Original Article

Perturbation model for a product of joint consumption

Received (in revised form): 20th June 2012

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ABSTRACT Couples often have difference in preference for a product. They are likely to use either coercive or non-coercive means to resolve their differences. This behavior is, however, likely to vary from person to person. We operationalize the difference of opinion through perturbation and models heterogeneity in an individual's propensity to coerce based on a certain level of perturbation. We use a mixture modeling approach using the Expectation-Maximization Algorithm to model this heterogeneity for a product of joint consumption – movies. We show that for the same level of perturbation, couples do behave differently in using coercive strategies to settle their disagreements. Although most individuals appear to be averse to using coercion as a means of resolving their differences, some do fight in order to get their way. We also attempt to profile such individuals on the basis of certain demographics.

Journal of Targeting, Measurement and Analysis for Marketing (2012) 20, 145–157. doi:10.1057/jt.2012.11; published online 23 July 2012

Keywords: spousal decision making; coercion; perturbation; mixture models; heterogeneity

Marketers are interested in predicting choice (see Chandukala *et al*¹ for a detailed review). Marketers are also interested in understanding and predicting consumers' behavior that leads to him/her choosing a particular product over another. Consumers' choice is often influenced by the preference and opinions of friends and family. Couples (a husband–wife dyad or

partners) often choose products together. Individual preference is inadequate in predicting choice in such cases² because spouses tend to have a lot of disagreements with each other. Spiro,³ for instance, points out that 78 per cent of the married couples in her sample encountered disagreements during the purchase process. These disagreements alter an individual's choice. Marketers are therefore interested in understanding spousal decision-making process and influence strategies used to form a joint choice. Understanding spousal decision-making behavior helps marketers not just in predicting

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choice, but also in targeting their communication messages^{4,5} and their sales efforts.⁶

When there is a difference of opinion between couples, they try to influence each other in a variety of ways to achieve their desired outcome. These influence strategies could be coercive or non-coercive.⁷ A coercive influence strategy includes the use of punishment, threats, authority, negative emotion and egocentrism, whereas non-coercive strategies include rewarding, reasoning, bargaining and concession.^{3,8} Use of coercion in a joint choice decision-making process could lower the satisfaction from the outcome chosen. Marketers therefore need to not just acknowledge the presence of difference of opinions, but also understand the coercive or non-coercive interplays that result in the product chosen. This is more important in product categories that are equally important for both partners and are consumed simultaneously. Managing coercion could increase product satisfaction and therefore be more likely to be chosen. Tivo, for instance, gives a solution to the TV viewing battles that ensue because both partners have different program preferences that run at the same time.

Difference in preference intensity has been shown to be the biggest reason for the use of influence strategies.^{9–12} Literature, however, assumes that the propensity for coercion would linearly increase as the difference in preference intensity/choice increases (captured by us as perturbation). This study looks at whether this is always the case. We establish an appropriate relationship between perturbation and propensity to coerce. We further examine how the relationship between perturbation and coercion changes with demographics. We examine this in the context of a product that is equally important for both the members of a dyad and is consumed simultaneously – movies.^{13,14}

DECISION-MAKING PROCESS AND INFLUENCE STRATEGIES

The existing literature on joint decision making focuses broadly on two areas: the influence strategies used by the members of the dyad use to get what they want and the joint decision-making process.

Sheth¹⁵ elaborates influence strategies as problem solving, persuasion, bargaining and politics. Davis⁴ points out that the decision in a group may either be consensual or accommodative. When family members find a solution through consensus, they use influence strategies like role structuring, budgeting and problem solving. When the decision is accommodative, the family members recognize that their priorities and preferences are irreconcilable and conflict is likely to occur as there is disagreement over purchase goals. They may now resort to persuasion, bargaining or coercion to manage conflict. Spiro³ describes six types of accommodative strategies – expert, legitimate, bargaining, reward/referent, emotional and impression management. Only about 22 per cent of the individuals in the study were classified as non-influencers, whereas the rest used these strategies from moderate to high levels. Nelson,⁸ using an empirical study, described four conflict management strategies: use of punishment, threat, authority and other negative emotions; subtle manipulation through the use of positive emotions; withdrawal and egocentricism; and use of persuasion and reason. Su *et al*⁷ combine Spiro³ and Nelson's⁸ findings to arrive at an influence strategy scale that had two factors – coercive influence strategies and non-coercive influence strategy. They viewed coercion as imposing adverse consequences on the target of influence without compliance. Non-coerciveness encompassed more than just cooperativeness and included withdrawal, manipulation and compromise. They further define 'propensity to coerce' as the likelihood of a spouse using a coercive strategy over a non-coercive one to resolve their differences. It can be seen that all the strategies suggested by previous authors can be classified into either coercive or non-coercive.

