implicit signal of the seller's and product's overall quality (Hellström & Nilsson, 2011; Wang, 2013).

The base condition, against which we compare the packaging signals, is *ordinary packaging*, both primary and secondary. At the secondary packaging level, it refers to industry standard, plain cuboid brown cardboard boxes without notable branding, while at the primary level it refers to plain and functional void fill (e.g., standard bubble wrap, plain polystyrene, or crumpled brown paper). Some online retailers have embraced package design with the understanding that the package is not just an ordinary utilitarian box to deliver an undamaged item. It is also a medium that can convey a more comprehensive message about the seller and their shipped items (communicating, e.g., a high sense of sophistication and luxury). According to Business Insider (2019), retailers like *getvinebox.com*, *actandacre.com*, and *otherland.com*, have all engaged specialized industrial design teams. These teams improve the physical appearance of both the secondary packaging (the exterior shipping box) and the primary packaging within it. For secondary packaging, this typically involves using different or multiple colors in combination with branding elements. Retailers may incorporate embossment or other haptic elements for the surface of the exterior package, or they may use non-cuboid boxes. For the primary packaging also, various elements can be used to create a premium esthetic appeal. These include, for example, elegant paper wrapping, presentation trays, elegant greeting cards, and stickers with the retailer's logo. Compared to the industry standard, all these can be considered “premium,” since they carry superior visual appeal.

Moreau (2020) suggests that customers experience higher levels of positive affect with items delivered in premium packaging where both primary and secondary packaging are designed for enhanced visual appeal compared to items delivered in the ordinary packaging designed for functionality with little or no attention paid to its sensory appeal. Items arriving in Premium Packaging are likely to

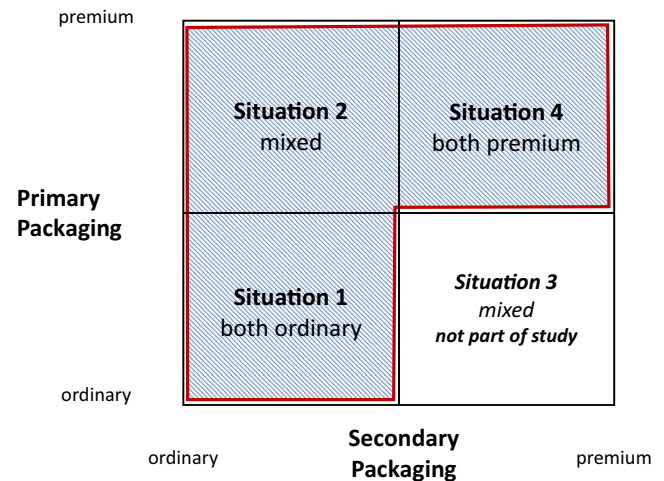


FIGURE 1 Packaging design matrix.

be viewed as superior in quality (Yang & Peterson, 2002). Further, research has shown that when perceived product quality is higher, customer satisfaction with the purchase is enhanced (Fu et al., 2016; Mukhopadhyay & Setapura, 2007), which in turn is reflected in reduced return rates for merchandise (Sahoo et al., 2018). Conversely, signals of lower quality are associated with reduced satisfaction (Song et al., 2015) and result in increased return rates. This leads to our first hypothesis:

Hypothesis 1 *Products shipped in Premium Packaging (i.e., PP) are less return-likely than products shipped in ordinary packaging.*

There are also packaging configurations involving mixed signals. We contend that this is the case where one level of packaging (e.g., primary) is enhanced and designed for visual appeal, but the other level (e.g., secondary) packaging remains purely utilitarian. In such cases, the premium quality signaled by the enhanced packaging at one level is incongruent with the ordinary signal at the other level. From a Signaling Theory standpoint, this is a *mixed signal*, where—knowingly or unknowingly—multiple inconsistent signals are sent (Connelly et al., 2011; Spence, 2002). Therefore, orders where primary and secondary packaging are not *both* premium constitute a signaling dynamic different from cases like those outlined in our first hypothesis. We refer to this kind of packaging as *semi-premium packaging*. Such semi-premium packaging can happen in ways. Either the primary packaging may be enhanced while the secondary is ordinary, or the primary packaging may be ordinary while the secondary is enhanced (in this paper we only operationalize the former, since data for the latter were not available to us through the natural experiment) (Figure 1).

