Behavioral Event Modeling:

Identifying and Altering the Antecedents of Action

Brian Wansink[1]
Cornell University

Target Journals:

International Journal of Social Research Methods
Journal of Applied Behavioral Science
Journal of Mixed Methods Research
International Journal of Market Research
Qualitative Market Research
Qualitative Research
Field Methods
Qualitative Research in Psychology

Feburary 14, 2012

[1] * Brian Wansink is the John S. Dyson Professor of Marketing, Dyson School of Applied Economics and Management Department of Cornell University, 110 Warren Hall, Ithaca, NY 14853-7801; wansink@cornell.edu. Wan-Chen Lee and Kate Stein are graduate students at the Dyson School of Applied Economics and Management Department of Cornell University, 110 Warren Hall, Ithaca, NY 14853-7801. Special thanks to the Cornell Food and Brand Lab and to Wan-Chen Lee and Kate Stein for help on earlier drafts of this methodology.

Behavioral Event Modeling:

Identifying and Altering the Antecedents of Action

ABSTRACT:

One difficulty that social scientists consistently face is the ability to generate meaningful insights about patterns of consumer behavior. As such, this paper introduces 'behavioral event modeling' as a systematic approach to predicting behavior. BEM outlines a series of possible events or behaviors that culminate in a specified outcome. The technique involves the careful examination of each event as a 'critical point' that plays a role in shaping that outcome. Procedures for implementing the event model of behavior are described and several examples of the model are provided. Implications for how this technique may successfully aid marketers in the study of consumers, enhance insight generation, and lead to more accurate predictions of consumer behavior, are also discussed.

What might trigger an individual to enter a store on whim and make an impulse purchase? Why do some people eventually end up donating to a non-profit organization, while others ultimately refuse? What factors would drive a varsity athlete to finally decide to take a break from playing sports during their college career?

When it comes to outcomes influenced by behaviors or situations, a claim that is often heard is, "I don't know how it happened?" Yet many behaviors, like the scenarios listed above, do not just 'happen'—they are not isolated instances unrelated to other events, nor are they the products of strange premeditations. Rather, it is more likely that each outcome belongs to a chain of events, set in motion by the series of actions that preceded them; had any of the preceding events taken a different turn, or had a given behavior occurred in a different context, then perhaps the ultimate outcome would have been drastically different.

BACKGROUND:

The Issue of Understanding and Predicting Consumer Behavior

The behavior of consumers has always been a topic of interest to both researchers and retailers alike, though perhaps for distinct reasons—for researchers in the social sciences, this information contributes to a broader knowledge of human behavior; for retailers, this information is seen as valuable for bringing about a potential increase in profits. Decisions of interest in the consumer world vary from the mundane to the significant, and may include either high-involvement behaviors (such as choosing to purchase one type of car over another) or low-

involvement behaviors (such as choosing to eat out at a particular restaurant versus eating at home, or even deciding between two beverages on a menu).

Yet regardless of the magnitude of the decision, marketers are constantly seeking ways to better understand and predict the behavior of their customers. For that reason, many have turned to the study of consumer behavior in order to determine what influences the decisions of their customers and the motivations behind their actions.

Past Methods for Predicting Behavior

Historically, one means of better understanding consumers was simply to observe their behavior. Over 50 years ago, urbanist and author William Whyte applied this technique to objectively study customers in public spaces. Through careful observation, Whyte noticed that peoples' behaviors occurred in somewhat predictable patterns, and that environmental cues played a significant role in influencing their actions.[i] Researcher Paco Underhill later built upon this concept, applying his observations of consumer behavior to improve the retail and service environments of stores so that they became more conducive to sales.[ii]

However, while behaviors can be observed in real time, this is a meticulous and time-intensive process that may require substantial financial resources and human effort. What's more, it is often difficult to make connections among events as they occur in sequence, since the periods of observation are usually limited to a single 'snapshot,' rather than a series of events in its entirety. Therefore, in order to be able to obtain a more inclusive picture regarding the factors that lead up to a given event, and to do so in a less time-consuming manner, a more suitable technique may be necessary—such as using the predictive modeling of behavior.

New Approaches to Predicting Behavior: The Use of Predictive Modeling

In more recent years, two types of approaches have emerged as valuable for predicting behavior, attitude-based and antecedent (event)-based approaches. The first approach deals with the techniques of laddering[iii] and prototyping[iv], which take attitudes into account when predicting behaviors. Alternatively, the basis of the second approach assumes that certain sequences of events, or paths, can lead to pre-ordained outcomes, which are ultimately manifested as behaviors. By examining points along the path and modifying the intermediate behaviors of that sequence, it may be possible to raise or lower the likelihood that a certain outcome occurs. Accordingly, it is this latter approach, based on antecedent events, which will be the focus of this paper.

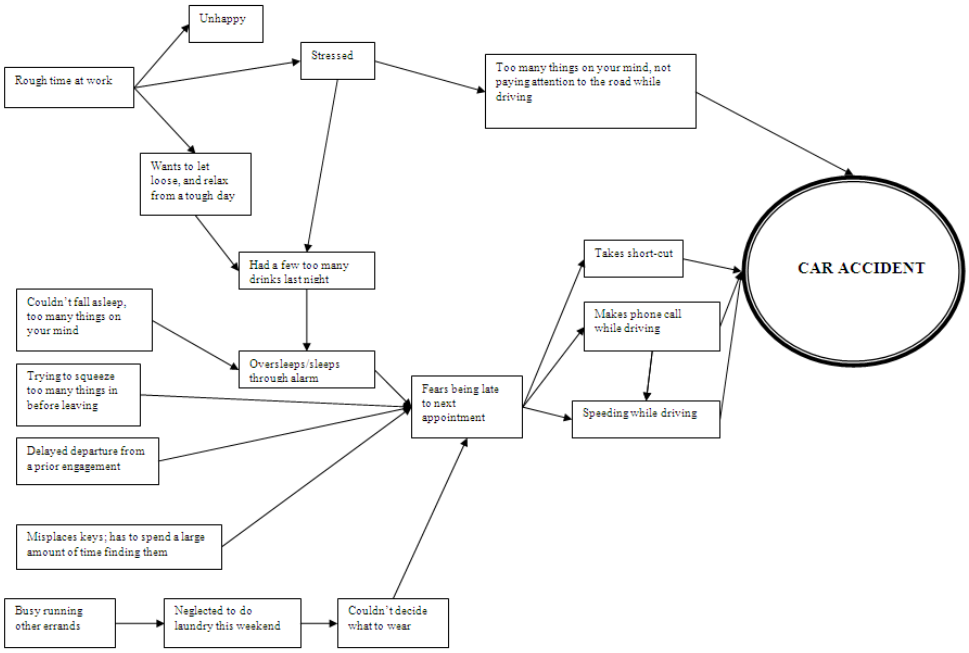
The Method of Behavioral Event Modeling

Specifically, we have devised a systematic approach to anticipating and predicting behavior, known as 'Behavioral Event Modeling.' Behavioral Event Modeling (BEM) seeks to explore the potential behaviors that an individual would exhibit in a given situation or context. Building off of previous behaviors, the model examines possible subsequent reactions or consequences that one might experience as a result. Through this process, the model is able to elicit an array of potentially related behaviors, connecting the behaviors that may occur as a result of each preceding behavior, ultimately forming a concrete, visual map.

In view of that, the main objective of BEM is to determine possible sequences of events that would lead to a 'target outcome' or 'critical incident' (e.g., choosing to join organization X over Y, ordering a pizza, deciding not pursue higher education, etc.). This involves critically identifying all of the various antecedent events that could possibly influence the 'target' outcome

or incident, as well as any indicators (or signals) along the way. By building upon the critical incident, the sequence of events leading up to the incident, and the indicators that are associated with each event in the sequence, a predictive model of behavior is ultimately constructed. With this knowledge, one can then determine potential points of intervention at earlier stages in the sequence, in hopes of altering the chain of events to ultimately establish a different outcome (for example, joining organization Y, deciding to order a salad over pizza, or deciding to apply to a college or university). What's more, understanding and predicting low-involvement behaviors and ingrained habits would be especially insightful and revealing, due to the high prevalence of such behaviors in everyday living.

Consider, for example, an oversimplified event modeling of a car accident. A variety of events in sequence could have ultimately led to its occurrence, such as being late, taking a short-cut and speeding, or making a phone call while driving. These events, in turn, might have transpired in part due to other antecedent events, such as oversleeping, trying to squeeze too many things in before leaving, or a delayed departure from a prior engagement. By connecting these potential sequences of events together with arrows, one would find that the time-related events (oversleeping, squeezing too many things in) led to the distracted-driving events (taking a short-cut, speeding), which ultimately contributed to, or culminated in, the accident.



The Uniqueness of Behavioral Event Modeling

The BEM technique is similar to other successful predictive modeling strategies in that it focuses on fundamental human tendencies and studying patterns within behavior, by analyzing how one behavior can lead to another. What distinguishes the BEM strategy from other predictive modeling strategies, however, is that BEM uses a method of 'backwardly modeling' the events that affect decision outcomes, in which the end outcome serves as the starting point of the exercise--rather than as the final step. In this way, the process consists of 'working backwards' from the outcome and arriving at the initial behaviors that could have led up to the outcome. The advantage of this approach is that it allows for the development of a more diverse range of possible pathways that may lead up to a critical incident, rather than having to begin the analysis with a given behavior whose subsequent possibilities may be more limited. Additionally, the BEM approach to predictive modeling is distinct in that it examines a sequence of events in its entirety (rather than merely focusing on the final outcome) and draws on past

events as influencers of a specific behavior or critical incident. As a result, this approach also allows for the possibility of devising interventions that may be able to reshape the ultimate outcome.