Several researchers have studied who in a husband–wife dyad makes the decision. Men and women preference intensity for different product categories is likely to be different. Men are therefore likely to dominate the purchase decisions for products like insurance and cars,^{4,16} whereas women are likely to dominate the purchase decisions for products like appliances¹⁶

and groceries.^{4,16} The process is likely to be more egalitarian for a product category like home purchase.¹⁷ Relative preference intensity has the greatest contribution to relative influence.¹⁸ Men have been shown to be more concerned with the outcome of across category decision than within category decisions.¹⁹ The initial level of disagreement also seems to be important. Though over the years, women have gained more influence in consumer decision-making process,²⁰ decisions are more likely to favor men in across category choices when a high level of disagreement was present and when the spouses differed in the preference intensities.²¹ Some other researchers^{12,19,22,23} have shown that members in a dyad use different influence strategies to resolve conflict across various product categories. Research is, however, silent on the choice of influence strategy when the relative purchase intensity is similar and the product is meant for joint consumption. Who exerts a greater influence for product categories like movies and television channels, which are products meant for joint consumption. In such product categories, the product is equally important to both members and has to be consumed at the same time.

Apart from difference in preference intensity and category relevance, research has also looked at some other factors that prompt a member to use a particular influence strategy. Corfman and Lehmann¹⁸ present a conceptual framework of conflict resolution and relative influence in cooperative groups. They suggest that in a group, different individuals have different degree of power (defined as the ability of one person to change other person's attitude, beliefs or behavior in an intended direction). They also suggest that the outcome of a group decision is a weighted function of the group members' individual preference. The weights being determined by the relative influence of each individual over the other. Power could lie in an individual by virtue of her expertise with a particular product category. Expertise of a member may lead the other member to revise her choice.^{18,24} When in a marriage or a relationship, the necessity to work for the relationship is likely to have an

overriding effect on the use of coercion. Often members of a dyad are willing to give up their preferred choice for the sake of their spouse. A more loving spouse is therefore less powerful and is less likely to use coercion.⁷ Individuals in a dyad are also likely to take their decision history into consideration.^{7,18,25} The premise here is that individuals want to establish some sort of equity in their decision making.²⁶ Spouses therefore tend to alternate in using strong influence strategies across different instances of purchase decisions. The effects of perceived fairness over time are shown to be moderated by personality traits like empathy, egalitarianism and empowerment.²⁵

Demographic and psychographic characteristics like length of marriage and stage of lifecycle²⁷; sex role orientation (Buss and Schaninger²⁸ in Menasco and curry²⁹; Kim and Lee¹⁷; Corfman and Lehmann¹⁸; Qualls³⁰; Rosen and Granbois³¹ in Menasco and curry²⁹; Commuri and Gentry³²); bargaining skill; need to be accepted; self-confidence; and sociability¹⁸ also lead a certain influence strategy to be chosen over others. Corfman and Lehmann¹⁸ suggests that member's influence attempts depend on three things – the potential effectiveness of attempted use of power sources at his/her disposal, the costs associated with their use and the value of successfully using them. Spouses with greater power-related resources like income and occupational statuses are therefore likely to be more coercive.³³ In United States, Fonseca *et al*³⁴ found the decision making was not centralized to a particular spouse and was impacted by the relative education of the spouses. In the case of Spanish dual-income families, Dema-Moreno³⁵ state that financial decisions are based on social norms that at times may not entail negotiations. Research on joint consumption has also focused on decision-making behavior of same-sex couples and cohabiters. It has been shown that in heterosexual couples the older spouse enjoys higher bargaining power, whereas in the case of same-sex couples and cohabiters it is the younger and richer spouse.³⁶

