



Understanding Television Viewing Among Multi-Cultural Consumers

A Behavioral Approach to Identifying Opportunity through
Audience Diversity

Research Brief

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Abstract

Many U.S. markets are developing into complex and fragmented multi-channel, multi-cultural environments. Making sense of the complex environments requires two things:

- 1) Data that captures differences among and across many small segments of the population
- 2) Methods that can help to make sense of the data

This paper outlines an effective method of analyzing set-top box data in order to identify behavioral patterns that align with multi-cultural diversity.

Introduction

In many U.S. markets, cultural and linguistic diversity supports a wide-range of television viewing options and drives media fragmentation. In Los Angeles there are more than 350 channel choices, including networks targeted at Armenian, Chinese, Flemish, Swahili, and Tagalog speakers. As we step back from this diverse world it may appear there is little order, that fragmentation is unmanageable. Making sense of the chaos is complicated by the nature and scope of television viewing data. However, it is possible to find order in this complex environment. Looking through the lens of set-top box data we have begun to examine the nature and scope of television viewing behavior in the culturally diverse market of Los Angeles. Set-top box data is ideal because it is:

- Based on large samples, to allow us to identify and quantify differences in behavior across many small groups.
- Granular, second-by-second measurement allows us to distinguish between different types of behaviors that people exhibit while they view.

Los Angeles is an excellent environment to study multi-cultural behavior. It is as diverse in terms of language, ethnicity, origin, and media accessibility as any other market in the U.S. This research has three broad goals:

- First, to illustrate an effective approach to behavioral analysis that allows us to find order within a fragmented multi-channel and multi-cultural environment.
- Second, to identify program sets and viewer segments, and to assess the degree to which the behaviors parallel the cultural diversity of the market.
- Third, to discuss how the fragments can aggregate, and how culturally and behaviorally distinct programs can “work together” to drive reach within individual market segments and within the market as a whole.

We performed this analysis by using the Charter Cable Los Angeles data, based on a subset of more than 270,000 homes and 400,000 set-top boxes. In this analysis we paid specific attention to culture and language as a moderator of behavior, but this approach can be utilized in many markets and vertical subsets of markets, with equal effectiveness.

A Basic Approach to Behavioral Analysis of Television Viewing

Viewing Behavior, Program Choice, and Preference

Behavior is a fairly broad term. Time-shift viewing, appointment viewing, channel surfing and search are all examples of viewing behavior. However, these are “viewing styles,” and they are distinct from “content choice.” We often blur the distinction between style and choice. It’s much like a product purchase, and it’s useful to think about an example that is outside of the domain of media analysis.

A person can buy Coke Classic at a convenience store and pay cash. The same person can buy a case of Coke Classic at Wal-Mart and pay with a check. Finally, the individual can buy Coke Classic from a vending machine at a train station, and pay with a debit card.

In this example we see a pattern of behavior that indicates a preference for Coke. The “style” of or how the purchase is made isn’t critical to the analysis. The point is:

People carry out specific actions in an irregular fashion. However, people act on their preferences in predictable ways. It would be odd to find someone say “I choose Coke because I prefer crème soda.”

Preference for types of media content, and the subsequent act of viewing a media vehicle is a subject where we do find order. We see this across all domains of behavior, including television viewing. In order to find order we need to keep the “orderly” patterns of choice separate from “messy” matters of style.

When we talk about viewing choice we often make reference to a personal probability to view. However, VOD and Time-shift aside, a person’s probability to view a program doesn’t represent a single choice, it’s the outcome of two choices, the choice to view TV and the choice of a specific program. We can see these two choices, along with viewing style, in Figure #1.