The predictive modeling of behavior method also holds some advantages over conventional methods that are used by marketers to determine how consumers arrive at a particular decision, such as focus groups or questionnaires. While typical methods require the consumer to actively interpret their own actions in order to generate insights, the fact is that many of the day-to-day decisions that consumers make, such as purchasing a brand of toothpaste, occur in a low-affect decision-making state that do not involve conscious deliberations. Accordingly, if customers are not aware of, or are unable to articulate their decision making process, their ultimate interpretations may not genuinely reflect how they arrived at a particular decision. Additionally, while demographic and psychographic data are also cited as useful in generating insights about consumers, these carry several disadvantages as well. In particular, it can be extremely costly to compile this data, and even so, the ease by which the data is interpreted may also be limited. Besides, psychographic data typically lacks objectivity. For these reasons, the limitations of conventional segmentation methods may not necessarily supply the best insights when consumers engage in low affect decision-making. BEM, on the other hand, is able to overcome these limitations. Thus, BEM serves as a favorable alternative to conventional segmentation methods, with the advantages of being quick and inexpensive.

Another advantage of BEM is that it is easily accessible and can be accomplished by any individual, since virtually all that is required is an imaginative mindset. One final advantage of BEM is that it is able to elicit insights without any other individuals actually present; furthermore, unlike the collection of demographic or psychographic data, the process need not be

made public. Accordingly, since the BEM technique can be used to examine hypothetical settings as well, this practice could be applied to numerous scenarios that would otherwise be impractical or unethical to replicate.

PROCEDURE:

Model Structure and Procedure

The behavioral event modeling of an action is structured as follows: The right-most part of the model/map should include the 'critical incident' or target event. The middle and left portions of the model/map will delineate the numerous possible sequences of events that could have led to the critical incident, in bubble format, with arrows pointing towards the critical incident. Events in the model that are non-observable (such as "celebrating a special occasion") can be depicted by noting the clues that one should look for (i.e., "happy people, big group, well-dressed, wrapped gifts") which are denoted as *'obvious indicators'* of the event.

Step-wise Methodology: The following describes the procedure that is generally used in order to construct the map.

1. **Incident**-Identify a critical incident or target event that could encourage change.

The BEM method is most effective when the event in question has the characteristic of being a binary behavior; that is, the incident should be based on whether the behavior can be discretely categorized as either occurring or not occurring. Along the same lines, it is also important to identify an event which is not too general or too ambiguous.

For example, a dietetic association may wish to use the BEM technique in order to determine how to encourage customers to order healthier entrees at restaurants. However, the association might find that this topic is too broad for BEM to be useful: the effectiveness of their analysis would be improved by breaking down the association's overall objective into smaller subsets of behavior—such as promoting the consumption of chicken over beef, for example.

2. **Indicators**-Identify clues which may signal the occurrence of each event; while most indicators are highly or readily visible, such as appearances or behavior, they can also be non-observable, such as grade point average or socioeconomic status.

The indicators that correspond to each event in the sequence serve as evidence or support for the event's occurrence. By identifying possible indicators that signal each occurrence, this allows the BEM technique to become more tangible and accessible, creating a more robust analysis. In the same way, specifying the indicators also serves to provide concrete evidence for each event in the chain, preventing the model from becoming too theoretical. Furthermore, determining the indicators which signal the occurrence of each trigger or event serves as an important intermediate measure for the final step of devising possible interventions, and is especially helpful for guiding those most interested in implementing the interventions.

For example, this can be clearly illustrated in the scenario of a restaurant promoting greater wine consumption; the indicators that are identified later become helpful in lending themselves to generate key interventions that can ultimately create changes in behavior. Accordingly, if a business dinner is proposed as a possible sequence event that would ultimately encourage wine

consumption at a restaurant, then restaurant owners could use this information to target customers who fit the demographic of a business person entering the restaurant, indicated by formal attire, carrying business folders or portfolios, or carrying a more reserved and formal manner among dining companions.

3. **Insights**-Identify possible explanations or triggers that may have led up to the critical incident.

While the actual incident is a crucial part of the BEM analysis, it is equally important to consider the attitudes, preferences, and tendencies of the types of individuals who would most likely engage in this type of incident, since a variety of people may engage in the same behavior for different reasons. One method for doing so is to simply imagine how a variety of individuals might behave in a given situation.

What's more, in many ways, it is the underlying motivations that ultimately affect a behavior, so any given event may have been triggered by a range of motivations. Therefore, developing insights into the incident entails not only considering the final outcome itself, but also the types of individuals and how the characteristics, motivations, and tendencies they possess may have an influence on a specific behavior. In doing so, the insights will be able to take implicit elements into account and incorporate them into the model.

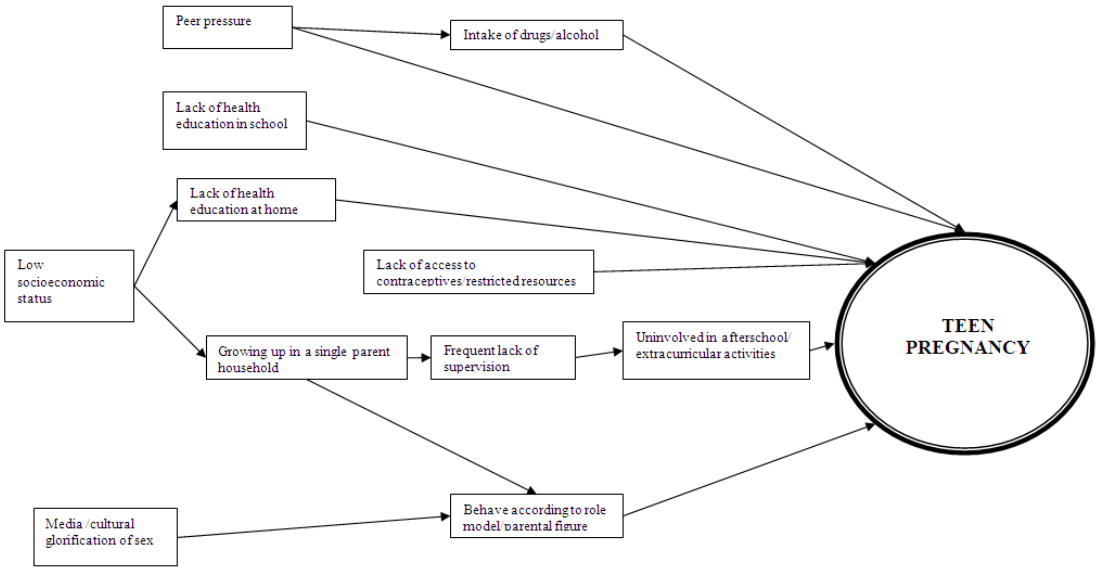
For example, a critical incident such as encouraging someone to attend a blood drive would have numerous triggers leading up to the event, due to the fact different people donate blood for different reasons. As a result, a comprehensive BEM would take into account the triggers and

experiences that would affect habitual donors, one-time participants, as well as the infrequent donors, who are likely to all possess distinct motivations.

4. **Interventions-** Select key interventions that have the potential to alter or interrupt the series of events, or guide other behavior.

The goal of this step is to devise a strategy to promote alternative behaviors or establish new outcomes. This serves as the final and most important step in the model, both in the context of marketing as well as other fields, since it examines the potential 'applications' that this model may have for implementing behavior change. The relevance and success of the interventions depend on the types of insights and indicators that were developed.

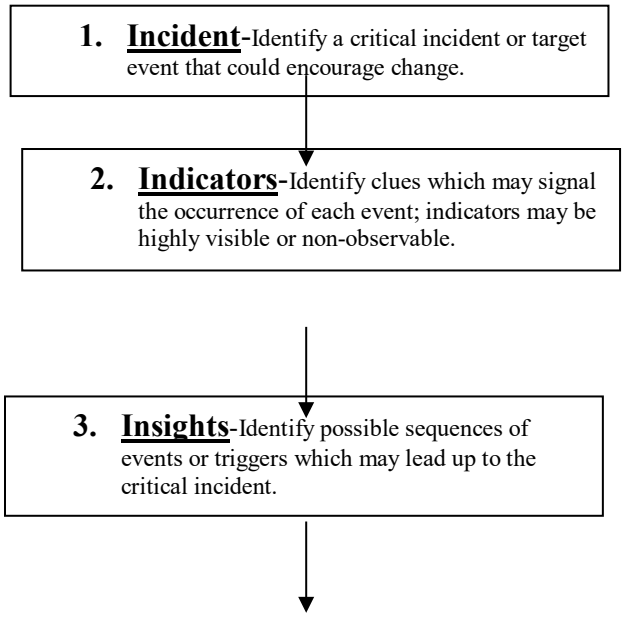
For example, in the scenario of preventing teen pregnancies, one main insight that was generated was that teenagers who lacked supervision or were not involved in extracurricular activities might be more likely to find themselves in situations of sexual pressure. Therefore, establishing an after-school community program that would encourage teens to become involved in extracurricular activities could serve as one type of intervention that could ultimately change an at-risk teen's behavior. Accordingly, a BEM map proved to be useful in facilitating the identification of this insight and the corresponding intervention.



