A COGNITIVE MODEL OF CONSUMER ACCULTURATION

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Consumer acculturation refers to the adaptation of immigrant consumers to the consumer environment in the host country. In this article, the author develops a cognitive model to explore the learning process underlying consumer acculturation. Based on ACT* Theory in cognitive psychology, the model proposes that knowledge about consuming in the new country is first acquired in the form of declarative knowledge. This declarative knowledge is then used interpretively through general problem-solving skills. Knowledge compilation further incorporates such declarative knowledge into new productions, which allow consumers to solve consumption-related problems more efficiently. Research propositions derived from the model are presented.

INTRODUCTION

With economic globalization and increasing cultural exchange between nations, consumers are moving from one country to another more often. Along with this geographic movement comes the problem of adapting to the consumer environment in a new country. Consumer researchers have termed this adaptation process "consumer acculturation" (O'Guinn, Lee and Faber 1986). Understanding consumer acculturation is important for three reasons. First, the sheer number of immigrants and sojourners in the United States makes them a large market for companies. In 1999, there are over 26 million foreign-born consumers in the United States (Brittingham 1999). More importantly, these immigrants have great consumption needs and possess enormous purchasing power (Wellner and Weisul 2000). However, a lack of understanding of these consumers has kept many companies away from this market (Miller 1991). As consumer acculturation plays an important role in immigrant consumer behavior and often decides what kind of consumer an immigrant will become in the new country, understanding consumer acculturation can help solve the mysteries of immigrant consumer behavior.

Secondly, consumer acculturation can offer insight into general consumer behavior. We often do not realize the underlying assumptions of our behavior until we have to change it. By looking at the adaptation of consumers new to a country, we gain insight into our own behavior (Gilly 1995). Research on consumer acculturation can lead to the discovery of underlying assumptions in consumer behavior that we may have ignored. Thirdly, consumer acculturation can enhance our understanding of consumer learning

process. Consumer acculturation can be considered a special case of consumer learning, in which an individual from one culture learns to consume in a second culture. Understanding this special learning process can shed light on how consumers learn in general.

Realizing the importance of consumer acculturation, consumer researchers have paid increasing attention to this area. Most studies in this research stream have looked at how immigrant consumers at different stages of the adaptation process differ in various aspects of consumer behavior, such as information search (D'Rozario and Douglas 1999), shopping orientation (Ownbey and Horridge 1997; Shim and Chen 1996), and consumer decision-making (Kara and Kara 1992). In the United States, more assimilated consumers, compared with less assimilated consumers, are found to behave more like American consumers (Kara and Kara 1992; Laroche, Kim, Hui, and Tomiuk 1997; Ownbey and Horridge 1997; Shim and Chen 1996). These empirical studies helped reveal the pattern of consumer behavior. But they did not answer the question why these consumers exhibit such behavioral differences. More systematic theories are urgently needed to guide future research efforts. Peñaloza (1989, 1994) has made some initial effort to establish theoretical models of consumer acculturation. However, her model is mainly exploratory and descriptive. It is still not clear *how* immigrant consumers adapt to the host consumer environment.

In this paper, we propose a theoretical framework that may help remedy this situation in consumer acculturation research. The current model specifies immigrant consumers' knowledge structure and the learning mechanism involved in consumer acculturation.

More specifically, we view consumer knowledge as consisting of two parts – declarative knowledge and procedural knowledge. Consumer acculturation starts with the acquisition of declarative knowledge. This knowledge is then used interpretively to solve consumption-related problems through general problem-solving skills. Knowledge compilation further incorporates such declarative knowledge into new productions, which allow the consumer to solve problems more efficiently. Due to the structural differences between declarative knowledge and procedural knowledge and their different use in problem solving, important implications on immigrant consumer behavior can be derived. By viewing consumer acculturation from a cognitive learning perspective, we take consumer acculturation research to a deeper level.

In the following section, we present a brief review of past research on consumer acculturation, followed by an introduction to ACT* Theory (Anderson 1983, 1987; ACT stands for Adaptive Control of Thought, and the star denotes a newer version of the original ACT Theory), which forms the theoretical foundation of our current model. Then we present our model and several hypotheses derived from the model, which will be tested in three studies. Managerial implications of our model are then presented. Limitations of the current theory and promising directions for future research are pointed out at the end.

CONSUMER ACCULTURATION

Consumer acculturation comes from the concept *acculturation* in social sciences. Acculturation refers to "cultural and psychological change brought about by contact with other peoples belonging to different cultures and exhibiting different behaviors" (Berry et

al. 1992). Correspondingly, consumer acculturation has been defined as “the movement and adaptation to the consumer cultural environment in one country by persons from another country” (Peñaloza 1994).

Although acculturation has been studied for more than half a century, consumer acculturation research has only started recently in the 1980s and has remained relatively scarce compared with acculturation research by psychologists and sociologists. The first consumer acculturation study was undertaken by Wallendorf and Reilly (1983). In the study, they compared food consumption pattern of Mexican-Americans in southwest United States with that of Mexicans in Mexico City. Their findings suggest that Mexican-Americans’ consumption patterns represent a unique cultural style. On some food items Mexican-Americans kept their cultural habits; on some items, they resembled American consumers; yet on other food items, they represented an overshooting of American consumers’ consumption pattern.

