The Duality of Structure in China's National Television Market:

A Network Analysis of Audience Behavior

Elaine J. Yuan and Thomas B. Ksiazek

This study adapts Giddens' structuration theory to assess audience agency and its relationship with media structures. It employs network analysis to examine the co-evolution of audience duplication patterns and elements of media structure in China's national television market. The findings reveal that Chinese audiences tend to gravitate to channels with greater market share, higher household penetration rates, and more drama programming. Furthermore, channels tend to adjust their levels of drama programming relative to patterns of audience duplication in the long run. Finally, there was evidence of higher-order patterns of audience behavior, suggesting the existence of channel repertoires, and market concentration.

Research on audience behavior frequently takes either a micro or macro theoretical approach to understanding patterns of media consumption. The former attributes behavior to rational choices made by individual agents, or audience members. These micro-level theories include preference-based frameworks such as the uses and gratifications paradigm which credits media choice to the rational actions of individual media users motivated by their expectation of need gratification (Katz, Blumler, & Gurevitch, 1974). This prominent research tradition relies upon audience needs and preferences to explain media choice and demonstrate audience activity. However, critics point out that research propositions in the uses and gratifications paradigm, and other individual-level approaches, often lean heavily on audience agency at the micro level while overlooking the influence of structural factors constituting the media environment (Webster, 2008b). In contrast, there exists a separate body of research, focusing on macro-level

characteristics such as audience availability and scheduling factors, which has successfully established that these structural features are more powerful than audience preferences in explaining macro-level audience behavior (Adams, 1997; Barwise & Ehrenberg, 1988; Goodhardt, Ehrenberg, & Collins, 1975; Webster & Phalen, 1997).

In order to reconcile these two conflicting approaches to the study of audience behavior, the current study adapts Giddens' (1984) structuration theory to assess audience agency and its dynamic relationship with media structures. In this framework, media choice is understood as resulting from the "duality of structure" (Giddens, 1984), an iterative process by which agents and structures mutually influence and shape one another, thus bridging objectivist and subjectivist approaches to the study of human behavior. However, as Webster (2008b) pointed out, in order to assess the longitudinal effects of the duality of structure, one needs to conceptualize media choice beyond the individual level of analysis and cross-sectional designs because media markets are more responsive to the audience in an aggregate form on a recursive, long-term basis.

Network analysis (Monge & Contractor, 2003; Wasserman & Faust, 2006) offers an appealing analytical approach to the study of the interdependence and co-evolution of audience agency and the media environment over time. In this approach, a network, consisting of media outlets as its nodes and ties defined by audience duplication between those outlets, represents the media environment. Economic, cultural, technological, and programming features of these media outlets constitute structuring elements of the media environment. Audience duplication across media outlets over time, a manifestation of audience agency in its aggregate form, is analyzed both as being influenced by the characteristics of the environment and as a driving force for

changes in the media environment. Applying network analysis to such a dynamic system allows one to assess the mutual influence between structuring elements and audience agency over time.

This study attempts to advance the understanding of structuration in audience behavior, and aims to demonstrate empirically the validity of applying network analysis to assess the duality of structure in media choice (Giddens, 1984). It does so by examining the co-evolution of audience duplication patterns and elements of media structure within the dynamic environment of China's national television market, a significant yet little examined economic and cultural system with the world's largest audience. Structuration theory provides a broad theoretical framework for understanding the mutual influence of structure and agency, within which this study empirically tested several other more concrete theories of networks and audience behavior. The findings support a reciprocally influential relationship between audience agency and media structure. While audiences exhibit diverse viewing patterns that are influenced by the media environment, over time their collective media consumption behavior may shape the very structures within which they operate (Webster, 2008a, 2008b).

Literature Review

Duality of Structure in the Media Environment

Giddens' structuration theory (1984) has three major components: agents, structures, and the duality of structure, or the mutual influence between agency and structure. In the context of audience behavior, agents are the audiences. Although in theory media choice is intentional and purposeful, it takes place within highly structured social and technological environments. Political ideology, technological infrastructure, business profit models, and geo-cultural characteristics are among the key elements of such environments. Furthermore, although media structures may seem persistent in bounding individual behavior in the short term, over time they

are susceptible to change brought about by audiences. In short, media structure both enables and constrains audience agency. Media choices result from the interaction of agents and structures. It is an iterative process that implicates both in perpetuating and/or reshaping the structural features of the environment (Webster, 2008b).