While LSCM research has explored signaling in a wide range of settings, most attention has been paid to single or uniform signals (e.g., Rao et al., 2018; Saldanha et al., 2013; Wagner et al., 2011). Therefore, little is known about situations involving mixed signals (Cheng et al., 2019), though studies have concluded that there may be a shaping effect where the presence of a contradictory signal affects the recipient's reaction to a positive signal. For example, when a supply chain disruption occurs, increasingly severe disruptions can cause buyers to develop such negative impressions of the focal supplier that even highly positive recovery signals from the supplier are viewed with skepticism (Liao, 2007; Wang et al., 2014). In other words, the benefit obtained by a positive signal, while still present, may be reduced in strength if there are multiple incongruent signals involved. Since we have previously argued that packaging serves as signal of quality related to satisfaction and returns (Song et al., 2015), the logical extension is that Semi-Premium Packaging (i.e., the mixed signaling condition) should accrue less positive impressions in the customer's minds than the Premium Packaging condition albeit more positive than ordinary packaging. Thus, we hypothesize:

Hypothesis 2 *Products shipped in Semi-Premium Packaging (i.e., premium primary packaging but ordinary secondary packaging) are less return-likely than products shipped in ordinary packaging.*

Hypothesis 3 *Products shipped in Premium Packaging are less return-likely than products shipped in Semi-Premium Packaging (i.e., premium primary packaging but ordinary secondary packaging).*

DATA COLLECTION

This study was conducted in collaboration with a major fashion accessory retailer in Germany that sells exclusively online and has annual sales exceeding US\$ 100 million. Concentrating on a single company's data is consistent with prior LSCM research in online retailing (e.g., Griffis, Rao, Goldsby, & Voorhees et al., 2012; Rao et al., 2014) and other domains (e.g., Nilakantan et al., 2019). We also focused on one product category (i.e., handbags) with the advantage of controlling for product-specific variation in customer reactions (Rao et al., 2014). In addition, this product category had been investigated in prior LSCM research (Rabinovich et al., 2008; Rao et al., 2014). Finally, a helpful characteristic of the retailer was its lenient shipping and return policy: customers pay for neither delivery nor return. Therefore, there was no concern about potential confounding factors (e.g., shipping or return fees) affecting our dependent variable (i.e., return incidents) when testing our hypotheses.

Research design

For the study, we considered orders placed between January 2011 and December 2014. To ensure uniformity within the data, we only included orders that fulfilled specific requirements, namely that each order had been placed in one country (i.e., Germany) and in one product category (i.e., handbags). As with Rao et al. (2014), the goal was to ensure that our results were contaminated with neither cross-border issues (involving order fulfillment, customs, and returns) nor cross-product behavioral uniqueness. The retailer's contracted delivery lead time did not change over the course of the study period. In addition, we filtered out orders having more than one item, ensuring that we could minimize the likelihood of home comparison and retail borrowing, where items are bought with the deliberate intention of returning some of them (Piron & Young, 2000). Further, we excluded returns in cases where the product was faulty, or not deliverable. This left us with 107,163 orders.

Operationalization of the main constructs

Dependent variable

The dependent variable *Product Return* refers to whether an item was returned. (For the variable operationalizations, see Table 1; for the correlation matrix, see Table 2.) A return is logged in the retailer's database after an item is received at the distribution center, inspected, and matched against the shipped sales orders. This was operationalized as a binary dummy variable (i.e., Returned = 1, Not Returned = 0). This is consistent with prior LSCM research that has investigated return incidents in online retail (e.g., Rao et al., 2014). The overall return rate in our sample was 30.37%, practically identical to the industry average of 30% for such product categories (Reagan, 2016).

