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Semantic Networks: How to Construct Unique Selling Propositions

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Semantic Networks: How to Construct Unique Selling Propositions for Your Brand's Advertising

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Introduction

Persuasive sales arguments begin with a “head nod”. Plato taught that in his *Dialogues*. Then he showed how, with a series of short steps in logic, it is possible to lead a person from that initial point of agreement to a concluding position that they would have been uncertain about at first had it been put it to them directly.

This may seem to be only a matter of semantics. But semantics are what advertisers are concerned with when they determine *unique selling propositions* to fix a brand's *positioning* in a competitive marketplace.

Mastering semantic clarity, along with emotion, its equal partner in the art of advertising, is one of two strategic keys for building successful brands.

Brand leadership is fundamentally concerned with managing meaning. How do the performance claims and support points communicated about your brand “fit” into the consumer's belief system? What are the resulting, higher level values your brand stands for in the mind of the consumer? And have you defined those values in ways that are meaningful to the contemporary consumer? These are all questions of semantics-- because semantics is the study of meaning.

Consumers are “logical” in their way, but consumer logic is not the same as Aristotle's logic. To *persuade* consumers, therefore, advertisers must develop sales arguments on *their* terms. Researchers, therefore, must help the ad team understand which “trains of thought” consumers use to arrive at a particular position with respect to the product category.

This paper introduces a new tool for helping with that task, the *semantic network*. Think of a semantic network as a “road map” to the consumer's mind. Just as a road map shows places and the pathways connecting them in a given geographical area, so a semantic network shows ideas which consumers associate with a given product category and the linkages between those ideas.

Importantly, this technique does not require the use of new questions or additional interviewing time in the data collection process, but rather is a means of adding value to the research with a new method of analysis for data that has probably already been collected.

Literature Review

The basic ideas underlying semantic networks have been well-known in the academic world for more than 30 years. However, only in the last decade has the business world been putting these ideas into practice and applying them to marketing and knowledge management issues.

Initially, in the mid-1960's, Ross Quillian first implemented what would later become known as a *semantic network* in his dissertation on the design and use of computer programs to store word meanings (see Quillian, 1967, 1969). The computer program itself embodied a theory of human language comprehension and paved the way for further work in Artificial Intelligence.

Shortly thereafter, Quillian and Collins and their associates (e.g., Collins & Quillian, 1969; Smith, Shoben, & Rips, 1974; Collins & Loftus, 1975) revolutionized the field of Cognitive Psychology by championing the study of semantic memory, i.e., memory for general information, knowledge about the world, and cultural knowledge.

Often using reaction time as a measure of cognitive workload, these researchers studied how real-world knowledge — at least in the form of subject-verb-predicate sentences like “A bird is a mammal”— is processed, stored, and accessed in real time. Up to this time, psychologists were content to focus on what came to be known as episodic memory—the storage and retrieval of abstract (even nonsensical) events such as the recall of “consonant trigrams” (e.g., MIW, PEQ, FAZ).

Throughout the 1970s and continuing to the present time, research workers enlarged these early “micro-theories” to explain more complex cognitive phenomena and, ultimately, to account for how the mind works in a unified manner to identify objects, retrieve information from memory, keep track of current goals and intentions, and plan actions. For the most part, these explanations have been in the form of computer programs that jointly serve as a model for human cognition and replicate findings observed among human subjects in rigorous laboratory experiments.

For example, what began as the semantic-network based HAM (short for “Human Associative Memory” in Anderson & Bower, 1973) for Anderson and his colleagues eventually became, ACT (short for “Atomic Components of Thought” in Anderson & Lebiere, 1998 and now in its fifth incarnation as ACT-R 5.0 in Anderson, Bothell, Byrne, Douglass, Lebiere, and Qin, 2004), a general cognitive architecture designed to explain such diverse cognitive phenomena as sentence-processing, problem-solving, attention, and decision-making.

Similarly, using a Latent Semantic Analysis approach, Kintsch and colleagues expanded their initial semantic network analysis of simple declarative sentences (see Kintsch, 1974) to such areas as learning and summarizing information from text, and, more generally, acquiring and representing factual knowledge about the world (see Foltz, P. W., Kintsch,

W., & Landauer, T. K., 1998; Landauer & Dumais, 1997; Landauer, Foltz, & Laham, 1998; Kintsch, Patel, & Ericcson, 1999; Landauer, 2002).

Finally, with regard to current business and marketing applications, Zaltman (2003) provides several examples of how qualitative interviews provide material for the creation of “consensus maps.” In a similar vein, but on a quantitative level, semantic networks provide marketers with a map of the mental models which different consumer segments hold about their product category.

Semantics: the Rational Side of Market Communications

The significant aspect of semantic nets for advertising is that they are concerned with the *relationships* or linkages between objects, concepts or events. In terms of language or semantics, the structural relationships between words can be interpreted as their semantic meaning.

In more general terms, it can be used as a representation of knowledge. As such, it can be used as a basis for understanding learning, that is, how new facts get added or fitted into our brains, and retrieval or recall, that is, how our brains determine what knowledge is relevant in solving problems or making choices.