After Wallendorf and Reilly’s (1983) initial effort, more consumer acculturation research followed. These later studies looked more closely at individual differences among immigrant consumers. Rather than considering immigrant consumers from the same country of origin as one large entity, researchers began to break the market down into different segments and compared immigrant consumer behavior across these segments. Because of the close tie between acculturation and consumer acculturation, level of acculturation has been the major segmentation variable. A research question often asked is whether and how immigrant consumer behavior differs at different stages of the acculturation process. A consistent finding from these investigations is that

highly acculturated consumers do differ significantly from low acculturated consumers in terms of their consumption-related attitudes and behavior. Highly acculturated consumers are found to resort to difference information sources than those consulted by low acculturated consumers before making a purchase decision (D'Rozario and Douglas 1999), use decision criteria similar to those used by consumers from the host group (Kara and Kara 1992), show less ethnocentrism, higher interest in shopping, and more interaction with salespeople (Shim and Chen 1996). Highly acculturated consumers are also shown to prefer advertisements featuring people from the host group to advertisements using characters from their culture of origin (Khairullah and Khairullah 1999).

These consumer acculturation studies have tried to associate the well-established concept of acculturation with consumer behavior and have found them to be truly related. The results help us form a picture of immigrant consumers. However, these studies cannot tell us how this picture is formed or how immigrant consumers become the consumers they are today. Without understanding this process, immigrant consumer behavior will still remain a myth to us. Two research directions emerged as consumer researchers try to explore the myth.

The first direction treats consumer acculturation as a socialization process (Peñaloza 1989). According to Moschis' (1987) Consumer Socialization Theory, consumers receive influence from various socialization agents including family, friends, mass media, and institutions. As a special case of consumer socialization, consumer acculturation is influenced by two competing sets of socialization agents, one from the culture of origin

and the other from the host culture (Peñaloza 1989). The weights these socialization agents bear on different immigrant consumers' acculturation produce variation in acculturation outcome as reflected in consumption-related knowledge and skills acquired during the process. Peñaloza (1994) later revised this model based on her empirical observation and interview of Mexican immigrants. The revised model takes on a more cultural point of view. Breaking away from the standard socialization process that includes modeling, reinforcement, and social interaction, the model conceptualizes consumer acculturation process as starting from the physical movement involved in immigration, to using the original cultural system as a bridge in acculturation, and to the final adaptation after trial and error (Peñaloza 1994). Acculturation outcome is the acceptance or rejection of the host consumer culture and the maintenance or rejection of the original culture.

The second research direction explores immigrant consumers' self-identity and its effects on consumption. Immigration inevitably leads to a significant transition of the self. Upon moving to the host country, an immigrant needs to reconstruct a new self in the new cultural environment. This transition is often difficult and sometimes painful. Consumption and possessions can help reconstruct this new self (Mehta and Belk 1991; Oswald 1999; Schouten 1991). Goods also provide a sense of security during the turbulent transition period (Mehta and Belk 1991). Furthermore, working with a past self, which is rooted in the original culture, and a present self, which is grounded in the host culture, is bound to produce some conflicts. Possessions help bring the past and the present together and fill the gap between the past self and the present self (Oswald 1999).

Immigrant consumers use these possessions to negotiate between the two sets of identity and to find their own places between the two cultures (Oswald 1999). Therefore, an immigrant consumer's behavior will reflect this special situation of self-in-transition. It will be a constant negotiation and switching between different cultural codes (Oswald 1999).

These studies offer us a deeper view of immigrant consumer behavior. Yet another useful way of looking at consumer acculturation is to view it as a cognitive learning process. This is the view we adopt in our current model. Consumer learning is not a new topic to consumer researchers. Although not explicitly pointed out, learning forms the foundation of much consumer research (Hutchinson and Alba 1991). While learning happens frequently in our daily life, it becomes especially salient for immigrant consumers. Facing a totally new consumer environment, immigrant consumers have to learn many things anew. By understanding the cognitive process underlying this learning, we can gain a better understanding of consumer acculturation and how different immigrant consumers end up behaving differently. Below we offer an overview of the theoretical foundation of our model -- ACT* Theory and its learning mechanism. Then details of our model are presented.

ACT* THEORY

Anderson's (1983, 1987) ACT* Theory utilizes a production system framework, which distinguishes between declarative knowledge and procedural knowledge. Declarative knowledge refers to factual knowledge in long-term memory such as brands available in the market, visual image of a product, or the fact that many Americans buy

their food and groceries in supermarkets. Declarative knowledge is embedded in an associative network and is activated through paths connecting associated concepts. While declarative knowledge represents "content", procedural knowledge represents "processes" (Linville and Carlston 1994). It consists of mental rules that individuals use to do things. Procedural knowledge is presented in condition-action pairs, called productions. For example, a production used by an immigrant consumer in deciding where to shop for groceries may be[1]:

IF the goal is to choose a place to shop for groceries and Americans buy their groceries in supermarkets and I want to do what Americans do,

THEN buy groceries in supermarkets.

In each production, the section following IF specifies the conditions that a rule will be carried out, and the THEN statement specifies the mental or physical actions to be taken if the conditions are satisfied. Although procedural knowledge takes the form of IF-THEN pairs, it does not mean that an individual follow these rules consciously. Rather, a production can be executed automatically and without conscious effort, as will be seen in later discussions.

The way individuals cope with the outside world under a production system framework is shown in Figure 1. Besides long-term memory storing declarative knowledge and procedural knowledge, individuals also possess working memory, which temporarily stores information from the outside world, information retrieved from declarative knowledge, and the results of production execution. Working memory can be considered the working space of the mind. It *stores* information to or *retrieves*

information from declarative knowledge memory. Its content is also used to *match* the conditions of productions. When the conditions are matched, the execution process deposits the actions of the matched productions into working memory. Working memory also interacts with the outside world by *encoding* incoming information and *performing* the actions deposited into it by production execution.