FIGURE #1: The Behavioral Dimensions of Viewing	
1) VIEWING STYLE:	= Viewing style, which includes time-shift viewing, appointment viewing, channel surfing and search. This is messy, often misunderstood, and highly variable both within individual viewers and across individual viewers
2) Probability: Watch TV	= The probability of viewing television at a specific time, which indicates a preference for television over other types of behaviors
3) Probability: Choose a Program	= The probability of choosing a specific program from among the current options, which tells us about the preference for a type or types of content

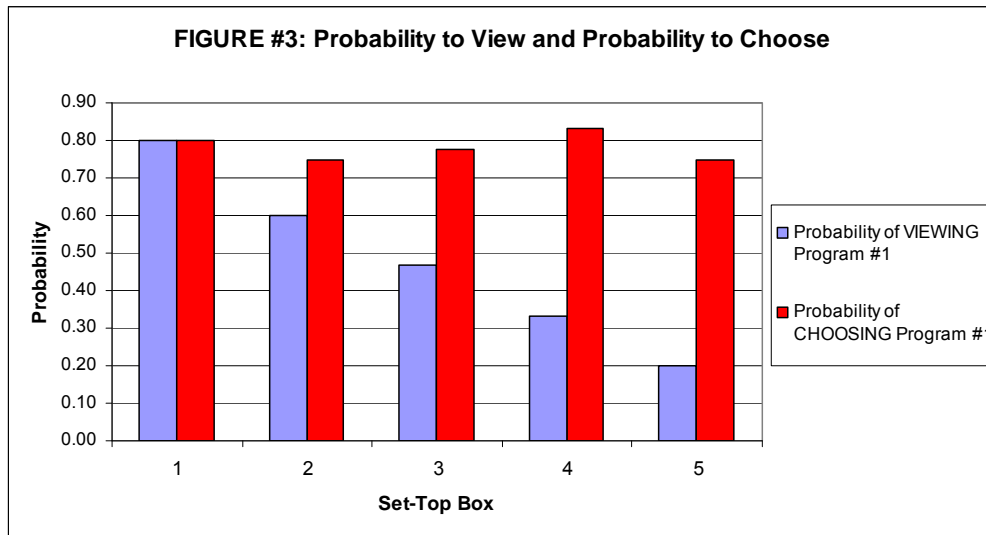
We also see how the choice dimensions combine, and result in, a personal probability in Figure #2.

FIGURE #2: A Person's Probability to View a Program	
Person's Probability of Viewing a Program	= (1: Probability: Watch TV) ... <i>multiplied by...</i> (2: Probability: Choose a Program)

With the exception of the heaviest viewers, most people do not approach the choice to view television in an orderly or predictable fashion. Despite notions like “appointment viewing,” a program’s typical or modal audience member watches fewer than 4 out of 10 episodes of a program. Viewers miss successive episodes of a program most often because they choose to do something other than view television. In the words of the downcast programming executive:

“Life gets in the way of people’s ability to watch my programs.”

It is the randomness of life, not the preference for content that makes an individual’s personal viewing probabilities variable over time . This can be seen in Figure #3, where the probabilities to view exhibit high variation, but the probabilities to choose are very similar. Subsequently, using personal probabilities of viewing as the unit of analysis can be fraught with the difficulty of trying to predict the unpredictable.



In contrast to the randomness of personal probabilities, the preference for one type of program over another will remain stable. That’s why it is critical to focus on preference and choice to view a program. There are several characteristics of program preference and choice that are important to any analysis of viewing, and even more important in a multi-cultural setting:

- Preference, both for consumer products and media content, is influenced by an individual’s core attributes, such as cultural affiliation, personal and social attitudes, personal beliefs, past experience, all of which are shaped through social interaction and language preference. Core personal attributes and attitudes tend to be relatively stable over time and the preferences they influence are not easily changed.
- Choice is influenced by core attributes. Persons who share social and psychological attributes also share behavioral patterns so they engage in “sets” of behavior that are similar within the group, and distinct from other groups. If we accept these principles it is reasonable to assume that people with shared culture and language will share “sets” of behaviors or “program choice sets.” In a rich multi-cultural setting such as Los Angeles, we should find evidence of preference and choice that align with the cultural and language composition of the market. Subsequently, it is critical to maintain the conceptual and operational distinctions of the three dimensions of television behavior shown in Figures #1 and 2.

The first step in our quantitative exploration is to provide an operational definition of preference and choice. It is shown in Figure #4. Once we have isolated this metric at the respondent level, we can begin to analyze differences that aggregate into meaningful subsets of programs and viewers.

