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Choice Modeling: A Pharmaceutical Marketer's Crystal Ball for Predicting Marketplace Behavior

Predicting the results of a product positioning platform is oftentimes a difficult task. When several outcomes are possible, the use of choice modeling techniques can be extremely helpful for product managers—as long as they are applied appropriately.

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A desperate product manager visits a fortune teller and a dialogue commences:

Product Manager: I desperately need you to look in your crystal ball and help me. Difficult times lie ahead for me and my colleagues in the pharmaceutical industry. The next few years will see a spate of new launches from competitors in novel classes that threaten to erode our marketshare. I have a great new product set to launch, but I am still not sure what positioning platform will maximize its uptake. One colleague is faced with mapping the dynamics in the market of his expensive infusion product over the next few years as several generics lay siege. Another is unsure whether the staggered launch of short- and long-acting versions of his new product will aid or hurt uptake. As you can see, I need your guidance!

Fortune Teller: Indeed, these are great dilemmas you each face. Have you sought the wisdom of your marketing-research colleagues?

Product Manager: We commissioned quite a bit of marketing research, but none of it has completely met our needs. For instance, none of the research gives us the bottom-line effect of alternative market events and marketing actions. Really, all we want to know is how and to what extent certain actions and events will affect our business, not whether a positioning platform has an average rating of six on a

SIDEBAR: CHOICE AND CONJOINT MODEL BACKGROUND INFORMATION

Choice and conjoint models belong to the class of trade-off models that are motivated primarily by the following insight:

- The best way to measure the relative importance of multiple decision criteria (product attributes) is to observe how people trade off one feature for another
- The more closely the survey task parallels real-world settings, the more accurately in-market behavior can be predicted; operationally, this means that the best way to predict the effect of a product or market event on choice behavior is to try to replicate the decision setting within the survey (choice models are truer to this ideal than traditional conjoint models)
- Specifically, the premise of all trade-off measurement techniques is that any product or service concept may be broken down into its component parts. For example, a drug under development is typically defined in terms of its primary indication, efficacy, side effects, method of dosing, and so on. The goal of trade-off techniques is to compute the value of all outcomes related to these component items. However, rather than directly asking physicians how much value they place on each component, researchers infer them on the basis of their evaluation of several carefully designed product profiles. An experimental design algorithm is used to reduce the total number of potential product profiles to a manageable subset; this has the benefit of minimizing the burden on the respondent while retaining the information needed to compute the potential uptake for every possible product profile
- Two primary differences exist between conjoint and choice models:

1. The Nature of the Respondent Task. Traditional conjoint tasks require respondents to rate or rank the experimentally created product profiles. The researcher then makes a leap of faith that physicians will prescribe product profiles with the highest preference, even though the survey task did not require respondents to indicate if they would do so in the context of all other available treatments. In contrast, choice modeling tasks place these profiles in their competitive context and ask respondents to choose (or allocate) from the available treatment options.

2. The Underlying Experimental Design. Traditional conjoint designs have generic attributes not tied to a particular brand or product. This makes testing for brand-attribute interaction effects extremely cumbersome (for example, sensitivity to price may be moderated by the difference in preference across products). In contrast, choice modeling designs have product- or brand-specific attributes. Figure 1 illustrates the procedural steps involved in a choice modeling study from the inputs into the experimental design through the actual respondent task, showing that all tested attributes are varied independently for products X and Y. It is this feature that gives it the flexibility to model complex scenarios featuring multiple market events.

seven point scale. Also, if another piece of research informs us that a new competitor will reduce our share of prescriptions, I think I will scream! I want to know how much share I will lose—as much, more, or less than my other competitors? Will my defensive actions protect me and to what extent? Will my line extension cannibalize the franchise or extend it? How will the actions of managed care organizations affect what physicians prescribe? Where do the consumers fit in to this picture? At the end of the day, what net result will all these interlinkages have on my product's performance? Please predict my product's future with your crystal ball!

Fortune Teller: Alas, I am afraid your issues are far too complex for my simple crystal ball. To make marketplace predictions in the face of so many variables and uncertainties, you need a much more powerful crystal ball.

