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# A Decomposition of Repeat Buying

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***Abstract***

The authors decompose repeat buying for frequently purchased nondurables. The results are very similar for two categories each over a different city and time period. A factor analysis of 18 measures of repeat buying obtains four principal factors that explain 79–85% of the variance: Preference, Inertia, Coupon Proneness and Impulse Buying. A cluster analysis of factors on these dimensions yields four segments, with distinct behavioral characteristics.

Studies in many areas of marketing suggest that brand loyalty is an important dimension of repetitive buying of low-involvement, low-cost, frequently-purchased products. Thus, a better understanding of brand loyalty would greatly promote our understanding of consumer behavior for such products. This goal has led to at least 80 studies on brand loyalty (Jacoby and Chestnut 1978; Elrod 1987). Kim, Batra and Lehmann (1991) recently presented a study which attempts to review past measures of brand loyalty and test them for reliability and validity using a single-source scanner data. Nevertheless, several difficulties with past research hinder a complete description of repetitive buying. First, no single definition or measure of loyalty is completely satisfactory. In particular, attitudinal measures suffer from problems with reliability or self report bias, especially for single period surveys. Behavioral measures suffer from an inability to separate loyalty from response to marketing variables and either of them from random events. In addition, loyalty itself may be multi-dimensional consisting of true preference for brands and inertia to switch brands. Similarly, brand switching needs

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to be distinguished from true variety seeking and response to marketing variables. Due to these measurement problems, research on brand loyalty has led more to controversy rather than to a body of accepted findings or generalizations (Jacoby and Chestnut 1978; Tarpey 1974, 1975).

To help resolve some of these problems, we present a different approach to the problem: a decomposition of repetitive buying into its key components: loyalty (preference or inertia), switching (variety seeking or response to marketing variables) and error. Our approach uses a factor analysis of multiple measures based on scanner data, that describe many aspects of consumers repetitive buying. Because the analysis uses unobtrusively collected multi-period observations, it is less prone to problems of self-report bias and unreliability. Because the primary variables describe a range of behaviors, including loyalty, variety seeking and switching in response to coupons, displays and features, the approach does not suffer from instrumentalism. The decomposition of behavior also has some practical benefits. First, it can measure the relation if any among important components of repetitive buying. In particular, we may distinguish to what extent repetitive buying reflects real preference across brands from inertia over time. Second, the study could determine the redundancy among the large number of indices for loyalty and brand switching proposed by past researchers. Third, the study could determine how these characteristics are related to segments and the size of these segments. In the subsequent section, we describe the design, results and implications of our study.

## 1. Research design

The design has three parts: development of measures of repetitive buying, decomposition of repetitive buying by factor analysis and the analysis of segments. We first describe the data and present some definition, and then detail these three stages in relation to the relevant literature.

*1.1.1. Data.* In the interests of generalizations, we use data from two different product categories, bathroom tissue and saltine crackers, each from a different city and time period. Information Resources Incorporated collected the data from scanner records of households' buying at retail stores in each city. The samples consists of 952 panelists for saltines and 1683 panelists for cracker. Panelists purchases are recorded by dollar and unit volume, and by dollar volume purchased with manufacturer coupons, store display and store feature. To obtain stable measures we included only the 514 households for bathroom tissue and the 603 households for saltine crackers who had a minimum of 12 purchases in the concerned time period. While this selection eliminates a large segment, they are the lightest purchasers whose purchases are probably not routine.

*1.1.2. Definition.* Without intending to join the debate on brand loyalty definitions (Jacoby and Kyner 1973; Jacoby 1975; Kahn, Kalwani and Morrison 1986; Tarpey

1974, 1975), for this study we parsimoniously define *loyalty* as "behavioral attraction for a brand." Consistent with prior definitions (Guadagni and Little 1983; Jacoby and Chestnut 1978; Kahn, Kalwani and Morrison 1986), our definition suggests loyalty is a behavioral phenomenon. Such loyalty consists of at least two components, preference and inertia. We define *preference* as "strong brand attraction revealed in non-sequential multiple brand choices." We define *inertia* as "weak attraction for brands revealed in sequential brand choices." Both attractions require that loyalty be distinguished from accidental repurchases of a particular brand. In the same spirit, we define *variety seeking* as "intentional brand switching." By *intentional* we mean deliberate switching that results from some prior motivation (McAlister and Pessemier 1982) and not random switches nor switches in response to marketing variables. These definitions are brief, consistent with past research and permit application to factors derived from a decomposition of repetitive buying.