***

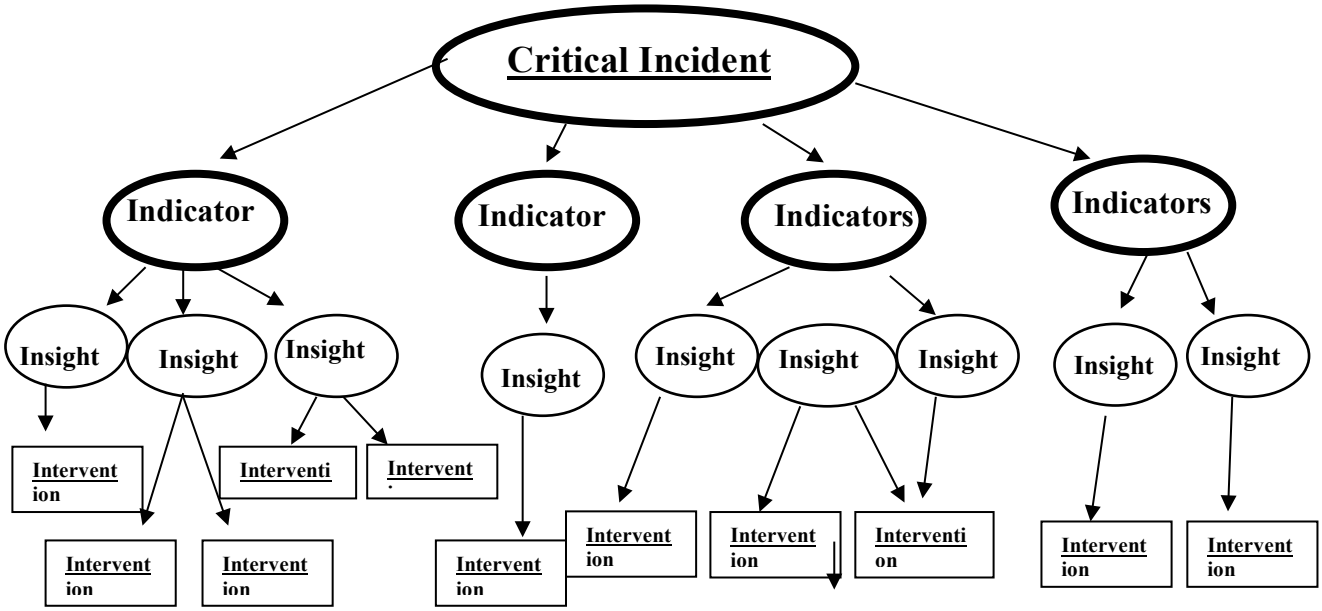
The steps described above can also be summarized in the following figures as an overview of how to *think* about the procedure in a graphical depiction, and may serve to be helpful for more visually minded individuals. *However, this process does not necessarily reflect the structure of the actual map/model.*

Figure 1:



4. Interventions- Select key interventions that have the potential to alter or interrupt the series of events, or guide other behavior.

Figure 2:



While the procedure above provides a general guideline for thinking about the process of the BEM technique, several different formats may be suitable for *developing* the actual map, depending on the type of critical incident that is chosen. In fact, there are several ways to go about creating the map. For most people, visualizing the actual sequence by drawing a rough sketch of the map seems to be the most helpful, by first selecting the critical incident to be targeted and then working towards thinking of indicators, subsequent insights, and ultimately interventions, in a box-and-arrow format. Others, however, may find it more useful to first create a chart or outline that delineates the critical incident, possible events, indicators of the event, any

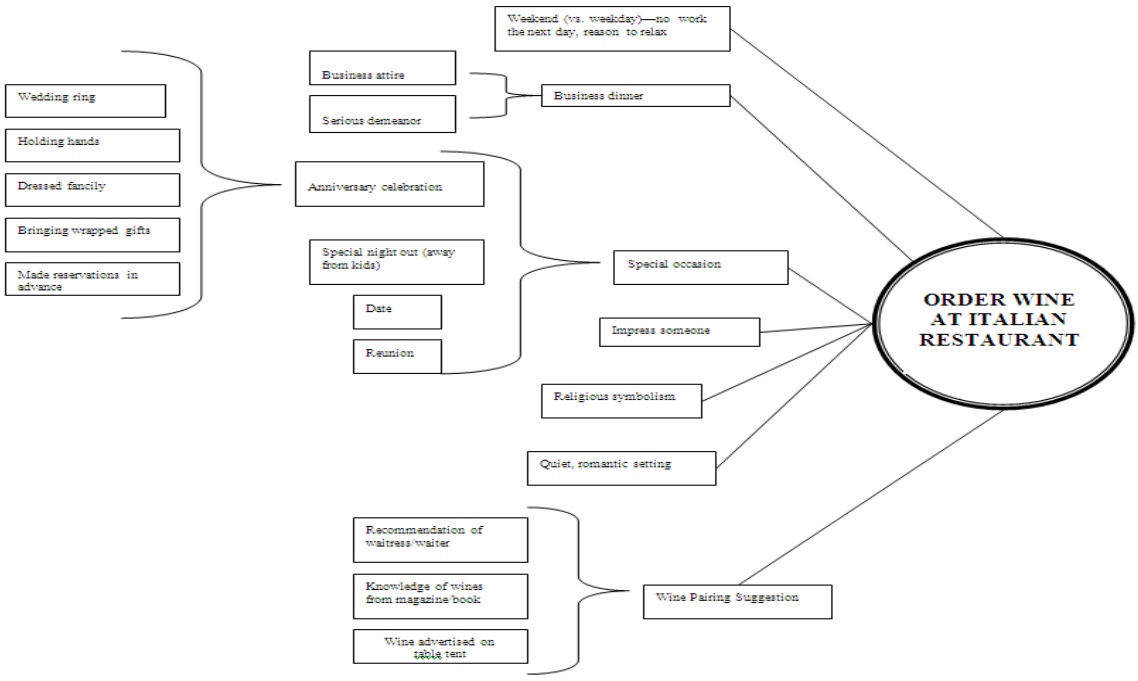
particular insights, as well as suggestions for interventions, and *then* go about creating the actual map diagram as a second step based on the chart or outline. Both approaches seem to be equally effective; it is only a matter of personal preference.

EXAMPLE:

To gain a fuller picture of how BEM works, the following example will illustrate all four steps in the mechanics of this method, as well as one possible corresponding chart. In particular, this example also demonstrates how the BEM technique can be applied to real-world applications, such as the guiding of marketing decisions:

> *An Italian restaurant was seeking to solve a dilemma that had developed: Since most of the alcoholic purchases made by their customers consisted of hard liquor and beer, this was creating an increased risk of drunk driving by their customers after leaving the restaurant. Therefore, the company sought to determine how to encourage their customers to buy more wine instead of beer or hard liquor--not only did wine have a higher profit margin, but the customers were also less likely to leave the restaurant intoxicated.*

Accordingly, the BEM technique can be used to gain insights into this question: 'What would trigger an individual to order wine at an Italian restaurant?'



Upon completion of the event modeling exercise, one can see that there are several possible scenarios which might trigger a customer to order wine, and thus aid in creating a marketing strategy that would encourage people to order more wine. One insight that the company may take into consideration is that customers tend to be more open to ordering wine during a special occasion (as seen by the possible events leading up to the incident). Therefore, one intervention could be that the wait staff should be more attentive to when special occasions are celebrated at the restaurant and offer wine to those customers. Additionally, 'inventing' a special occasion as an excuse to celebrate could also lead customers to purchase wine, so if the wait staff observes the indicators as mapped on the BEM chart (i.e., dressed fancily, wedding ring, holding hands), another possible intervention could be to inquire the couple, "Is this a special occasion?". By doing so, this may also lead customers to be more inclined to order wine.

APPLICATIONS:

Relevant Applications of Behavioral Event Modeling and Applications to Marketers

As the previous example demonstrates, predictive modeling can be particularly relevant in the context of marketing. In fact, the technique serves as a useful tool for determining the series of behavioral events that would lead to a purchase decision, since it provides insight into how patterns of human behavior can be deduced or even modified. For that reason, the technique may help managers to more effectively predict the patterns of actions taken by consumers, thereby allowing them to better target new and existing customer segments.

The assumption is that the marketing insights generated by the predictive model could be generalized to broader customer segments, and would serve to guide retailers and managers in creating innovative marketing strategies that can modify behavior. As such, marketing strategies that are developed based on the event modeling of behavior would not only take into account the ways in which new behavioral patterns are established, but also how such patterns are influenced by past behaviors. By becoming better informed about behavioral patterns and being able to anticipate certain behaviors of consumers, marketers can use this information to better tailor their advertising, and ultimately elicit behaviors which would lead a customer to consider purchasing a product.

Similarly, the BEM can also be very useful in its application to the Marketing Mix (4Ps), by determining where specific implications could influence or change the sequence of events. Since the technique examines various areas in the series of events as opportunities for modifying behavior, strategies for marketing would be informed by both past behaviors and by anticipated patterns in the sequence. Additionally, given that the technique also highlights the important influence of the initial events in the sequence, applying the marketing mix at the outset of the sequence or to important situations within the sequence could lead to more effective marketing. Thus, a marketer can examine potential points of intervention along several different pathways to

try to determine how to change a rigid or inflexible behavior of a given customer—such as how to 'break' a buying habit that a customer may have engaged in for a long time. Practically speaking, what might push a customer who has always been loyal to Dunkin' Donuts coffee to try a Frappaccino at Starbucks, for example? Or, what actions could be taken to influence a romantic couple to celebrate their anniversary at one Italian restaurant over another? What could lead an overweight individual to enroll in a gym rather than watch television on the couch after work? Picturing how a sequence of events would transpire using the BEM method may reveal relationships between a consumer's unconscious mental processes and their subsequent action of choosing one option over another, which could ultimately lead marketers to come up with some answers to these questions.

Other Applications of BEM

However, the application of the BEM is not limited to the topic of retail marketing. While this paper discusses its uses to be highly relevant for marketers, this tool can extend beyond the application of marketing to analyze a wide variety of human behaviors—ranging from simple, ordinary decisions on a personal level to addressing more complex issues that are relevant to government policy and society as a whole. The model also has the potential to map out sequences of unfortunate events that people commonly experience (such as the car accident example from above, or an event less serious, like missing a movie) and identify points of intervention that may prevent such undesirable events from happening or discourage undesirable behaviors in the future. What's more, having a tool such as BEM that helps to answer insightful questions is valuable to virtually everyone, regardless of one's status, industry, affiliation, etc., or

even of the seriousness of the issue in question. In fact, the following chart delineates several questions or issues that may be of relevance to interested individuals, sources, or institutions.