Media institutions, an integral part of the media structure, often monitor and manage audience consumption to suit their needs and purposes in the competitive environment (Webster, 2008b). They do so by catering to what they perceive to be audience preferences, and adapting and adjusting, among other things, the structure and content of their offerings via control of program scheduling and availability. U.S. television industry personnel, for instance, routinely analyze television ratings produced by The Nielsen Company to make informed decisions on programming and advertising.

The mechanism at work in the duality of media structure depends on aggregating individual actions, which is often obtained through market information regimes (Webster, 2008b). Such regimes consist of regular updates about market activity provided by an independent supplier and available to all interested parties (Anand & Peterson, 2000; Andrews & Napoli, 2006). Examples include audience measurement firms such as The Nielsen Company in the United States and CVSC-Sofres Media (CSM) in China. After all, anonymous and isolated individual viewers often are elusive to media institutions, which can only respond to what they detect. Aggregation turns those invisible and isolated viewers into “institutionally effective audiences” that have social meaning and/or economic value (Ettema & Whitney 1994, p. 5). Only then can media institutions both capture and respond to audience preferences and behaviors. Therefore, there is a need to study audience dynamics beyond the individual level of

analysis in order to fully understand the interaction between audiences and their media environment.

While aggregate audiences are a summation of individual viewers, the former possess unique behavioral patterns that differ from that of the latter (Webster, 2008b). Audience duplication is one such example. This concept captures the degree to which two media outlets share a common audience (i.e., the level at which audiences duplicate between them). Media researchers and practitioners identified some interesting patterns of audience duplication. For instance, two adjacent television programs often share exceptionally high levels of overlapping audience members. Dubbed the “inheritance effect,” this audience feature is frequently utilized by media programmers to maximize audience retention (Tiedge & Ksobiech, 1986; Webster, 2006). This is just one example of how audience agency changes program availability, a factor often treated as one of the structural characteristics of the media environment.

Structuration theory typically deals with individual agency (Giddens, 1984), a sort that is characterized by inherent intentionality. Alternatively, this study concerns itself with *aggregate agency*. But how can aggregations of dispersed individuals exhibit this collective form of agency? Sewell (1992) notes that aggregations do, in fact, have the ability to influence structure. This “ability to influence” is where aggregate audiences derive their agency, whereby media institutions ascribe or attribute agency to aggregations of individuals. This is evident in language throughout media industries where aggregate audiences are commonly discussed as though they, as collective entities, chose a particular media product. Furthermore, it is only aggregate agency that has the potential to influence the structure of the media environment (e.g., low ratings causing a TV program to be moved to a different time-slot or even cancelled). To the extent that media institutions constantly monitor and respond to patterns of audience behavior, audiences

are perceived as having agency that is both enabled and constrained by the structuring features of the media environment.

A Network Analytic Approach to Analyzing Audience Duplication

Network analysis is a set of research procedures for identifying structures, or regular patterns in the relations among interacting units, rather than their individual attributes, of a social system (Monge & Contractor, 2003; Wasserman & Faust, 2006). Communication researchers most often define relationships in a network by the magnitude of information flow among individuals or organizations (Barnett, Danowski, Feeley, & Stalker, 2010).

The current study conceptualizes China's national television market as a network consisting of 31 nationally available yet locally originating channels. The study attempts to assess audience behavior in the market as a result of the interplay of audience agency, residing in audience duplication patterns among these channels, and media structures, embodied in the features of the channels. In network terminology, the 31 channels are the nodes in the network. The levels of audience duplication, or overlap, between these channels define the ties between nodes. More specifically, audience duplication is defined here as the percent of one channel's audience who also watch another. The percentage indicates the likelihood of one channel's audience to also watch another channel. A channel is considered to have a tie with another channel if the percent of its audience who also watch the other channel exceeds the average level of duplication between channels across the entire network.