The basic assumption is that the ideas which consumers hold about a given product category do not exist in a vacuum but rather are embedded in a context of related ideas. The key to using a semantic network is to understand the *connections* that consumers make between one thought and another.

Constructing a semantic net is a way of “parsing” a message to get at the deeper structure. This structure represents the meaning or significance of the brand message in the context of the belief structure of the category.

How to Build a Semantic Network

The raw material for a semantic network is drawn from brand attribute ratings. The ratings are collected in typical consumer questionnaires that attempt to describe consumer brand perceptions with five or six point rating scales. These kinds of ratings can be found in a wide variety of quantitative consumer studies, such as diagnostic pre-tests, tracking studies, or general attitude and usage surveys.

The data that is analyzed is a matrix of correlations (typically Pearson Product Moment correlations) rather than the metrics that are usually reported, such as average scores or top box/top two box percentages. In this analysis attention should be focused on the relationships between variables, rather than on the levels of agreement to particular rating statements viewed one at a time. As in traditional factor analysis, correlations are interpreted as distance metrics, providing measures of the strength of association or linkage between the various pair-wise combinations of mental objects (such as product features and benefits, personality traits, etc.) in the set of constructs being rated.

Unlike factor analysis, which is usually used as a form of data reduction to collapse the differences between highly correlated items into a few underlying dimensions, with semantic network analysis the focus is on doing the opposite: the objective is to “explode” the differences between correlated items in order to explore the context of closely related—but not synonymous—ideas. The method of constructing a semantic net follows a mechanical, iterative procedure to identify the hierarchy of relationship between consumer perceptual categories.

To begin the process of constructing a semantic network, start with a criterion variable or “bottom-line” type of item, such as purchase intent. Then, using a stringent statistical cut-off point, you should identify the few ideas that are most closely correlated with the starting, criterion variable. These two or three or four variables are the *primary drivers* and represent the first level of relationships in the map.

The next step is to identify secondary variables that are connected to the primary drivers. In other words, in round two start with each of the driver variables and identify a small subset of the remaining variables that are most highly correlated with these.

Then the process is repeated again. Correlations are used to identify those ideas that are most closely linked to the secondary variables, and then the ideas that are related to these tertiary variables, and so on, until the set of variables in the dataset is exhausted.

Typically, in moving from the few important correlations between the criterion variable and the primary drivers to the correlations between the drivers and other descriptive concepts the overall degree of inter-relatedness between ideas increases. This normally results in a corresponding increase in the number of high correlations. As a rule of thumb, therefore, the cut-off point is raised slightly (using judgment) so as not to blind the analyst with too many relationships. This adjustment is usually allowed once and after that you should stick to a reasonably fixed cut-off point for identifying “significant” correlations is recommended.

Finally, after this very mechanical procedure, a degree of artfulness comes into play. This is the right-brain task of graphing and organizing the various connections on a piece of paper in as compact and efficient a way as possible. Examples of these graphs are shown throughout this paper.

An obvious limitation of this kind of road map of the consumers mind is that it is two dimensional. Physically, at least, the human brain is 3-D. A truer representation, it would seem, would look more like the space filling wiring of neural ganglia. Indeed, you could build a model of a semantic net out of short bits of wire, and by lifting up the ends, bend them around to bring the ends together and close the connections that are awkwardly displayed on paper. What you might get is a three dimensional, multifaceted polyhedron.

Applications of Semantic Networks

What follows are several examples used to illustrate semantic networks. These examples are drawn from a variety of consumer research projects conducted for several clients over the past few years. In particular, I would like to thank the United Dairy Association for granting permission to use case histories for several of the product categories which they support. Each of the networks in these examples was constructed from quantitative datasets based on a range of sample sizes, from a minimum of a hundred consumer interviews to over a thousand interviews.

Example One: Identifying Drivers of Purchase Intent

The first simple example of a semantic net involves a snack product based on the familiar party mix that you make with peanuts, pretzels, cereal biscuits and seasonings, usually prepared around Christmas time in vast quantities for your friends. This party mix comes ready-to-eat in a box, and therefore is a convenient snack anytime. Because convenience is the original reason-for-being for selling the product pre-mixed in the box, the original communication strategy that was developed to advertise this product was based on convenience.

The simple semantic map shown in this example was constructed from a set of brand ratings from a pre-test control cell. Notice that there are several “mental paths” that might be followed to reach the consumer. Taste is the perceptual variable most strongly linked to purchase intent for the party mix, with the highest degree of correlation of 0.64. (See Exhibit 1.) Convenience is an important but secondary benefit, indicated by a lower correlation with purchase intent (of 0.49.) Moreover, it is clear that taste could be supported in several ways, e.g. premix–heritage–taste; while convenience idea is supported only by the product attribute that this product comes in a box.

The usefulness of the map, in this case, was to convince the client to shift the focus of advertising away from a convenience message to a taste story. The result was a systematic improvement in motivation scores for their advertising.

Example Two: Identifying Barriers to Purchase Intent

In this case, a semantic network was used to explore a range of possible ways to sell butter. Butter is an interesting product to try to market in that it is the only example we could think of where the *unbranded* product usually costs *more* than the competing, branded alternatives— that is, margarines.