INSERT FIGURE 1 ABOUT HERE

When encountering a problem, an individual searches for available productions that match the current goals and conditions. If such productions are found, they are executed to solve the problem. When such productions do not exist, as in the case of dealing with a new domain, however, the situation becomes more complex. ACT* Theory posits that people learn first in the form of declarative knowledge (Anderson 1983). When people face a problem in a new domain, they first acquire declarative knowledge about the domain. Declarative knowledge is learned when incoming information is encoded and added to the associative network of facts. Equipped with general problem solving skills such as analogy and working backward, individuals can then utilize the declarative knowledge associated with the domain to solve the problem (Anderson 1987). This is called interpretive application of declarative knowledge (Anderson 1983). For example, an immigrant consumer may originally observe that middle-class American consumers around him or her often go to department store A for apparel shopping (declarative knowledge). When it comes for the consumer to buy a suit for him or herself, the initial

productions involved may be similar to the following:

IF the goal is to buy a suit for work and my income level is equivalent to middle-class Americans,

THEN set the sub-goals as (1) retrieve information about middle-class American consumers' apparel shopping behavior; (2) follow these consumers' apparel shopping location choice;

IF the goal is to retrieve information about middle-class American consumers' apparel shopping behavior,

THEN recall that middle-class American consumers around me often go to department store A;

IF the goal is to follow middle-class American consumers' apparel shopping location choice,

THEN choose to go to department store A to buy the suit.

As can be seen in this example and in Figure 1, interpretive application of declarative knowledge requires retrieval of relevant factual knowledge into working memory and requires the general problem-solving productions to work on the declarative knowledge. This process needs a lot of cognitive effort. As the individual becomes more experienced with the domain, however, production compilation helps compose new productions that can be directly applied with much less cognitive effort.

Production compilation takes on two forms, composition and proceduralization (Anderson 1987). Composition combines two or more productions that usually go together into a single production. For example, in the above situation, the consumer

may be able to shorten the productions as follows:

IF the goal is to buy a suit for work and my income level is equivalent to middle-class Americans;

THEN follow middle-class Americans' shopping location choice.

IF the goal is to follow middle-class Americans' shopping location choice,

THEN recall middle-class Americans around me go to department store A for apparel shopping and decide to go to department store A for my own shopping.

By combining the original productions into fewer steps, production composition speeds up the process and makes decision making more efficient.

Another way of knowledge compilation is proceduralization, which refers to the process declarative knowledge is incorporated into productions so that the new productions can be executed without retrieving declarative knowledge into working memory. In the above example, the productions can be furthered simplified as follows:

IF the goal is to buy a suit for work,

THEN go to department store A to shop.

By using this new production, the fact that middle-class Americans go to department store A for apparel shopping no longer needs to be retrieved into working memory. This reduces the memory load on the consumer's part and also speeds up decision making by eliminating the time needed for knowledge retrieval.

Every time a new production is formed, it does not replace the original more general production. Rather, the two will compete in the matching process. ACT* Theory's production conflict mechanism favors more domain-specific productions and stronger

productions. While the new production is more domain-specific, it is very weak in the beginning. However, every time it is successfully executed to solve a problem, its strength is increased by one unit. This is the production tuning process (Anderson 1983, 1987). The more times the new production is used to solve problems successfully, the stronger it will become, which facilitates future matching and increases the chance that it will be applied in future problem solving. When a production is strengthened enough, it can be executed automatically without any conscious effort, as the consumer in the above example habitually go to department store A for apparel shopping without thinking about her decision any more.

Through this interpretive application of declarative knowledge, production compilation, and production tuning, an individual is able to deal with problems in a new domain with decreased cognitive effort and increased efficiency. As immigrant consumers enter the host country, they need to learn many consumption-related knowledge and perform many new consumption tasks. We posit that these consumers also go through the learning process specified above. In the next section, we offer a detailed description of our model of consumer acculturation and develop several testable hypotheses based on the model.

A COGNITIVE MODEL OF CONSUMER ACCULTURATION

The current model of consumer acculturation is based on ACT* theory's learning mechanism. More specifically, we view consumer acculturation as a learning process. Acculturating consumers first acquire declarative knowledge about consumption in the host country. Through experiences, this body of declarative knowledge is incorporated

into new productions that facilitate consumption in the new environment. This learning process is influenced by the consumer's prior declarative knowledge and procedural knowledge learned in the country of origin, external information sources, and the consumer's firsthand experience in the host country. The model is presented in Figure 2 and is detailed below.

INSERT FIGURE 2 ABOUT HERE

Declarative Knowledge Acquisition

Consumer acculturation starts with acquiring declarative knowledge about consumption in the host country. This declarative knowledge ranges from general information about the consumption environment, such as currency of the host country and availability of general product categories, to brand availability and brand attributes, to symbolic meaning of products and brands in the host country. While information about available brands and product attributes are relatively easy to acquire, symbolic meaning of products and brands are more culturally dependent and requires extensive understanding of the host culture (Gronhaug, Gilly and Peñaloza 1995). Therefore, we expect that declarative knowledge about brand availability and product attributes will be learned faster than symbolic meaning of products/brands. If we compare the declarative knowledge of immigrant consumers with that of the average American consumers, we should expect the gap to be larger in the area of symbolic meaning than in brand availability and product attributes.

H1: The declarative knowledge gap between immigrant consumers and American consumers will be larger in the area of symbolic meaning of products/brands than in the area of brand availability and product attributes.