This network approach allows us to examine the co-evolution of structural attributes of the channels and audience duplication over time. Unlike traditional duplication studies that only look at pairs of media vehicles, a network approach provides the opportunity to explore new patterns of audience duplication that may exist across three or more channels.

China's National Television Market

The use of structuration theory in media studies, television in particular, has seen limited application. Straubhaar (2007) maintained that television production and consumption inevitably dwell on political economic, cultural, and technological structures of the broad environment. McQuail (2001) also pointed out that these structural factors were “temporary arrangements,” which may appear stable in the short term but generate change in the long run (p. 204). When it comes to China's enormous and complex television system, these structural factors are certainly playing an important role in affecting what television has to offer and how audiences watch it.

With 1.3 billion viewers and over 2,000 television channels operating in its local, provincial and national markets, China boasts one of the world's largest television systems. China's television stations, all of which are owned by the governments at either the central, regional or local levels, long relied on government subsidies. However, after a vigorous period of marketization of the media system in the recent installments of China's socio-economic reforms, a rapidly growing advertising industry became the new driving force of development for the media industries in the past few decades (Anderson, 1981; Zhao, 2008). Television's rising profit potential, in turn, resulted in waves of channel proliferation around the country. The fast growth of provincial and local television markets led to the decentralization of the formerly highly centralized media system and significantly altered the structural relations among its national, regional and local components (Wu, 2000). Although China's television system remains structured very much along the local-provincial-national hierarchy of geopolitical boundaries and reined by government ownership, television in China increasingly is open to market competition. Consequently, current Chinese television not only serves the financial and political interests of the Chinese governments at various levels, but also pursues audiences for their enormous

advertising potential (Zhao, 2000). While the economically independent Chinese TV stations still have to cope with the close monitoring of the authorities, the regulation of Chinese television is less ideologically heavy-handed and more market-oriented than before (Zhang, 2000). For instance, the State Administration of Radio, TV and Film (SARTF) recently issued a directive that requires Chinese TV stations limit the overall drama programming on screen, which grew rapidly due to severe market competition (SARFT, 2010). Examples such as this show that political and regulatory factors in Chinese television system are important structural elements that deserve attention.

Drawing the largest audience and biggest advertising revenue among all markets at the various levels, the national television market bears important sociopolitical as well as economic significance in China. There are two major types of television in the national market. First and foremost, China Central Television (CCTV), a former national monopoly under the auspices of the central government, broadcasts channels that could be considered the Chinese equivalent of national networks in the United States. Second, 31 provincial television services (one for each of the 31 provinces in China) recently became available to the national audience through satellite-fed cable systems across the country. These locally-originating yet nationally-available channels are both serious political organs serving the provincial governments and lucrative economic vehicles that bring in national advertising revenues. Although all 31 channels offer broadcast-network-style comprehensive programming, the programs, especially news shows, often are locally produced and cater to local audiences in their respective provinces. Despite dominating their regional markets in terms of audience share and advertising revenue, these provincial channels often are less successful in other provinces, especially in rural areas, than CCTV. However, recent years witnessed the rise of some provincial channels which have become

serious contenders to the dominant CCTV channels in the national market. For instance, Hunan Satellite channel, known by the national audience for its highly successful variety shows, surpassed all but one CCTV channel to become the second largest advertising revenue earner in the national market in 2009. The total market share of all 31 channels rose to 25.8 % in the same year (CSM, 2010). These channels are of particular interest to the current study because they bear significant socio-economic consequences as explained further in the following paragraphs.

Since these nationally-available channels originate from different parts of China, regional inequality in China's socio-economic development carries significant implications for the success of these channels. Provinces in wealthier regions have more financial resources to develop better technological infrastructure, afford better programming and attract larger national audiences than others. Therefore, the 31 channels in the national market differ significantly in their household penetration rates and advertising revenues (CSM, 2010)¹.