Independent variables

The two independent variables of interest are Premium Packaging and Semi-Premium Packaging. Our natural experiment allows us to capture these two variables over the four calendar years for which we have access to data (January 2011–December 2014). During the first 18 months of this period, the retailer shipped items in ordinary, purely utilitarian packaging. This formed the base condition against which further enhancements were measured for H1–H3. In July 2012, the retailer started shipping all items with upgraded, premium primary packaging. This included luxurious wrapping paper overlaid on the item to create a gift-like appearance. In addition, a high-quality envelope, enclosing a printout of the

TABLE 1 Operationalization of variables and descriptive statistics

Variable	Description of operationalization	Operationalization	Mean	SD.
Product Return	Whether the product/the order was returned	Binary dummy (1 = Yes, 0 = No)	0.30	0.46
Semi-Premium Packaging	Whether the product had a premium primary and ordinary secondary packaging	Binary dummy (1 = Yes, 0 = No)	0.49	0.50
Premium Packaging	Whether the product had a premium primary and premium secondary packaging	Binary dummy (1 = Yes, 0 = No)	0.45	0.50
Product Contextualization	Whether the product was contextualized in the webstore via an inconspicuously dressed mannequin	Binary dummy (1 = Yes, 0 = No)	0.34	0.48
Pre-receipt Direct Payment	Whether the order was paid directly in full pre-receipt	Binary dummy (1 = Yes, 0 = No)	0.09	0.28
Rate Payment (3 M)	Whether the order was paid with a rate payment over a duration of three months	Binary dummy (1 = Yes, 0 = No)	0.18	0.38
Rate Payment (12 M)	Whether the order was paid with a rate payment over a duration of twelve months	Binary dummy (1 = Yes, 0 = No)	0.30	0.46
Invoice	Whether the product was purchased on account (invoice payment)	Binary dummy (1 = Yes, 0 = No)	0.43	0.49
Product Price	Price paid for the product	Continuous	296.12	263.34
Age	Age of the customer at the time of purchase	Continuous	37.99	11.74
Gender	Whether the customer is female	Binary dummy (1 = Yes, 0 = No)	0.87	0.34
New Customer	Whether the customer is purchasing for the first time at this retailer	Binary dummy (1 = Yes, 0 = No)	0.51	0.50
Sale	Whether the product is sold on sale (below recommended retail price)	Binary dummy (1 = Yes, 0 = No)	0.62	0.48
Voucher	Whether a discount coupon was used	Binary dummy (1 = Yes, 0 = No)	0.17	0.38
Month	The month in which the purchase was made	Binary dummy (1 = Yes, 0 = No)	0.15	0.36
Return Hassle	Whether the customer was facing low return hassle (printed return label within the parcel) or high (return label needed to be printed out by customer)	Binary dummy (0 = low hassle, 1 = more hassle)	0.31	0.46
Return History	Natural logarithm of 1 + number of returns of the respective customer at this retailer (including other product categories)	Continuous	0.46	0.81

order details and a premium card with a personalized message from the retailer, were added to the package. During this time, the outer box, the secondary-level, ordinary packaging was unchanged, forming the Semi-Premium Packaging condition.

Subsequent to this first improvement, a further enhancement was made in the packaging format starting in April 2014, this time to the secondary packaging so that all products were shipped in premium cardboard parcels instead of ordinary packaging. The upgraded inner packaging was left unchanged. The new outer parcel design had crisp white and black accents embedded with the company logo and a black ribbon-like bar around the parcel, contrasts typical of luxury

design and specifically chosen to create a premium appearance. This formed the Premium Packaging condition in our study. In chronological sequence, Semi-Premium Packaging was introduced about 21 months before the introduction of Premium Packaging.

Control variables

In addition to the hypothesized variables, we also included various control variables to account for potentially confounding effects.