The overall preference item “Butter is the product for me” was chosen as the criterion variable or starting point for the semantic net. What we found was that “freshness”, “taste”, and the ingredient dimension that “good cooks use it” were, in that order, the most strongly linked items (out of 41 possible items being rated) to preference for butter. (See Exhibit 2.)

There were a number of important insights which could be gleaned from this graph.

First, concerns about cholesterol and calories are negatively correlated to butter preference. In this case negative correlations were interpreted to represent significant barriers to usage that marketing must overcome.

Note the strong linkage in consumers' minds between cholesterol and calories (+.66). While it is true that versus margarine, butter does contain more cholesterol and thus may not be as good for you, it is a fact that butter and margarine contain exactly the same number of calories. And yet consumers assume that butter contains more calories than most margarines. Why? Apparently, because of an association they make in their minds between calories and the cholesterol content of butter.

If you were to ask the typical consumer exactly what cholesterol is, the answer you might get would be something like a yellow, gloppy, fatty substance—that's full of calories! So, one way to advertise butter would be to educate consumers about this misconception of the caloric content of butter. And while the perception of high cholesterol could not be addressed with advertising head-on, since it is a true negative to health, it might be possible to isolate that concern, by breaking the links to other negative misconceptions consumers have, so that it might wither on the vine, so to speak, or at least be minimized as an issue that has to be dealt with by advertising.

But a second, more important observation that was made from this graph is that freshness, based on the natural origins of butter, is more strongly linked to butter preference than taste is. This appears to be somewhat surprising, since we would expect good taste to be the primary benefit for any food product. So what's going on?

Perhaps, it's simply a matter of what the old advertising master Leo Burnett would have called "inherent product drama": of *good* versus *bad*. Most consumers would agree that butter tastes better than margarine. But margarine is used more often than butter because of the "bad aura" that butter has developed as a result of consumer concerns about cholesterol and the misconception about its calorie content. To overcome this bad aura and increase butter usage, advertising would need to communicate on an emotional level something *good* about butter. Under the circumstances, taste does not automatically qualify, since buying butter for its taste can be translated by many consumers as a form of "indulgence", which is just another kind of sin. A better strategy for lowering the cholesterol barrier, might be to point out that butter is a fresh, natural dairy product, while margarine is artificial and factory-made.

Example Three: Developing Alternate Strategic Selling Paths

To guide us in developing possible strategies for selling milk, a semantic network was constructed to provide answers to four basic questions:

1. What are the *motivating* ideas which consumers hold, to a greater or lesser degree, about the product?
2. What are the *initial points of agreement* about perceptions of the product—that is, what product

claims will elicit “head-nods” of agreement from the consumer?

3. What are the points of *leverage* that can be used to move consumers to product ideas about which they are less likely to agree?
4. What is the *shortest path* to follow in taking the consumer from an initial point of agreement to a motivating idea about the product— without requiring “great leaps in consumer logic?”

Taken together, this information from semantic networks can be used as a guide for developing persuasive ad campaigns to win more business from consumers.

Motivating Ideas

Two types of measures are shown on this semantic map. (See Exhibit 3a.) The numbers within the circles are mean scores on a 5-point agreement scale that the given idea describes milk. The numbers next to the linkage lines are correlation coefficients. These are indicators of the closeness or degree of association between ideas.

Three primary drivers were identified in this study. These are the three ideas most closely linked with respondent ratings of milk as a beverage for personal consumption.

The first is *taste*. Agreement that milk tastes good among light/medium users was a moderately high 4.5 on a 5-point scale.

The second is *refreshment*. On this dimension milk also receives a moderately high rating of 4.4 on a 5-point agreement scale.

The third dimension we call “*emotional relevance*.” This is our rough translation of the item “for people like me.” There is undoubtedly a psychological component to milk usage due to its association with motherhood, childhood, the comforts of home, etc. Unfortunately, none of the items which we had to work with represent this area very well. This item seems to come closest in meaning to that area. As support for that interpretation, we note that this item is associated in the network with other items descriptive of “caring” and a sense of well-being (i.e. health items).

Finally, we note that all three areas— taste, refreshment and emotional relevance— are roughly equal in their linkage to milk usage as a beverage.

Persuasive Pathways

In analyzing the semantic network for milk, we identified four paths that seemed to offer interesting strategic alternatives for persuading light/medium milk users to drink milk more often. (See Exhibit 3b):

Safe to Drink Every Day
Milk Goes Great With Food
Part of a Balanced Diet
Energizing Refreshment for Men

Below we sketch out these paths in terms of a step-by-step consumer argument. Before we do so, however, we should point out two things. First, the semantic “argument” is not written out in advertising language; indeed, it is not even written in the language of a good concept. Instead, what the net provides is the *logical skeleton* around which more polished concepts could be written. Second, the semantic network does not tell us which of the four paths is best. To determine that, one needs to *test these four strategic concept areas among consumers*. What the semantic network provides is a disciplined approach to constructing distinctive—and from a consumer standpoint, “logical” *selling propositions* for driving milk consumption.