Difference in preference intensity is one of the most important sources of coercion. Spouses with stronger preference are likely to use coercion more often because coercion is regarded as a more effective influence strategy³⁷. We capture difference of preference intensity through ‘perturbation’. Perturbation simply means a disturbance in arrangement. Choffray and Lilien³⁸ define ‘preference perturbation’ as the probability that a given product would be chosen by a firm’s buying center. It is inversely proportional to the number of preference shifts that would be needed to make that alternative the first choice of every decision participant. We define ‘preference perturbation’ or more conveniently just ‘perturbation’ as the deviation of an individual’s preference order from the joint preference order of the dyad (that is, a couple). This definition is slightly different from the original Choffray and Lilien³⁸ definition as we are not looking at the probability of choosing an alternative but the variation brought about in the order of preference when making that choice. This is because although it matters to a partner if his/her first choice is being pushed backwards, it also matters to him/her if his/her last choice is being pushed forward in the joint sequence. Both situations are likely to cause coercion.

MODEL

When modeling group interactions in an organizational buying setting it has been suggested that when a group does not reach unanimous agreement, it is most likely going to choose the alternative that ‘perturbs’ individual preference structures the least.³⁸

We define perturbation as the deviation of an individual’s preference order given the joint preference order of the dyad (that is, a couple). As mentioned in the previous section, we are not looking at the probability of choosing an alternative, but rather the variation brought about in the order of preference when making that choice.

Coercive strategies are defined as actions including talking loudly, becoming angry, using authority, clamming up, looking unhappy and

Figure 1: Research framework.

forming a coalition.⁷ We adopt this definition to operationalize and capture coercion.

Our research framework captures perturbation and coercion. The framework captures coercion while the decision for choosing a product is being made. This framework is a similar but simplified version of the framework used by Aribarg *et al.*⁶ In this framework, we divide the decision-making process into three stages – pre-decision (individual decision), negotiation and joint decision. It is noteworthy that couples would use influence strategies (coercion or non-coercion) during the negotiation stage only. Our framework captures this.

Our framework is summarized in Figure 1.

In Stage 1, the individual members of the dyad form an initial preference order (pre-decision). In Stage 2, the dyad enters into a negotiation process with each other to resolve the difference in their preference orders. Coercion is captured at this stage. The final stage captures their joint choice order. Although the joint choice process may not always follow these three steps, the framework captures both perturbation and coercion and is therefore used here.

MODEL DESCRIPTION

When two individuals, belonging to a dyad, having different set of preference ordering, come together to choose a particular product, it is likely that they would use coercion as a strategy to influence each other.

We define:

θ_{ij} = vector representing the order of movies of individual i belonging to a dyad j .

$$i = \begin{cases} 1 & \text{for Male} \\ 2 & \text{for Femal} \\ 3 & \text{for Joint} \end{cases}$$

$j = 1, 2, \dots, p$; p is the total number of couples.

For example, preference order $\alpha_1 \gg \alpha_2 \gg \alpha_3$. The symbol ' $\gg$ ' means 'is preferred to'. α_n represents the card number. The subscript of α represents the rank of the card. So, α_1 is the most preferred card, and α_n is the least preferred one.

$\lambda_j = \{\theta_{ij}\}$ is a set of preference orderings across decision participants – male, female and joint.

Q_{ij} ($i=1$ for the male member, 2 for the female member and 3 for joint) is defined as 'perturbation' associated with the set of preference order λ_j . It is operationalized by the number of shifts in the card order of husband or wife required to make to resemble the respective joint order.

For example, $\lambda_j = \{\theta_{1j}, \theta_{2j}, \theta_{3j}\} = [(1, 3, 2, 4); (3, 1, 2, 4); (1, 2, 3, 4)]$, where $\theta_{1j}(1, 3, 2, 4)$ is the husband's order; $\theta_{2j} = (3, 1, 2, 4)$ is the wife's order; and $\theta_{3j} = (3, 1, 2, 4)$ is the joint order. Husband's perturbation is calculated as follows.

$Q_{1j} = 0 + 1 + 1 + 0 = 2$ (Card 1 does not change position in the joint sequence, Card 3 shifts one position forward, Card 2 shifts one position backwards and Card 4 does not change its position. The total perturbation or disturbance in husband's sequence is therefore $0 + 1 + 1 + 0 = 2$).

Similarly, wife's perturbation would be:
 $Q_{2j} = 2 + 1 + 1 + 2 = 6$.