TABLE 2 Correlation matrix.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Premium Packaging	–													
2. Semi-Premium Packaging	0.22	–												
3. Product Contextualization	0.78	0.18	–											
4. Pre-receipt Direct Payment	0.10	–0.11	0.07	–										
5. Rate Payment (3 M)	–0.08	–0.07	–0.07	–0.15	–									
6. Rate Payment (12 M)	–0.01	–0.10	–0.02	–0.21	–0.31	–								
7. Product Price	0.06	–0.11	0.05	–0.02	0.07	0.21	–							
8. Age	–0.03	0.00	0.01	–0.04	–0.08	–0.05	0.03	–						
9. Gender	–0.03	–0.01	–0.01	–0.12	0.03	0.06	0.00	–0.01	–					
10. New Customer	–0.02	0.00	–0.06	0.14	–0.12	–0.20	–0.15	–0.07	–0.14	–				
11. Sale	–0.27	–0.08	–0.18	–0.03	0.05	–0.01	–0.06	0.07	0.05	–0.04	–			
12. Voucher	0.19	0.03	0.16	0.10	–0.09	–0.15	–0.04	–0.10	–0.01	0.05	–0.25	–		
13. Return Hassle	–0.61	0.17	–0.49	–0.14	0.02	–0.02	–0.09	0.02	0.04	0.03	0.23	–0.16	–	
14. Return History	0.03	0.00	0.05	–0.12	0.10	0.19	0.20	0.09	0.09	–0.57	0.04	–0.07	–0.03	–
15. Product Return	–0.05	–0.01	–0.02	–0.08	0.01	0.02	0.09	0.05	0.06	–0.16	0.04	–0.02	0.03	0.28

Product contextualization

Product contextualization—the “presentation of the product in an appropriate context to simulate how the product can be used” (De et al., 2013, p. 1005)—can foster imagination. It may create an evaluative picture, raise customer expectations (Steinmann et al., 2014), and increase the return likelihood after product receipt owing to raised expectations. All items introduced on the retailer's website after November 2013 were contextualized by being photographed on a mannequin. To control for the potential confounding effect of this contextualization, we measured it with a binary dummy variable.

Payment method

People value goods that they own more than goods that they do not (Kahneman et al., 1991). Prior research has shown that one way to induce the feeling of ownership lies in paying for the product. Moreover, the feeling is stronger when the payment is more salient (Shah et al., 2016). Various payment methods are usually available in online retail, differing in terms of their salience. In this case, seller payment methods included pre-receipt direct payment, three-month rate payment (3 M), 12-month rate payment (12 M), and post-receipt payment to invoice. We controlled for these payment methods.

Age and gender

Hjort (2010) concludes that younger customers tend to return items more often than older ones, and Ulbrich et al. (2011) contend that female customers return items more than male customers do, which is why we controlled for both factors. In addition, gender also partially controls for orders made for gifting: it can be assumed that many of the handbags bought by men were intended as gifts for women.

Month

A second variable that accounts for potential gifting in holiday seasons is month, which shows via dummy variables in which month the order was placed.

New customer

Rao et al. (2014) have said that customers may be less likely to return when ordering for the first time. We therefore included a dummy variable to control for customers who were ordering for the first time at this retailer.

Product price

Higher-priced products are considered more likely to be returned (Petersen & Kumar, 2009). Therefore, the product price was controlled for, denoting the effective price of the product at the time of purchase.

Products on sale and discount vouchers

Sales and discount vouchers may induce urgency. With sales promotions, customers expect reduced inventory availability

(Peinkofer et al., 2015). Therefore, the decision may be less thoroughly considered, potentially increasing the return likelihood (Ishfaq et al., 2016). We accounted for both factors.

Return history

Customers who have returned items in the past may be more likely to also return future orders (De et al., 2013). We therefore included the number of past return incidents with this retailer as control.

Return hassle

More cumbersome returns reduce the customer's net utility from returning (Shulman et al., 2009) and may therefore reduce return likelihood. By not including a return label in the shipment, the retailer made returns less convenient for customers between November 2012 and August 2013, which was captured via a dummy variable.

DATA ANALYSIS AND RESULTS

General approach

The 107,163 observations in this study each refer to one handbag and its respective customer, product, and order information, as well as information about whether the handbag was returned. Because the dependent variable was binary, we used logistic regression for our analysis (Hosmer et al., 2013). This is consistent with prior LSCM research that has used similar models to study binary outcomes (e.g., Castillo et al., 2018; Prockl et al., 2017).