Although by definition consumer acculturation starts when direct contact with a second consumer culture occurs, acquisition of declarative knowledge about consumption in the host country can start well before immigration. As American movies and TV shows become available in many countries, people often more or less know about conditions of the United States before they actually move to the country. This knowledge is further supplemented by information provided by people who have been to the host country. As information obtained in this way is often fragmented and biased, the conception one forms about the host country based on this information may often be wrong or imprecise (Lee 1989). With little firsthand experience with life in the host country, such information may also be misinterpreted. After moving to the host country, however, immigrant consumers have the opportunity to gain firsthand experience with the host people and consumer environment of the host country. Misconceptions formed prior to immigration may be partially corrected and made more precise. A comparison of Taiwanese consumers in the United States and Taiwanese in Taiwan (Lee 1989) revealed that the former do have a more precise perception of the consumption reality in the United States than the latter.

Individual differences are likely to arise during this declarative knowledge acquisition. Hoch and Deighton (1989) proposed three factors that influence consumer learning, two of which reflect individual differences: consumer familiarity with the

domain and motivation. Familiarity refers to "the number of product-related experiences that have been accumulated by the consumer" (Alba and Hutchinson 1987, p.411). Consumers familiar with a product domain and consumers unfamiliar with the product domain differ on the extent of their information search (Johnson and Russo 1984), encoding of incoming information (Hoch and Deighton 1989), and easiness of digesting incoming information. A concept closely related but distinct from familiarity is expertise. Expertise is "the ability to perform product-related tasks successfully" (Alba and Hutchinson 1987). Expertise and novices differ on their knowledge structure, with experts possessing a more complex, refined, and veridical structure. When experts are exposed to new information, their extensive knowledge and skills allow them to better analyze the information and are less influence by irrelevant information than novices (Alba and Hutchinson 1987). Hence, for immigrant consumers who are familiar with and have expertise in a product category in the host country prior to immigration, their acquisition of declarative knowledge will be more efficient.

H2: Immigrant consumers familiar with a product category at the time of immigration will acquire declarative knowledge about the category faster than do immigrant consumers who were originally unfamiliar with the product category at the time of immigration.

H3: Immigrant consumers who have expertise in a product category at the time of immigration will acquire declarative knowledge about the category faster than do immigrant consumers who are novices on that product category at the time of immigration.

A consumer's motivation and involvement during learning is also likely to influence what and how he or she learns (Hawkins and Hoch 1992; Hoch and Deighton 1989; Hutchinson and Alba 1991). When motivation and involvement is low, one tends to make minimum cognitive effort (Hoch and Deighton 1989) and is more likely to be influenced by peripheral information (Petty, Cacioppo and Schumann 1983). For immigrant consumers who actively seek to integrate into the consumer environment of the host country, they should exert more effort in acquiring factual knowledge and be more efficient in this acquisition. For the same consumer across different consumption domains, he or she may learn better in areas that are important to him or herself.

H4: Immigrant consumers who are more motivated to integrate into the host country will acquire declarative knowledge faster than those who are less motivated.

H5: Immigrant consumers will acquire declarative knowledge faster in consumption areas important to them than in areas not important to them.

Besides differences in familiarity and motivation, where immigrant consumers acquire their declarative knowledge is also likely to produce a difference in their learning and subsequently their consumer behavior. Consumer Socialization Theory posits four types of information sources: family, friends, mass media, and institutions (Moschis 1987). We can further divide each of these information sources by its country-of-origin (Peñaloza 1989). For example, friends can be from the same country of origin or from the host country. From which of these sources immigrant consumers obtain information is determined by the sources' availability to the consumers and the consumers' language ability in utilizing the sources. For highly acculturated consumers, they tend to have

mastered the host language well and have established extensive social network within the host society. They are exposed more often to people of host country and more likely to consult people from the host society for consumption information (D'Rozario and Douglas 1999). Low acculturated consumers, on the other hand, due to language difficulties or unwillingness to assimilate into the new culture, may be restricted to people from the country of origin, mass media, or mere observation for information (D'Rozario and Douglas 1999). Compared with people from the host country, who tend to possess extensive firsthand consumption experience, immigrants from the same country of origin are "outsiders" and have limited experiences with consumption in the host country. Mass media and observation also provide potentially biased and incomplete information. Therefore, the information highly acculturated consumers receive is likely to be different from what low acculturated consumers receive. This difference in information acquired is likely to produce different perception of the host consumer environment and products/brands in the host country.

H6: Highly acculturated consumers and low acculturated consumers tend to consult different information sources for declarative knowledge, with highly acculturated consumers more likely to consult people from the host country and low acculturated consumers more likely to consult people from the same country of origin and the mass media.

H7: Highly acculturated immigrant consumers and low acculturated immigrant consumers will have different perceptions of brands in the host country.

Procedural Knowledge Transfer

We mentioned before that prior declarative knowledge an immigrant consumer possesses is likely to influence the efficiency he or she learns declarative knowledge in the host country. Prior procedural knowledge can also exert an influence on consumer acculturation. When encountering a consumption problem in the host country, immigrant consumers first check whether existing procedural knowledge learned in the country of origin is applicable here. For example, if a consumer used to use Crest toothpaste, which is still available in the host country, he or she may continue to use that brand. This is consistent with the finding that human beings tend to use what has worked in the past to solve current problems (Schwartz 1982). Using prior ways of doing things whenever possible decreases the cognitive demand on immigrant consumers. With many new information to absorb and new situations to deal with, the possibility of simplifying tasks is essential and often beneficial. Interviews with people who have moved to another country did find that familiarity with how to do things is one of the things they missed most (Gilly 1995).