Sadly, as the fate of this meeting reveals, the fortune teller has little to offer our beleaguered product manager. However, things are not as bleak as they appear. Choice modeling, when designed well, can be used to answer many of the issues that keep product managers awake at night. The *raison d' être* of choice modeling has always been its ability to measure directly the effect of alternative product profiles on product choice (Sidebar). Choice modeling's underlying design engine can be harnessed to expand the range of marketing actions/scenarios that may be tested in similar fashion by:

- Optimizing the positioning platform of a new product
- Analyzing the effect of changes in the competitive environment in the form of line extensions, new competitive entrants, new data, or new indications for existing products
- Measuring the effect of market events, such as the arrival of generics, or change in drug status from prescription to OTC

This is a result of two factors: (1) The increasing power of computing makes it possible to estimate models of a level of sophistication previously unthinkable, and (2) developments in experimental design techniques allow the savvy researcher to distill very complex scenarios into manageable tasks that may be tested in a survey setting.

From Optimizing Target Product Profiles to Product Positioning

Research aimed at optimizing the positioning platform of a new product represents a natural extension of the principles underlying product profile optimization. The goal of quantitative positioning research is to identify the best positioning platform for the product (i.e., mechanism of action, speed of onset) and then choosing the statements (i.e., reasons

Design Variable	Product X Attributes	Tested Levels		
		1	2	3
X1	Efficacy Rate	30%	40%	60%
X2	Drop in Key Clinical Market	1.0%	1.2%	1.5%
X3	Available Dosage Strengths	2 mg	3 mg	4 mg
X4	Incidence of Side Effects	2.0%	5.0%	8.0%

Design Variable	Product Y Attributes	Tested Levels		
		1	2	3
Y1	Efficacy Rate	25.0%	35.0%	45.0%
Y2	Drop in Key Clinical Market	2.0%	2.5%	3.0%
Y3	Available Dosage Strengths	2 mg	3 mg	5 mg
Y4	Incidence of Side Effects	4.0%	6.0%	10.0%

Experimental Design Creates Several Such Product Profiles

Product X Profile	
Efficacy Rate	40%
Drop in Key Clinical Marker	1%
Available Dosage Strengths	4 mg
Incidence of Side Effects	2%

Product Y Profile	
Efficacy Rate	25%
Drop in Key Clinical Marker	3%
Available Dosage Strengths	3 mg
Incidence of Side Effects	4%

RESPONDENT TASK: Based on the profiles described above, please allocate your next 30 patients of each listed type across the available treatments.

	Patient Type 1	Patient Type 2
Product X	_____	_____
Product Y	_____	_____
Brand A	_____	_____
Brand B	_____	_____
Brand C	_____	_____
Brand D	_____	_____
Brand E	_____	_____
Total	*30*	*30*

Resulting data are analyzed using a multinomal logit model that links product attributes to product use; key metric is share of patients for all products in the competitive set.

Figure 1. Procedural overview of the classic-choice model—range of variation to be tested for two pipeline products.

to believe) that best support that platform. This is typically done through a two-step process in which respondents are first exposed to various platforms in a sequential monadic format and then perform an association exercise to link reasons-to-believe statements with each platform. Apart from the artificiality of the exercise, it is impossible to know whether the final platform is one that will maximize uptake of the product or one that just happens to be first among losers. Furthermore, the resulting metrics do not provide any information on the potential uptake of the product under alternative positioning strategies.

The choice modeling framework offers a more integrative approach by treating the different positioning platforms and the supporting messages as design variables that can take on different values. That is, similar to the process of generating multiple product profiles by combining different levels of product attributes, it is possible to create several positioning platforms by combining each positioning statement with different combinations of supporting statements. This is a complex design problem, as not all reasons to believe support every positioning statement. The resulting stimulus is more realistic, however, as it is a complete positioning platform similar to what will eventually be deployed in marketing communications. The respondent task itself is similar to a standard choice task in that respondents indicate prospective prescribing behavior across all available treatment alternatives in