Pathway 1: Safe to Drink Every Day

From the semantic network, the consumer argument is in brief:

Supporting Argument: 1. Because it’s a natural product.
2. Milk is safe.
3. So it’s appropriate to drink every day.
4. (And it tastes good too.)
5. So milk is for people like you.
Therefore: Drink milk more often

This argument starts with a very strong “head nod” from the consumer: milk is a natural product (Agreement level = 4.7). From there, the path runs easily “downhill” to “Emotional Relevance”—i.e., “Milk is for people like you.” This pathway can be thought of as having a certain amount of leverage because consumers will more easily grant us the first point than the last point:

Natural Product (4.7) → For People Like Me (4.4)

This area is interesting because it may capitalize on a concern that some consumers might have that man-made products, such as soft drinks, may have harmful *cumulative* effects. This is a hypothesis which might be explored further with additional consumer research.

Pathway 2: Milk Goes Great With Food

The argument in brief:

-
- Supporting Argument: 1. Milk is versatile.
2. It goes with many foods.
3. Milk is appropriate to drink with food.
4. It tastes so good.
Therefore: Drink milk more often
-

This Pathway can be thought of as running along “level ground” in that consumer agreement with the opening point is equal to consumer agreement with the final point:

Versatile (4.4) → Tastes Good (4.5)

Nonetheless, the path may be well worth traveling because of the opportunity available, via advertising, to dramatize the opening point by showing milk being consumed with a wide variety of foods. A particular strength with this strategic approach is that— if the advertising is successful— many food products around the house can become strong psychological cues reminding consumers day after day to drink milk more often.

Pathway 3: Part of a Balanced Diet

The argument in brief:

-
- Supporting Argument: 1. Milk has nutritional value.
2. It’s a healthful beverage.
3. It’s needed for a balanced diet.
4. For instance, milk is a good source of calcium.
5. Women need calcium.
6. So milk isn’t just for kids, it’s good for adults.
7. For people like you.
Therefore: Drink milk more often.
-

Like the first path, there’s an inherent leverage in this downhill path: most consumers will grant you that milk has nutritional value:

Nutritional Value (4.7) → For People Like me (4.4)

Pathway 4: Energizing Refreshment

The argument in brief:

-
- Supporting Argument: 1. Milk gives you pep.
2. It refreshes.
3. And for men,

4. It's good for adults like you,
Therefore: Drink milk more often.
-

Unlike the other three paths, this one appears to run slightly “uphill”. Consumers are less likely to grant you the milk “kick”—i.e., “milk gives you pep”—than the ultimately motivating item of refreshment:

Gives You Pep (4.2) → Refreshing (4.4)

While this is certainly a valid strategic area, it requires that advertising work harder, to possibly *change*, and not simply reinforce, the ideas consumers associate with milk. It is highly dependent, therefore, on a believable and energizing advertising execution to strengthen the linkage between energy and refreshment in order to motivate consumers to drink more milk.

By working outward from these ideas, we developed 4 stepping-stone strategic paths for consumer persuasion, each of which begins with a relatively non-controversial “head nod” point of agreement. The 4 paths are:

1. **Safe to drink every day.** Begins with “milk is a natural product” and plays on negative perceptions of artificial beverages.
2. **Milk goes great with food.** Begins with “milk is versatile” and can use a variety of everyday foods as psychological cues to remind consumers to drink milk.
3. **Part of a balanced diet.** Begins with “milk has nutritional value” and can use the calcium benefit story as an added benefit for women.
4. **Energizing refreshment for Men.** Begins with “milk gives you pep” and can use additional masculine associations of fun and refreshment.

These are the four strategies which seemed to offer the smoothest logical path for consumers to follow to a positive feeling about drinking more milk. With each semantic spine in place, advertising executions could then be developed to wrap emotional flesh around the semantic skeleton.

Example Four: Identifying the Effects of Persuasive Advertising

A bar soap analysis was conducted having a main objective fundamentally different from the preceding examples. The objective in this fourth example was to find out how two very different advertising ideas impact on the semantic belief structure of consumers.

What linkages would be made stronger by the new advertising? What new linkages created?

This application used a baseline semantic network constructed from the brand attribute data collected in a pre-test control cell. (See Exhibit 4a.) In two test cells, consumers viewed a test ad and brand attribute ratings were also collected (a standard part of the test). Correlations between brand attributes in the two advertising cells were then compared to those from the control cell. For each of the two ads, linkages which were strengthened (i.e. significantly higher correlations) are highlighted with heavy black lines, in Exhibit 4b.

The two ads produced different semantic effects. Ad B appears to strengthen or reinforce more of the semantic linkages than ad A. It also appeared to be creating new connections; for instance, the idea of “good smell” is now linked to the idea that this is “soap for the entire family” and, importantly, it is now directly linked (with a correlation above our cut-off point) to the preference variable, this “soap is for me.”