### *1.2. Measures of repeat buying*

Jacoby and Chestnut (1978) report 53 different measures of brand loyalty, 33 of which are behavioral. Many of these are brand specific and, therefore, not immediately relevant to our study. However, each brand specific measure has a consumer specific measure that is generic across brands. For example, while "share of brand purchases" is brand specific, the "variance of share of brand purchases" is independent of brands. Based on Jacoby and Chestnut's (1978) review and our subsequent review of the literature, we arrived at 18 measures of repeat buying (see Table 1). The two criteria we used in arriving at this short list are that they capture the breadth of repeat buying, but avoid redundancy.

Note from table 1 that the first 12 variables measure loyalty and variety seeking, while the last six measure responsiveness to promotion activity. The former may be considered spontaneous response to the available brands, while the latter, response conditional on marketing activity. The first six variables focus on intensity of preference, a dimension that is most commonly associated with brandy loyalty. The second six relate to regularity of brand choices, a dimension which many researchers associate with variety seeking (Carman and Stromberg 1967; Carman 1966; Frank 1962; Keuhn 1958; Massy, Frank and Lodahl 1968). Measures of brand shares in dollars, units and occasions ensures sensitivity to buyers' needs, price consciousness and shopping intensity. Measures for the "highest" or "most preferred" among brands emphasizes exclusive loyalty, if any, while measures of "variance" capture responsiveness to the entire brand set.

### *1.3. Identifying underlying dimensions*

Only a few precious studies used multiple (three or more) measures of repeat buying, and only two used factor analysis. For example, Burford, Enis and Paul

*Table 1.* Definition of variables

| Variable | Definitions (all at the individual consumer level) |
|---|---|
| 1. Pref Units Share | Highest share[a] (by units) of brands purchased |
| 2. Var Units Share | Variance of shares (by units) of brands purchased |
| 3. Pref Dollar Share | Highest share (by dollar) of brands purchased |
| 4. Var Dollar Share | Variance of shares (by dollar) of brands purchased |
| 5. Pref Occasion Share | Highest share (by purchase occasion) of brands purchased |
| 6. Var Occasion Share | Variance of shares (by purchase occasion) of brands purchased by a panelist |
| 7. % Brands Avoided | 100*(Number of brands − Number of brands bought)/(Number of brands) |
| 8. % Switches Avoided | 100*(Number of possible switches − Number of actual switches)/(Number of possible switches) |
| 9. Mean Repeat Run Pref | Mean run length of the most preferred[c] brand |
| 10. Mean Repeat Run All | Mean run length[b] of all brands purchased |
| 11. Max Repeat Run Pref | Maximum run length of the most preferred brand |
| 12. Max Repeat Run All | Maximum run length of all brands |
| 13. % Display Occasion Pref | 100*(Number of purchases of most preferred brand made on display)/(Number of purchase occasions) |
| 14. % Display Occasion All | 100*(Number of purchases made on display)/(Number of purchase occasions) |
| 15. % Feat Occasion Pref | 100*(Number of purchases of most preferred brand made on feature)/(Number of purchase occasions) |
| 16. % Feat Occasion All | 100*(Number of purchases made on feature)/(Number of purchase occasions) |
| 17. % Coupon Occasion Pref | 100*(Number of purchases of most preferred brand made on coupon)/(Number of purchase occasions) |
| 18. % Coupon Occasion All | 100*(Number of purchases made on coupon)/(Number of purchase occasions) |

LEGEND:
a: share = the ratio of a brand's value to the sum of the values for all the brands expressed as %.
b: run length = number of consecutive purchases of the same brand.
c: most preferred = the brand which has been purchased most.

(1978) calculated loyalty as a composite of three indices while Massy, Frank and Lodahl (1968) used four indices. Rice (1962) carried out a factor analysis on 22 measures of buying behavior. He found seven important factors, three describing brand loyalty, which he named "household share of purchase loyalty," "run length loyalty" and "run distribution loyalty." Olson and Jacoby (1971) factor analyzed 12 measures of loyalty obtained from a survey of 177 undergraduates. They found 67% of the variance was explained by four factors which they called behavioral, attitudinal, multiple and general brand loyalty. We also use factor analysis. However, we focus on repeat buying, use 18 behavioral measures and focus on three key dimensions underlying repeat buying: brand loyalty, inertia and responses to promotions.