These structural characteristics of the market are reflected in the different economic, cultural and technical attributes of the channels, which will necessarily have an impact on audience consumption. Drawing on structuration theory and a network analytic framework, this study aims to empirically assess audience duplication patterns across the nationally-available provincial channels, a prominent feature of cultural agency in the aggregate, and evaluate the mutual influences of both structural factors and audience agency.

Research Hypotheses

This study treats the 31 nationally-available provincial channels as nodes embedded in a network representing the Chinese national television market. When viewers in the audience of a certain channel choose to watch another channel, it is considered an instance of audience duplication, or in network terminology, the channel develops a tie with the other channel, via

their shared audience. In this relationship, the originating channel is called an “ego,” whereas the receiving channel is termed an “alter.” In this section, several network theories are applied in conjunction with theories of audience behavior to estimate the mutual constitution of the media environment over time by analyzing the co-evolution of the ties among channels and some important channel attributes.

There are two prominent network theories that are highly applicable to the analysis. These principles, preferential attachment and social influence, serve as the theoretical framework for the study’s hypotheses. The explication of the hypotheses and the research question is also firmly grounded in the relevant audience theories.

Preferential Attachment Theory

The theory of preferential attachment in social network analysis states that network nodes aspire to link to other nodes that are both well connected and/or exhibit a desired trait (Monge & Contractor, 2003). In other words, the more popular a node is in a network, the more likely other nodes will develop ties with it. By applying this theory to the analysis, one would expect that audiences, over time, tend to flow to channels that are popular and/or have favorable structural features in the market.

Market share, expressed as the percent of total viewing attributable to a particular channel, is a common measure of a television channel’s popularity and is often used to gauge the audience size of a given channel relative to others. Traditionally, a majority of existing studies on audience duplication used audience size to predict the levels of audience duplication across pairs of channels or programs. The findings indicated that audience size is a significant predictor of the proportion of one channel’s (or program’s) audience who is likely to watch another channel (or program) (e.g., Headen, Klompmaker, & Rust 1979; Webster, 2006; Webster & Lin,

2002). In fact, the relationship between the audience sizes for a given pair of programs and the level of duplicated audience between the two programs was found so consistent that Barwise and Ehrenberg (1988) termed it the “duplication of viewing law.” Hence, the first hypothesis tests if the preferential attachment effect may apply to the television market and dictates the duplication of viewing law in audience behavior.

H₁: Audiences tend to flow to channels with higher market shares over time.

In explaining the duality of structure in media choice, Webster (2008a, 2008b) pointed out that although in principle audiences may choose at will what and when to consume, in reality they act within highly structured environments. The social and technological infrastructures developed by governments and industries provide resources as well as set the limits for people to enact their media preferences. One such structural feature, channel availability, is dictated by the technological infrastructure of the market.

In today’s multichannel television market, channels are no longer universally available over the air. They differ in household penetration rate, measured as the percent of total television households that can receive the channel, as a result of the difference in technical capacity among various cable and satellite carriers. Previous research on audience behavior demonstrated that a channel’s household penetration rate had a positive impact on the average size of the audience it reached on a weekly basis (Webster, 2005). Given the highly unbalanced development in China’s television market, channels vary greatly in household penetration rate. Channels rich in resources can afford to pay or barter with the local authorities to get access to more local markets, thus achieving wider penetration through satellite-fed cable systems than channels with fewer resources. This is expected to bear some important consequences on audience duplication patterns in the market.

H₂: Audiences tend to flow to channels with higher household penetration rates over time.

Embedded in these structural limits, audiences develop knowledge of the environment and act upon their preferences. The uses and gratifications paradigm in audience research posits that audiences choose media primarily to gratify their sociopsychological needs (Blumler & Katz, 1974). To the extent that certain types of programs can satisfy their expectations, they develop preferences for those program genres.