We tested a basic model with control variables only and then built an extended model that added the main effects according to H1–H3. Chi-squared coefficients for the overall significance and for the model extension were significant, at $p < .01$. Since the Hosmer–Lemeshow test is not recommended for samples larger than 25,000 (Paul et al., 2013), we randomly selected 20,000 observations from our full sample and performed the test on this sample to assess goodness of fit. It is important to note that the results could be sensitive to the number of “bins” used. For example, if eight bins were used instead of ten, the results could differ. To mitigate this issue, we used the following formula (Paul et al., 2013):

$$g = 2 + 8 \left(\frac{n}{10000} \right)^2,$$

where g is the number of bins and n is the number of observations. Based on $n = 20,000$ and the resulting $g = 34$, we conducted the Hosmer–Lemeshow test. This gave $\chi^2 = 32.014$ and a p -value of 0.467, showing no evidence of poor fit. The model was correctly specified.

Regression results and hypotheses evaluation

Since we have only 1.65 orders per customer, and the hypotheses require to use the model using all subjects, we used the standard logit model. The results are displayed in Table 3. The coefficients for both hypothesized variables (i.e., Premium Packaging and Semi-Premium Packaging) represent binary dummies (i.e., the “1” condition), with the “0” condition representing ordinary packaging.

The results support H1, H2, and H3. Specifically, products shipped with Premium Packaging (odds ratio; $\alpha = 0.724$, $p < .001$) show significantly decreased return likelihood compared to items shipped in ordinary packaging. This supports H1. Thus, we expect to see a 27.6% decrease in the odds of return when using Premium Packaging; 95% confidence interval = [23.4%; 31.8%]. Similarly, testing for H2 also shows support for the relationship between Semi-Premium Packaging and product return (odds ratio; $\beta = 0.874$, $p < .001$). Compared to ordinary packaging, we expect a 12.6% decrease in the odds of return when using Semi-Premium Packaging; 95% confidence interval = [6.4%; 18.8%]. Finally, as hypothesized in H3, the impact of Semi-Premium Packaging is significantly lower than the impact of

Premium Packaging ($\chi^2(1) = 13.25$, $p < .001$; $H_0: \alpha = \beta$ vs. $H_A: \alpha < \beta$). The results of our hypotheses tests are summarized in Table 4.

Results for the control variables are also along expected lines. This gives us enhanced confidence not only in our data, but also in the analyses. For example, consistent with prior research (e.g., De et al., 2013), we find that product contextualization increases merchandise returns ($p < .05$). Similarly, high-priced products tend to be returned more often than lower-priced items, consistent with Petersen and Kumar (2009).

Robustness evaluation

To alleviate any concerns about correlated residuals, we added an analysis in which one-time customers' orders were included, along with one randomly sampled order for each repeat customer. These data, holding only one observation per customer, were also evaluated using a standard logit model (e.g., Rao et al., 2014). The results from this estimation are substantively similar to those of the main analysis (see Table 5).

TABLE 3 Main analysis: Results for logit model.

Dependent variable=Product return				
Variables	Estimate (Odds Ratio)	Std. Error	Z value	p-value
[H1] Premium Packaging (α)	0.724	0.021	-11.390	.000
[H2] Semi-Premium Packaging (β)	0.874	0.031	-3.770	.000
Controls				
Contextualization	1.060	0.026	2.380	.017
Pre-receipt Direct Payment	0.519	0.016	-21.640	.000
Rate Payment (3 M)	0.682	0.014	-18.210	.000
Rate Payment (12 M)	0.636	0.012	-24.390	.000
Product Price	1.001	0.000	19.710	.000
Age	1.002	0.001	2.630	.008
Gender	1.244	0.028	9.880	.000
New Customer	0.985	0.018	-0.820	.411
Sale	1.128	0.018	7.510	.000
Voucher	1.051	0.022	2.450	.014
Return Hassle	0.972	0.023	-1.200	.230
Return History	2.075	0.023	65.350	.000
Intercept	0.817	0.026	-6.350	.000
Month Dummies	Included			
Pseudo R^2	.078			
$\chi^2(25) = 8,429.7$ with p -value $< .01$				
[H3] $H_0: \alpha = \beta$ vs. $H_A: \alpha < \beta$	$\chi^2(1) = 13.25$	p -value $< .001$		

TABLE 4 Hypotheses test results.