### *1.4. Identification and description of behavioral segments*

We use the factor scores to cluster consumers into separate behavioral segments using an iterative partitioning method for three reasons. First, this approach is more efficient because a few factors efficiently summarize the 18 primary variables. Second, it makes the interpretation easier because the factors have clear meaning. The disadvantage in using factors scores is the potential loss in separability because the latter are normally distributed (Rohlof 1970). We then describe the segment on behavioral characteristics.

## 2. Results

### *2.1. Factor analysis of repeat buying*

The criteria of eigen values greater than 1.0 and the scree plot both support a four factor solution. We, therefore, proceed with these four factors, which explain 85% of the variance for bathroom tissue and 79% for saltine crackers. Table 2 presents

*Table 2.* Orthogonal factor analysis (Loadings*100 from Varimax Rotation)

| Variable | Factors | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Preference | | Inertia | | Impulsive purchasing | | Coupon proneness | |
| | B.T. | S.C. | B.T. | S.C. | B.T. | S.C. | B.T. | S.C. |
| 1. Pref Units Share | 93 | 94 | 30 | 29 | −8 | −6 | 1 | 3 |
| 2. Var Units Share | 92 | 91 | 36 | 34 | −9 | −8 | 0 | 2 |
| 3. Pref Dollar Share | 93 | 92 | 27 | 28 | −10 | −9 | 2 | 1 |
| 4. Var Dollar Share | 93 | 91 | 33 | 31 | −10 | −10 | 2 | 1 |
| 5. Pref Occasion Share | 92 | 93 | 31 | 30 | −12 | −13 | −2 | −1 |
| 6. Var Occasion Share | 91 | 91 | 36 | 33 | −11 | −12 | −2 | −2 |
| 7. % Brands Avoided | 77 | 75 | 16 | 15 | −13 | −12 | −7 | −5 |
| 8. % Switches Avoided | 73 | 75 | 54 | 53 | −13 | −12 | −13 | −11 |
| 9. Mean Repeat Run Pref | 64 | 66 | 73 | 74 | −8 | −9 | −7 | −6 |
| 10. Mean Repeat Run All | 62 | 60 | 68 | 69 | −7 | −7 | −6 | −7 |
| 11. Max Repeat Run Pref | 58 | 55 | 78 | 75 | −7 | −7 | −5 | −3 |
| 12. Max Repeat Run All | 55 | 52 | 80 | 78 | −7 | −6 | −5 | −3 |
| 13. % Display Occasion Pref | 9 | 11 | −5 | −7 | 79 | 80 | 6 | 4 |
| 14. % Display Occasion All | −36 | −38 | −18 | −15 | 76 | 79 | −1 | −2 |
| 15. % Feat Occasion Pref | 2 | 3 | 6 | 8 | 78 | 77 | −5 | −6 |
| 16. % Feat Occasion All | −33 | −30 | −8 | −7 | 78 | 78 | −7 | −8 |
| 17. % Coupon Occasion Pref | 9 | 7 | −3 | −5 | −3 | −4 | 86 | 84 |
| 18. % Coupon Occasion All | −15 | −11 | −7 | −4 | −3 | −3 | 84 | 85 |
| Variance Explained | 44 | 42 | 18 | 16 | 15 | 14 | 8 | 7 |

B.T.–Bathroom Tissue
S.C.–Saltine Crackers

the orthogonal varimax solution for both product categories. The first twelve measures load heavily on the first two factors while the last six measures have low or negative loadings. The definition of the measures (see Table 1), suggest a distinction between the first 12 and the last 6 variables. High scores on the first 12 measures indicate brand loyalty (and low scores indicate variety seeking), while high scores on the last six variables indicate switching behavior in response to promotions. Note also that (high scores on) the first eight variables indicate preference for brands over the entire time period independently of time, while those on the next four measures indicate inertia to switch over consecutive occasions. Since the first eight measures load more heavily on the first factor, while the next four load more heavily on the second factor, we label the first factor "Preference" and the second factor "Inertia."