As market competition intensified in China, television stations adapted to expand their entertainment program schedules in order to vie for audiences. TV dramas have quickly become the most popular program genre among Chinese audiences. According to CSM (2010), around 30% of the total airtime was dedicated to dramas, and 40% of Chinese audiences' total viewing time was spent watching them each year in the past decade. As a comparison, variety shows, the second largest entertainment genre in the market, had three times less airtime and viewing share than dramas. Drama programming has also been the most lucrative in the television advertising market. It earned about 30%–40% of the total revenues for 24% of Chinese stations, and 60%–80% for another 36% of the stations in 2004. Moreover, dramas took up about 90% of the total market share in China's burgeoning program production industry that year (CSM, 2004). Channels richer in resources usually can afford to offer better and more drama programming, attracting larger audiences in this highly competitive market. Therefore, **it is** postulated that audiences are more attracted to channels with higher levels of drama programming.

H₃: Audiences tend to flow to channels with more drama programming over time.

Social Influence Theory

Social network researchers have looked at the interdependence between the attributes (behaviors) of nodes and network ties among them from a social influence perspective.

Sociologists have long observed that network nodes tend to adapt their own individual behaviors to match those of their social neighbors (Friedkin, 1998). This perspective originated from classical sociological theory on socialization and coercion.

In a highly competitive market, television channels are compelled to monitor audience preferences through ratings analysis and adjust their programming strategies accordingly to win over audiences. It is highly plausible that programmers of a channel would take notice of where its audience tends to duplicate and modify their program schedules to accommodate programs that prove popular on other channels. Here, the present study focuses on drama programming, the most popular genre in the market. It predicts that audience duplication patterns will have an effect on the levels of drama programming on the channels over time. Indeed, the official SARTF data show that there is yearly fluctuation in the number of drama episodes made and distributed in the market. For instance, while there were 14,498 episodes in 2008, the number was 12,910 in 2009 (SARTF, 2010). This presented a chance to detect the power of audience agency in reshaping the media environment.

H₄: Over time, channels tend to develop levels of drama programming similar to the average level of all channels to which they link.

Other General Network Parameters

In addition to the hypotheses formulated above, the network analytic approach offers tools to gauge general patterns of audience duplication across the entire network over time. Existing studies of audience duplication focused on measuring levels of overlapping audiences between pairs of channels or programs (Cooper, 1996; Ksiazek & Webster, 2008; Rust, 1986;

Webster, 2006; Webster & Lin, 2002; Webster, Phalen & Lichty, 2006). Because the unit of analysis was limited to channel or program pairs, the researchers did not have the means to detect and examine audience duplication patterns that may exist across more than two channels. Measuring the tendency for transitivity and balance at the network level offered this possibility.

Network transitivity refers to the tendency toward triadic relations among three nodes (Steglich, Snijders, & Pearson, 2010, Table 2). In other words, if the audience of channel i overlaps with channel j , and the audience of channel j overlaps with channel k , does the audience of channel i also overlap with channel k over time (See Table 1 for a visual representation)? Similarity in certain attributes of these channels, such as programming or cultural origin, may be the root for developing this kind of relation.

The network transitivity parameter helps identify television channels that share a common audience. A positive transitivity measure provides evidence for the existence of channel repertoires. A channel repertoire is a subset of available channels that viewers frequently watch (Yuan & Webster, 2006). As an illustration, a recent report by The Nielsen Company revealed that American television viewers only use an average of 16 channels despite the fact that the average household receives 118.6 channels (Nielsen, 2008, June 6). Using peplemeter data from Beijing, Yuan & Webster (2006) also found that an average Chinese viewer uses only one third of all available channels. While the network transitivity parameter only allows for the identification of repertoires on a smaller scale (i.e., three channels), it would still be significant evidence that audiences tend to develop preferences for a small number of channels despite the increasingly abundant media environment.

RQ₁: Is there a tendency toward network transitivity over time?

Alternatively, network balance “expresses a preference of nodes to have ties to those other nodes who have a similar set of outgoing ties as themselves” (Snijders, Steglich, Schweinberger, & Huisman, 2007, p. 20). In simpler terms, if the audiences of channel i and channel j both overlap with channel k , does the audience of channel i tend to overlap with channel j over time, or vice versa (See Table 1 for a visual representation)? In essence, this measure evaluates the general tendency of structural balance of the overall network.