Also, as another observation, there are a greater number of connections being strengthened. In a semantic sense, one might say that Ad B is a “bigger idea” than Ad A—it’s *better connected*. And while it’s premature to generalize at this point, it is interesting to note that ad A was more motivating than ad B in terms of purchase intent. Indeed, in another paper we have previously shown that in more persuasive advertising (using the well established ARS measure of persuasiveness) the visuals are better connected in the mind of the consumer as well. (See Young and Robinson, 1992)

Conclusion

In this paper we have introduced a new analytical tool into the advertising researcher’s toolkit. The semantic aspect of advertising communication is critically important for understanding strategic marketing concepts such as a brand’s positioning in the marketplace and the unique selling propositions behind effective advertising campaigns. Semantic network analysis provides a disciplined, quantitative approach to exploring the connections between semantic concepts in the mind of the consumer. As our examples have shown, this can be useful for identifying brand differentiating options for advertising strategy development. Moreover, because it does not require new data but rather is a new way of looking at data that may have already been collected, it is an economical approach to finding potentially new insights into the differences in persuasiveness between advertising executions.

References

- Anderson, J. R., Bothell, D., Byrne, M. D., Douglass, S., Lebiere, C., & Qin, Y. *An integrated theory of mind*. Manuscript submitted for publication, 1/16/04.
- Anderson, J. R., & Bower, G. H. *Human associative memory*. New York: Wiley, 1973.

Anderson, J. R., & Lebiere, C. *The atomic components of thought*. Mahwah, NJ: Erlbaum, 1998.

Collins, A. M., & Loftus, E. F. A spreading-activation theory of semantic processing. *Psychological Review*, 1975, 82, 407-428.

Collins, A. M., & Quillian, M. R. Retrieval time from semantic memory. *Journal of Verbal Learning and Verbal Behavior*, 1969, 8, 240-247.

Foltz, P. W., Kintsch, W., & Landauer, T. K. The measurement of textual coherence with Latent Semantic Analysis. *Discourse Processes*, 1998, 25, 285-307.

Kintsch, W. *The representation of meaning in memory*. Hillsdale, New Jersey: Erlbaum Associates, 1974.

Kintsch, W., Patel, V. L., & Ericsson, K. A. The role of long-term working memory in text comprehension. *Psychologia*, 1999, 42, 186-198.

Landauer, T. K. On the computational basis of learning and cognition: Arguments from Latent Semantic Analysis. In B. H. Ross (Ed.), *The Psychology of Learning and Motivation*, 41, New York: Academic Press, 2002.

Landauer, T. K., & Dumais, S. T. A solution to Plato's problem: The Latent Semantic Analysis theory of acquisition, induction, and representation of knowledge. *Psychological Review*, 1997, 104, 211-240.

Landauer, T. K., Foltz, P. W., & Laham, D. An Introduction to Latent Semantic Analysis. *Discourse Processes*, 1998, 25, 259-284.

Quillian, M. R. Word concepts: A theory and simulation of some basic semantic capabilities. *Behavioral Sciences*, 1967, 12, 410-430.

Quillian, M. R. The teachable language comprehender. *Communications of the Association for Computing Machinery*, 1969, 12, 459-475.

Smith, E. E., Shoben, E. J., & Rips, L. J. Structure and process in semantic memory: A featural model for semantic decisions. *Psychological Review*, 1974, 81, 214-241.

Young, C. and Robinson, M., Visual Connectedness and Persuasion, *Journal of Advertising Research*, March/April, 1992, Vol. 32, No. 2, 51-59

Zaltman, G. *How customers think: Essential insights into the mind of the market*. Boston, MA.: Harvard Business School Press, 2003.