Knowing that existing procedural knowledge may be used to solve consumption-related problems in the host country is not enough. We also need to know under what conditions and to what extent existing procedural knowledge is likely to be used. According to ACT* Theory, the probability a production will be matched and executed is decided by how well the conditions specified in the production are matched, the production's strength, and the production's relevance to the current goal (Linville and Clark 1989). From these criteria, we can infer what existing productions learned in the country of origin are likely to be applied to a current consumption situation.

The first criterion states that the better the conditions specified in the production are matched, the more likely the production will be evoked and executed. For example, an immigrant consumer who used to use toothpaste brand A may have the following production:

IF the goal is to buy toothpaste and brand A is available,

THEN buy brand A.

An essential condition of the productions is availability of brand A. Due to change of consumer environment, the brand may no longer be available in the host country. Therefore, the condition is not matched and the production is unlikely to be executed. We expect that when consumer environment of the host country is similar (versus dissimilar) to that of the country of origin, conditions of existing productions will have a greater probability of being matched, and therefore the productions will be more likely to be applied in the host country.

H8: When consumer environment of a product category in the host country is similar (versus dissimilar) to that in the country of origin, more (versus less) existing procedural knowledge learned in the country of origin will be transferred to consumption problems related to the product category encountered in the host country.

Secondly, a production's strength decides the probability and speed of its matching and execution. Strength is determined by how successful the production has been in solving past problems. When a production is used successfully in solving a problem, its strength is increased. The *more* it is used *successfully*, the stronger the production

becomes. The frequency of a production having been used in the country of origin and the strength it possesses is likely to be related to the importance of the consumption task the production aims to accomplish. Consider the case in which the cultural tradition of origin assumes a woman should cook a decent dinner for one's family every night. The production of cooking a nice dinner is likely to be executed frequently. And because of the cultural tradition, such an action is also likely to be approved by family members and by the society in general. Therefore, execution of this production is deemed successful every time. The strength of the production is likely to be high, increasing the probability that it will also be carried out in the host country. Because of the cultural importance of the task, it is also less susceptible to changes (Gronhaug, Gilly, and Peñaloza 1993). Compare this with consumption tasks that are not important to the consumer. Such unimportant tasks may be executed less frequently and productions involved in the task are likely to have less strength. Because the tasks are not important, the consumer will also be more open to changes. All this decreases the probability that productions associated with these tasks will continue to be carried out in the host country. Therefore, we expect that existing procedural knowledge acquired in the country of origin will be used more often in areas important to the consumer than in areas not important to the consumer.

H9: Existing procedural knowledge acquired in the country of origin is more likely to be applied to accomplish a consumption task in the host country when such a task is important for the consumer than when the task is not important for the consumer.

Another constraint on production match and execution is the relevance of the

production to the current goal. This distinguishes immigrant consumers adopting different acculturation strategies. Some immigrants may have very positive attitude towards their culture of origin and are strongly motivated to preserve it as much as they can, while other immigrant consumers may not care to do so. We expect it to be more likely for the former consumers to transfer existing procedural knowledge acquired in the country of origin to consumption problems in the host country.

H10:Immigrant consumers who have more positive attitude towards their culture of origin will transfer more procedural knowledge acquired in the country of origin to consumption problems in the host country than consumers who have less positive attitude towards their culture of origin.

Interpretive Application of Declarative Knowledge

Although use of existing procedural knowledge is relatively effortless, it is not applicable to many new consumption tasks encountered in the host country, especially when consumer environment in the host country are very different from that in the country of origin. Take the toothpaste purchase example from the previous section. When toothpaste brand A is not available, the consumer cannot use the above production when buying toothpaste in the host country. To accomplish the task, immigrant consumers have to rely on the declarative knowledge they acquired about the product domain and their general problem-solving skills. For example, the consumer can make a choice based on more general choice productions comparing attributes of toothpaste products. One possible production set is as follows:

IF the goal is to buy toothpaste and brand A is not available,

THEN set the sub-goals as (1) retrieve available toothpaste brands; (2) find out the brands with whitening functions; (3) choose the cheapest brand among brands with whitening function.

IF the goal is to retrieve available toothpaste brands and if the brands are available in long-term memory,

THEN retrieve toothpaste brand names from long-term memory.

IF the goal is to retrieve available toothpaste brands and if the brands are not available in long-term memory,

THEN observe brands available from supermarket shelf.

IF the goal is to find out available brands that have whitening function,

THEN read the packages of the brands retrieved above and find out candidate brands with whitening function.

IF the goal is to find out the cheapest brand among brands with whitening function,

THEN find out the prices of the candidate brands above from the supermarket and choose the one with the lowest price.

Through this production set, the consumer finds the right brand satisfying his or her needs (whitening teeth and good value for money).

General problem-solving methods such as analogy, working backward, means-ends analysis, and pure forward search can all be used in combination with declarative knowledge. This interpretive application of declarative knowledge has several advantages. First of all, it allows consumers to break out of their purchase routine and try something new. Consumers are often highly resistant to changes and are biased

towards confirming their existing beliefs instead of trying new possible hypotheses (Hoch 1984). This bias prevents consumers from trying new things that may be beneficial to them. The environmental changes immigrant consumers encounter force them to at least partially change their existing ways of doing things. And interpretive application of declarative knowledge facilitates this change. It allows consumers to step back and look at a consumption task in a more general way.

Furthermore, interpretive application of declarative knowledge is also more flexible. Unlike domain-specific procedural knowledge, which is highly context-specific and is often carried out without the individual's conscious control, interpretive application of declarative knowledge is under better control of the individual. The same declarative knowledge can be combined with different general problem-solving skills to accomplish different tasks. For example, knowledge about the quality and price level of suits in the host country allows a consumer both to judge the purchase a friend has made and to make a purchase decision him or herself. Such flexibility is lost in proceduralized problem solving, where specific procedural knowledge for judging a purchase made by a friend and that for making a purchase decision are totally independent.