That is, the husband's perturbation was 2 units whereas the wife's perturbation was 6 units.

For our analysis, we use rescaled perturbation by dividing it by $a = (Q_{\max} - Q_{\min})$ so that the values of Q lie between 0 and 1. It can be seen that while $Q_{\min} = 0$,

$$Q_{\max} = \begin{cases} (n^2 / 2) & \text{if no of cards is ev} \\ ((n^2 - 1) / 2) & \text{if no of cards is od} \end{cases}$$

where n is the number of cards.

C_{ij} is the member's propensity to coerce. We used Su *et al's*⁷ scale to obtain this. It was taken as a fraction of the five statements indicating use of coercive strategy. C_{ij} ranges from 0 to 1.

We tested five different models to establish the relationship between propensity to coerce and perturbation.

1. Model 1: Linear in Q

Differences between preference intensity exist between members of a couple or a dyad.^{6,9}

As difference between partner's relative influence increases, tendency to use a stronger influence strategy also increases.¹⁸ The member whose preference is more intense toward a desired outcome is likely to use coercion.⁷ Literature seems to suggest that the strength of influence strategy (propensity to coerce) is an increasing function of members' differences between preference intensity (measured as perturbation by us) but the exact nature of the relationship has not been studied. The overarching goal of a family is continuity of the relationship and to maintain harmony. Members are therefore unlikely to use have higher propensity to coerce at smaller levels of perturbation. We therefore test:

$$C_{ij} = \beta_0 + \beta_1 Q_{ij} + \varepsilon_{ij}$$

2. Model 2 – Quadratic in Q and Model 3 – Exponential in Q

Couples can be assumed to be averse to using coercion with low values of perturbation, while coercion would increase faster when perturbation is high. This can also be seen in Ward's²¹ study where she says that with lower levels of disagreement the women tended to give in (to preserve harmony), whereas with higher levels of initial disagreement there was a tendency on the women's part to be more adamant about her choice. This leads us to believe that the degree of coercion would be lower when perturbation was low and would intensify with increasing perturbation. Corfman and Lehmann¹⁸ also believe that though coercion is regarded as a more effective strategy, couples are averse to using it because it is important for them to 'work' for the relationship. They are willing to give up their preferred choice and revise their preference⁶ in order to accommodate their partner. However, for alternatives that they feel strongly about and higher levels of perturbation, they are also likely to resort to coercion to get what they want. We therefore explore a quadratic and an exponential relationship.

$$C_{ij} = \beta_0 + \beta_1 Q_{ij} + \beta_2 Q_{ij}^2 + \varepsilon_{ij}$$

We expect the sign of β_2 to be positive.

$$C_{ij} = \beta_0 + \beta_1 e^{Q_{ij}} + \varepsilon_{ij}$$

3. Model 4 – Quadratic in Q , Mixture model and Model 5 – Exponential in Q , Mixture model
When there is perturbation in the preference order of an individual in a dyad, he/she is likely to use a coercive strategy to get his/her way. This response, however, is likely to be different from couple to couple, depending on age, educational status, role and status within the family and so on. For the same level of perturbation, a tolerant, milder individual is less likely to use coercive influence strategies *vis-à-vis* an aggressive individual. The objective of our third model is to capture heterogeneity in consumers' response to a certain level of perturbation.
Heterogeneity has for long been captured through the process of segmentation, which may simply be on the basis of certain demographic or geographic characteristics that are known *a priori*. Segmentation of consumers on the basis of other characteristics like psychographics, personality characteristics, benefits and so on are slightly more tedious and marketers have for long used cluster analysis in various forms to capture it ^(24,39–42).
These approaches focused on separating the homogeneous groups from the heterogeneous groups on the basis of some distance measure (for instance, Euclidian distance or Mahalanobis distance). The cluster characteristics in these cases were not known *a priori* and the segments were profiled once the clusters were formed. Last few years have seen the emergence of another class of procedures – the finite mixture models. Mixture models are essentially model-based clustering approaches that assume the data to originate from certain sub populations or segments.⁴³ They assume that the overall population is a mixture of segment-specific density function.
Researchers have used mixture models in different marketing contexts like adoption of telecommunications services⁴⁴; information acquisition process before the purchase⁴⁵;

choice modeling⁴⁶; consumers with the similar value system⁴⁷; purchase frequencies;⁴⁸ consumer choice⁴⁹; consumers demand for variety⁵⁰; forecasting new product sales⁵¹; choice for bundles of products⁵²; Internet search engine visits⁵³; browsing behavior⁵⁴; household preferences⁵⁵; product use compliance⁵⁶; response to marketing interventions⁵⁷; attitudes toward luxury⁵⁸; customer churn detection⁵⁹; forecasting store sales⁶⁰; attribute level behavior⁶¹; brand choice⁶².