FIGURE #4: Operational Definition of Program Preference

$$\frac{\text{THE NUMBER OF MINUTES OF VIEWING TO PROGRAM "A"}}{\text{Divided by}} \frac{\text{THE NUMBER OF MINUTES OF VIEWING TO TELEVISION DURING THE TIME PERIOD(S) WHEN PROGRAM "A" IS TELECAST}}$$

Finding Order in Behavior and Preference

In order to find order in the television viewing landscape we rely on the notion that behavioral preferences tend to “group together.” Using another example from the world of tangible products we note that:

One does not buy a bottle of red wine to go with hot dogs; the “preferred” beverage is beer. Subsequently, hot dogs and beer fit into a loosely related behavioral set, and red wine fits into a different behavioral set.

The second step to identifying the behavioral sets is to reduce the thousands of viewing options down to a moderate number of groups of preferentially related programs. This is similar to market basket analysis, where we can understand the things people buy without needing to talk about each item. Programs that are selected based on a viewer’s core preference will tend to group together, much the same as in the beer and hot dog example. We are not trying to find a typology to describe programs, although that can be a by-product of the process. We are trying to identify the “types of preferences” that are most frequently exercised by television viewers, and aggregate those types of preferences as a reliable basis for distinguishing between viewers.

In order to create the behavioral program sets, we use the preference metric that we defined in Figure #4 and we focus on the association, or correlation, across viewers and between programs. We are asking if:

Above average values for the preference metric for a program are associated with above average values for the preference metric of other programs

We can think of programs that group together as “preference sets,” organized around latent dimensions, or factors, that align with preferences of individual viewers. Subsequently, factor analysis and the methods related to factor analysis provide us with a powerful tool kit to identify program preference sets.

The Results: Program Preference Sets

Figure #5 illustrates the primary program preference sets that are the result of our analysis. A cursory look might lead one to believe that the programs are grouped according to one of the “genre” schemes that are common within the industry. There are parallels to genre, but there are many points of departure:

- First, several programs that are classified as “drama” within industry schemes fall into our “Comedy” preference set.

- Further, programs that are classified as “comedy,” such as *The Daily Show* and *The Colbert Report* are behaviorally closer to news & information.

Remember, this is about programs that group together based on viewer choice. There are also obvious absentees from the list, including reality, and children’s, as well as a catch-all category to account for sports viewing. We’ll address the truants shortly, but first a few facts that will help orient to the sets.

FIGURE #5: Program Preference Sets

	<u>Program Set</u>	<u>Key Programming</u>	<u>Share of Tuning</u>
English	Pop Culture & Infotainment	E1, VH1	4.0
	Family Oriented	Disney, TBS, ABC Family	4.0
	Prime, not Crime, Drama	House, Desperate Housewives	6.2
	Crime Drama	CSI, Law & Order, USA, TNT	8.6
	News & Info	Local News, HLN, Discovery	8.2
	Movies	Pay Channels	6.0
	Comedy	Sit-coms, all networks	4.0
	Guy Stuff	Spike, FX, ESPN, (non-event)	4.0
Spanish	Novellas	Univision	12.0
	News and Information	Galavision, CNN, Discovery	9.0
	Pop Culture	Telefuturo, mun2, MTV	4.0
Niche	Chinese	Language-based	1.2
	Korean	Language-based	2.0
	Armenian	Language-based	0.9
	Arabic	Language-based	1.0
Not Assigned	Sports	All sports	18.9
	Misc.	Misc.	6.0

- Sets can be composed of as few as 10 programs or as many as 60 programs, and while many sets cut across networks, a typical set will be limited to three or four networks at most.
- The labels used to describe the “genre of each set” were appended after the fact to reflect the typical nature of the programs. The labels do not correspond to existing industry labels. For example, the USA program *Burn Notice* falls into the Crime Drama program set even though it could be considered an “Action Adventure” program.

