The Art and Science of
Uplift Modeling

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Marketing & Modeling, LLC

Uplift

Uplift Modeling is one of the hottest, most exciting areas of Predictive Analytics today. As a relatively new application of long-standing theory, Uplift methodologies are still emerging. And though much of the focus is being driven by business, it shows great promise within other industries, such as the medical industry.

While Uplift concepts are theoretically sound and simple to grasp, the associated Uplift modeling requirements are more involved than many Predictive Analytics applications. So, Uplift Modeling is more challenging and is generally not for the inexperienced or casual analyst. Even so,

the upside potentials of successful Uplift applications are so great, they should warrant serious consideration.

WHAT IS UPLIFT MODELING?

Simply stated, Uplift Modeling is the use of Predictive Analytics to segment customer behavior into one of four distinctively different categories. As we'll see, each of these behavioral categories have different risk, cost, and profit profiles. Because these differences exist, Marketers can leverage data-driven intelligence to more effectively and more profitably drive their customer relationships.

WHEN A RESPONSE IS NOT A RESPONSE

Key to understanding Uplift are the concepts of "non-incremental" and "incremental" response. And they can best be illustrated through some made-up examples.

Example 1: Let's imagine a retailer who decides to distribute $5-off coupons to half of its customers standing in a check-out line. As a result of doing this, the retailer receives a 100% response to its coupon offer! However, it's easy to surmise that, for every coupon redeemed, the retailer also lost $5 in revenue because the redeeming customers were already planning to pay full-price for their purchases.

Whenever an incentive or "treatment" is utilized by a customer and it doesn't result in a change of their purchasing behavior (ex. they would've purchased anyway), this is called a "non-incremental" response. In turn, each non-incremental response results in an cost to the company. In this example, the retailer "subsidized" each non-incremental response to the tune of $5 each.

Clearly, subsidized coupons can be expensive! So why distribute coupons at all? Let's see in the next example.

Example 2: Instead of doing it at check-out, let's assume the retailer distributes the $5-off coupons to half of its customers as they exited the store, usable within the next hour only. As a result, while most don't, some of the customers decide to go back into the store and make additional purchases because they received the coupons.

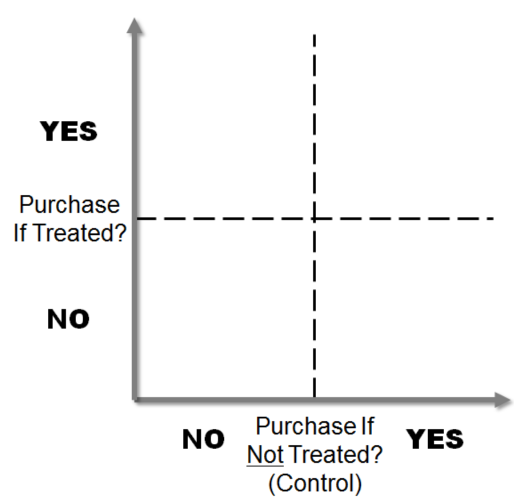
In comparison to Example 1, this time the retailer gets a much lower response rate. However, the coupons caused some customers to make extra, unplanned purchases. So these coupons motivated incremental response, resulting in greater total revenues and profits.

ENTER THE SCIENCE OF UPLIFT

While it's easy to understand the concepts, how do we apply Predictive Analytics to determine what constitutes incremental and non-incremental behavior? The answer lies in the scientific method.

Recall that under the scientific method, we first form a hypothesis. Then, we test the hypothesis by comparing the response differences of a "treated" group to those of a "control" group who are "not treated". This is exactly what we do with Uplift modeling.