While most studies on buying decision process and influence strategies have brought out *a priori* heterogeneity on the hindsight, it is also important to capture heterogeneity in the way members respond to a given level of perturbation.

We use the Expectation-Maximization (EM) Algorithm for the ML fitting of the mixture model.⁴³

We test for the presence of 2, 3, 4 and 5 mixtures.

EMPIRICAL TESTING

We used motion pictures as a product for our study. We chose movies because it is a product for joint consumption (that is, the two individuals who choose the product also consume the product together at the same time). Razzouk *et al*¹⁴ study over 26 product categories and find that for movies, concerts and entertainment decisions are syncretic and shared in the problem recognition, search and decision phases. Bonds-Raacke¹³ shows that husbands and wives have very different choices for movies though they are consumed together. Furthermore, a movie as a product is equally important for both partners and its choice affects them equally. As the stakes are equal, the likelihood of the partners using coercion as an influence strategy is also higher.

Incidentally, a commentary on research in motion pictures also points to the lack of studies in this product category⁶³ and emphasizes the need to study and model consumer decision process and the sequence of choices made.

Our questionnaire consisted of three parts:

1. Eight cards – each representing a movie.
The cards were designed using the following attributes:
 - (a) Language: English and Hindi.
 - (b) Genre: Comedy; romantic/drama; action/sci-fi and thriller/horror.
 - (c) Star-cast: My favorite and my partner's favorite.
2. Bonds-Raacke¹³ shows that actor/actress starring and the genre of the movie were the two most important attributes that an individual considered when deciding a movie. In this research, the attribute language is added as in India each region is dominated by a regional language with Hindi and English being the national languages. A full factorial design yielded an eight card design with three holdout cards. The holdout cards were used for the purpose of validation.
3. The second part consisted of certain statements that indicated the use of coercive/non-coercive strategies during the process of joint choice. These statements were taken from Su *et al.*⁷
4. The third part contained certain demographic questions.

Our field study consisted of the following three stages.

In the first stage, both partners ranked the set of eight movies in their separate rooms.

In the second stage, the couple was directed to a separate chamber, where they repeated the exercise and give us a joint order. The proceedings of this step were video recorded. However, not all couples agreed to be recorded (only about 35 per cent agreed to a video recording).

In the third step, the partners were asked to separately fill out a questionnaire based on Su *et al.*'s⁷ scale. This was done to capture the use of coercive/non-coercive strategies during the joint decision process. These results were used to corroborate the results from the video recording. This questionnaire also contained some general demographic questions like number of years of marriage, frequency of watching movies, occupation, income and so on.

Data collection

The questionnaire was pre-tested with eight couples to reconcile the difference between what was being asked and what the respondents understood.

Data were gathered outside the movie theater IMAX at Hyderabad, India. Movie ticket buyers were intercepted randomly after they had bought their tickets and were waiting for the movie to start. They were given a gift coupon, which let them avail of a discount (20–100 per cent) on the ticket of certain amusement facilities in the mall. We collected data from 107 couples. Data from 100 couples were found to be complete.

Our sample consisted of both married (76 per cent) and unmarried couples (24 per cent).

The average age of women in our sample was 28 years and that of men was 31.5 years. The modal household income of the participating couples was above Rs. 500 000 per annum. Most couples in our sample went for a movie once a month. The sample was well represented by students (12 per cent), entrepreneurs (10 per cent), professionals (35 per cent), service persons (21 per cent) and homemakers (22 per cent). On an average, the family size ranged from three to four members. The median age of marriage was about 5 years. Thirty-five per cent of couples consented to be videographed.

