Part G
Marketing Analytics, Marketing Metrics, and Research

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A Video-Based Garment Recommendation Model

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Keywords: retailing, customer preference, video analysis, product recommendation

EXTENDED ABSTRACT

Research Question
As a clothing and accessories retailer, Zara launches 11,000 designs on store shelves every year. There are over 200 distinct items in a given Zara store with a one-week inventory turnover. A retailing chain like Zara usually maintains a wide variety of products at its warehouse, but only displays a much smaller set of products at a given store due to space constraints. Even so, evaluating all the items (>200) in a single store would be a tremendous drain on time and require significant cognitive effort from customers. Since only a subset of the available inventory is typically evaluated, a consumer may leave the store without finding anything s/he likes, even when the retailer may possibly carry the products appealing to his or her preferences—at the store, a different store, or the warehouse.

Understanding customer preference is the key to address these problems in garment retail stores. We have developed and tested a model relying on the state-of-art computer vision techniques, to infer customers’ individual preferences based on their affective and behavioral responses, which are captured by video recording. The method infers a customer preference for garment features from physical clues such as facial expressions and features-of-interest on garments.

Method and Data
In this paper, we propose and test one method of inferring individual preferences using in-store video analysis, relying on the state-of-art computer vision techniques. This video-based preference inference method automatically detects customer’s facial expressions and features-of-interest from video captured while a customer is evaluating garment in a retail store. Customers’ preferences on a subset of garment features are then inferred from this information. These partial preferences, together with customer’s body features extracted from the video are then used to match with a customer database to construct a composite preference profile for the focal customer. Finally, product recommendations are made for customer based on this composite preference profile. The recommendations help customers find products that fit their preferences and thus enhance their satisfaction of overall shopping experience, thereby increasing store sales in both the short and long run. This model combines video analysis method from the computer science discipline and standard marketing research methods.

Summary of Findings
We test performance of the garment recommendation model in a garment retailing context, where 127 apparel shoppers choose from 140 garments displayed on racks in a store-like environment. The model is able to make individualized recommendations every time a customer evaluates a product, and its superior predictive performances are shown to be robust using information inferred from any garments a customer evaluated. The proposed method can benefit customers as well as retailers by helping customers find items that fit their preferences better than using average partworths from conjoint analysis. In an empirical study on implementation, the recommendation model is shown to: (a) improve the average percentage of customers who finally purchase the recommended items; and (b) perform consistently using information inferred from any garments a customer evaluated.

Key Contributions
To the best of our knowledge, this research is one of the first attempts to integrate video analysis with extant marketing

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research methods to create useful managerial tools in the retail context. The present study contributes to the marketing discipline on video data in two ways. First, to the best of our knowledge, this is the first paper that uses video data, a new source of data compared to survey and scanner data, to estimate customer preferences in retailing context. Second, unlike existing marketing literature that uses commercial software, we are among the first to write and test algorithms for video analysis in marketing, thus opening the black box of existing commercial software. This should help pave the way for new innovations in modeling in marketing as related to video data. We believe that this video-based recommendation model will be of great benefit for both customers and garment retailers, especially for Clothing Chain Company that can share customer database and garment database among its chain stores.

References are available on request.
The Impact of Coupons in Coalition Loyalty Programs: Promotion and Waste Effects

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Keywords: coupons, sales promotions, advertising spillover effects, loyalty programs

EXTENDED ABSTRACT

Research Question
Vendors commonly use coupons to enhance their sales numbers. Given the importance of coupons in daily business practice, studies on promotion effectiveness usually focus on the strengths of promotions and conditions under which they are efficient (e.g., Reibstein & Traver, 1982; Yin & Dubinsky, 2004). As coupon promotions expose recipients to both, the featured products’ brands and the vendor’s brand, they increase product awareness and vendor brand awareness simultaneously. However, vendors do not know whether the coupons they issue may lead to customers wanting products that they might purchase at competing vendors. We call such unintended effects of coupon promotions on customers “waste effects.”

We examine coupon promotion effectiveness on multiple dependent variables, such as revenues and customer numbers of the issuing vendors and competitors. At first, we investigate whether coupon promotions in coalition loyalty programs affect customers’ purchase behavior at the issuing vendor and at partner vendors in the same loyalty program. We call these intended effects of coupon promotions on customer behavior “promotion effects.” Secondly, we determine whether coupon promotions trigger waste effects in the same way. At last, we distinguish between three coupon types (discount, special offer, and gift coupons) and examine how different coupon types influence promotion effects and waste effects.