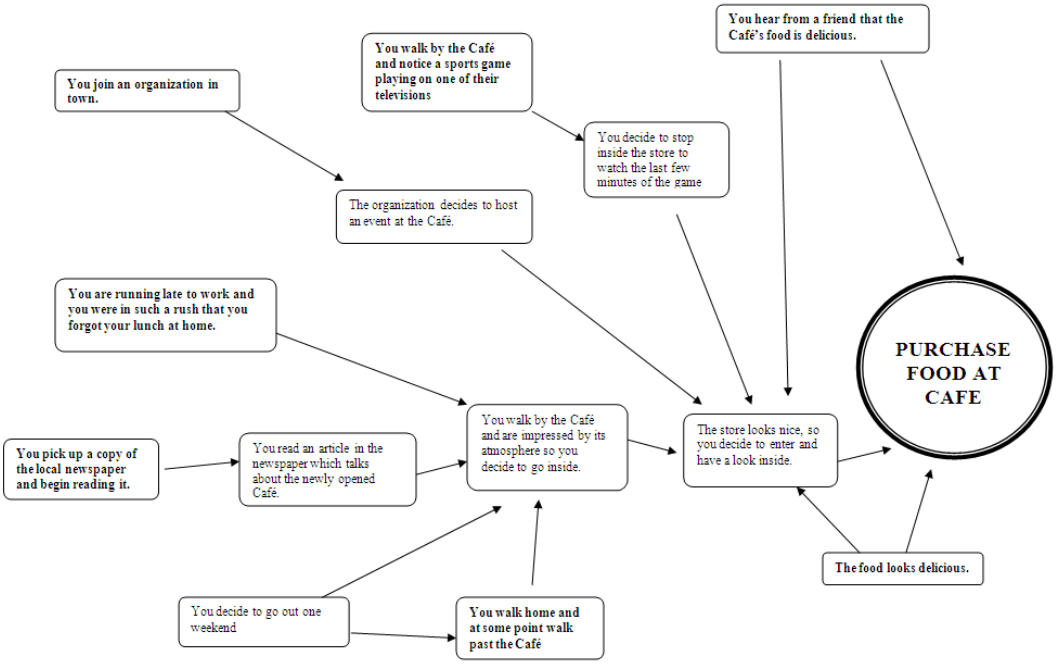
Figure 3:

Critical Question or Issue of Relevance	**Interested Sources or Institutions**
Preventing car accidents	Driver education teachers, Driving schools, Insurance companies
Wearing medical identification tags	Hospital staff, EMTs, Physicians, Family members
Trading up from beer and mixed drinks to more expensive wines	Restaurant owners, Bar owners
Changing an academic major	College advisor, Career center counselor
Situations leading to teen pregnancy	Health clinics, Planned parenthood, Health and wellness centers, Women advocacy groups
Shopping less frequently at a retail store	Budget-constrained shoppers, Credit card companies, Retailers, Individuals with credit card debt
Increasing attendance at the local theatre	Theatre companies
Enlisting donors/increasing donations	Non-profit organizations

Simply put, the BEM technique is a versatile method that is able to address many different kinds of topics. As such, the remainder of this paper will attempt to address how the BEM can be applicable to issues on multiple levels.

Applications on a personal decision level

On a personal level, the BEM can be used to model the ordinary, mundane decisions that individuals make on a daily basis. The following example illustrates the use of this approach to explain possible factors that might lead a customer to make an impulse food purchase at a local café, as seen in the chart and accompanying map below.

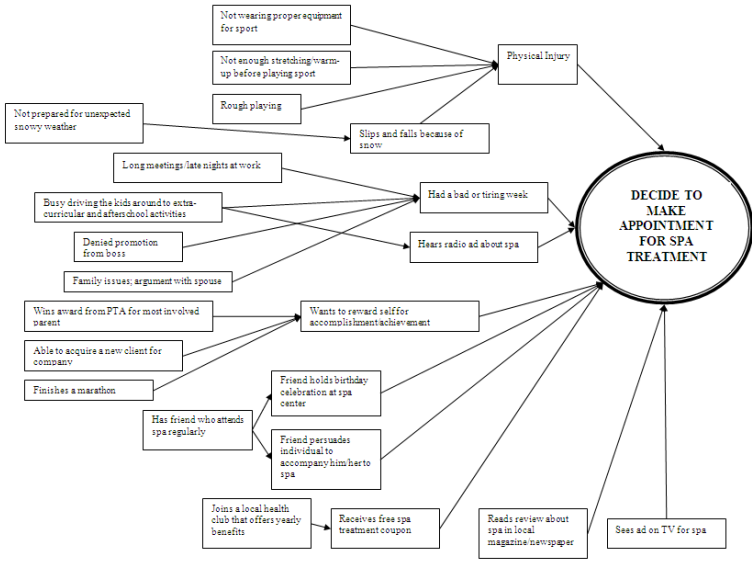


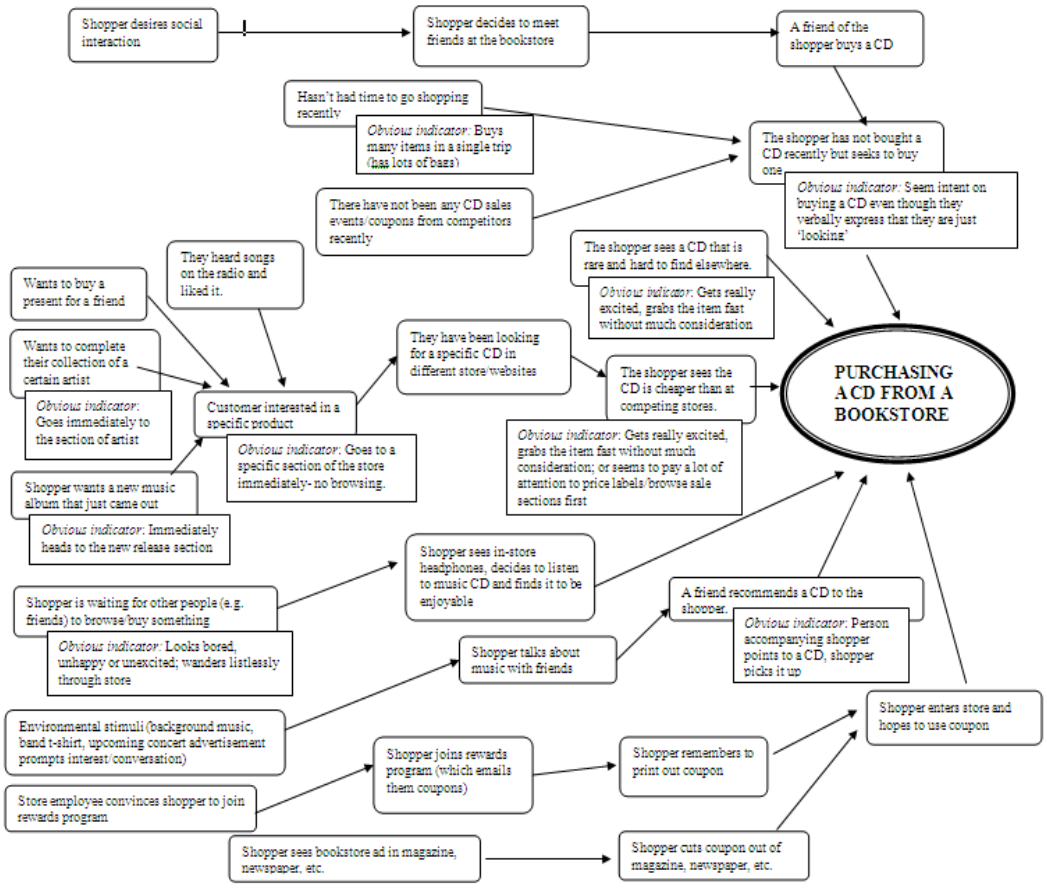
Critical Incident	Possible events	Indicators	Insights	Interventions/Applications for Marketing Mix (4 P's)
Purchase Food at Café				
			A great deal of Café's success relies on impulse decisions	
	Hear from friend that food is delicious	Store looks nice, decide to enter and look around		
			Novelty is one of the café's greatest assets (for now)	Café needs to maintain its novelty and differentiate itself from other local eateries
			Business model of Café is geared primarily towards customers coming in to purchase food and then promptly leaving--as a stop-and-go more so than a target destination	Product: Being open 24 hours would add to its convenience
	Reads article in daily local newspaper about newly opened café			Promotion: generating publicity about the café through local publications is an excellent way for the café to reach its target market
				Promotion: sponsorship of charity events in conjunction with local organizations would encourage more people to enter and increase café exposure

	Walks by café and notice a sports game playing on their big screen television	Decides to enter to watch the last few minutes of a football game	Café needs to be able to attract people who are walking by to step inside	Place: Since the café is located in a prime location in the town, it should take advantage of its visibility
				Make sure the Café appears as inviting as possible--have TVs visible from the street (to lure sports fans)
				Promotion: Drink specials on game nights would also encourage sports lovers to enter the café
				Product: Food should be readily visible; displayed in buffet style to entice visitors
				Product: The café's location is known for its nightlife; adding a bar area, karaoke, or live DJ may contribute to the café's allure
	Decide to go out one weekend	Food looks delicious/appetizing, decides to enter	Once inside, atmostphere should be conducive to customers spending money	Price: Charging for food from the buffet by the pound makes customers less cognizant of price; fosters greater impulse buying decisions
			Café's appeal is also a result of its convenience--restaurant needs to make itself as convenient as possible for its target market	
	Running late to work and in a rush, forgets lunch at home			Product: providing pre-packaged and pre-prepared foods with easy access for those in a rush
	Joins a local organization	Organization hosts a charity event at café		

In turn, these insights might help, say, an individual who is concerned about saving money to take steps that would minimize impulse purchases at the café in the future; on the other hand, these same insights could also help the café to reposition themselves to increase customer business.