RESULTS AND ANALYSIS

Reliability and validity issues

The video recording was analyzed separately by four independent experts to conclude the use of coercive/non-coercive strategies. Each expert was given a coding sheet containing the 12 items from Su *et al.*'s⁷ scale. The experts also looked at the body language, facial expressions, voice pitch and loudness. The experts finally gave us their judgment on a 5-point scale to indicate the usage of coercion. Interestingly, in some limited cases, the experts observed one member of the couple dominating the process of decision making (so much so that the other member was extremely passive). Dominance as an item does not figure in Su *et al.*'s⁷ scale. This could be a culture

specific phenomenon, specific to this part of the world. Dominance was classified as coercion.

Inter-rater reliability among the four experts was high with an average correlation of 0.79.

A correlation of 0.85 was observed between the average scores given by the experts and the average scores obtained from the questionnaire on coercion. This indicated a high convergent validity. We therefore used the responses gathered by the questionnaire to measure coercion.

The individual holdout cards rank order was also compared with the main cards rank order to ascertain the validity of their responses. A high correlation of 0.85 indicated a high level of holdout card validity.

Model estimation and results

The five models – linear in Q , quadratic in Q , exponential in Q , quadratic and exponential in Q assuming mixtures, were fit to the data. We use mean square error (MSE) and Akaike Information Criteria (AIC) to uncover the best fit model.

The mixture model, quadratic in Q with two components fits the data best. Both Model 1 and Model 2 were found not significant. AIC of the two-component model is the highest and MSE is the lowest for this model.

Overall model and heterogeneity issues in Model 2

Our initial analysis revealed the possibility of the data being heterogeneous, non-normal with the presence of normal mixtures. Kolmogorov-Smirnov and Shapiro-Wilk tests indicated that the data were non-normal. Non-normality may not always indicate the presence of mixture of distributions, but the reverse is always true.

The regression (Model 2) was run for different subsets of the data, partitioning it according to various demographic classifications (for instance, years of marriage, married versus unmarried and so on). The results (as shown in Table 2) demonstrate that the relationship between the variables varies with demographics. These results therefore indicate that mixtures may be present and can be explored.

It is noteworthy that at the aggregate level there is no significant relationship between coercion and perturbation in both Model 1 and Model 2 (at 95 per cent confidence). In Model 2, the results are significant for married couples but are inconclusive for couples who are unmarried.

Again in Model 2, among the married couples, the results were not significant for those married for <3 years and >8 years. However, they were significant for couples married for between 3 and 8 years.

These results indicate that couples who had been married for <3 years were passing through the formative years of being and living together, hence were trying to 'put their best foot forward' and hence there was no influence of perturbation on coercion. Similar could be the case with individuals who have not yet married but claim to be a couple. Couples who have been married for more than 8 years probably understand each other's choices, and hence no relationship.

When taken individually (in Model 2), results for women are not conclusive and for men are significant. It was also seen that if the individual was not working (labeled here as a homemaker), the results were inconclusive but significant for those who were financially independent.

Even though the Model 2 was not significant at the aggregate level, splitting the data by demographics divulges that the relationship between perturbation and coercion to be significant for some demographics. For the demographic groups where the results are significant, the coefficients are not the same. This indicates a heterogeneous behavior. Statistical tests for normality further strengthen this belief.

Model estimation for mixtures of normals (Model 3)

The EM Algorithm was run on 2, 3, 4 and 5 component mixture models. It was found that the results for ANOVA F -tests for the 4 and 5 component models do not converge, hence they were not considered.

The MSE for a two-component model was 1.96 per cent and for the three-component model was 9.52 per cent.

A comparison of the mixture models for two and three components based on AIC and BIC is given in the Table 1. On the basis of these criteria, a two-component model seems to be the best choice.

On running the EM Algorithm several times, with two components, we got the results as given in Table 1 and graphically depicted in Figure 2.

The results indicate that the model comprises of two mixtures of regression, with the first component consisting of 72 per cent of the individuals and the second component the rest. The presence of two components indicates that all individuals do not behave in a similar manner. The β s of the two components are significant. Our model therefore captures this heterogeneous behavior.

The two components are distinctly different from each other in terms of their response toward perturbation. As evident from parameter values from the Table 1 and Figure 2, in Component 1, the couples have a lower propensity to coerce, given a certain level of

perturbation. In Component 2, we observe that the propensity to coerce is higher and it also increases at a faster rate.

Hereafter, we drew the profiles of the two components based on demographic characteristics (Table 3).