To extend the examples, our hypothesis is that distributing coupons will have an effect. So customers who received coupons are the treated group and customers who didn't receive coupons are the untreated, control group. Finally, let's assume that the retailer has excellent tracking systems. So it can identify customers who purchase and customers who redeem coupons. With these possibilities, we can draw a conceptual plot of treated versus control behaviors:

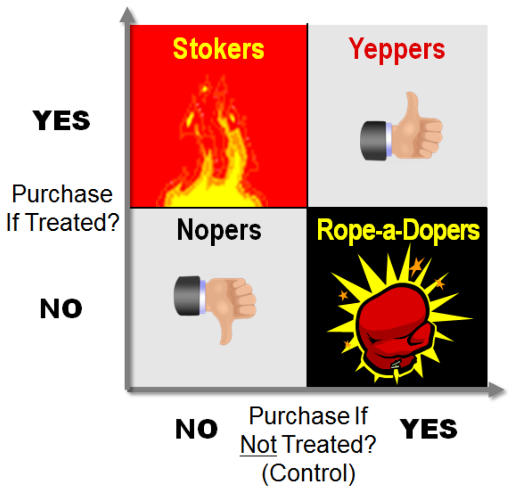


Uplift requires tracking data from control and treated groups in order to develop a Predictive Analytics model.

THE FOUR UPLIFT SEGMENTS

At this point, if you're wondering why we introduce two behaviors (incremental and non-incremental) but say there are four uplift segments, stay tuned. We'll reconcile them shortly.

Instead, let's note that on the previous conceptual plot, the combination of Yes/No possibilities between the Treated and Control groups results in four quadrants. These are the four Uplift segments:



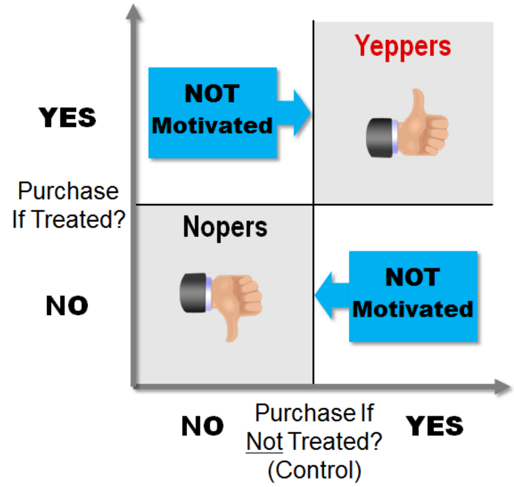
To give them definition, we'll begin with the top, left quadrant and proceed clockwise:

- **STOKERS** are customers who become "red hot" when treated. They weren't planning to purchase but get fired-up to purchase when treated.
- **YEPPERS** say "Yes!" to everything. If they receive a treatment, they'll purchase. if they don't receive a treatment, they still purchase anyway.
- **ROPE-A-DOPERS** are a contrarian group. They purchase if not treated but suddenly don't if they are treated! Similar to a boxing strategy innovated by Mohammed Ali, these customers lie on the ropes and wait. However, the surprise is on you because, when you think you're winning with them, they suddenly deliver a knock out punch to you!

  Think of a business that has annual contracts with its customers. They're billed and pay every month, like clockwork. However, when the business lets them know it's time to renew (a treatment), they decide to cancel or switch to another brand.
- **NOPERS** are the opposite of "Yeppers". They say "No!" to everything. Of course, if untreated, Nopers won't purchase. But even if they are treated, they still don't purchase. They're not very motivated at all.

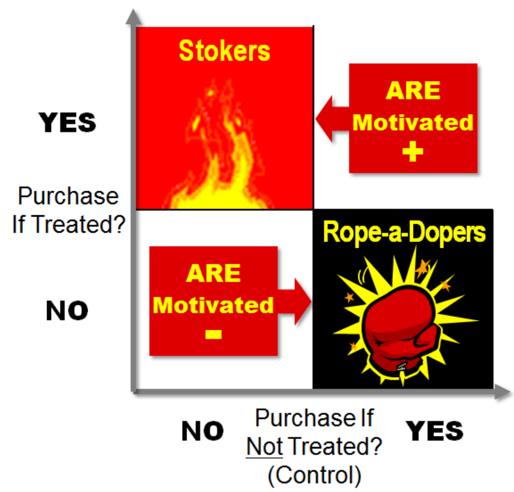
RECONCILING TWO AND FOUR

With the Uplift segments defined, now we can show how they relate to incremental and non-incremental behaviors. To do this, let's look at the Uplift quadrants in a slightly different way, beginning with the Yeppers and the Nopers:



Though their behavioral profiles are in opposition to each other, Yeppers and Nopers do share one very important characteristic. When treated, neither segment is motivated to change behaviors. Therefore, we say that *both segments exhibit non-incremental behavior*.