Exhibit 1

Semantic Network for Party Mix

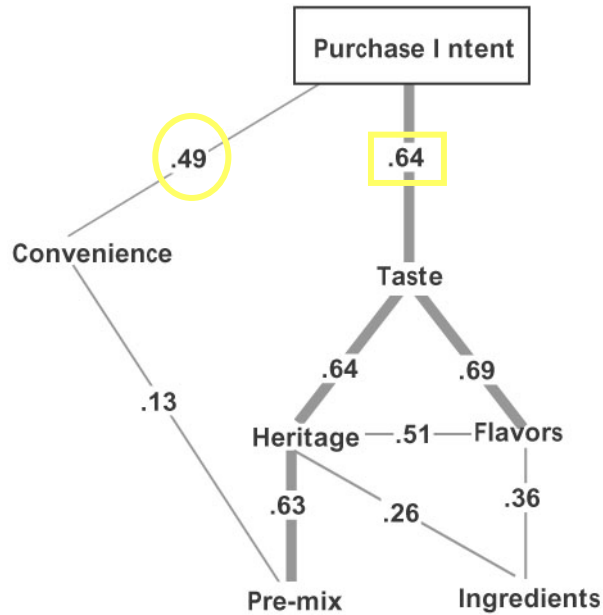


Exhibit 2

Semantic Network for Butter

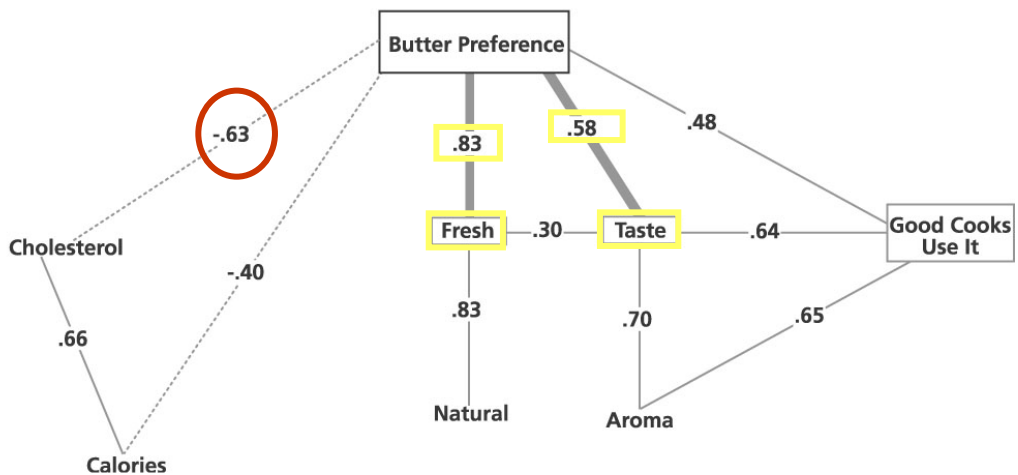


Exhibit 3A

Semantic Network for Milk