Only about 40% of all programs fit into a program preference set. However, the well-defined program sets in addition to sports account for more than 90% of all television tuning. About 60% of all programs do not fit into any of the program sets. However, the programs that don’t fit into a preference set account for only 6% of viewing, and the choices that viewers make with respect to these programs are characterized by a high degree of randomness.

- The programs that are included in any set are not always the most highly rated. For example, programs on foreign language networks might group together nicely because they reflect “consistent” choices among a small subset of viewers. The consistency of choice leads to a clearly identifiable preference set, even when the ratings are very low.

Sports, children’s and reality are conspicuously absent. That’s because there is not enough consistency of choice across pairs of programs. If you calculate the preference metric for a football game and correlate it with the preference metric for other football games you will find low levels of association. That’s because each sports event is unique, and can be uniquely interesting to a different set of viewers. The same can be said for many reality-based and event-driven programs.

American Idol really doesn't fit anywhere. The appeal of the program is "not quite like" anything else on television. That's not to say that there are not associations across sports and among sports viewers, but they take a different form, often driven by regional and local loyalties. Further, their identification was not entirely necessary for purposes of this exercise, and so we did not include them.

Segmenting Viewers

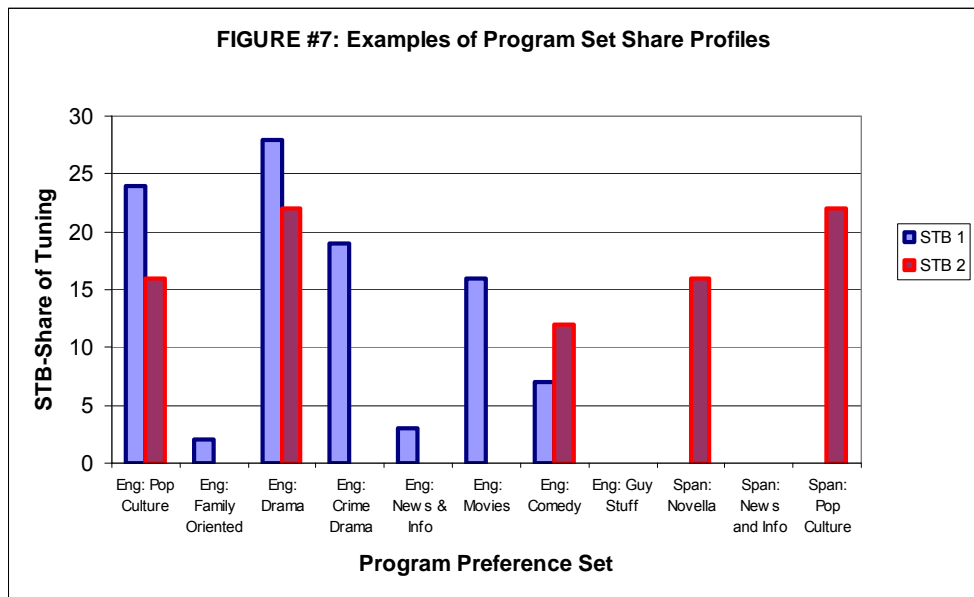
The final step in our process is to make a behavioral distinction based on the entire preference profile for each and every set-top box. To do this we create one final metric. The metric is a calculation of tuning share across each of the program choice sets. The calculation that is applied to each set-top box is shown in Figure #6.

FIGURE #6: Preference Set Share

FOR EACH SET-TOP BOX and EACH PROGRAM PREFERENCE SET:

PROGRAM PREFERENCE SET SHARE	=	THE NUMBER OF MINUTES OF VIEWING TO PROGRAMS IN EACH PREFERENCE SET	DIVIDED BY	THE NUMBER OF MINUTES OF VIEWING TO ALL TELEVISION
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We apply the calculation to all of the "program set viewing choices" that are identified for each set-top box. That metric allows us to develop a tuning, or time-spent-viewing profile for each set-top box in the Los Angeles sample. Two contrasting examples of a profile are shown in Figure #7. The profiles in Figure #7 are interpreted, simply, as the share or percent of tuning to each program set.