No.	Statement	Outcome
H1	Products shipped in <i>Premium Packaging (i.e.,PP)</i> are less return-likely than products shipped in regular packaging.	Supported
H2	Products shipped in <i>Semi-Premium Packaging (i.e.,SPP)</i> are less return-likely than products shipped in regular packaging.	Supported
H3	The impact of <i>Semi-Premium Packaging (i.e.,SPP)</i> on return reduction is lower than the impact of <i>Premium Packaging (i.e.,PP)</i> on return reduction.	Supported

TABLE 5 Robustness analysis: samples with one observation per customer.

Dependent variable=Product return				
Variables	Estimate (Odds Ratio)	SE	Z value	p-value
[H1] Premium Packaging (α)	0.679	0.028	-9.380	.000
[H2] Semi-Premium Packaging (β)	0.884	0.047	-2.340	.020
Controls				
Contextualization	1.097	0.040	2.570	.010
Pre-receipt Direct Payment	0.539	0.021	-16.180	.000
Rate Payment (3 M)	0.699	0.024	-10.500	.000
Rate Payment (12 M)	0.684	0.020	-12.950	.000
Product Price	1.001	0.000	18.300	.000
Age	1.005	0.001	5.760	.000
Gender	1.413	0.043	11.450	.000
New Customer	0.415	0.050	-7.280	.000
Sale	1.196	0.028	7.570	.000
Voucher	1.178	0.034	5.690	.000
Return Hassle	0.963	0.033	-1.080	.280
Intercept	0.767	0.035	-5.800	.000
Month Dummies	Included			
Pseudo R^2	.024			
$\chi^2(24) = 1,331.74$ with p -value < .01				
[H3] $H_0: \alpha = \beta$ vs. $H_A: \alpha < \beta$	$\chi^2(1) = 11.97$		p -value < .001	

Note:: Return history variable is omitted from the model because of the very strong negative correlations between New Customer and Return History.

DISCUSSION

Our results provided support for all three hypotheses. Specifically, we found that (consistent with H1 and H2) items shipped using some form of visually enhanced packaging were less return-prone compared to items that were shipped in ordinary, purely utilitarian packaging. Likewise, H3 found support, indicating that the effects of packaging on return reduction are substantially stronger for packaging that is uniformly premium (exterior and interior) than for semi-premium packaging, where only one level of packaging is premium. The results have direct theoretical and practical implications for LSCM, as discussed below.

Given that merchandise returns are cost centers and do not themselves generate revenues, sellers may do well to try decreasing return incidents (Blackburn et al, 2004; Rao et al., 2014). While some prior LSCM research has tried to find a positive aspect in merchandise returns (e.g., Griffis, Rao, Goldsby, & Niranjana et al., 2012; Petersen & Kumar, 2009), it is hard to deny that returns continue to burden online retailers. The average return incident can cost over \$15 in shipping and handling expenses alone (USPS, 2018). Compounded by the fact that, depending on the product category and the country, up to 50% and more of products sold online get returned (Berzgal, 2018; Zalando, 2019), there is the possibility that *the same item* is

returned multiple times, incurring multiple rounds of shipping and handling. Moreover, less than half of all returned merchandise can be sold at full price, which means that returns can cost retailers more than once (Reagan, 2016). For these reasons, retailers in the USA alone are estimated to lose US\$ 550 billion annually (Statista, 2020).

Gatekeeping and avoidance have both been suggested as alternatives to control these high costs of returns (Bower & Maxham, 2012; Posselt et al., 2008). Yet, customers view these two alternatives very differently. For example, liberalized return policies' tends to increase consumers' willingness to pay for products (Rao et al., 2018). Moreover, when consumers experience easier returns, the follow-on benefits in terms of loyalty are significant (Griffis, Rao, Goldsby, & Niranjana et al., 2012). The implication of this prior research is therefore that a return request from a customer is a decisive moment giving the seller the opportunity to correct a wrong. In other words, while returns are expensive, gatekeeping may not be the best answer: It may be unpopular in the short term and inefficient in the long term. Retailers may be better served by focusing on avoidance through practices in selling and order fulfillment that pre-empt return requests. It is in this area that our findings have most of their key implications.

