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From myth to math: Harnessing the halo effect of promotions

How retailers can use advanced analytics to boost full store performance with optimized promotions

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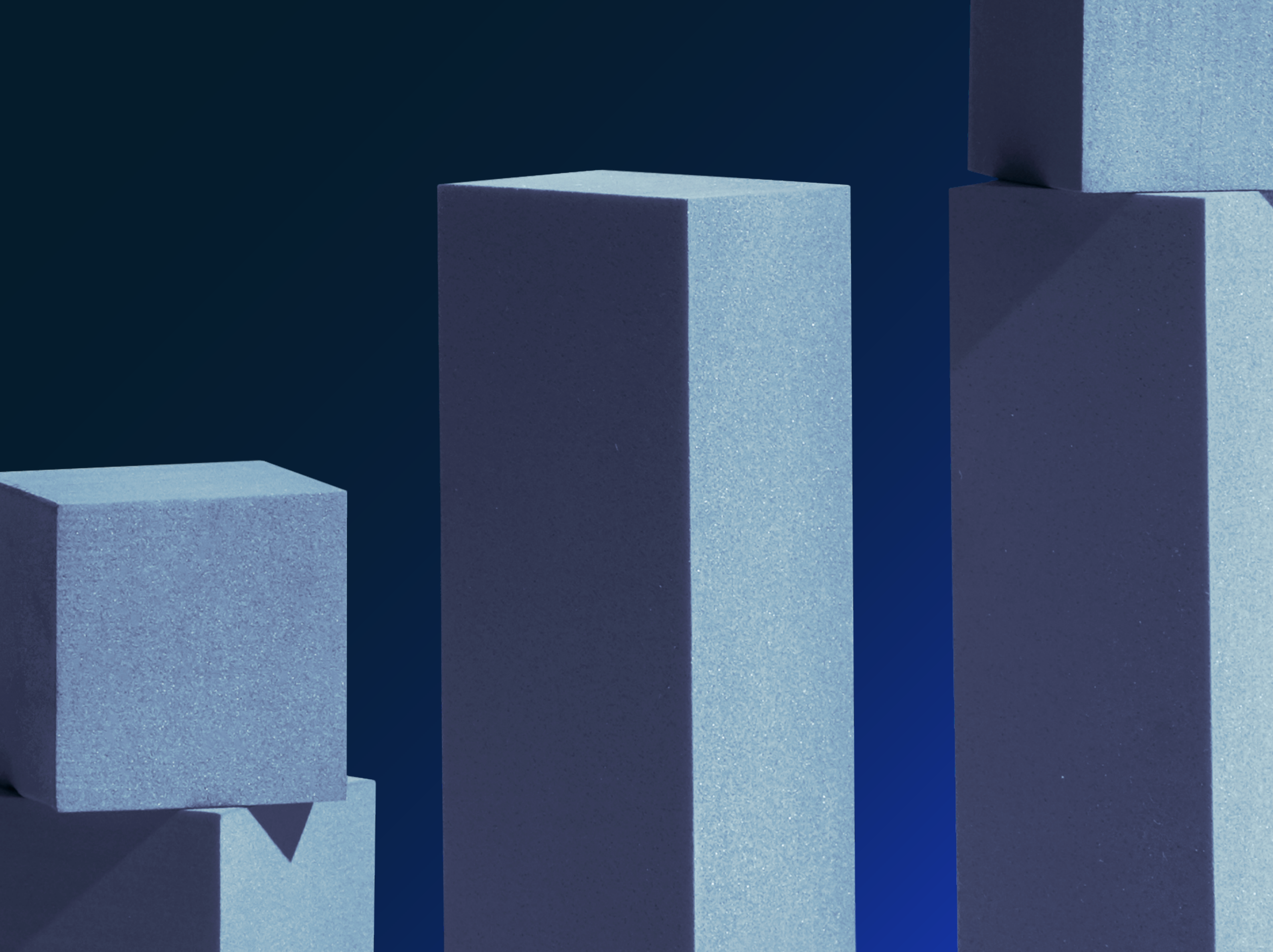


A lack of facts

At any given time, up to one third of a retailer's assortment is on promotion. Most of these promotions are meant to turn a stand-alone profit. Retailers set them up in such a way that the expected uplift in volume and the subsidies suppliers provide ("vendor funds") will offset the negative margin impact of the discount. Other promotions are set up as loss leaders. In these cases, the discounts are so high that the promotion doesn't turn a profit just from the sales of the promoted item, not even after the supplier's contribution. Typically, loss leaders are featured on the front page of a circular or in online ads. Retailers run loss-leading promotions to trigger incremental trips to the store, either by attracting new shoppers or by causing existing shoppers to increase the frequency of their visits. Retailers hope that these shoppers don't just come to buy the deeply discounted product itself ("cherry-picking"), but that they buy a basket of goods that creates profitable revenue growth.