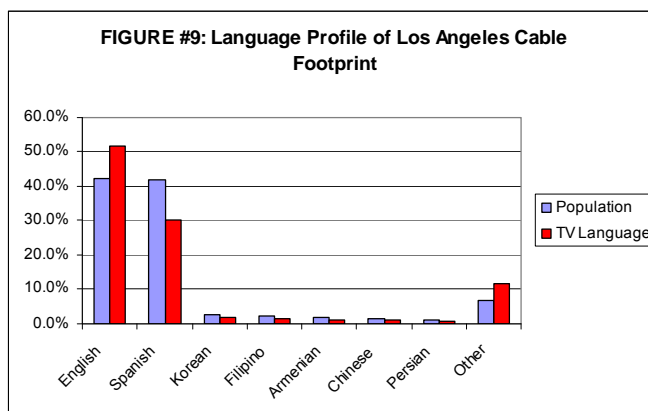
The viewer preference profile for each respondent (set-top box) is used as the input into a k-means cluster solution that segments viewers. The initial segmentation solution is shown in Figure #8.

FIGURE #8: Primary Behavioral Segments

Language Preference	Segment	Program Sets (in order of viewing dominance)			% Pop	Set-Top Box Count
English Language	Dramatics	Prime Drama	Crime Drama		11.0	46,200
	Cops & Robbers	Crime Drama	Comedy	Pop culture	6.0	25,200
	Happening Now	Comedy	Pop Culture		5.0	21,000
	Informatics	News & Info	Crime Drama		5.0	21,000
	Fun loving	Comedy	Guy Stuff		4.5	18,900
	All in the family	Family Oriented	Comedy	News & Info	8.9	37,380
	Mixed Bag	Crime Drama	Comedy	Info	7.0	29,400
	Contemporary cross-overs	Pop Culture	Spanish Pop culture	Prime Drama	1.8	7,560
	Men, men, men, men	Guy Stuff	Crime Drama		2.4	10,080
	TOTAL ENGLISH:					51.6
Spanish Language	Contemporary Cross-overs	Spanish Pop culture	English Pop Culture	Mixed bag entertainment	6.3	26,460
	Informed Cross-Overs	Spanish News & Info	English News & Info		3.2	13,440
	Drama	Spanish Novellas	Spanish News & Info		15.6	65,520
	Macho Cross-overs	Spanish Pop culture	English Guy Stuff		5.2	21,840
TOTAL SPANISH:					30.3	127,260
Niche	Chinese Native Language	Chinese Entertainment	Chinese News		0.5	2,100
	Chinese Cross-over	Chinese Entertainment	English Pop Culture	English News & Info	0.8	3,360
	Philippine Assimilators	Philippine Entertainment	English Pop Culture	English News & Info	1.2	5,040
	Philippine Mixed Bag	English Pop Culture	Philippine Entertainment	Spanish Pop culture	0.2	840
	Korean Cross-Over	English Pop Culture	Korean Entertainment	English News & Info	0.7	2,940
	Korean Native	Korean Entertainment	Korean News		1.1	4,620
	Armenian	Armenian News	Armenian Entertainment		1.1	4,620
	Arabic Traditionalist	Arabic Entertainment	Arabic News		0.3	1,260
	Arabic Cross-Overs	English News & Info	Arabic Entertainment	Arabic News	0.6	2,520
TOTAL NICHE:					6.5	27,300
Not Assigned					11.6	48,720
					100.0	420,000

A comprehensive discussion of the segments is beyond the scope of this paper, but here are a couple of important facts:

- Membership in a segment is typically defined by viewing two or three program sets. That suggests that most viewers have a dominant set of preferences, and they stick with them. That doesn't necessarily mean that the viewers are loyal to programs, it just means that viewers have strong tendencies to make qualitatively similar choices on separate viewing occasions.
- Second, the segments are based on the data from each set-top box, so they represent differences across the people within a household.
- Finally, the initial cluster solution parallels the ethnic profile of the Los Angeles marketplace and the sample footprint that is shown in Figure #9. However, many viewers from the niche and non-English dominant homes cross-over to English language viewing options, and within the multi-cultural environment there are clear behavioral differences that emerge due to the cross-over.