Although advantageous from several perspectives, interpretive application of declarative knowledge also has one distinct disadvantage – the demand on cognitive effort. Because at this interpretive stage consumers need to consciously combine declarative knowledge and general skills to accomplish a consumption task, it will demand significant amount of cognitive effort on the part of the consumer. Given that immigrant consumers face a lot of pressure adapting to the new life, they may not have

the time and energy to always use such careful thinking every time they buy something. They need to speed up and simplify tasks. This is accomplished through knowledge compilation.

Knowledge Compilation

Recall that knowledge compilation can occur in two ways: composition and proceduralization. Composition combines several production into one, the effect of which is faster problem solving. And proceduralization compiles declarative knowledge into productions to form new productions, so that the declarative knowledge is embedded in the new productions and no longer needs to be retrieved from working memory when the productions are executed.

Problem solving before and after knowledge compilation is very different. Before proceduralization, relevant declarative knowledge has to be held in working memory to solve the problem, and verbal rehearsal is often observed (Anderson 1983). This makes the declarative knowledge used more accessible (Smith 1984). A result of this is, when a decision is made through interpretive application of declarative knowledge, the information used in the decision may be better remembered and recalled later on than when the decision is made through productions that already embed relevant declarative knowledge.

H11: When making a decision in a consumption domain, an immigrant consumer familiar with the domain will be better able to recall the information he or she used in the decision making than a consumer who is not familiar with the domain.

A further effect of proceduralization is the free up of working memory and therefore

cognitive resources. Problem solving after proceduralization should require less cognitive effort than problem solving before proceduralization.

H12: Other things being equal, a consumption task an immigrant consumer is familiar with requires less cognitive effort than a consumption task a consumer is not familiar with, and therefore increases the cognitive resources available for concurrent tasks.

An observable effect of composition is the speed up in problem solving. Because several productions that need to be executed are simplified into one production, solving the problem should require less time.

H13: Other things being equal, a consumption task an immigrant consumer is familiar with requires less time than a consumption task he or she is not familiar with.

Under adaptation pressure, knowledge compilation can happen rather quickly for immigrant consumers. New productions may be formed after only one or two trials. This may be especially true for low-involvement products. When consumers are not highly involved with a purchase and therefore not motivated to do deep thinking, they tend to simplify the task and use heuristics to solve the problem. With low-involvement purchases, the cost of using wrong productions is also much lower. As a result, the consumer will be less cautious in forming new productions. For high-involvement products such as large-sum purchases, wrong productions will result in much higher cost, and consumers will be more careful not to make mistakes. In this case, more successful trial or more thinking may be needed to form a new production.

H14: Knowledge compilation will occur faster in areas immigrant consumers are not highly involved than in areas consumers are highly involved.

Production Tuning

Consumer learning does not stop with composing new procedural knowledge. When new productions are formed, they are rather weak and have to compete vigorously with existing productions in production matching. Production tuning helps strengthen a production if the production is successful in achieving its goal, or weaken a production if it is not successful in achieving its goal. This helps polish one's production system and make it more efficient. Hoch and Deighton (1989) have proposed a four-stage model of consumer learning from experience, from hypothesis formation, exposure to evidence, encoding of evidence, to update existing beliefs. To some extent, production tuning is very much like a hypothesis testing. When a new production is formed, an implicit hypothesis that the production works is formed. When the production is matched and executed, the consumer is exposed to evidence. The consumer uses the evidence to verify the hypothesis and updates existing beliefs (existing production system) to reflect the success or failure of the production.

If a production receives continuous strengthening from successful execution, it can be matched and executed more quickly, to an extent that the production can be carried out automatically. The relationship between familiarity and automaticity has been spelled out in consumer research (Alba and Hutchinson 1987). As a consumer becomes *very* familiar with a consumption task, it is likely that he or she has formed a production set for accomplish the task and that the productions in the set are very strong. Therefore

accomplishing the task can be automatic for the consumer without conscious thinking. A common test of automaticity is to detect whether deterioration effect can be observed when adding concurrent cognitive load during problem solving. If a problem solving process is automatic, no deterioration effect should be observed. Therefore, we hypothesize that:

H15: Adding concurrent cognitive load to a consumer while he or she is solving a very familiar consumption problem will not slow down his or her problem solving. In contrast, deterioration effect should be observed when the consumer is not very familiar with the problem.

As argued by Alba and Hutchinson (1987), decrease of cognitive effort needed to solve a problem (H12) can happen after only one or two trial, but automaticity requires significantly more practice to develop. Given that automatic productions are out of an individual's conscious control, it is also safer for the individual to go slower in automization. Therefore, what we observe should be a two-stage improvement in consumer problem solving. At the first stage, with several initial trials, consumers are able to use knowledge compilation to form new productions for solving the problem and therefore decrease the cognitive effort needed. At the second stage, as abundant practice has been accumulated and the productions gain sufficient strength, automaticity in problem solving will be observed.

The above discussion has focused on new productions formed through knowledge compilation. But production tuning is not restricted to these new productions. Existing productions formed in the country of origin can also be strengthened or

weakened through production tuning. As argued earlier, immigrant consumers will tend to use these existing productions whenever applicable. However, applicability of an old production in the new environment may be misjudged. A consumer may choose to use an old production that no longer works in the host country but may not know it until the production is carried out. Production tuning helps find such mistakes and correct them by weakening the old productions' strength, thus decrease the probability and speed the productions will be matched and executed in the future. As some old productions have been well practiced in the country of origin, their strength will not be weakened very quickly. This partially explains why adaptation is often gradual and habit change does not occur overnight.