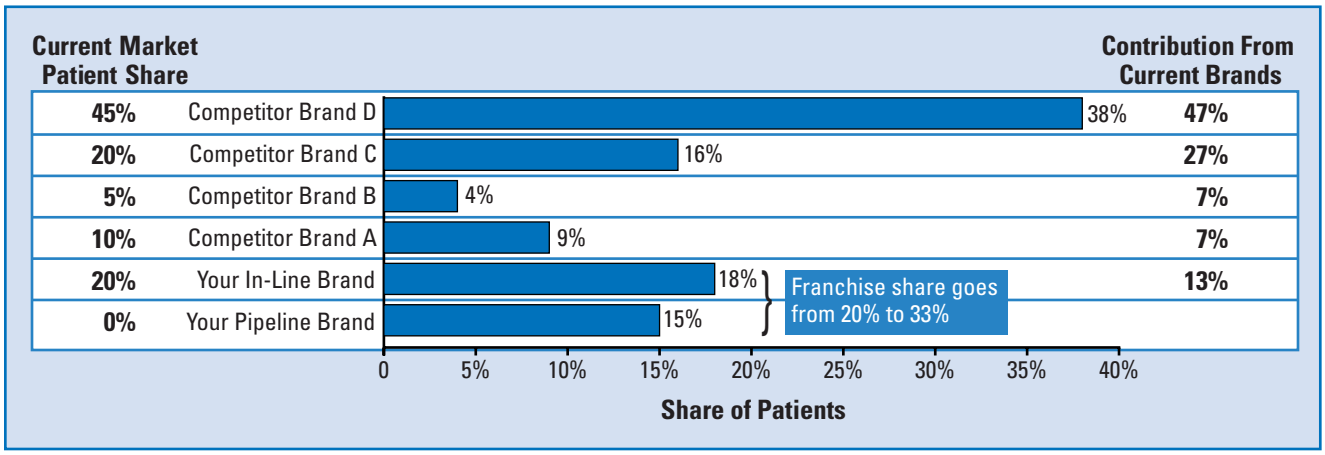

Figure 2. Postlaunch product shares.

response to changes in the positioning of the new product. Analysis of this data results in concrete metrics in the form of peak patient share under alternative positioning strategies. This has the advantage of establishing a direct link between positioning and intended behavior, as well as the ability to clearly quantify the relative merit of one positioning strategy versus another.

Changes in the Competitive Environment

The ability of choice model designs to incorporate brand-specific attributes is a primary factor in their capacity to model complex market scenarios involving changes in the competitive environment. Traditional conjoint designs account for multiple new products by testing attribute levels that cover a wide range of variation. This allows researchers to simulate different products that are likely to enter the market. However, as the conjoint model ignores the competitive dynamics among the new products *vis-à-vis* the incumbents, the estimates of uptake, source of volume, and so on are tentative at best. Choice designs, in contrast, treat each event as an independent design variable, thereby placing all potential market events in the proper competitive context. Figure 1, which details the procedural overview of the choice model, demonstrates this idea. It shows two new products, X and Y, both of which vary independently. The choice design places them both in context of each other, as well as with the market incumbents. This allows for the fleshing out of the competitive dynamics among all these products. By experimentally controlling the presence and absence of these new products, the model provides the brand team with the ability to explore market scenarios with different player combinations (e.g., only X, only Y, both X and Y, etc.).

The fundamental question behind any line extension is whether it will extend the franchise or cannibalize the existing line. Choice models provide a means by which to make this assessment. By incorporating usage of all products in the competitive set, the model provides accurate estimates of the new product's uptake, as well as source of volume. As Figure 2 illustrates, the line extension increases the share of the franchise from 20% to 33% and draws nearly half its volume from