As a practical example, let's take a look at the viewing behavior of the Chinese segment to the thirteen Chinese language networks carried on the Charter LA line-up shown in Figure #10. Thirteen networks account for 44% of all of their TV viewing, spending 4 out of the 9 hours of TV they watch each day on these channels. Notably, these networks garner a collective 12% prime time rating and represent a good opportunity for a brand to deliver relevant advertising to reach this cultural segment.

Figure #10: Viewing to Chinese Language Networks Among Chinese Viewers

Chinese language Channels	
AZN-TV	AZN Asian Television
CCTV4	CCTV4
CCTV9	CCTV9
CTITV	CTI-Zhong Tian Channel
ETGBL	ETTV Global
ETNWS	ETTV News (Chinese)
HLJTV	HLJTV HeiLongJiang TV
IA	Imagine Asian
IAVC	Taipei International
JADE	TVB-Jade Channel
NTDTV	New Tang Dynasty TV
PHNX	Phoenix Television
SKLNK	Skylink

- Viewing to Chinese networks accounts for 44% of all TV viewing
- Chinese viewers watch 9 hours of TV per day compared to 8 hours per day for all households
- Chinese viewers spend almost 4 hours per day watching Chinese nets
- Chinese networks garner a 12% prime time rating

Opportunity: Piecing the Fragments Together

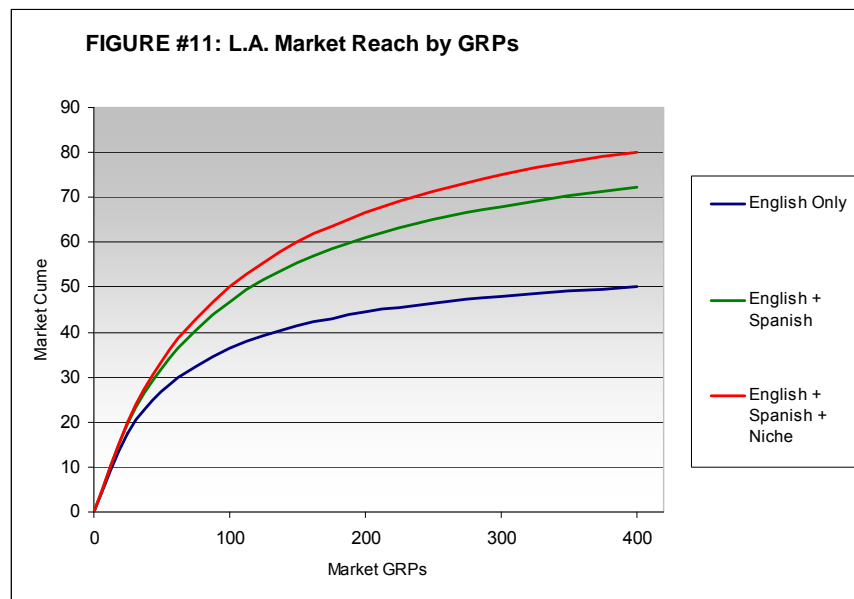
The Los Angeles market is characterized by fragmentation, with more than 300 channels, and several small niche populations. Despite this fragmentation our initial analysis allowed us to identify 15 program choice sets, groups of programs that have a high propensity for being consumed together. Then we were able to identify more than 20 behaviorally distinct viewer segments, groups of viewers that share a common choice profile. These sets of programs and persons have utility that goes beyond imparting a sense of order to the market. They can be useful in almost all facets of media analysis.

For agencies and advertisers the results can be used to support targeting efforts. We can start with the proposition that television viewing behaviors are predisposed to associate with other consumer behaviors. This goes beyond vertical interests, such as cooking, travel, or hunting and fishing, and extends to broader patterns of consumer choice. We can suggest a few examples from the segments shown in Figure #8:

- The All in the Family Segment would, likely, demonstrate a higher propensity of consuming products that are relevant to home and family life.
- The Happening Now and Contemporary Cross-overs would demonstrate much higher consumption of fashion and personal care products.