How does variety seeking fit in? In the literature, traditionally measures 9 to 12 have been used inversely (or negatively) to measure variety seeking. So we could also label low scores on factor 2 as intentional variety seeking. By the same logic, low scores on factor 1 could also be labeled as another aspect of variety seeking.

Variables 13 to 16 load on factor 3 and variables 17 and 18 load on factor 4. The latter two variables measure purchases with coupons, which in contrast to purchases on display and feature, require prior planning. So we label factor 4 as coupon proneness or "rational" purchasing. By the term coupon proneness or rational purchasing we do not mean to assert that all such purchases are strictly utility maximizing, but merely that such buyers plan their purchases, and probably think they are maximizing utility. Because response to displays and to some extent features involve impulsive rather than planned behavior, we label factor 3 impulsive purchasing.

The loadings and names of the first two factors suggest that they are not strictly orthogonal to each other. The loadings on factors 3 and 4 do not change dramatically, and as the factor inter-correlations suggest, each is approximately orthogonal to the other three. However, the first two factors have a correlation of 0.68 for bathroom tissue and .61 for saltine crackers.

In summary, the decomposition of repetitive buying reveals four behavior patterns, with only the first two being positively related. In particular, the analysis orthogonally separates brand loyalty from response to marketing variables. Loyalty itself has two clear dimensions, brand preference and inertia, with the former explaining 42% to 44% of the variance and the latter 16% to 18%. The traditional idea of variety seeking seems to be the bipolar opposite of inertia. The third and fourth dimension captures impulsive response and coupon proneness to marketing activity.

## 3. Analysis of behavioral segments

### *3.1. Identification of behavioral segments*

We used a two-stage approach for clustering as discussed before. In the first step, the hierarchical clustering analysis on the factor scores yielded four segments. We

stopped at four, because beyond that number we found a sharp increase in the error sums of squares. In the second step, we used the above four clusters as a starting point for the iterative partitioning of panelists. The procedure assigned 52, 78, 330 and 54 panelists (or 10%, 15%, 64% and 10% of the sample, respectively) to the four segments for bathroom tissues and 79, 99, 354 and 71 panelists (or 13%, 16%, 59% and 12% of the sample respectively) to the four segments for saltine crackers.

We carried out several tests of the robustness of this solution. First, two computer routines, SAS and BMDP gave identical results. Second, an overlapping clustering procedure verified that the clusters do not overlap. Third, we obtained the same solution even with different initial seeds in the iterative partitioning method. Fourth, a discriminant analysis of the clusters by the factor scores gave a hit ratio of 96% and confirmed that the cluster membership was not spurious.

Considering that bathroom tissue belongs to a mature product category one would expect less number of loyals and more regulars i.e., people who switch between a few selected brands. Given the fact that there are 11 major brands in the market with little product differentiation, price promotion is intense in the form of couponing. This explains the presence of more coupon prone than impulsives in this product category. Similar argument holds good for saltine crackers.

### *3.2. Description of segments*

Table 3 presents the behavioral characteristics of the four segments. The dramatic differences of each segment's mean value across factors makes the labeling of segments easy. Thus, Segment One has very high positive means on the two loyalty factors versus negative means on the other two factors (and mostly negative means by the other three segments on the loyalty factors). So we label this segment of panelists "loyals." Segment Two has a very high positive mean on coupon proneness, versus negative values on the other three factors, so we label these panelists "coupon prone." Segment Four has a very high positive mean only on impulsive purchasing, so we label its panelists "impulsives." Because Segment Three has the largest number of panelists with no distinct pattern of scores across the factors, we label this segment "regulars." Note, however, that this segment has the lowest mean on inertia, so these panelists could also be called moderate variety seekers-over-occasions.

Figure 1 provides one pictorial representation of the four behavioral segments in a three-dimensional space, consisting of loyalty-to-brands or preference, impulsive purchasing and the density estimates of the distribution of panelists. This figure is developed using an extension of the nonparametric density estimation of Rust (1988) and reveals the number, size and position of the segments as a function of the factors used (Kumar and Rust 1989). In this figure, the regulars constitute the central peak, while loyals the small segment to its left with high scores on loyalty-to-brands. The coupon prone with moderate scores lie just behind the central peak, while the impulsives with high values on factor 3, lie way behind.