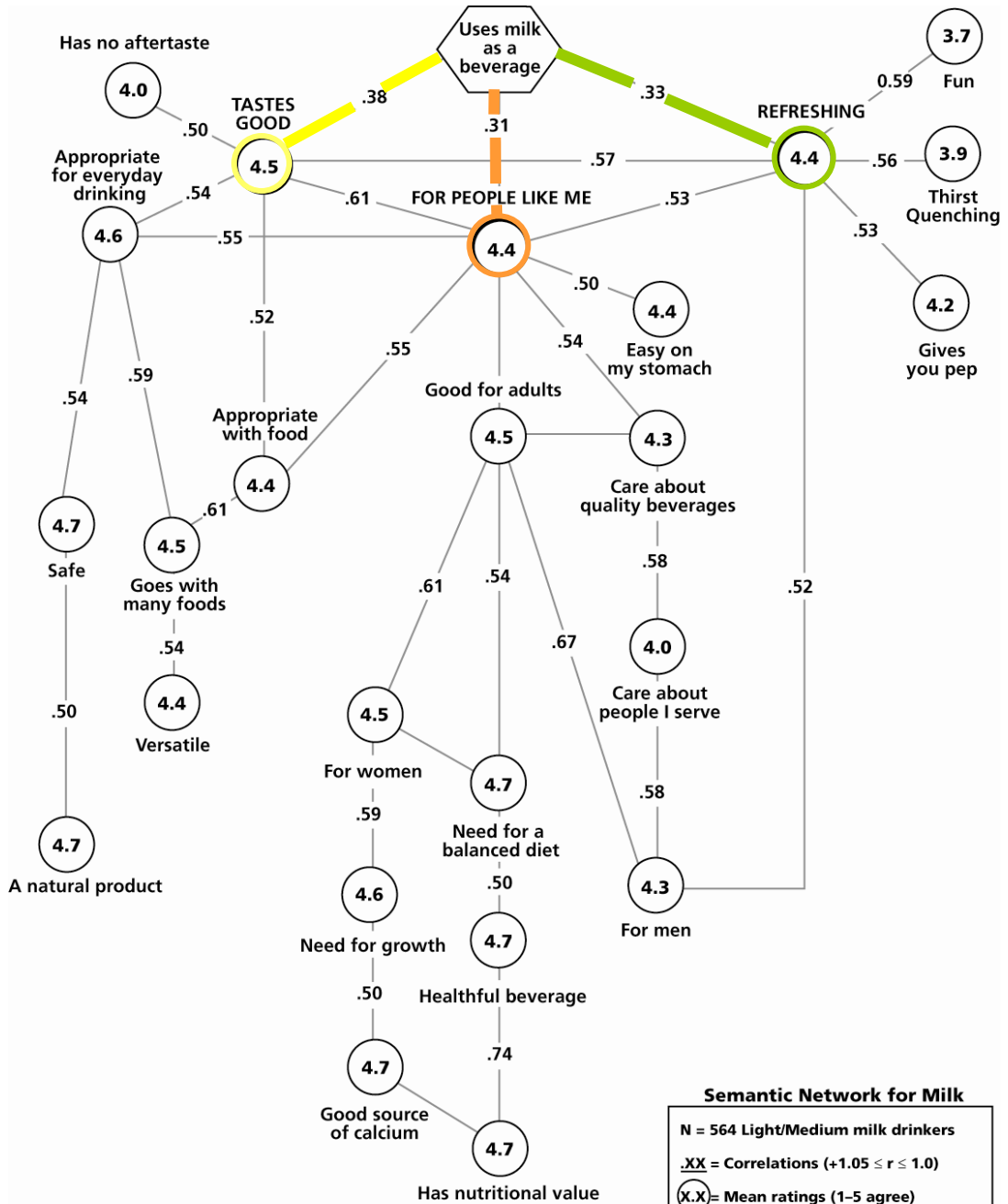


Exhibit 3B

Four Selling Paths For Milk

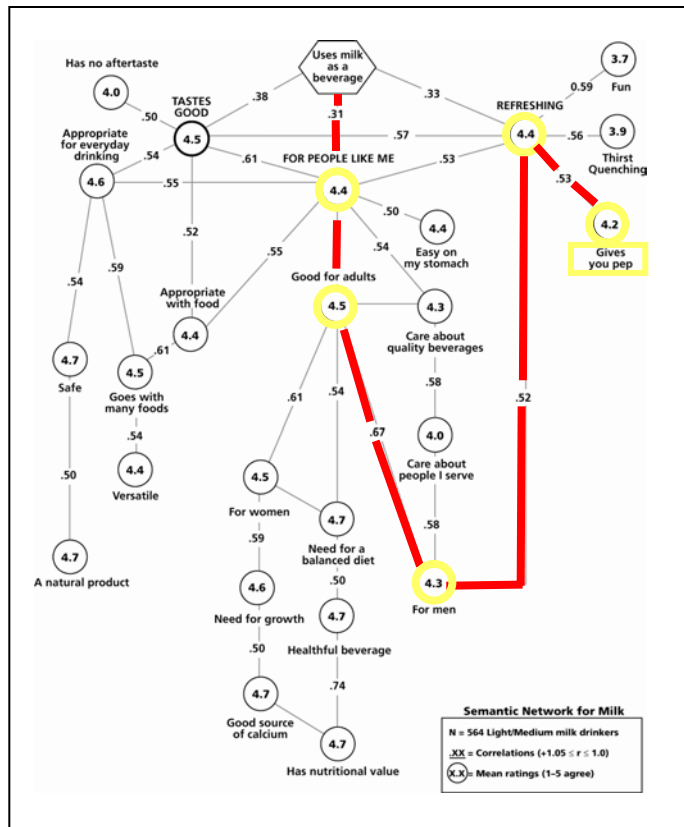
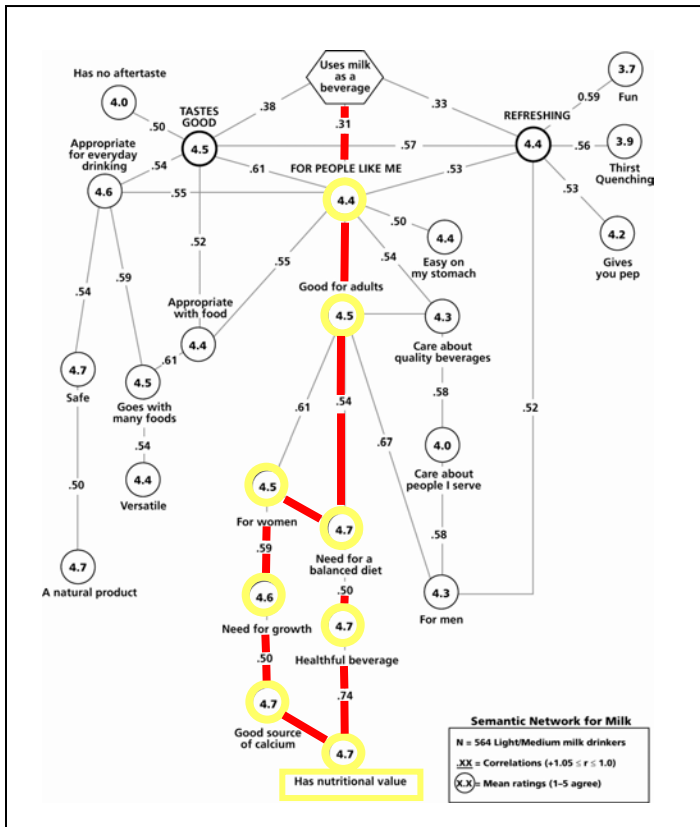
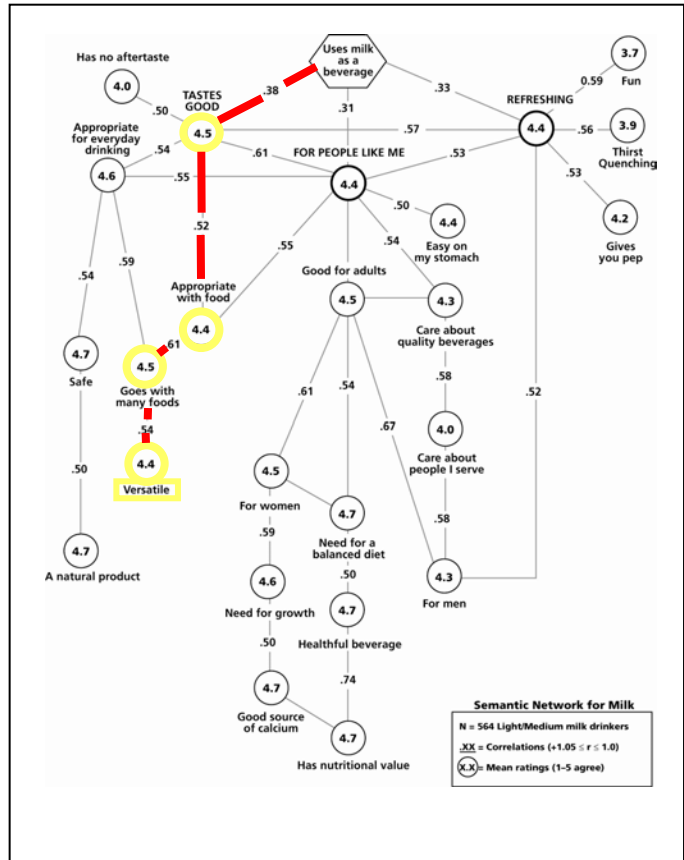
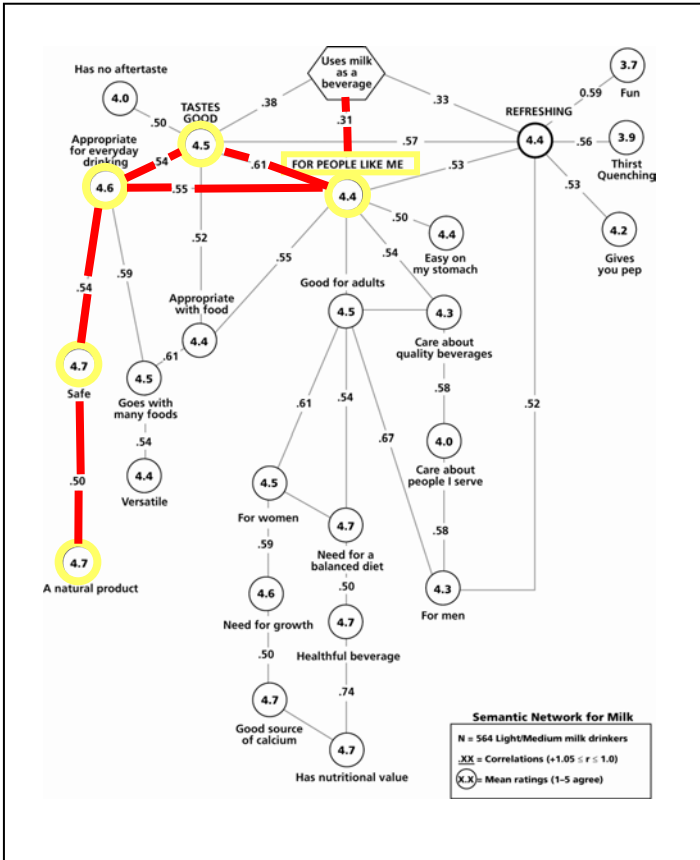