As explained earlier, China’s national television market is characterized by a significant disparity among the channels in terms of their economic resources and technical capacities resulting from regional inequalities in the country’s economic development (Wei, 2002). The available data show that the top ten channels have more than 70% of the total market share of all 31 national satellite-fed cable channels (CSM, 2010). This high degree of market concentration strongly suggests that audiences of less popular channels would tend to flow to popular channels, rather than spreading their attention evenly across the network. A negative tendency toward network balance over time would be an indicator of this predicted pattern.

H₅: There is a negative tendency toward network balance over time.

Method

Sample and Data

The audience data for this study came from a year-round national peplemeter panel of 4,000 television households across China. The panel is owned and operated by CVSC-Sofres Media (CSM), a Chinese media research company that provides ratings data for the television and advertising industries in China. The panel was created through a multi-stage probability sampling process to represent the national audience across China.

Similar to the kind The Nielsen Company uses for the American television market, CSM peplemeters are electronic devices that, when attached to the TV set, automatically record minute-by-minute viewing behavior of all members in the sample households. Such meters are known to produce a much more precise audience viewing record than either diaries or telephone recall techniques, and therefore are the preferred method for measuring television audiences worldwide.

The audience data for this study are excerpts of the panel data at four points in time: the first week of March, June, September and December in 2007. Market shares of the channels were then calculated for the four periods. CSM also provided channel household penetration rates in 2007 and data measuring the percentages of drama programming that aired during the four time periods.

The 31 provincial channels are the nodes in the network. The audience of a given provincial channel is defined as the viewers who spend the largest share of their total viewing time on that channel during the 4 weeks chosen for the study. Audience duplication between these channels, measured as the percent of a channel's audience who also watch another channel for 10 or more consecutive minutes during the week in question, constitutes directed ties among the channels. This 10-consecutive-minute measure was employed as an effective discriminating standard that successfully identified channel audiences in previous studies using peplemeter data (e.g., Yuan & Webster, 2006).

Procedure

This study uses SIENA (Simulation Investigation for Empirical Network Analysis), an analytical program that specializes in actor (node)-oriented modeling of longitudinal data, to evaluate the co-evolution of the media environment and audience behavior. SIENA estimates

models of a network through a series of simulations based on observed data at an earlier time and compares the estimated network parameters to those in the observed network at a later time (see Snijders, et al., 2007 for a detailed explanation of SIENA).

Table 1 summarizes the network analysis parameters and node (channel) attributes to be analyzed for each hypothesis and research question. To aid the reader's comprehension, the table includes a simple diagram indicating the evolution of network ties (patterns of audience duplication) across time for each hypothesis.

H₁ through H₃ test the network preferential attachment effects. H₁ analyzed the effect of market share on a node's popularity to other nodes in the first week of March, June, September and December. A positive parameter suggests that audiences tend to overlap with channels that have higher market shares over time. H₂ analyzed household penetration rates across the four time periods, where a positive parameter suggests that audiences tend to overlap with channels that have higher penetration rates over time. H₃ analyzed the amount of drama programming, measured as the percent of total programming (in minutes) offered by the channels, in the first week of March, June, September and December. A positive parameter implies that audiences tend to duplicate with channels that have more drama programming over time.

H₄ tested the theory of social influence. This theory suggests that channels will adjust their programming to match that of the channels they link to (the alters). Here, the study analyzed the preference of channels to be similar to their alters, where the total influence of the alters is the same regardless of the number of alters. A positive parameter suggests that channels do adjust their programming according to audience duplication patterns. It is further posited that it would take the channels a considerable amount of time to respond to patterns of audience behavior in the market and subsequently adjust their program offerings. It might not be

reasonable to expect a significant change in drama programming by the channels in such short time spans as every 3 months. In fact, the SARTF data show that the fluctuation of drama episodes is much greater yearly than quarterly (SARTF, 2010). Therefore, the researchers decided to test this hypothesis with the network and market programming data in March and December only.