*Table 3.* Behavioral characteristics of segments (Segment means on factor scores [× 100] and selected primary variables)

| | Segment | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Loyals | | Coupon prone | | Regulars | | Impulsives | |
| Characteristic | B.T. | S.C. | B.T. | S.C. | B.T. | S.C. | B.T. | S.C. |
| FACTORS | | | | | | | | |
| 1. Preference | 95 | 89 | −50 | −52 | −18 | −15 | 26 | 24 |
| 2. Inertia | 82 | 78 | −18 | −20 | −33 | −36 | −3 | −4 |
| 3. Impulsive Purchasing | −43 | −44 | −26 | −22 | −25 | −27 | 124 | 109 |
| 4. Coupon proneness | −22 | −25 | 127 | 118 | −38 | −39 | −38 | −41 |
| PRIMARY VARIABLE | | | | | | | | |
| 1. Pref Units Share | 85 | 82 | 50 | 46 | 54 | 56 | 64 | 66 |
| 5. Pref Occasion Share | 86 | 84 | 48 | 49 | 55 | 56 | 63 | 62 |
| 7. % Brands Avoided | 75 | 77 | 53 | 49 | 59 | 55 | 64 | 62 |
| 8. % Switches Avoided | 85 | 81 | 34 | 37 | 45 | 47 | 57 | 56 |
| 9. Mean Repeat Run Pref | 6.5 | 5.8 | 1.7 | 2.1 | 2.1 | 1.9 | 3.1 | 2.8 |
| 10. Mean Repeat Run All | 5.1 | 5.3 | 1.5 | 1.8 | 1.8 | 2.0 | 2.6 | 2.9 |
| 13. % Display Occasion Pref | 8 | 10 | 8 | 6 | 8 | 7 | 30 | 32 |
| 14. % Display Occasion All | 11 | 9 | 21 | 19 | 20 | 21 | 43 | 39 |
| 15. % Feat Occasion Pref | 5 | 6 | 19 | 20 | 2 | 4 | 3 | 6 |
| 16. % Feat Occasion All | 6 | 6 | 38 | 36 | 6 | 4 | 7 | 6 |
| 17. % Coupon Occasion Pref | 7 | 8 | 11 | 10 | 9 | 7 | 29 | 26 |
| 18. % Coupon Occasion All | 11 | 9 | 25 | 27 | 25 | 24 | 48 | 45 |
| Number of Panelists | 52 | 79 | 78 | 99 | 330 | 354 | 54 | 71 |
| (Percent) | (10.1) | (13.1) | (15.2) | (16.4) | (64.2) | (58.7) | (10.5) | (11.8) |