Likewise, BEM maps can also be created to examine other commonplace situations, such as the factors that may lead a teenager to purchase a CD from a bookstore, the circumstances that would call for a woman to make an appointment for a spa treatment, or what would motivate someone to attend a show at the local theatre if they happened to miss a movie at a traditional movie theatre. Such maps not only provide insights for both individuals and companies alike, but can also offer a deeper understanding of consumer behavior and everyday decision-making.

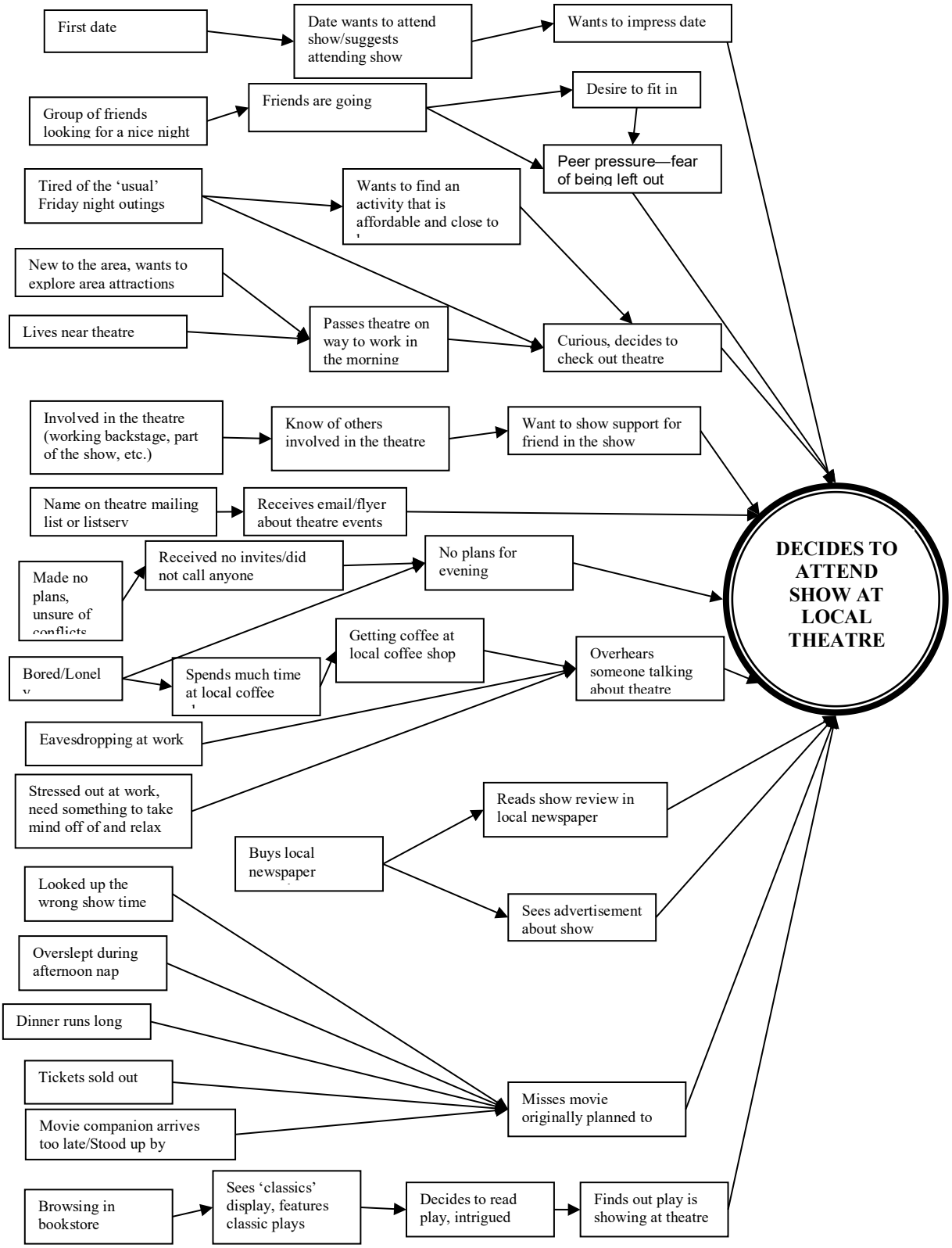




Critical Incident	Possible events	Indicators	Insights	Interventions/Applications for Marketing Mix (4P's)
Purchasing a CD from a bookstore				
			Peers are highly influential towards a shopper's behavior--in 5 of the 7 events, friends significantly influenced the outcome (either directly or indirectly)	
	Environmental stimuli (background music, band t-shirt, upcoming concert advertisement) prompts conversation			
	Shopper talks with friends about music			
	Friend recommends CD to shopper	Friend points to CD, shopper then picks up CD and considers it		Hold promotions that encourage conversation about music products with friends (ex., friends recommending albums, buying CDs for each other as gifts), such as free bookmarks, stickers, pens, etc. that promote a specific genre or band

	Shopper approaches employee about locating a specific CD	Bookstore employee talks with shopper, convinces shopper to join rewards program	Coupons can be a major incentive for a purchase	Price: Instruct employees to promote Rewards programs by mentioning program at checkout; specifically mention that it is free
	Shopper sees coupon for CD in magazine	Shopper uses coupon		
	Shopper had previously signed up for bookstore's rewards program, which sends coupons and discounts			
	Shopper is looking for a specific CD	Goes to a specific section of the store immediately, no browsing		
	Shopper heard a specific song on the radio and liked it, decides to buy album			
	Shopper wants to buy a present for a friend			
	Shopper had been looking for a specific CD in different stores/websites, unable to find it			
	Shopper wants a complete collection of a certain artist			
	Shopper wants a new album that just came out	Immediately goes to the 'new release' section		
	Shopper sees a CD that is rare and hard to find elsewhere	Very excited, grabs item fast without much consideration	Store location relative to competitors is important (in terms of either price or selection)	
	Shopper sees a CD that is cheaper than at competing stores	Seems to pay much attention to price labels		Price/Promotion: Store should pay close attention to what competition is doing promotion-wise or price-wise
		Browses the sale sections first		Store can distinguish itself by 'filling in' its competitor's selection gaps (e.g., if competing stores lack variety in a certain genre, putting certain items on sale that do not directly compete with competitor's sale items)
				Time major promotions so that they are not in conflict with competitors, give advanced notice
	Shopper is waiting for others to browse/buy something	Wanders listlessly through store, looks bored		
	Shopper sees in-store headphones, decides to listen to a CD and likes it	Shopper puts on headphones, exhibits favorable demeanor	Customers may not always have a sepcific product in mind	Product: All stores should have in-store headphones
	Shopper uses bookstore as typical hangout spot	Often seen there in groups	Importance of friends in purchase decision translates into ensuring that the store is a good hang-out location for potential customers	Product: Have coffee shops attached to store

		Uses couches to sit and talk		Have many chairs within own store--increases comfort and brings customers in closer proximity to product
	Convenient location of bookstore leads to more time spent there	Easy access to food		Have employees behave in a manner that is conducive to a social atmosphere--respect large groups that are browsing
		Located close by		Place: Position stores inside malls, big shopping/eating areas
	Shopper has not bought a CD recently, is looking to buy one	Shopper mentions this to friends/people around them		Place: Placement of CDs within a store that would facilitate purchase
	Shopper desires social approval of peers	Shopper seems intent on buying CD even though they don't want really anything in particular (say they are just looking)		
		Shopper sees friend buying CD, decides to buy it too		


First date
Date wants to attend show/suggests attending show
Wants to impress date
Group of friends looking for a nice night
Friends are going
Desire to fit in
Peer pressure—fear of being left out
Tired of the 'usual' Friday night outings
Wants to find an activity that is affordable and close to
New to the area, wants to explore area attractions
Lives near theatre
Passes theatre on way to work in the morning
Curious, decides to check out theatre
Involved in the theatre (working backstage, part of the show, etc.)
Know of others involved in the theatre
Want to show support for friend in the show
Name on theatre mailing list or listserv
Receives email/flyer about theatre events
DECIDES TO ATTEND SHOW AT LOCAL THEATRE
Made no plans, unsure of conflicts
Received no invites/did not call anyone
No plans for evening
Bored/Lonel y
Spends much time at local coffee
Getting coffee at local coffee shop
Overhears someone talking about theatre
Eavesdropping at work
Stressed out at work, need something to take mind off of and relax
Reads show review in local newspaper
Buys local newspaper
Sees advertisement about show
Looked up the wrong show time
Overslept during afternoon nap
Dinner runs long
Tickets sold out
Movie companion arrives too late/Stood up by
Misses movie originally planned to
Browsing in bookstore
Sees 'classics' display, features classic plays
Decides to read play, intrigued
Finds out play is showing at theatre