Method and Data
To answer our research questions we use a data set from a European coalition loyalty program (CLP). The data set includes purchase transaction data from 14,000 CLP members and 141 marketing campaigns that use a coupon to promote specific vendors or products. Thus, we are able to observe whether customers, who received a coupon, subsequently buy at any CLP vendor. Furthermore, all customers own a credit card from the CLP. The credit card data allows us to look at purchases conducted outside the CLP and at competitors. We estimate customers’ reactions to coupon promotions by performing a panel vector autoregression (PVAR). A PVAR enables us to control for unobserved individual heterogeneity between different coupon promotions. Our dynamic model estimates revenues and customer numbers for the coupon-issuing vendor, for other vendors inside the CLP, for vendors outside the CLP, and for competitors. Based on the PVAR model, we calculate impulse response functions, which are able to predict the response of sales to shocks like a coupon promotion. Since we include a dummy variable for each coupon type, we are able to estimate the effects of different coupon types on revenues and customer numbers.

Summary of Findings
Coupons offering a discount and special offer coupons cause promotion effects on weekly revenues. They both increase revenues of the issuing vendor and of other vendors in the CLP. Additionally, revenues of vendors outside the CLP and competitors decrease after customers received such coupons. In general, special offer coupons perform better than discount coupons, which confirms current research. However, we observe different effects for coupons that offer a gift to customers. Revenues of the issuing vendor and of other vendors in the CLP decrease in the first week of a gift.
coupon promotion, but increase in the succeeding weeks. We could show that waste effects exists when vendors use gift coupons as revenues increase outside the CLP network and at competitors after a gift coupon promotion. Furthermore, we found that coupons’ effects on revenues are stronger than on customer numbers. Based on our findings, we recommend managers to use special offer coupons instead of discount or gift coupons as they lead to strong promotion effects and no waste effects.

**Key Contributions**

Our main contribution is to provide insights on waste effects and on customers’ purchasing behavior as a response to coupon promotions in general. Furthermore, this is the second study that explicitly investigates the effects of promotions in coalition loyalty programs. Dorotic et al. (2011) found mixed results addressing promotion effects in CLPs. As we are able to use 141 marketing campaigns, we can control for individual promotions’ heterogeneity and determine general effects of promotions. Besides that, we are able to estimate the effects of three different coupon types. Different studies already focused on each of the coupon types and its promotional effects (e.g. Reibstein & Traver, 1982; Chen, Marmorstein, Tsiros, & Rao, 2012; Kamins, Folkes, & Fedorikhin, 2009), but until now, no study compared all three types of coupons to each other and none of them investigated waste effects. With our research results, we are able to help managers to choose an adequate coupon type for their promotions.

*References are available on request.*
New Product Development
Heterogeneous Conjoint Choice Design

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Keywords: experiment design, choice experiment, new product development

EXTENDED ABSTRACT

The first and critical step of a conjoint choice experiment is to set up an efficient experimental design for the conjoint tasks. Extant research on choice designs in marketing generally use numerical approaches to search the design space in order to locate a good experimental design. Such search, conducted in the exact design framework, cannot guarantee the optimality of the final recommended design, simply because computing power limitation forbid a thorough search through a noncontinuous design space. This computation challenge has proven a problem for choice designs. Also, extant research on choice designs in marketing focuses on the construction of efficient homogeneous designs where all respondents get the same design or questionnaire. Sandor and Wedel (2005) were the first to propose the construction of efficient heterogeneous designs where different respondents or groups of respondents get different subdesigns or questionnaires, and demonstrate substantial efficiency gain when such heterogeneous designs are employed.

A significant hurdle in widespread adoption of heterogeneous designs is the high computation cost. We use well-established mathematical theories for quick identification of a globally optimal design. The proposed approach makes it feasible to generate a highly efficient choice design that is completely heterogeneous—a unique conjoint choice questionnaire or subdesign for each individual respondent in the choice experiment. Results from simulation and empirical studies demonstrate superior performance of the proposed approach over extant approaches in constructing efficient heterogeneous choice designs.