Exhibit 4A

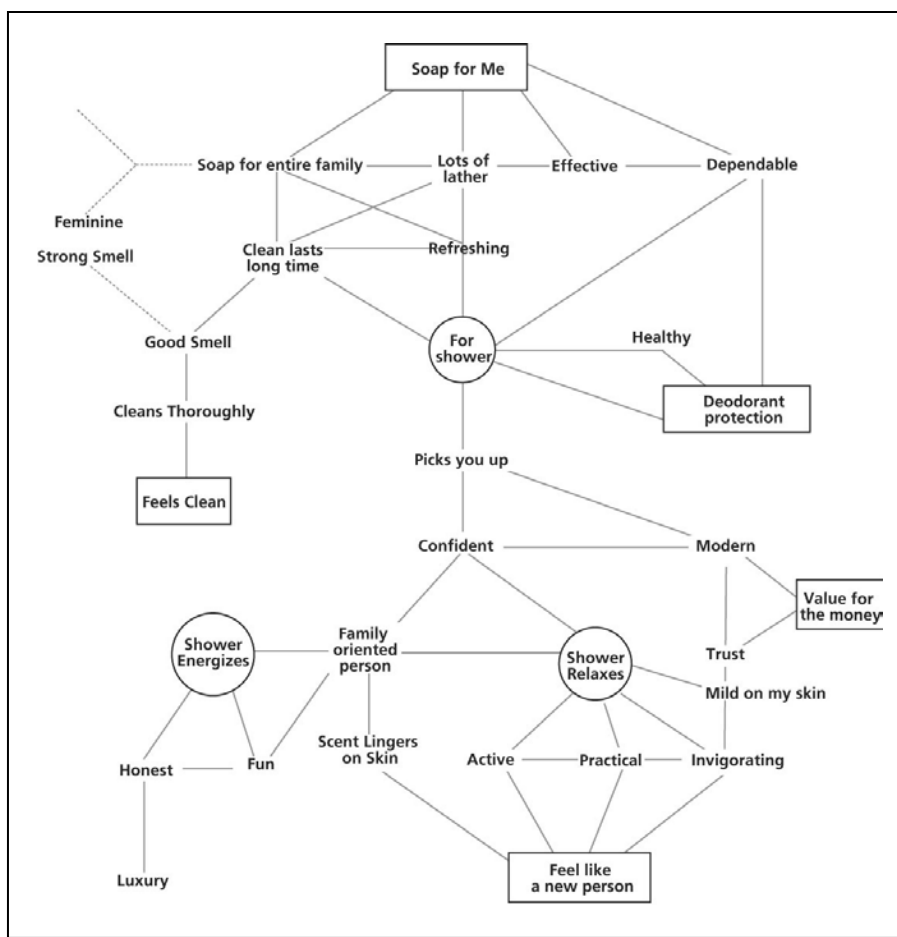


Exhibit 4B