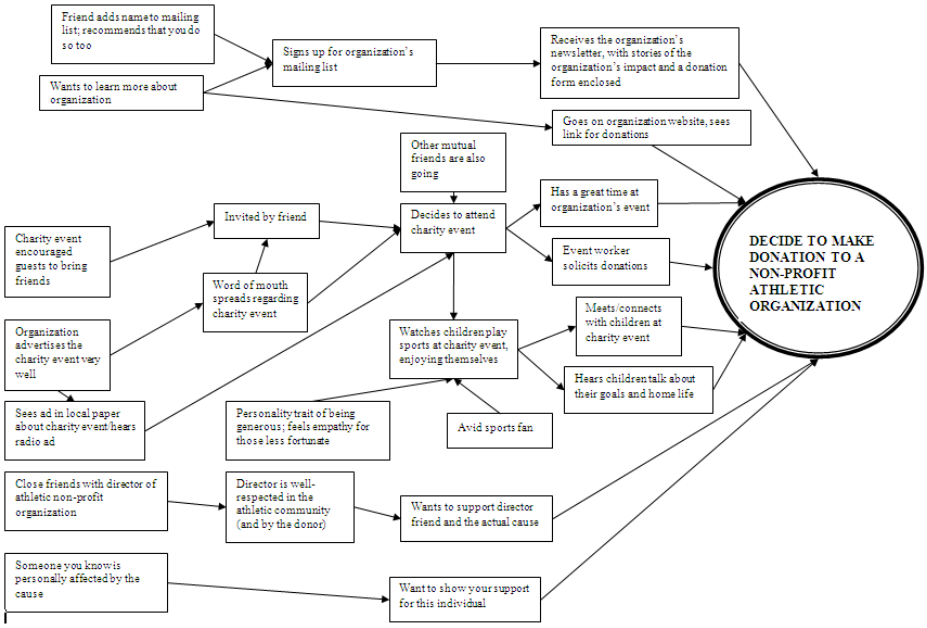
Critical Incident	Possible events	Indicators	Insights	Interventions/Applications for Marketing Mix (4P's)
Deciding to attend a show at the local theatre				
			Attending the show is not necessarily always a planned event; Lack of planning or absence of plans might prompt someone to attend theatre	Promotion: Theatre should not only target the most avid theatre-goers
				Place: Place ticket table outside of theatre in final 15 minutes prior to performance, to attract those originally not intending to go but have missed their plans
				Offer discounts on last-minute tickets, able to fill seats that would otehrwise go empty
			Attending the show may be a last-minute plan to replace a missed event or fill an uneventful evening (as a back-up for more avid theatre-goers)	Promotion: Theatre should not only target those who have previous intentions to attend, but also those for whom the theatre might be a second choice
	Misses movie originally planned on watching	Tickets sold out		Promotion: Work with cinema or other arts venues to accommodate popular events; have them offer discounts to theatre to those customers who were unable to get into original show
		Movie companion arrives too late/Stood up by movie companion		Promotion: Consider promoting shows in and near other arts venues or other cinemas
		Dinner runs long		Promotion: Place advertisements near exits of local restaurant
		Looks up wrong show time		
		Overslept during afternoon nap		
	No evening plans	Receives no invites/does not call anyone	Not having someone to go with to the theatre is a major deterrent	Promotion: Attempt to position the theatre as a place that is okay to go alone--encourage a 'me night' and offer discounts for solo attendees, as a way to pamper themselves
		Makes no plans, unsure of conflicts		
		Bored/lonely		
	Stressed out at work, needs to find a relaxing activity			Place: Promotions could be placed at health or fitness centers or doctors' offices--places where individuals are encouraged to take care of themselves
	Gets recommendation from co-worker/friend		Word of mouth is not only credible, but a powerful method of communication	

	Overhears someone talking about theatre	Spends much time at local coffeeshop	Recommendation does not necessarily have to come from unknown source	
		Eavesdropping at work		
	Buys local newspaper every day	Reads play review in local newspaper		Promotion: Feature comments about the show from audience members or 'anonymous opinions'
		Sees advertisement about show in paper		Place: Place ads not only in newspapers, but also in napkin advertisements for those who do not read the paper
	Receives email/flyer about theatre events	Name on listserv or theatre mailing list		
	Passes theatre on way to work in morning	Curious, decides to check out theatre		
	Lives near theatre			
	New to area, wants to explore area attractions			
	Tired of 'usual' Friday night outings	Wants to find an affordable activity close to home		
	Group of friends decide to go to theatre	Fear of being left out/peer pressure		
	Date suggests attending show	Wants to impress first date		
	Want to show support for friend in show	Involved in the theatre (Working backstage, etc.)		
		Friend is involved in theatre		

Applications to non-profit organizations and charities

Additionally, the method can be utilized to examine everyday occurrences with respect to a different focus—such as modifying the way people perform daily tasks so as to greater benefit society or the environment. One example of this could be persuading someone to recycle or consume more locally-grown produce. Similarly, non-profit organizations or groups that support a certain cause can also benefit from using the BEM technique. For instance, a non-profit organization that is seeking new donors for their cause may be able to create a map and generate further insights regarding how people decide to donate to an organization. Below is given a diagram and a corresponding chart that may illustrate how a charity event, sponsored by a non-

profit athletic team, might lead caring individuals with untapped resources to become regular donors.



Critical Incident	Possible events	Indicators	Insights	Interventions/Applications for Marketing Mix (4P's)
Finding new donors for a non-profit athletic organization				
	Signs up for organization's newsletter; sees form for donation		Making the act of donating as easy as possible will lead more people to donate	Include the actual donation form in the newsletter, or provide an online form that donors can easily fill out
	Invited to charity event by friend		Social aspect of organization is just as important as fundamental cause	Word of mouth is important in spreading information about a cause
	Mutual friends are attending a charity event		The more people that the donor knows are involved in a cause, the more likely that the donor will become involved too	Allow donors to send their friends links to the organization website and the cause; share information that allows their friends to learn more about the cause; communicate to donors that they do not want to

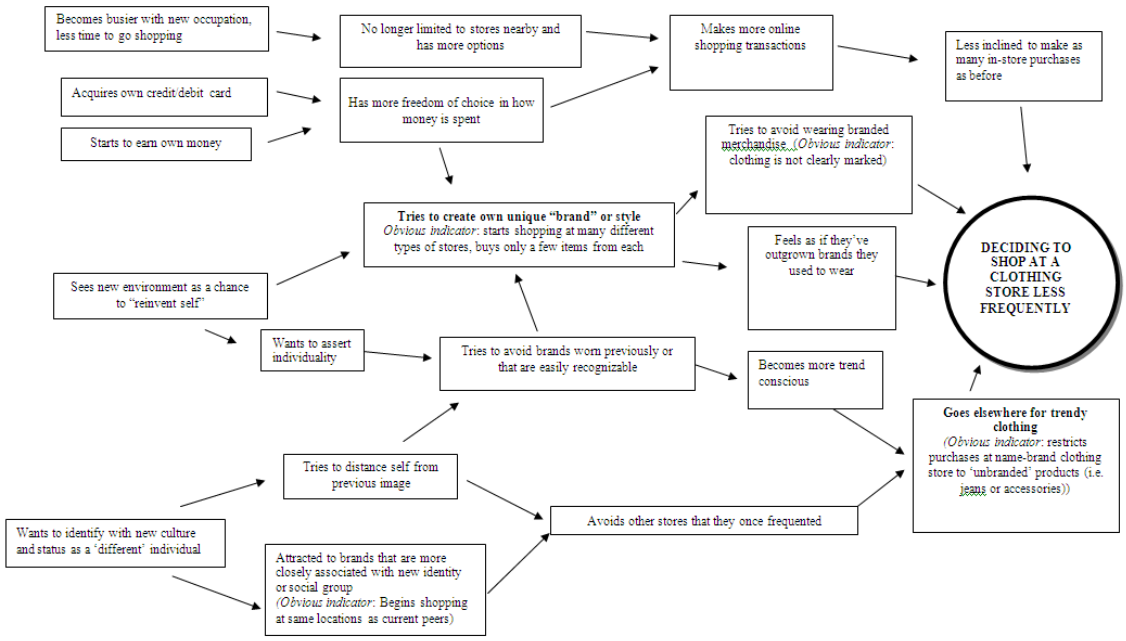
				be 'left out' if everyone else is involved--this may make donors more likely to take similar action as their peers
	Sees advertisement in newsletter about donation		Developing a connection with the individuals that the organization is trying to help will make an individual more likely to donate; make the donation more meaningful	
	Develop a connection with children	Watches children play sports at event	It is important for the donor to know where the money is going and whom it is benefitting	
		Hears children talk about their goals and home life		
			When a cause can be tied to some aspect of the donor's everyday life, they are more likely to be able to 'see' the impact that the sport can have on others and be more willing to donate so that others can receive the same experience	Promotion: Emphasize how much the cause impacts the everyday life of the donor and ways to share this with others
	Friends with the director of the non-profit		When the donor respects and admires the people behind the program, they are more likely to donate	
			Donors are more likely to donate if they know that their peers will appreciate the donation	Promotion: Provide some sort of recognition or token of appreciation to the donor so that they know that their donation is appreciated
				Promotion: Have some of the children send letters of thanks to the donors
				Promotion: Publicly display the donations the organization has received--this may cause others to feel more compelled to donate or think more about donating

	Someone you know is personally affected by the cause		Donors are more likely to donate if there is some type of personal attachment involved	Promotion: Provide testimonies of how donor became involved and how their investment personally affected the children

Applications to explaining the absence of a certain behavior

Alternatively, this method also has the means to generate insights as to why an individual would choose to *not* perform a specific behavior. For example, the technique could be used to explain why a particular individual chooses to *not* support a certain cause or why someone *doesn't* volunteer for a youth program. In fact, charities and non-profit organizations may be especially interested in discovering why individuals decline to donate to their causes, so as to find ways to encourage donations in the future. As such, the rationale behind utilizing the BEM method in this way is that, by being able to identify the factors that contribute to the absence of a certain behavior, this may aid in the design of interventions that would steer an individual towards a different choice of action.

Even for marketers, this question of why a consumer *stops*—rather than starts—a certain behavior, is a potentially relevant issue. The map below illustrates how the method can be used to map a consumer's decision to make less frequent purchases at a clothing store.