Figure 2: Regression equations.

Table 1: Models summary

			Size of the component (%)	MSE (%)	AIC
Model 1: Linear in Q		—	$\beta_0=0.285^{***}$ $\beta_1=0.026$	5.56	5.80
Model 2: Quadratic in Q		—	$\beta_0=0.3462^{***}$ $\beta_1=-0.4027^*$ $\beta_2=0.5096^*$	5.46	5.83
Model 3: Exponential in Q		—	$\beta_0=0.254^{***}$ $\beta_1=0.028$	5.56	5.80
Model 4a: Quadratic in Q (two components)	Component 1	72	$\beta_0=0.2625^{***}$ $\beta_1=-0.5128^{**}$ $\beta_2=0.6191^{**}$	1.96	7.98
	Component 2	28	$\beta_0=0.5992^{***}$ $\beta_1=-0.7753^{**}$ $\beta_2=1.410^{**}$		
Model 4b (three components)	Component 1	48	$\beta_0=0.1145^{***}$ $\beta_1=-0.054$ $\beta_2=0.0052$	9.52	4.73
	Component 2	41	$\beta_0=0.43^{***}$ $\beta_1=-0.1586$ $\beta_2=0.2078$		
	Component 3	11	$\beta_0=0.7208^{***}$ $\beta_1=0.622$ $\beta_2=1.1358$		
Model 5 (exponential, two components)	Component 1	65	$\beta_0=0.125$ $\beta_1=-0.033$	3.18	6.92
	Component 2	35	$\beta_0=0.324^*$ $\beta_1=0.061$		

*Significant at $P=0.1$; **significant at $P=0.05$; ***significant at $P=0.01$.

Component 1 is most likely to comprise of individuals have a family income of either below Rs. 150 000 or above 500 000, and are more than 35 years of age.

Component 2 is likely to comprise of individuals who are homemakers, have an income between Rs. 150 000 and Rs. 500 000 per annum and 25–35 years of age.

In the regression equation, the intercept term (β_0) indicates a certain inherent level of propensity to coerce. This comes from an individual's personality. It is his/her characteristic. As seen, the larger component (Component 1) has individuals with a lower propensity to coerce. This shows that majority of the individuals are non-coercive in nature and that coercion is not

Table 2: Regression results to demonstrate heterogeneity

	Sample size	β_0	β_1	β_2
Aggregate (no demographics)	200	0.346 (0.000)	−0.402 (0.094)	0.509 (0.061)
Married individuals	152	0.416 (0.000)	−0.689 (0.009)	0.699 (0.016)
Unmarried individuals	48	0.202 (0.000)	0.063 (0.910)	0.411 (0.559)
Married <3 years	32	0.555 (0.000)	−1.477 (0.089)	1.570 (0.163)
Married 3–8 years	62	0.451 (0.000)	−0.863 (0.047)	0.914 (0.052)
Married >8 years	58	0.343 (0.000)	−0.342 (0.400)	0.341 (0.429)
When a partner is a homemaker	43	0.439 (0.000)	−0.262 (0.586)	0.095 (0.850)
When the partner is not a homemaker	157	0.344 (0.000)	−0.568 (0.040)	0.760 (0.018)
Women only	100	0.413 (0.000)	−0.407 (0.241)	0.417 (0.255)
Men only	100	0.336 (0.000)	−0.668 (0.056)	0.851 (0.047)

The values in parentheses indicate the *P* values.

Table 3: Demographic profiling

		Component 1 ^a (%)	Component 2 ^a (%)	Ratio ^b
Occupation	Working	80.27	69.81	1.15
	Homemaker	19.73	30.19	0.65
Frequency of watching movies	Once a week	34.69	30.19	1.15
	Once fortnightly	21.09	18.87	1.12
	Once a month	33.33	39.62	0.84
	Less than once a month	10.88	11.32	0.96
Number of years of marriage	Unmarried	23.81	24.53	0.97
	<3 years	17.01	15.09	1.13
	3–8 years	31.29	32.08	0.98
	>8 years	29.25	28.30	1.03
Income	Below Rs. 150 000	14.29	7.55	1.89
	Between Rs 150 000 and Rs. 300 000	17.69	22.64	0.78
	Between Rs. 300 000 and Rs. 500 000.	23.13	30.19	0.77
	Above Rs. 500 000	44.90	39.62	1.13
Age	<25 years	30.61	28.30	1.08
	25–35 years	40.82	58.49	0.70
	35–45 years	21.09	9.43	2.24
	>45 years	7.48	3.77	1.98

^aProportion of the individuals of the demographic characteristic to the number of individuals present in that component expressed in percentage.