So much for the theory. In reality, many promotions don't turn a profit at all, or at least they don't add nearly as much profitable revenue as retailers expect. To manage promotions according to their real ROI, retailers would have to be able to quantify the sales of nonpromoted items caused by a promotion, the so-called halo effect. But so far, there has been no reliable method to quantify the halo effect of promotions. Even more sophisticated approaches to measure the impact of promotions have usually been limited to the items on promotion. At best, leading practitioners have tried to quantify indirect losses caused by the substitution effect[1], i.e., the percentage of shoppers buying an item on promotion instead of their first (full-price) choice. More than a decade ago, pioneers tried to quantify the halo effect of promotions with in-store surveys, but the results were so imprecise that category managers have been skeptical about any such efforts ever since. And even in today's datarich environment, many retailers still follow yesterday's rules of thumb.

Examples from grocery include:

— Putting canned soft drinks on promotion may attract many cherry-pickers, but retailers feel they have no choice because all their competitors are doing it.

— Thanks to the high volume uplift potential and subsidies paid by suppliers, national A-brands are considered to be well-suited for promotions.

— Among perishable products, milk is a classic choice for promotions because it is an important value item ("KVI") and can build traffic.

We are not saying that such rules of thumb don't apply at all. But our data shows that the net effects are often not nearly as big as many category managers think, and some rules may actually be false for a given retailer or a given store. The important point is that, without a reliable analysis of the halo effect, retailers will never know whether the promotion at hand yields a positive ROI. At the same time, we find that there are many hidden champions in a retailer's assortment that would be well suited for ROI-positive promotions. But for want of reliable insights, many category managers tend to play it safe. Why change what they think is a winning selection of items? As a result of this mindset, many promising SKUs[2] never even make the long list for planned promotions. In effect, retailers who run promotions solely based on experience and intuition either leave money on the table or even incur a net loss. In either case, they are flying blind with regard to the true ROI of their promotions.

1. Sometimes also referred to as cannibalization. See https://www.mckinsey.com/industries/retail/our-insights/how-retailers-candrive-profitable-growth-through-dynamic-pricing (retrieved April 9, 2019).
2 SKU = Stock-keeping unit. In this article, SKU is used synonymously with "product" and "item".

A holistic approach to promotion impact modeling

Thanks to advances in statistical modeling, computing power, and a growing base of ever richer transaction data, a new method to measure the halo effect of promotions is emerging. This enables retailers to assess past promotions from a true ROI perspective, as well as to optimize SKU selection for planned promotions.

For the first time, it is now possible to measure the impact of promotions on non-promoted products across a store's entire assortment with sufficient reliability and precision. To what extent does the promotion trigger substitution, i.e., how many shoppers are buying the promoted product instead of their regular full-price choice? How many additional shoppers does the promotion attract? And what is the influence of the promotion on average basket size? Do buyers of promoted items also buy other, regular priced items that they would normally not be buying?

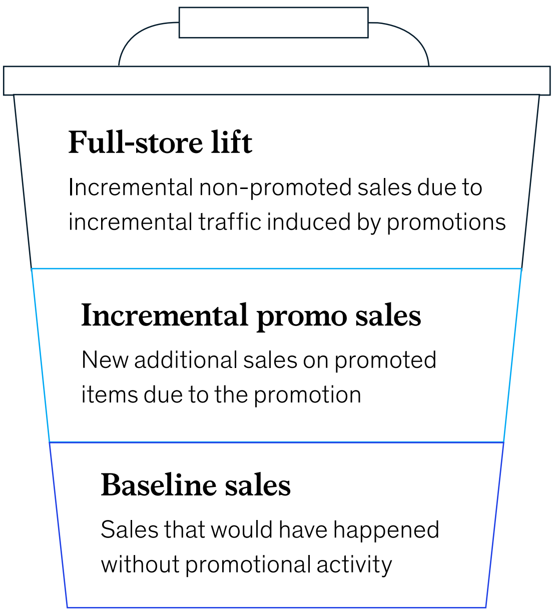
In the past, the answers to these questions were a matter of experience, mixed with a fair amount of mythology and speculation. Now, these questions can be answered with scientific rigor, drawing on more data, more computing power, and more sophisticated analytics than ever before. State-of-the-art models differentiate between baseline sales (pre-promotion), promotional sales (sales of promoted items), and full-store lift (incremental sales of nonpromoted items; see exhibit). Other features include:

— Two-level modeling, including both a product and a category perspective, using the most granular data available, typically at the level of individual SKUs.

— Control for external factors, such as store-wide coupons, seasonality, and holidays to isolate the impact of the promotion itself.

— Application of advanced statistical techniques to decouple the impact of a given promotion from other, potentially correlated promotions.