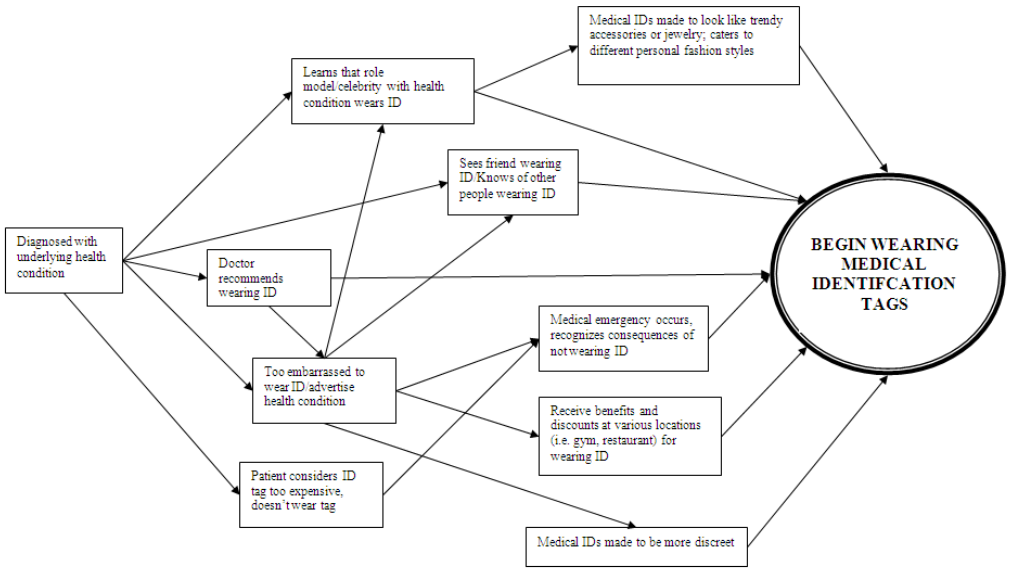


By creating a BEM map to determine why a consumer begins to make less frequent purchases at a certain store, marketers may be able to gain deeper insights beyond the typical claims of 'change in clothing style' or 'outgrowing the brand'. Indeed, the insights may even lead the company to consider re-engineering its brand image, as the hypothetical map reveals the company's challenge in preventing older consumers, who are undergoing transitions in life stages, from venturing elsewhere for their shopping needs, while at the same time, attempting to maintain its current loyal, younger consumer base. On the other hand, the map could also reveal that the company will not be able to successfully capture brand loyalty from the two separate types of consumer segments, and thus ultimately direct the company to formulate a new marketing strategy that would focus its energies on investing more heavily in one of those segments.

Applications to health, policy, and society

Beyond decisions related to personal choice or daily living, this method can also shed light on more serious issues relevant to health, policy and society, such as: What are the factors that would lead to a teenage pregnancy? How might those with medical conditions become persuaded to wear medical ID tags in the event of an emergency? Or even more critically, how does a highly educated individual get implicated in committing a first-degree crime? While such questions may seem less relevant to marketers and consumers, nonetheless, they carry significant implications for society, and therefore merit consideration. Thus, one will find that the BEM method possesses applications which go beyond typical 'buying and selling' transactions.

As mentioned before, one practical health application could be the use of the BEM to determine how to encourage patients with certain underlying medical conditions (such as diabetes, asthma, or heart conditions) to begin to wear medical identification tags. By doing so, in the case of a medical emergency occurring (the 'critical incident'), these individuals might be able to receive the proper medical attention more promptly, which could save their lives. An example of such a BEM map follows, with some of the associated implications.



Critical Incident	Possible events	Indicators	Insights	Interventions/Applications for Marketing Mix (4P's)
Begin Wearing Medical Identification Tags	Diagnosed with underlying health condition			
	Doctor recommends wearing heatlh tag		By allowing the purchase of the medical ID to be more accessible/convenient, this might help the patient to be more likely to buy one (rather than having to go out of their way to obtain something they do not wish to wear)	Place: Instead of only being able to purchase IDs through brochure call-in orders and online orders, allow patients to be able to purchase the ID directly at the doctor's office
				Place: making the IDs accessible at locations where adolescents often frequent (ex., kiosks at the mall)
	Patient considers tag to be too expensive, fails to wear one			Price: make IDs more affordable or even free (covered by insurance or subsidized by government); or, offer free replacements if ID breaks; this eliminates the excuse for not wearing one
	Medical emergency occurs; realizes consequences of not wearing ID		Educating patients about the possible negative consequences of not wearing medical IDs may persuade them to wear the ID before the emergency occurs	Price: Educate patients about the costs (negative consequences) of not wearing an ID and show that the benefit of wearing an ID would outweigh the costs
	Patient sees friend wearing ID/someone they know wearing ID			Promotion: feature articles of patients tell personal testimonies of how wearing the ID saved their lives and the consequences of not wearing it
	Patient learns that celebrity/role model also wears ID			Promotion: create ads with celebrities wearing the ID to encourage others to wear the ID; show that a medical condition does not have to stop one from achieving their dreams
	Too embarrassed to wear ID/advertise health condition		Social and incentive-based events may increase the possibility of convincing patients to wear IDs, especially for teens and adolescents	Product: Make medical IDs more discreet or more trendy (creative designs, personalized styles) so that people may be more inclined to wear them
			Convincing teens to display their condition by wearing the ID is more difficult; requires positioning wearing the ID as 'cool' or 'trendy'	Product: Incorporate the medical ID into a trendy bracelet that is already worn by teens (or create a medical charm that could be attached to existing bracelet)
			It is necessary to transform the medical ID from being an obligation to something that an individual *wants* to wear	Product: Create a bracelet that has different themed options (such as sports teams, movies, or musical artists)

Other health applications: A focus on gateway behaviors

By learning more about the processes through which people maintain or change behaviors, the factors that might contribute to such changes, and how behaviors are linked to one another, the BEM could prove to be especially useful in serving to better guide the development of interventions that would bring about health-related behavior changes—such as smoking cessation, increasing physical activity, and improving diet and nutrition. Promoting health behavior changes is especially meaningful, given that the leading causes of disease affecting the United States today involve behaviors that are largely preventable (smoking, high-fat diet and physical inactivity).[v] In fact, according to figures published in the *Journal of the American Medical Association*, tobacco use, poor diet, and physical inactivity were cited as the leading causes of death in 2000, and the number of deaths related to poor diet and physical inactivity was increasing.[vi] These health risk behaviors were also linked to cardiovascular disease, diabetes, obesity, and some cancers.[vii]

Interestingly enough, previous research has produced evidence of the existence of several behaviors known as 'gateway behaviors,' that when performed, may naturally 'trigger' other behaviors to occur as well. 'Gateway behaviors' may include any factors or characteristics that directly facilitate the practice of multiple behaviors or where the strengthening of a given intermediate factor may then lead to other behavioral outcomes. While the term 'gateway behavior' has historically been associated with negative behaviors leading to other negative behaviors (such as the role of tobacco and marijuana as 'gateway' drugs to heavier substance use),[viii] more recent applications of the term have been in a positive sense.

For instance, some have suggested that physical activity may serve as a 'gateway' for other health behavior changes such as healthier eating,[ix] such that increasing the amount of physical activity would lead the way for subsequent improvements in eating behaviors. Studies

have shown that there may be a potential gateway relationship between exercise and healthful eating behaviors among older adults[x] as well as among children,[xi] while other recent studies have simply demonstrated significant associations between physical activity and the types of foods consumed in one's diet.[xii] In the same way, studies have also suggested that linkages between negative behaviors exist as well. Prior research has demonstrated that smokers are more likely to consume high-fat diets and be less active than non-smokers.[xiii] Similar studies have also examined the relationship between low physical activity and poor nutrition[xiv], as well as between smoking and weight control.[xv]

The rationale behind this concept of exercise as a 'gateway' to modifying other health behaviors is that as an individual starts to see benefits from being more physically active, they may desire to increase these benefits by also improving other health behaviors.[xvi] Or, likened to a spill-over effect[xvii], experiencing health improvements from physical activity may boost an individual's self-efficacy and intrinsic motivation to change their diet as well.[xviii] This 'spillover effect' however, is not limited to associations between diet and exercise. One study found that other positive 'gateway' health behaviors (such as seatbelt use, avoidance of high fat food, eating a high-fiber diet, attempting to lose weight, exercising regularly, avoiding sun exposure, sunscreen use, attempting to reduce stress, stopping smoking, and conducting cancer self-exams) may be interrelated, such that maintaining one of these behaviors may lead an individual to contemplate or maintain other gateway behaviors, or to maintain a higher level of overall general health.[xix]

Because the gateway behavior hypothesis is based on the idea that behavior change occurs sequentially (for example, increasing the amount of physical activity may promote subsequent changes in diet), a parallel can be drawn between the 'gateway behavior' concept and

the BEM approach, in that two seemingly independent 'events' (or discrete behaviors) are in fact related. Thus, a BEM map could be created to investigate the sequence of events that ultimately lead an individual to perform a negative health behavior (such as smoking a cigarette), the events that culminated in such a behavior (stressful day at work, argument with spouse, having to placate cranky children, etc.), and potential opportunities for interventions along the way (which would ultimately involve choosing another outlet besides smoking). Similar to the process of identifying indicators that signal the occurrence of an event, one could identify the 'gateway factors' that result in certain behavioral outcomes and subsequently, attempt to target them in interventions.

In this way, BEM could contribute to a greater understanding of how several health-related behaviors may be linked (ex., smoking and eating poorly), how to best to motivate an individual to adopt a new health behavior, or how an individual maintains a positive behavior change over time. This could ultimately lead to societal implications, with greater advancement in public health and improvement of overall well-being.

Accordingly, the question remains whether an intervention concerning one of these behaviors might be able to impact, and essentially change, a related behavior. Further exploration regarding the effects of a single behavior change on other behaviors, and how interventions targeting one behavior may affect other behaviors, are necessary to obtain more information on the strength of these relationships. Longitudinal analyses may also be needed to further examine the 'gateway behavior' concept itself as well. However, if the results are supported by further research, then perhaps health behavior change interventions in the future may only need to focus on a few key behaviors in order to propel changes in other health behaviors. Such measures

would increase the efficiency of targeting a single behavior in order to change other behavioral outcomes.