RQ₁ examines network transitivity over time. A positive transitivity parameter points to a tendency toward network closure in the form of transitive triplets (See Table 1). This would indicate the existence of higher order structures, or clusters, of audience duplication beyond simple pair-wise duplication, and suggest the presence of small-scale channel repertoires. H₅, on the other hand, predicted a tendency away from network balance. While a positive balance parameter would indicate a tendency for channels to link to other channels that are structurally equivalent, or have similar tie patterns to their own, this study predicted a negative parameter, supporting the notion of a complex, unbalanced Chinese television market where audiences of small channels tend to duplicate with popular ones rather than to each other.

For analytical purposes (SIENA only works with dichotomous tie variables), these valued ties are dichotomized based on the average number of ties across the entire network in order to be analyzed by SIENA. In plain words, only ties that represent a level of audience duplication that is above the network average were considered. Conversely, if the level of audience duplication between two channels was below the network average, the tie was considered nonexistent. This provides a more conservative threshold than simply defining a tie by any degree of duplication. In effect, this focuses the analysis on those channels that exhibit high levels of duplication.

Insert Table 1 about Here

Results

The SIENA parameter estimates for all hypotheses and the research question are presented in Table 2. H_1 through H_3 test the network preferential attachment effect. H_1 , audiences tend to flow to channels with higher market shares over time, is supported. Popular channels among the 31 channels are more likely to be watched by audiences across China. This finding not only indicates a general pattern of market concentration at the national level, but also hints at the imbalance in the regional development of local television markets. H_2 , audiences tend to flow to channels with higher household penetration rates over time, is supported. Household penetration rate provides information about the size of the potential audience a channel can reach. The result suggests that this technical element in the market may put a constraint on the size of the audience universe for a given channel (Webster, 2005). H_3 , audiences tend to flow to channels with more drama programming over time, is supported. It demonstrates that television has indeed become a medium of mass entertainment in China. In summary, all three preferential attachment hypotheses are supported.

H_4 , channels tend to develop a similar level of drama programming as the average level of all channels they link to over time, is supported. This finding substantiates the power of audience agency to affect program scheduling, a structuring factor (Webster & Phalen, 1997). It is also worth noting that the effect was significant when only considering the network data in March and December. A significant result was not seen when attempting this procedure across all four periods. This confirms the notion that the process by which audience agency reconstitutes the media environment tends to be a long-term effect.

Finally, the results reveal a tendency toward network transitivity over time. This is evidence for audience duplication across multiple channels and the existence of channel

repertoires, albeit on a small scale. These channel repertoires often consist of popular channels in the market. Thus, an intriguing line of future research would involve exploration into the internal mechanism(s) underlying the formation of these transitivity structures. At the same time, providing support for H₅, there is a negative tendency toward network balance over time in China's national television market. This finding only confirms the observation of concentration and regional imbalance in the market.

Insert Table 2 about Here

Discussion

Applying Giddens's structuration theory to media environments, researchers propose that audience consumption is both enabled and constrained by structural factors such as economics, technological foundations, and cultural characteristics (Straubhaar, 2007; Webster, 2008a, 2008b). However, the grand scale of structural determination across time is difficult to capture in short-term laboratory experiments or cross-sectional surveys. Actor (node)-oriented network analysis is a potent analytical approach for the study of the co-evolution between structural factors of the environment and audience agency. Applying both approaches to the study of audience duplication in China's national television market, this study treated the market as a network consisting of its major channels that differ in key economic and technological aspects. The study successfully captured the temporal influence of structural factors in the media environment, as reflected in the differences among channels in terms of popularity, household penetration rates, and programming, on audience duplication patterns, an aggregate form of audience agency.

Furthermore, the study demonstrated that audience consumption patterns, in turn, bear long-term impacts on the media structure. This dynamic relationship between audience agency

and media structures confirms the notion of duality of structure. Results showed that channels, in response to recognized preferences from audience duplication patterns over time, tended to adjust their drama programming levels, and consequently the overall program availability in the market. Taking the findings together, these results effectively captured a structuration process whereby audiences exhibit agency within structures, while over time reconstituting the dynamics of those structures.