In the field of new product development, it is critical to understand consumer preferences and choice behavior. Given the high cost of conducting conjoint choice experiments and impact it will have on the product to be made and marketed, it is desirable to use an optimal experimental design. Choice optimal experimental design allows a marketing researcher to effectively design experiments to probe consumer preferences. With the proposed new method, marketing managers can find a globally optimal design in a relatively short time period. This is valuable for marketing research professionals who rely on choice designs to find out about consumer preferences, and develop new products accordingly.

In summary, the proposed new algorithm, compared to existing algorithms, has the advantage of faster speed and more efficient parameter estimation. For practitioners, this means a much faster method to find out about consumer preferences. The contribution of the current work is that this statistical theory based new method makes the task of designing a choice experiment easier/faster as well as with better efficiency.

References are available on request.

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How Do Initial Discounts Affect Customer Retention?

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Keywords: customer retention, price discount, insurances, survival analysis

EXTENDED ABSTRACT

Research Question
In the context of contractual settings, the notion that customer retention is not only beneficial but also profitable for companies is widely accepted. For this reason, there is an ongoing interest of practitioners and academics on finding ways to increase customer retention. In this study, we examine the effectiveness of a common strategy adopted by companies, in which they attract customers through an initial discount for a product or service, in the hope of retaining them in the long run. Thus, we investigate a rather simple issue that has been overlooked in extant research and has to do with the influence of an initial discount on long-term customer retention. In this study, we do not attempt to provide a new methodology for calculating customer prediction churn. Rather, our purpose is to provide empirical evidence on how an initial discount granted to customers has an impact on customer retention even five years after the discount was granted, and whether the magnitude of the discount also plays a role on increasing customer retention. To these ends, our research question is: How do initial discounts affect customer retention?

Method and Data
We use survival analysis to estimate the effect of the initial price discount on the duration of customers’ relationship with the company. We tested our hypotheses utilizing Cox Proportional Hazard Model, which assesses the effect of several independent variables on customer survival. In our model, the dependent variable is the hazard of defection (i.e. the customer ceases to purchase the service). In the analysis, we used four variables: the magnitude of the initial discount, and three control variables (premium paid by the customer, customer’s age, and whether the customer was awarded with regular customer credits).

The data used in this study were obtained from a financial services company. The data set includes customers who purchased car insurances (N=333,411) and spans the period from 2007 to 2012. Our sample includes those customers who obtained a discount during their first year as customers, but no additional discounts during later periods (44,332). These customers are compared with customers who did not get any discount from the company during the period under study (289,079). We excluded from the sample the customers who obtained discounts in one of the later years (N=74,427), to avoid confounding effects and misspecifications in the estimation model.

Summary of Findings
Our results show that granting an initial discount is an effective strategy for increasing customer retention. On average, customers’ likelihood to stay with the company is 94% when an initial discount was granted and 73% when no discount was granted, after five years. Furthermore, the analysis suggests that the initial discount has a U-shaped relationship with respect to the hazard of defection. In other words, the higher the initial discount granted, the more likely is that the customer repurchases the service, when the discount is relatively low. At higher levels of initial discount, the rate at which the discount negatively influences customer churn, levels off. Also, the effect of the control variables was statistically significant. Customers who received regular customer credits at the time of the initial purchase are 3.5 times more likely to repurchase the service, when compared with those who did not. Customers who purchased car insurances at an older age are less likely to stop purchasing the service by 1.1% per additional year. Finally, the churn tendency of those who obtained an initial discount decreases by 0.2% as...
the premium increases by one euro. The effects of the control variables, however, are not moderated by the magnitude of the initial discount.

**Key Contributions**
This study is aimed at understanding and evaluating the impact of an initial discount on customer retention in the short and the long term. Extant literature has shown that a small improvement in customer retention rates has a remarkable impact on firms’ profits. Through this study, we provide empirical support to the use of price discounts as a strategy for attracting customers, thus shedding light on one simple and often economic form of increasing customer retention rates in firms. This study shows that granting relatively high initial discounts, is not the best solution for attracting customers. Yet, granting a small initial discount could help companies that want to effectively improve the retention rates of its customers. We also provide further insights on the type of customers that could be potentially appealing for companies to attract. These insights could be of major utility for companies having problems related to customer selection, and serve to prioritize companies’ efforts towards this type of customers. Our results also provide fruitful avenues for future research—for example, related to the role of discounts at different stages of the customer lifecycle and the moderating role of cross-buying behavior in contractual settings.

*References are available on request.*