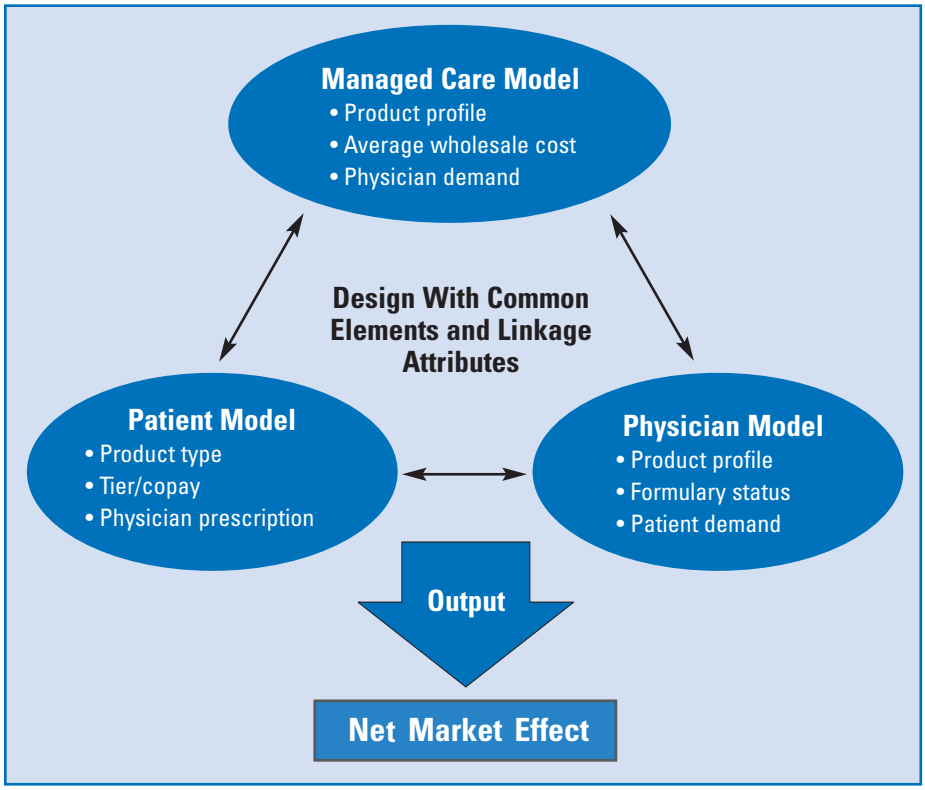

Figure 3. Integrated-choice model.

competitor D.

A similar design approach is used to evaluate the effect of new competitive entrants or the emergence of new clinical information. As with the other examples previously discussed, the primary benefit is the ability to gauge the effect of these events in terms of a concrete metric, such as share of patients.

Capturing the Effect of Market Events

Shock waves ripple through the market when industry-changing events take place. The dynamics of such events are complex, and the final outcome is caused by the interactions of multiple stakeholders. A choice model can be designed that incorporates attributes and levels for:

- Change in prescription status of particular drugs
- Availability of generics
- Retail prices
- Formulary coverage/tier
- Patient copay

Each stakeholder evaluates a design that has common elements, as well as linkage attributes specific to one stakeholder that represent the actions of the other stakeholders. The linkage attributes ensure that the output of each stakeholder model feeds into the other models in an iterative framework. The end result is a bottom-line effect of market events that incorporates these various feedback effects as illustrated by the integrated-choice model detailed in Figure 3.

Is Choice Modeling a Panacea?

Hardly! To quote Peter Parker's (aka Spider-Man) uncle Ben, "With great power comes great responsibility." The design and estimation methodologies discussed here provide skilled researchers with the tools to tackle issues of a complexity unimaginable a decade ago. However, like the owner of a hammer who views every problem as a nail, the urge to force fit the methodology to every research problem is a temptation that should be suppressed. Although something may be possible from a mechanistic perspective it does not mean it is advisable.

Conclusion

Choice modeling techniques work best when several outcomes are possible, be they product or market related, and the goal is to quantify their effect on the decisions of key players. The key is to define these outcomes so decision makers can provide a legitimate response. The applications discussed in this article are ones that play to the strengths of everything that these techniques have to offer.

Ultimately, as with all methodological tools, the value of these techniques lies in the marketer's ability to apply them appropriately. This requires a full understanding of the underlying assumptions and, consequently, proper interpretation of the findings. It also necessitates the active participation of the extended team to ensure that the tested scenarios are correctly defined and placed in the proper context. The goal of all marketing research is to aid decision making by reducing uncertainty—this is something choice modeling can do, perhaps as well or better than any other quantitative methodology currently available. However, is it a crystal ball that eliminates the need for managerial skill and intuition? Of course not! Even a fortune teller would know that. ■

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