An important question concerning this production tuning process is practically when and under what conditions productions will be strengthened. By definition, productions are strengthened when they are successful in achieving their goals and helping solve a problem, which depends on a consumer's subjective judgment. Research has found that people have a confirmation bias (Deighton 1984). In more concrete terms, people are biased towards confirming evidences (Alba and Hutchinson 2000; Hoch and Deighton 1989). They tend to search more actively for evidences confirming their beliefs than for disconfirming evidences (Cummings and Venkatesan 1976). When information is ambiguous, they also tend to interpret the information as supporting their beliefs (Srull and Wyer 1980). Product experience becomes assimilated into prior expectations. The mechanism in ACT* Theory also reflects such a confirmation bias. When the success of a production is unknown, by default it is considered successful (Anderson 1983).

Consumers, therefore, will be biased towards confirming the success of a production and therefore strengthening it than confirming the failure of a production and weakening it. However, this does not mean that consumers will only strengthen productions. When evidence is obviously contradictory to existing beliefs, such evidence will be contrasted to existing beliefs (Hoch and Deighton 1989), and relevant productions will be strengthened or weakened.

However consumers pay attention to evidences, the availability of confirming or disconfirming evidence is important. In other words, feedback is essential (Alba and Hutchinson 2000; Hoch and Deigton 1989). Several factors are likely to influence the use of feedback and the subsequent judgment and learning, the first of which is the ambiguity of information environment (Hoch and Deighton 1989). When a consumer applies a production set to make a purchase decision, he or she is likely to use product experience to judge whether the purchase is successful. When physical evidence is present, such a judgment may be relatively easy. However, in many cases, product experience may be ambiguous, in the sense that the same product experience may be interpreted differently (Hoch and Ha 1986). When this happens, the consumer may have to rely on cues other than product experience, such as advertising and friends' comment, to make the judgment. Research has shown that advertising has greater influence on interpretation of product experience when the experience is ambiguous than when the experience is unambiguous (Ha and Hoch 1989; Hoch and Ha 1986).

When external feedback is important in production tuning, from what sources a consumer seeks feedback will have significant influence on his or her judgment and

subsequent production tuning. We argued before that highly acculturated consumers are likely to consult consumers from the host country for information, while low acculturated consumers are more likely to rely on family members, friends from the same country of origin, mass media, or mere observation for information. In the same vein, these same information sources are also likely to be consulted for direct or indirect feedback. This reinforcement from feedback is likely to set highly acculturated consumers and low acculturated consumers further apart in terms of their judgment and procedural knowledge and subsequently consumer behavior. Therefore, we expect that the difference in consumer behavior between highly acculturated consumers and low acculturated consumers are likely to be larger in areas where product experience is ambiguous than in areas where product experience is unambiguous. Self-confidence is likely to moderate this relationship. While consumers with high competency are more likely to rely on their own experience and judgment, less confident consumers will be more likely to rely on expert opinions or other people's opinions (Cowley and Caldwell forthcoming).

H16: Highly acculturated consumers and low acculturated consumers consult different information sources for postpurchase advice.

H17: In areas where product experience is ambiguous (unambiguous) and consumers (do not) need to rely on external feedback for judging the success of a production, consumer behavior of highly acculturated and low acculturated consumers will be more dissimilar (similar).

H18: The above effect is moderated by the consumers' self-confidence.

Timeliness of feedback is also likely to influence the consumer's judgment on whether a production is successful and should be strengthened. Consider the case in which a consumer bought a refrigerator. It is unlikely that serious problems will appear during the first year of usage. In order to judge whether the purchase is successfully made, the consumer has to wait for quite some time to really test the quality of the product. Delayed feedback requires the consumer to retain information about the decision point until judgment can be made, which the consumer may fail to do so (Anderson 1987; Linville and Clark 1989). For example, after two years of usage, the refrigerator may break down. But by that time, the consumer may have forgotten what strategy he or she used to make the purchase decision. In other words, he or she does not know what production to weaken. There is some empirical evidence that immediate feedback is beneficial to learning (Lewis and Anderson 1985; van Houwelingen and van Raaij 1989). We expect that immigrant consumers' learning of procedural knowledge is faster when immediate feedback is available than when the feedback is delayed.

H19: Immigrant consumers will acquire procedural knowledge faster when immediate feedback is available than when feedback is delayed.

With internal and external feedbacks, an immigrant becomes a more experienced consumer in the host country. He or she will be able to gradually filter out productions that are deemed not applicable in the host country and replace them with new productions. This leads to the final adaptation into the host country as a consumer.