Behavioral segmentation can become a more powerful targeting tool when ones recognizes that a solid behavioral segmentation allows us to think about people in terms of “who” they are rather than “what” they are. The common demographic labels that we append to the population are becoming more and more likely to “lump” people together who are very different in terms of behaviors, preferences, and choices. In contrast a behavioral segmentation, although based on television tuning, can tell us much about the common preference and choice patterns of population sub-groups.

For agencies and advertisers it’s important to recognize that a market composed of many cultural niches can only be reached by piecing together the fragments. In Figure # 11 we can see how the total market reach is driven via schedule weight that is assigned, proportionately, to each of the program sets. Subsequently, the program sets can help us to think, strategically, about piecing the fragments together both within niche markets and across the market as a whole.



The program set and viewer segmentation results also have value for television programmers. A solid on-air schedule doesn’t come just from a list of strong programs. Programs must work together to keep viewers tuned across the line-up. A comedy series like *Chuck* might not hang together with the pseudo-slap-stick comedy show like *Jackass*. Good programming practice requires that we identify programs that hang together with *Chuck*, and hang together with *Jackass*, and align them in the appropriate schedules. The method used to develop the program preference sets does this, and does it much better than comparing demo profiles, since the association is based on actual behavior instead of a spurious demographic tendency.

The obvious advantage of the set-top box data is the large sample. The sample size allows to drill into our broad segments and take a look at a granular level. Back to our Chinese segments again in figure# 8, we see two segments that are identified by their viewing of Chinese language television. These segments account for only 1.3% of the viewers in the analysis, yet we are able to look at more granular behaviors because the Chinese language segments are derived from data from more than 5,000 set-top boxes that are distributed within 3,500 households. The ability to drill down is important. Although Chinese Language television viewers are different from other viewers because they watch Chinese language television as shown in figure #10, this does not make them a monolithic group. Here are a few additional observations:

- About 60% of all viewers, who watch at least one hour of Chinese language television each week spend more time viewing English language television.
- The English TV dominant group, which we have named the cross-overs, typically views six hours of Chinese language television a week. The Chinese language viewing tends to be concentrated in one or two channels.
- When “Cross-overs” cross-over to English Language Channels they view a wide range of popular entertainment.
- The 40% of viewers who are Chinese language dominant spread their viewing across a broader range of Chinese language channels, typically three or four, and view a mix of news and entertainment. However, they also cross-over, viewing two to three hours of English Language Television per week, and favoring news or sports.
- It was common to find set-top boxes, in a single household, that showed markedly different profiles. Over half of the multi-set homes had set-top tuning that resulted in assignment to different segments, including some sets that were assigned to English language segments. Diversity just doesn’t occur across homes, in happens under one roof.

The ability to drill down into the segments is important when we approach the effective targeting of niche populations. When we look at targeting as merely a matter of language we will be less precise than when we account for behavioral differences within groups of people with a shared language.

A final idea is emerging from our analysis. It involves the idea that the program sets and segments help us to identify the places where viewers “land and stick.” Tuning stickiness appears to be related, negatively, to overall channel changing and viewing churn. People land and stay on content they prefer, and “churn through” content that is less preferential. Subsequently, we are investigating links between viewing to program preference sets and advertising exposure and ad tuneaway, and believe that program sets and segments are a place to identify ad environments with lower levels of tuneaway during commercial pods, and potentially higher levels of ad attention.

Final Thoughts

The goal of our work is to find a method and data in order to find order in a highly fragmented multi-cultural environment. Perhaps the most important finding is that there are distinct program preference segments that do parallel the diverse nature of the market. This would suggest that segmentation models that are based on a national sample might not fully reflect the true behaviors that drive viewing. It has been said that all politics are local, and it may also be true that all viewing is local. This would mean that a true understanding of television audience behavior would require an amalgam of data, based on large samples, from across markets and cultures. Clearly, a more complex model, that looks at content preference in combination with the propensity to view television, “layered” across viewing styles, and constrained by geography and culture could be the prerequisite to support audience analysis in the multi-channel and multi-cultural environment that is emerging.

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