Model mechanics



In effect, the latest generation of models provides retailers with the means to review the full-store impact of past promotions and to design future promotions to maximize true ROI, recognizing both the direct impact and the halo effect. The underlying analytical approach is applicable to all retail formats that are based on baskets, such as supermarkets, drugstores, and department stores. Typically, it requires three to five years of past transaction data. The bigger the data base, the better. In most cases, the implemention of systematic measurement of the halo effect of promotions is part of a bigger transformation toward more data-driven decision making in retail.

From myth to math

The objective of halo effect modeling is to increase the ROI of promotions by supplying category managers with the facts they need to take better decisions (see exhibit). Many of them, however, are skeptical about what they perceive as a black box. But once they see the value, they don't want to go back to rules of thumb. Examples of surprising insights that have turned the tide in our work with leading grocers over the past few years include:

— **Limes punch above their weight.** In areas with a large Hispanic population, limes are great for promotions. Because limes are a key ingredient in many Mexican recipes, they drive sales of products such as chicken, vegetables, rice, pasta, and beverages. What good is a bag of limes without a juicy bird and a bottle of Tequila? And because these items are well-dispersed through the store, shoppers often make additional unplanned purchases on their way from A to B. To top it off, the margin loss is moderate because limes are low-price items to begin with.

— **Tartlets build baskets. I**n more traditional neighborhoods (think Wisteria Lane), putting pre-baked sponge cake tartlet shells on promotion can be very effective to drive sales of fresh fruit, sugar, and whipped cream. What good is a tartlet shell without a proper filling and a dollop of cream to top it off? And like limes, tartlet shells are relatively low-price items, so that the purchases triggered by the promotion typically outweigh the margin loss. Our analysis revealed that unlike say soda, tartlets are not traffic drivers but great basket builders.

— **Dental care is underrated.** Drugstore category managers have long suspected that dental care products are good for promotions, and they are. What they don't know is how good they really are. Our data shows that putting a dental care product on promotion often triggers a whole cascade of related purchases in the oral hygiene category. If, for example, a toothbrush is on promotion, many shoppers will also buy toothpaste, mouthwash, and floss, adding many times the value of the toothbrush itself to their baskets.

— **Milk is overrated.** The impact of putting a gallon of milk on promotion is not nearly as big as many grocers expect. In most cases we have seen, the true ROI effect was negative. Cheap milk doesn't attract nearly as many new baskets as retailers assume, and the impact on average basket size is also smaller than expected. Perhaps this is partly driven by a changing diet. In the US, fluid milk consumption has been in decline for the past thirty years.[3] (Is this still true despite coffee consumption uplift?)

— **Soda is not always a magic potion.** Soft drinks promotions are powerful traffic drivers, but their true ROI is often low and can even be negative. This is because these promotions attract many cherry-pickers who stock up on soda without buying anything else, a tendency that is increased by the fact that soda can be stored for extended periods of time without refrigeration. Only a robust analysis of the halo effect of recent soda promotions will tell retailers whether these make sense at a given store, and which brands provide the highest ROI.

— **Decay can be a good thing**. Contrary to common belief, perishable items are often preferable to packaged A-brand products as promotional items. For one thing, consumption of fresh foods is growing at the expense of processed, packaged foods as part of a global mega-trend towards healthier, more nutritious, more responsible diets.[4] Additionally, fresh food deters shoppers from bulk purchases of promoted items ("pantry-loading"). Why buy a whole crate of limes when you will only be able to use a handful before they spoil?

3 https://www.livekindly.co/dairy-farmers-look-to-grow-plants-instead-as-u-s-milk-consumption-drops-nearly-10/ (retrieved April 14, 2019).
4 https://www.euromonitor.com/fresh-food-in-the-us/report (retrieved April 14, 2019).

Sample View: Total margin including full-store lift shown through tool tips in incremental profit vs sales scatter plot

Promo Detail – Scatter

These examples should not be generalized. Rather, they are meant to illustrate that retailers will benefit from putting rules of thumb to the test. Often, it turns out that only a small group of SKUs is fit to balance the objective to drive revenue with the objective to protect profitability, and this group of suitable items varies greatly across categories, regions, and even individual neighborhoods. Also, consumption patterns and shopping habits change over time. This is why it pays to move from myth to math. Typically, retailers can hope to add a percentage point to their ROI – 1% with comprehensive data-driven promotion management. Retailers who use state-of-the-art halo effect modeling can often reduce their promotional spending by up to ten percent, or re-allocate these funds to more promising commercial levers. Additionally, they often observe a welcome educational effect. Working with data-driven decision support systems trains category managers (CMs) to think more critically about the real effect of promotions, and it prevents them from making excuses. The responses of the many CMs we have worked with can be summarized as: "Going in, I had my doubts about this approach. But the output changed my mind. Based on our own data, the model revealed that we had been overestimating the effect of many of our most popular promotions for years. Now, we have a data-driven approach to ensure that our limited funds go to the most promising promotions."

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