In contrast to the majority of audience studies that focus on individual agents, this study formulated audience agency in its aggregate form. This analytical approach effectively embodied the notion of “institutionally effective audiences” (Ettema & Whitney 1994, p. 5). By examining audience behavior in its collective form, this research was able to identify the mutual influences between audiences and the media environment. While individual viewers’ program choices are ultimately bound by the restrictions of a media environment, collective representations of choice can influence the structure through patterns of audience duplication (Webster, 2008a, 2008b).

The network approach in this study also expanded the study of audience duplication to a higher analytical level. Traditional duplication studies were limited in scope as they only looked at pair-wise patterns of overlap. The application of network analysis in this study helped identify audience duplication patterns across multiple channels. The negative balance parameter faithfully reflects the imbalance in China’s national television market where audiences of small channels tend to duplicate with popular channels rather than to one another over time. This finding is consistent with a “double jeopardy” effect, where channels with low market share also have relatively disloyal audiences in terms of repeat viewing (McDowell & Dick, 2001).

The findings have other significant implications for China’s national television market. As the number of channels proliferates in the market, Chinese audiences become more selective.

They tend to focus their viewing on channels that provide more programming with high entertainment value such as dramas. Meanwhile, there is evidence that the television stations are keen to monitor and respond to the needs of their audiences by adjusting their programming schedules accordingly. There is a considerable degree of market concentration as Chinese audiences are pulled toward popular channels with better drama programming and technical resources. It is conceivable that as China's current socio-economic environment further develops audience behavior patterns will certainly evolve accordingly.

Although the current study represents a fresh effort in bringing together multidisciplinary theories and methods in examining audience behavior, it does so with some limitations. First, the researchers hope to extend this work to include network measures that span a longer period than 1 year. It is possible that the influence of audience behavior on programmers would be even more profound with data ranging over several years. This would validate these findings and test to see if the duality of structure effect sustains. Related, it would also be interesting to compare whether a higher level of market competition predicts a shorter adjustment period for programming. Finally, this study was conducted with data from the Chinese media environment. It would be useful to examine whether these results hold in alternative media systems with distinct characteristics.

Conclusion

This study analyzed the co-evolution of structure and agency in a media environment. It found support for the reciprocal influence between structural factors and aggregate agency, represented in patterns of audience duplication. Analyzing audience behavior data in the Chinese television market, it was found that audiences tend to gravitate to channels with greater market share, higher household penetration rates, and more drama programming. Examining the

opposing influential path, the study revealed that channels tend to adjust their levels of drama programming relative to patterns of audience duplication. Finally, there was evidence of higher-order patterns of audience behavior, suggesting the existence of channel repertoires, as well as market concentration. These findings highlight the value in casting a fresh set of theoretical and empirical eyes on the study of audience behavior and media environments.

Note

¹ According to CSM (2010), the household penetration rates of the 31 channels ranged from 91% to 9% with an average of 45.6%. The annual prime time advertising revenues ranged from 2,060.64 to 156.32 million RMB with an average of 966.58 million RMB.

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Table 1

Network Parameters and Node (Channel) Attributes Analyzed for Each Hypothesis and Research Question

Network Theory	RQ(s) / Hypotheses	Parameters & Variables	Time ₁	Time ₂
Preferential Attachment	H ₁	Market Share
	H ₂	HH Penetration		
	H ₃	Drama Programming		
Social Influence	H ₄	Drama programming
Transitivity	RQ ₁	Transitive Triplets
Balance	H ₅	Balance

Notes: ○ = Low score, ● = High score, and ● = Arbitrary score (adopted from Steglich, Snijders, & Pearson, 2010, Table 2).

Table 2
Parameter Estimates for the Co-Evolution of Channels and Audience Duplication

2007	All Four Periods	
	Estimate	SE
Preferential Attachment		
Market Share	.42**	.07
HH Penetration	.02**	.004
Drama Programming	2.72**	.54
Social Influence⁺	4.14*	1.97
Transitivity	.40*	.15
Balance	-3.30**	.74

Notes: * $p < .05$, ** $p < .01$

⁺ The results presented for the Social Influence hypothesis tested the co-evolution for only two time periods, March and December. The result was not significant when testing across all four periods.