^bRatio of Component 1 proportion to Component 2 proportion. A value of >1 indicates a probable candidature to Component 1 and a value of <1 indicates a probable candidature to Component 2.

the most favored method of influence. Furthermore, the curves show an initial dip in the propensity to coerce at lower levels of perturbation. This indicates that when the difference in preference structure is low, all individuals in both the components decreased their propensity to coerce from their inherent levels. This could possibly be because when in a relationship or when already married, partners would like to have and work for a happy and successful relationship. Thus, coercion may not be the favored influencing strategy. Su *et al.*'s⁷ and Corfinan and Lehmann's¹⁸ works also point in the same direction. In addition, as both the individuals are in near agreement as to choice, the need to coerce or indulge in any sort of discussion does not really exist. This behavior, however, changes as perturbation increases. Normal human behavior would subscribe to the fact that an individual would like to have his/her preference chosen to purchase. And as the variation in choice increases individuals start using a variety of ways to get their preferred choice. Thus, the propensity to coerce should also increase. This increase is different in the two groups and thereby leads to different behaviors. Individuals who have initially higher propensity to coerce when faced with higher levels of perturbation seem to indulge more in coercive behavior. The rate at which coercion is adopted as a strategy by this group is also distinctly higher from the other group. This could be because of these individuals' inherent personality. The larger component shows a much slower rate of adoption of coercion. This indicates that majority of the individuals whether in a formal (married) or non-formal (unmarried) relationship would like to make their relationship work for the better. Interestingly, it can be seen that the women who are homemakers or are financially dependent on their partner had a higher tendency to coerce. This could be seen as their mechanism of asserting power in the household.

We acknowledge the possibility of certain psychographic, situational and other demographic factors, not captured by us, the cause of this heterogeneity.

DISCUSSION

Although most research in joint buying behavior that focuses mainly on the buying process and influence strategies does occasionally demonstrate the heterogeneous way in which couples might behave while choosing a product, it does not explicitly model heterogeneity.

Understanding heterogeneity in the buying behavior could shed more light onto the way couples decide for a product. Although this research points out that most people are averse to using coercive methods to resolve their differences, a substantial segment is not averse to it. Using coercive techniques in decision making may reduce the satisfaction from the product drastically. For a product meant for joint consumption and equally important to both partners, it would mean that a substantial segment of couples go unhappy with the product, not because the product was bad in any way, but because they fought over it before buying it. This is an important insight for marketers for understanding the (dis)satisfaction with their products.

For researchers, this study borrows a construct 'perturbation' from the industrial buying context and uses it to model joint behavior of couples. It also emphasizes the important issue of heterogeneous behavior of consumers. Past studies have either assumed homogeneity or have pointed out heterogeneity on some *a priori* basis. This is not adequate. Differences in the behavior exist, and are needed to be pointed out. Some cluster-analysis based techniques that have been used in the past assign the given observations into groups based on some distance measure. These are inappropriate when drawing inference for the population based on a certain sample. Mixture models assume the sample to be drawn from a population that follows a certain mixture of distributions. These are therefore more appropriate in modeling heterogeneity. Mixtures can be modeled using the EM Algorithm or a Bayesian approach.

Another important benefit of the mixture approach is that these can be applied to linear models explaining the relation between a set of variables.

The model that best explains the relationship between perturbation and coercion is a quadratic (in perturbation), mixture model. While the mixture model indicates heterogeneity, the quadratic model indicates that members of the dyad reduce their propensity to coerce when faced with low to medium levels of perturbation. Coercion seems to definitely be the 'weapon of last choice' and is used only when perturbation is very large.

ACKNOWLEDGEMENTS

The authors wish to thank Tanmoy, Tina, Arun, Ankur and students of IBS Hyderabad for helping them in data collection. The authors also wish to thank Mr P. Ramesh and Mr Kishan Krishnamurthy Prasads, IMAX, for allowing them to conduct this research in their premise.

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