FINAL POINTS AND LIMITATIONS:

In sum, Behavioral Event Modeling may serve as an important method for understanding both low- and high-involvement behaviors, as the previous examples have demonstrated both its adaptability and ease of use. Additionally, the insights that are generated from the development of a BEM map are applicable to a wide range of sources and issues, from the concerns of ordinary consumers, to those of companies and organizations, and even to those of national policymakers. What's more, these models can also be used to form testable hypotheses on consumer behavior for further research.

Some guidelines regarding the model, however, should be kept in mind. First, the successful application of the BEM in predicting behavior depends, in part, on the types of target events that are studied. Target events that are either obvious or cannot be influenced may not contribute much insight to the model. Rather, the BEM technique of predictive behavior seems to work best for incidents or interventions that have the potential to encourage change. Furthermore, as mentioned in the methodology, the analysis works best if the crucial event is binary--one that can be typified as either occurring or not occurring, as opposed to a behavior allowing for a wide range of decisions, which is less suitable to the BEM analysis. The existence of multiple points where this behavior is likely to be interrupted also adds to the effectiveness of this technique.

However, some limitations of the technique should also be addressed. While the technique can be applied as a method of generating consumer insights, it may not necessarily be

relied upon as the sole approach. Other methods for generating insights, such as laddering and prototyping, may also be used in conjunction to produce a richer profile of an individual as he or she relates to the issue in question. Besides, the use of demographic and psychographic data should not be entirely discounted, as those methods do have their merits as well. What's more, there are also limitations to predicting behavior change. Since behavior changes occur over time, it may be difficult to measure the strength of the correlations between any two given events in a series without a longitudinal research design, given that a cross-sectional study does not allow for an analysis over a period of time. Second, while the method rules out self-report as a bias, each individual may also have a bias in the creation of the event model map. Finally, the results of mapping a certain demographic (ex., older adult versus teenager) may not necessarily be generalizeable to other populations, as individuals all have different reactions to different events.

Nevertheless, the BEM approach does allow for important insight generation. Its applications are not limited to retail marketing or everyday decisions, but can extend beyond to produce societal implications, such as through the support of specific causes or policies, addressing educational matters, or even the promotion of health behavioral changes. As such, by identifying the events that can trigger certain behaviors, points along the sequence for potential interventions, and translating these insights into actionable items, this procedure may ultimately be able to generate more effective and efficacious ways to modify behaviors.[xx]

References

[i]Whyte, William. City: Rediscovering the Center (1988)

[ii] Underhill, Paco. Why We Buy: The Science of Shopping (2001)

[iii] Wansink B. (2003), "Using Laddering to Understand and Leverage a Brand's Equity," Qualitative Market Research: An International Journal, 6:2, 111-118.

[iv] Wansink, Brian (1994), "Developing and Validating Useful Consumer Prototypes," Journal of Targeting, Measurement and Analysis for Marketing, 3:1, 18-30.

[v] Nigg CR, Allegrante JP, Ory M. Theory-comparison and multiple-behavior research: common themes advancing health behavior research. Health Educ Res. 2002 Oct;17(5):670-9.

[vi] Ali H. Mokdad, James S. Marks, Donna F. Stroup, and Julie L. Gerberding. **Actual Causes of Death in the United States, 2000.** JAMA, March 10, 2004; 291:1238-1245.

[vii] American Cancer Society, 2003 American Cancer Society, Cancer facts and figures, 2003. American Cancer Society (2003) Atlanta, GA, Miller and Fletcher, 1998 T.D. Miller and G.F. Fletcher, Exercise and coronary artery disease prevention, *Cardiologia* **43** (1998), pp. 43–51, Mokdad et al., 2003 A.H. Mokdad, E.S. Ford, B.A. Bowman, W.H. Dietz, F. Vinicor, V.S. Bales and J.S. Marks, Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001, *JAMA* **289** (2003), pp. 76–79, U.S. Department of Health and Human Services, 1996 U.S. Department of Health and Human Services, Physical activity and health: a report of the Surgeon General (1996) USDHHS, Atlanta, GA., Williams, 2001 P.T. Williams, Physical fitness and activity as separate heart disease risk factors: a meta-analysis, *Med. Sci. Sports Exerc.* **33** (2001), pp. 754–761.

[viii] Ginzler J, Cochran B, Domenech-Rodriguez M, Cauce A, Whitbeck L (2003). Sequential progression of substance
use among homeless youth: an empirical investigation of the gateway theory. Substance Use and Misuse 38, 725–758.

[ix] Blakely et al., 2004 F. Blakely, T. Dunnagan, G. Haynes, S. Moore and S. Pelican, Moderate physical activity and its relationship to select measures of a healthy diet, *J. Rural Health* **20** (2004), pp. 160–165; Nigg et al., 1999 C.R. Nigg, P.M. Burbank, C. Padula, R. Dufresne, J.S. Rossi, W.F. Velicer, R.G. Laforge and J.O. Prochaska, Stages of change across ten health risk behaviors for older adults, *Gerontologist* **39** (1999), pp. 473–482; Tucker and Reicks, 2002 M. Tucker and M. Reicks, Exercise as a gateway behavior for healthful eating among older adults: an exploratory study, *J. Nutr. Educ. Behav.* **34** (suppl 1) (2002), pp. S14–S19.

[x]Exercise as a Gateway Behavior for Healthful Eating among Older Adults: An Exploratory Study. Tucker, Michelle Reicks, Marla, Journal of Nutrition Education & Behavior; Mar/Apr2002 Supplement 1, Vol. 34 Issue 2

[xi]Simons-Morton B G; Parcel G S; Baranowski T; Forthofer R; O'Hara N M Promoting physical activity and a healthful diet among children: results of a school-based intervention study. **1991**: American journal of public health 1991;81(8):986-91.

[xii] Carine Platat1, Anne-Elisabeth Perrin1, Mohamed Oujaa1, Aline Wagner1, Marie-Christine Haan2,Jean-Louis Schlienger1 and Chantal Simon. Diet and physical activity profiles in French preadolescents. British Journal of Nutrition (2006), 96, 501–507, Aranceta et al., 2001 J. Aranceta, C. Perez-Rodrigo, J. Gondra and J. Orduna, Community-based programme to promote physical activity among elderly people: the GeroBilbo study, *J. Nutr. Health Aging* **5** (2001), pp. 238–242, Coulson et al., 1997 N.S. Coulson, C. Eiser and J.R. Eiser, Diet, smoking and exercise: interrelationships between adolescent health behaviours, *Child Care Health Dev.* **23** (1997), pp. 207–216., Eaton et al., 1995 C.B. Eaton, J.B. McPhillips, K.M. Gans, C.E. Garber, A.R. Assaf, T.M. Lasater and R.A. Carleton, Cross-sectional relationship between diet and physical activity in two southeastern New England communities, *Am. J. Prev. Med.* **11** (1995), pp. 238–244.,

Simoes et al., 1995 E.J. Simoes, T. Byers, R.J. Coates, M.K. Serdula, A.H. Mokdad and G.W. Heath, The association between leisure-time physical activity and dietary fat in American adults, *Am. J. Public Health* **85** (1995), pp. 240–244.

[xiii] K.M. Emmons, B.H. Marcus, L. Linnan, J.S. Rossi and D.B. Abrams, Mechanisms in multiple risk factor interventions: smoking, physical activity, and dietary fat intake among manufacturing workers, *Prev. Med.* **23** (1994), pp. 481–489.

[xiv] Sothern,M. Obesity prevention in children: physical activity and nutrition *Nutrition*, Volume 20, Issue 7, Pages 704-708

[xv] Hall, S. M., Tunstall, C. D., Vila, K. L., & Duffy, J. (1992). Weight gain prevention and smoking cessation: Cautionary findings. *American Journal of Public Health*, *82*, 799–803.

[xvi] Tucker and Reicks, 2002 M. Tucker and M. Reicks, Exercise as a gateway behavior for healthful eating among older adults: an exploratory study, *J. Nutr. Educ. Behav.* **34** (suppl 1) (2002), pp. S14–S19.

[xvii] Mata, Jutta; Silva, Marlene N.; Vieira, Paulo N.; Carraça, Eliana V.; Andrade, Ana M.; Coutinho, Sílvia R.; Sardinha, Luis B.; Teixeira, Pedro J. Motivational "spill-over" during weight control: Increased self-determination and exercise intrinsic motivation predict eating self-regulation. Health Psychology. Vol 28(6), Nov 2009, 709-716.

[xviii] Emmons et al., 1994 K.M. Emmons, B.H. Marcus, L. Linnan, J.S. Rossi and D.B. Abrams, Mechanisms in multiple risk factor interventions: smoking, physical activity, and dietary fat intake among manufacturing workers, *Prev. Med.* **23** (1994), pp. 481–489

[xix] The Gerontologist 1999 39(4):473-482; doi:10.1093/geront/39.4.473
Stages of Change Across Ten Health Risk Behaviors for Older Adults by Claudio R. Nigg1, Patricia M. Burbank2, Cindy Padula2, Robert Dufresne3, Joseph S. Rossi1, Wayne F. Velicer1,

Robert G. Laforge1 and James O. Prochaska1

http://proquest.umi.com.proxy.library.cornell.edu/pqdweb?RQT=569&curl=http%3A%2F%2Fproquest.umi.com%2Fpqdweb%3Fdid%3D44680126%26sid%3D1%26Fmt%3D6%26clientId%3D8424%26RQT%3D309%26VName%3DPQD&TS=1263696521

[xx]Acharya, K., Maxwell, K. A., Middlestadt, S. E. and Storey, J. D. , 2004-05-27 "Gateway Behaviors: Improving the Effectiveness and Efficiency of Health Communication Programs" *Paper presented at the annual meeting of the International Communication Association, New Orleans Sheraton, New Orleans, LA Online* <.PDF>. 2009-05-26 from http://www.allacademic.com/meta/p113185_index.html