Let's similarly look at Stokers and Rope-a-Dopers:

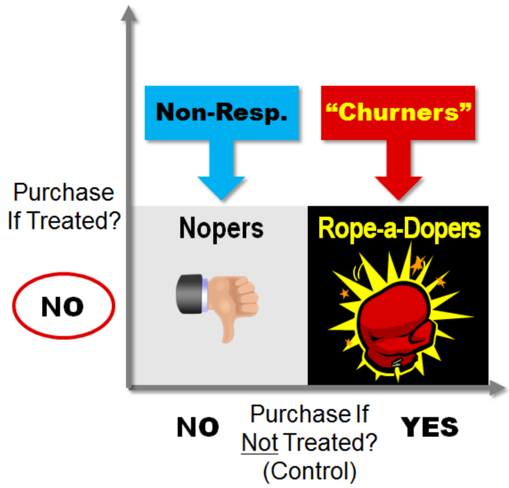


These two segments are also opposites. Stokers are motivated to purchase when treated while Rope-a-Dopers are motivated to stop purchasing when treated. Since treatment results in a change in the behavior of both segments, we can say that *Stokers generate incremental behavior while Rope-a-Dopers generate negative or "decremental" behavior.*

Uplift

REVENUE AND COST PROFILES

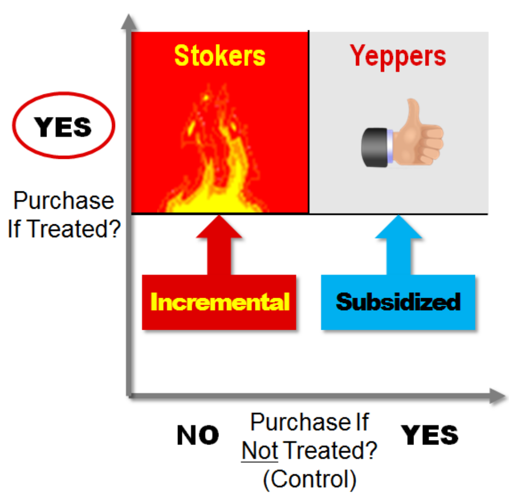
If we look at the Uplift segments in yet another view, we learn even more about how they affect costs and revenues. In this view, let's compare the upper and lower quadrants, starting with the lower:



In the absence of Predictive Analytics segmentation, both Nopers and Rope-a-Dopers would most likely be tracked as non-responders using traditional methods.

However, with Predictive Analytics and proper Uplift segmentation, we see they are not at all alike. In reality, Nopers are the true non-responders. So their costs are limited to campaign costs. On the other hand, while they may not redeem incentives, Rope-a-Dopers quit purchasing when treated, resulting in a total loss of the campaigns' costs plus <u>all</u> their future revenues.

Now, let's shift our focus and let's look at the upper quadrants through a similar lens:



In this view, note that both the Stokers and the Yeppers "purchase if treated." *In the absence of Uplift segmentation produced through Predictive Analytics, both of these segments would appear to be response segments.* When this is assumed, it most definitely is a very costly mistake!

Of all the Uplift segments, Stokers have the most profit-building potential. They alone are the source of incremental behaviors and so they alone are responsible for 100% of all increases in treated revenues and profits.

On the other hand, Yeppers can be a most costly segment. When they take advantage of a treatment, this results in foregone, planned purchase revenues and replaces them with subsidies. Not only are these subsidies very costly to a campaign, repeated subsidies will occur in every campaign until they are properly identified and treated differently by Marketing.