Implications for practice

The prevailing belief that guides returns-avoidance literature is that there are elements of the purchase process that influence a buyer's return-decision (Bechwati and Siegal, 2005). Therefore, by controlling the transaction (e.g., how an item is presented online to customers, or how it is priced), a seller may be able to influence the return likelihood (e.g., Rao et al., 2014; Ishfaq et al., 2016). While researchers have embraced this belief, the main focus of prior investigations has been on the first half of the online retail transaction (i.e., the "selling"; e.g., Foscht et al., 2013; Shulman et al., 2015; McFarland, 2014; Walsh et al., 2014). Yet, the delay between ordering and receiving an item makes the last-mile logistics and order fulfillment critical for the success of any online returns management program.

An overlooked aspect of the order fulfillment process promises a meaningful complement to other efforts in managing merchandise returns. Online retailers have traditionally paid little attention to the physical appearance of shipped packages. Packages are most often shipped in ordinary brown cardboard boxes or envelopes designed for function rather than for enhanced esthetic appeal. Even when retailers pay attention to packaging, the focus, again, is mostly on functionality, for example, in terms of ease of unboxing (e.g., Amazon's "Frustration Free Packaging;" Krishnan et al., 2014). Such packaging is viewed as a purely functional part of the last mile, with limited roles for appearance.

Instead, this aspect may be a vital element in controlling returns. According to the results of our study, Premium Packaging leads to a substantial reduction in merchandise returns. Specifically, the Marginal Effects at the Means for premium packaging is -6.6 percentage points, indicating a 6.6 percentage points lower probability of return for products shipped with premium packaging (25.5% return likelihood) than for products shipped in ordinary packaging (32.1% return likelihood). Our results also show that the impact of packaging on merchandise return reduction calls for a holistic view of packaging. Partial improvements in packaging (i.e., Semi-Premium Packaging) also accrue lower return rates (-2.8 percentage points) than ordinary packaging but are significantly less effective than Premium Packaging (i.e., improvements to the primary and secondary package). Therefore, our results not only provide guidance on the "What" question (enhancing the esthetic appeal of packaging), but also the "How" question (i.e., enhancements should be holistic to provide a consistent signal to the consumer). Thus, packaging is potentially one of the better value-for-money last-mile improvements for online retailers. In our study, for example, the added cost to the retailer of the premium packaging to the retailer was less than 10¢ per shipment. Improving order fulfillment timeliness—for example, through expedited shipments—is almost certain to cost more, yet they led to added gross profit (i.e., from fewer returns) of close to US\$ 14 per order. Applied to all orders in our sample, the added gross profit would have been approximately US \$1.5 million, and a reduction of 6,600 returned parcels for every 100,000 parcels sent to the customers.

Implications for theory

Prior applications of Signaling Theory in LSCM have commonalities that leave room for the theoretical extension that this study provides. Specifically, most prior investigations focus on uniform signals, with limited attention paid to mixed signals (Cheng et al., 2019; Rao et al., 2018). Even outside the mainstream LSCM literature, investigation on mixed signals and unintentional signals has been limited (Connelly et al., 2011; Spence, 2002). Unintentional signals arise in situations where parties send signals without realizing that they are doing so (Spence, 2002), sometimes by oversight. Connelly et al. (2011, p. 59) argued that "such signals could potentially conflict with intentional signals or be communicating negative information about the signaler."

In our study, we measured two distinct treatment conditions—Premium Packaging and Semi-Premium Packaging. The former stood for a case of clearly positive signal, where the primary and secondary packaging were both premium. The latter represented a mixed (unintentional) signal where the retailer intended to send a positive signal

through premium packaging, but the ordinary outside box (secondary packaging) added ambiguity to the signal's reception. The literature has, given the limited investigation that this area has seen, until now lacked clarity about how mixed signals are perceived by recipients (Cheng et al., 2019; Connelly et al., 2011). On the one hand, it could be argued that such contradictory signals may draw a respondent's attention even more to the positive in the situation, thus amplifying the impact of the positive signal (Cheng et al., 2019; Gulati & Higgins, 2003). On the other hand, contradicting signals may draw the recipient's attention to the weaker signal, in which case the positive signal may be dampened (Boulding & Kirmani, 1993; Liao, 2007).