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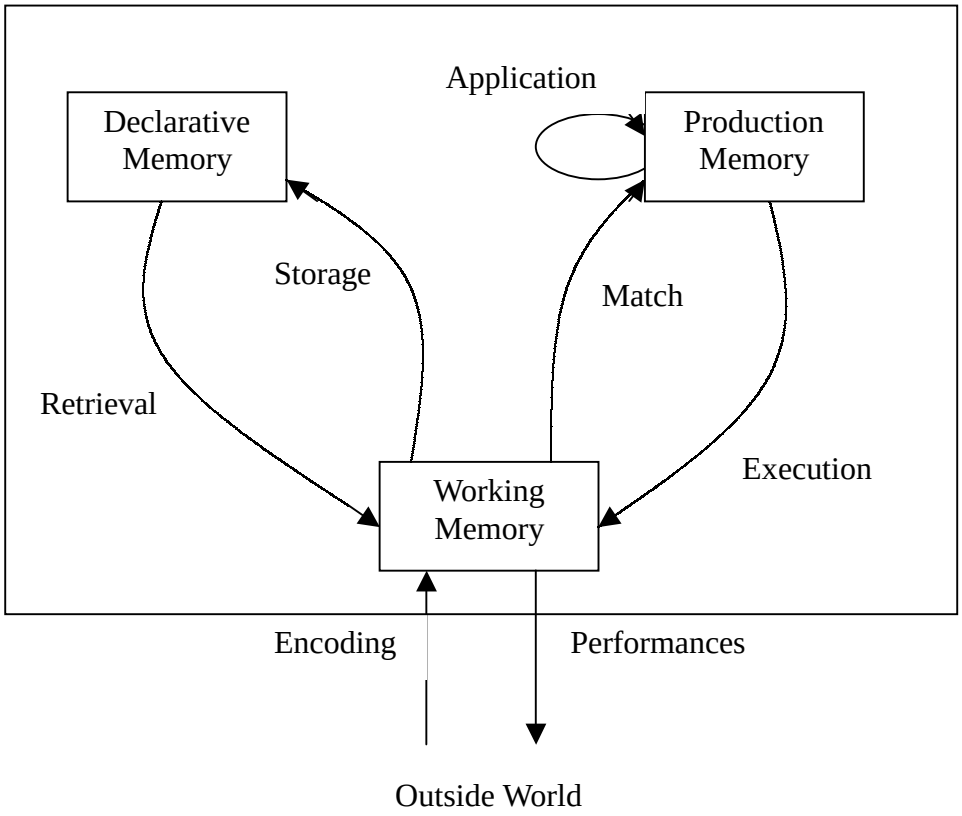
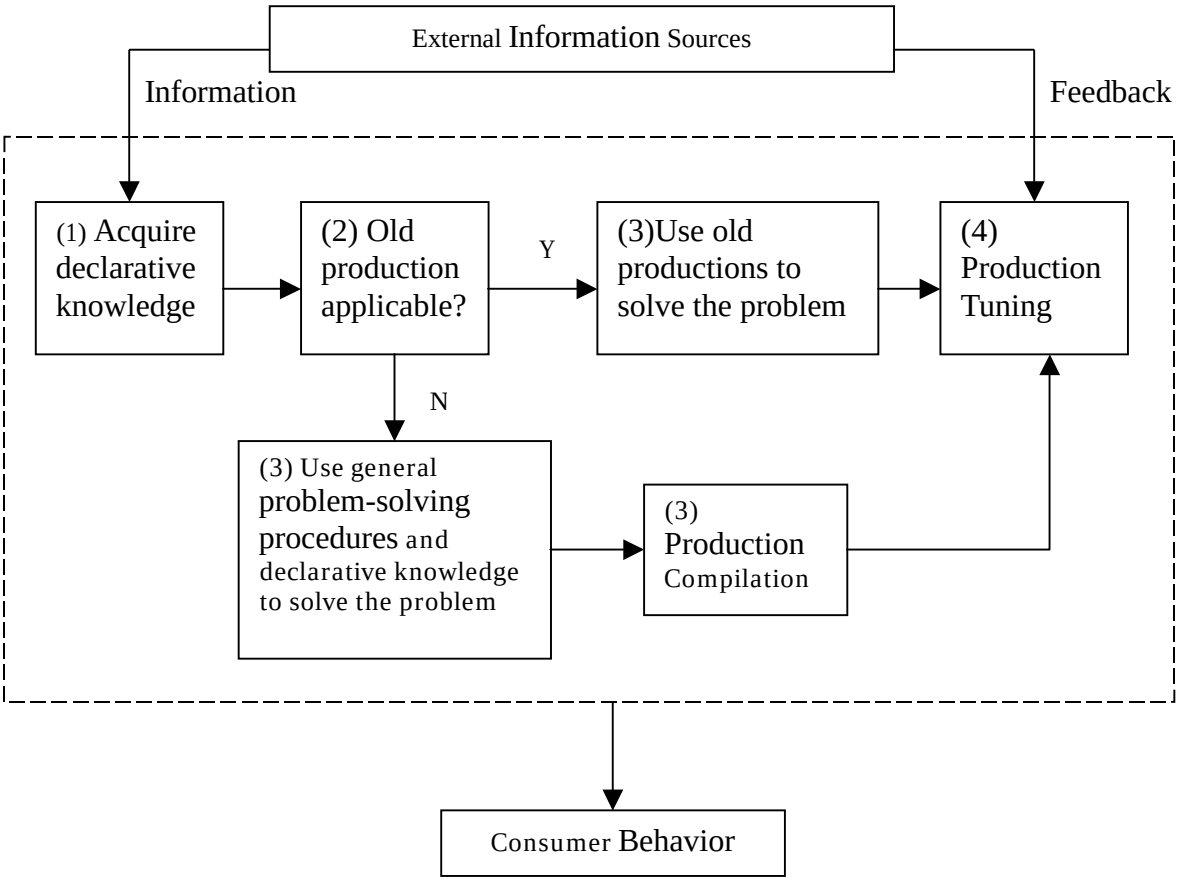
Figure 1. Production System Framework



Note: Adapted from Anderson (1983), Figure 1.2, p. 19.

FIGURE 2. COGNITIVE MODEL OF CONSUMER ACCULTURATION



[1] For convenience of explanation, the productions presented in the article are in very simplistic forms. In ACT* Theory, very detailed and complex production sets are specified.