THE ART OF UPLIFT MARKETING STRATEGIES

With Uplift, a variety of Marketing cost-saving, revenue-producing strategies are possible. For example, in its simplest form, Predictive Analytics can be used to identify highest propensity Stokers and they can be the sole recipients of Marketing treatments.

On the other end of the spectrum, each segment can receive more globally coordinated Marketing strategies. To illustrate, we'll return to upper versus lower quadrant comparisons, starting with the upper:

Upper quadrant Stokers and Yeppers are the wellspring of businesses. Though their expressions differ, both can be enthusiastic about the businesses' products and services. Therefore, wise Marketers will give them attention that optimizes their enthusiasm. ***With these segments, Marketing action is needed.***

Strategy-wise, Yeppers often are "Best Customers" so Marketing efforts should employed to maintain Yepper loyalty. Given that Yeppers also are the segment where profit-killing subsidies are generated, a strategy that doesn't involve deep discounts is needed.

Fortunately, Yeppers are already more likely to be loyal customers. So, longer-term Marketing programs that reward loyalty and frequency can be quite effective. These programs don't need deep discounts to be motivating and profitable. Purchase discounts are minimal and participants are happily rewarded via program status and cumulative rewards, over time.

Marketing strategy for Stokers is centered on the realization that they can be motivated to purchase. It's the nature of this motivation that can be tricky! Some Stokers are total opportunists. They perpetually remain in an "I only purchase if I receive an incentive" mode. Other Yeppers view incentives as a means to try a business out before committing their loyalty.

A Marketing strategy that attempts to migrate Stokers into the more loyal Yepper segment is sound. Marketers will benefit when more frequently-purchasing, longer term Stokers are incented to join loyalty programs.

Now, since every business is unique, ***for the bottom quadrants, whether or not action is needed is situational.***

Since they tend to say "No!" to everything, the most conservative strategy drops Nopers from all Marketing efforts. Given that some may have moved away or are deceased, these Nopers should be dropped and good list hygiene practices will help identify them.

Alternately, if we recognize that people are always evolving, customer situations change and it may be wise to market to cross sections of Nopers on an infrequent, test basis. If this course is taken, higher incentives will be required to motivate Nopers. This is generally OK because the probability of subsidizing Noper purchases is low. So higher incentives can be afforded.

Because they're so enigmatic and potentially volatile, Rope-a-Dopers should be treated delicately, if at all. Businesses with contractual relationships and auto-renew may elect to test non-notifications of renewal status. Or, if Rope-a-Dopers are to be contacted, a proactive decision to "sweeten the pot" in exchange for continued business can lift their retention rates.

MODELING UPLIFT

As already noted, modeling Uplift is a more involved process that should not be undertaken by the inexperienced. First, it requires the establishment of control groups and tracking for each Uplift application. Second, with Uplift, the target objective is not a typical responder vs. non-responder scenario. Rather, *the Predictive Analytics targets differences between control and test groups and the ability to successfully accomplish this requires knowledge and skills.*

With respect to algorithmic approaches, as is true with all Predictive Analytics efforts, there are a number of options that can be prescribed after thorough discovery.

UPLIFT MODELING ISSUES

The two largest issues with modeling Uplift have to do with "transience". Customers rarely fall into one of the four segments on a consistent basis because of product preferences. For example, someone who's interested in housewares may be a Yepper but this same customer may be a Noper when it comes to power tools. It follows that multiple Uplift applications may be needed, with each being developed for specific product offerings.

Similarly, Customers are transient over time. The interests of young, single adults change as they grow older, marry and have kids. Because of this, Uplift models generally have shorter shelf-lives and need to be retuned or reformulated more often.

INTERESTED IN UPLIFT? HOW WE CAN HELP

If there's an interest, we're here to help in many ways:

- Need Uplift models? We build the best.
- If you need training, we conduct onsite classes.
- If you need guidance for an application, we can assist and mentor very economically.
- Want an in-house practice? We've done many!

Or, if you simply have a question or would like to chat, feel free to give us a call. We'll give you the answers and of course, you'll *never* receive a high-pressure sales pitch.

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