Our results support the latter since Semi-Premium Packaging's mixed signal (consistent with H3) had a significantly weaker impact on returns. This is in line with prior research that suggests respondents pay more attention to negative cues (i.e., signals) than they do to positive ones (Ashford, 1993). Similarly, Boulding and Kirmani (1993) noted that when divergent signals are sent together (e.g., increased warranty strength from a low-reputation warrantor), respondents over-weigh the negative signal and under-weigh the positive one. The heuristic that explains this observation is proposed by Miyazaki et al. (2005, p. 146), who argue that “a linear form of information integration accounts for evaluations when cues are consistent,” but that “a negativity bias dominates evaluations when cues are inconsistent, with more weight accorded the negative cue.” In these examples, the negative signal was unambiguously negative (e.g., low-reputation warrantor). Yet, in our case, the “negative” signal was only mildly negative in the Semi-Premium Packaging condition. Some may even argue that the signal was not truly negative, but rather just neutral. We agree with this assertion and contend that our results suggest that the over-weighting of the non-positive signal extends not just to negative signals but also neutral ones. This suggests that even mildly mixed signals may tend to be under-appreciated by the market, thereby supporting the imminent importance of signal consistency within the realm of Signaling Theory.

Limitations and future research

As with any research, this study has limitations. First, our transaction data came from a single retailer. While this was helpful in terms of data consistency, it cannot be ruled out that customers of other retailers or buyers of other products may behave differently. Future research should, therefore, investigate other product categories and different online retailers.

Second, we limited our analyses to orders containing only one item in order to avoid confounding effects from consumers' ordering from different product categories or ordering

multiple similar items with the intention of comparing them at home and returning most of the items. Yet, there is no indication that the positive signal of premium packaging would not prevail in those contexts as well.

Third, our approach also entails drawbacks compared to behavioral experiments. Our use of secondary archival data provides advantages by being representative and referring to actual purchasing and returns behavior for a very large number of customers while eliminating potential researcher bias in the data collection process (Calantone & Vickery, 2010). Despite this, it does not allow concluding causality from statistical results, but only in conjunction with our theoretical framework in its argument for a causal relationship. Thus, our data cannot prove causality, but only provide support for our theoretical model.

Finally, since this was a natural experiment, as opposed to a controlled laboratory manipulation, we were unable to operationalize every possible packaging-related permutation. For example, the Semi-Premium Packaging condition in this study refers to situations where there is mixed signaling because the primary packaging is premium, but the secondary is not. In some cases, the opposite may be possible, the secondary packaging being premium, but the primary not. Unfortunately, we do not have the data to test a potential difference between the two settings. However, we encourage future research into this aspect as it relates to the sequencing of mixed signals, which so far has not received notable scholarly attention.

With Semi-Premium Packaging in our study, the consumer first received a neutral signal (via the ordinary outer box) before being exposed to the positive signal (via premium inner packaging). It is unclear if the opposite sequencing of first a positive signal (via a premium outer box) followed by a neutral signal (via ordinary inner packaging) would be better or worse in reducing returns than our treatment. In this respect, we conclude two opposing effects to be in play. On the one hand, a premium outer packaging may be better because the consumer may be exposed to this signal for a longer time than to the neutral inner packaging (presuming that the time from taking possession until opening the parcel takes longer than the act of unboxing). Moreover, the premium outer packaging may lead to a first positive assessment of seller and product quality to which the customers only insufficiently adapts once exposed to the less positive second signal from the ordinary inner packaging. A corresponding argument is made by Reh et al. (2017) regarding signals pertaining to the assessment of leadership qualities of managers. On the other hand, and contrary to the above, the second signal via the inner packaging may be more decisive for the overall assessment—and consequently, have a stronger impact on return likelihood—because of its close physical proximity to the actual product. Therefore, this signal may be more closely tied to assessing product quality than the more detached outer packaging.

CONCLUDING REMARKS

Packaging continues to be an overlooked but highly salient part of the online retail environment. While there would be little argument about the role of product packaging and appearance in traditional retail (Creusen & Schoormans, 2005), online retail has neglected this important issue and continues to view packaging mostly as a strictly utilitarian concern. This study proves that the package is much more than just a box. Online retailers may do well to change their mindsets, moving from viewing their outbound shipping as an issue of mailing boxes to one of sending signals through doorstep branding.

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