B.T.–Bathroom Tissue
S.C.–Saltine Crackers

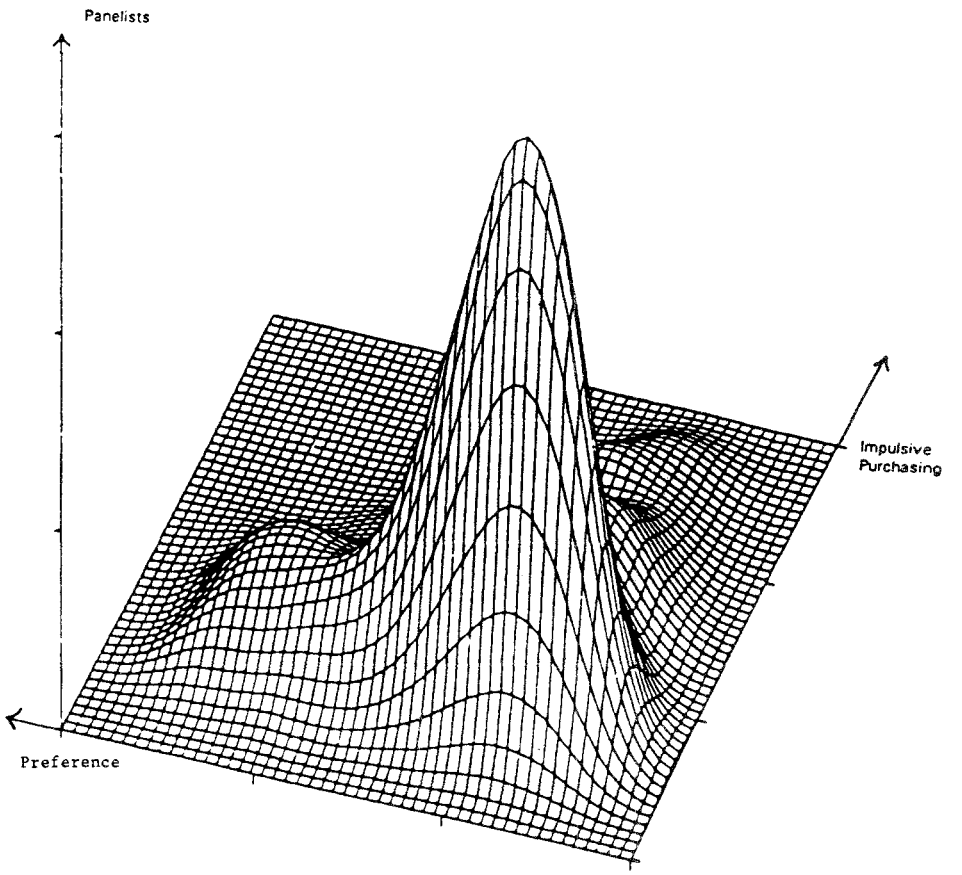


*Figure 1.* Distribution of Panelists by Two Factors Revealing Four Clusters

Mean values of the segments on the primary variables provide further insight about their behavior. For bathroom tissues, 95% of the loyals' purchases are of one brand which is purchased on 86% of the occasions. They avoid 75% of the remaining brands, and avoid switching a brand on 85% of consecutive purchases. They purchase their preferred brand on runs of as many as 6.5 consecutive occasions. The other three segments display substantially different behavior patterns on all of these variables. Note especially that coupon prone switch frequently, and buy a featured brand on 38% of their purchases which is 5 to 6 times higher than any other segment. Impulsives buy the displayed brand on 43% of their purchases, which is four times more often than loyals, and twice as often as regulars and coupon prone. Similar results are observed for saltine crackers.

## 4. Discussion

The most valuable contribution of this research, is that two dimensions of loyalty have been extracted from the data separately of response to marketing activity (e.g. displays, features and coupons), by factor analysis. So, the measure of loyalty is not contaminated by marketing activity. A second contribution is that we identify and relate two dimensions of loyalty: Preference and Inertia. That discovery may throw some light on the controversy about loyalty. Preference describes attraction to a few brands with regular alternating, possibly for multiple users, uses or occasions. Inertia describes purchases of few brands, each in long runs. We also find two dimensions of response to marketing activity, which may be useful if they can be interpreted as impulsiveness and coupon proneness respectively. We provide behavioral and graphical illustrations. A third contribution is the similarity of the results over two different product categories, cities and time periods, which suggests that the findings may generalize to low cost frequently purchased products.

The variation explained by the factors provides one indication of their relative importance. Preference is the primary factor explaining 44% and 42% of the variance for two product categories, respectively. This means that almost half of routine behavior is characterized by direct response to the variety of brands, either in the form of exclusive purchases of a few (preference) or deliberate sampling of alternate brands. For the two product categories, temporal changes in behavior (inertia) explains another 18% and 16% of routine behavior. Impulsive behavior explains the next 15% and 14% and coupon prone behavior explains only 8% and 7% for bathroom tissue and saltine crackers, respectively. External validity for these proportions comes from consumer choice models of nondurable purchases, where researchers have found that brand-loyalty is a much stronger explanatory factor than the marketing variables (Guadagni and Little 1983; Tellis 1988).

The cluster analysis provides another picture of the analysis. The dominance of loyalty in repeat buying can be observed from the fact that all segments purchase only one brand on over half of the occasions for over half of the total quantity purchased. In addition, one small segment of "loyal" panelists exhibit a very high degree of loyalty. Segments exhibiting primarily impulsives and primarily coupon prone behavior are also small. Although the majority of panelists do not exhibit any strong behavior pattern relative to the above groups, they do have moderately lower inertia. One practical avenue of research would be to estimate choice or other types of response models for each type of segment. Such research would help managers use marketing resources more efficiently. Another research question would be to determine how to win over the "loyals" over the long haul. They constitute a highly attractive segment who stay with their preferred brand and do not respond to costly promotions (coupons, features and displays). Possible reasons for their loyalty may be inertia, quality consciousness, or specific attributes. A third avenue of research would be to test the generalizability of these results over durables and services.

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