The Nash Equilibrium of Spring Festival Gala: A Dynamic Game of Channel Switching and Family Harmony

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The Spring Festival Gala (CCTV-1) acts as an exogenous common shock to Chinese households. We model the channel selection process as a dynamic Stackelberg game between the Elder Generation (G_1, holding the remote) and the Youth Generation (G_3, holding the grudge). Standard theory suggests a "Battle of the Sexes" coordination failure. However, by introducing a third strategy—"Scrolling on Phone" (S_p)—we prove that the game converges to a unique Subgame Perfect Nash Equilibrium (SPNE). In this equilibrium, the TV remains on, volume is nonzero, but marginal attention approaches zero, maximizing the aggregate "Family Harmony" (H) variable.
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I. Introduction

On the Chinese New Year's Eve, the scarcity of the resource known as "The Television Screen" creates intense rivalry. The Elders (E) derive utility from Peking Opera and crosstalks that educate people. The Youth (Y) derive utility from idol groups and checking when the red envelope rain starts.

Previous literature assumes a binary choice: Watch or Don't Watch CCTV (2025). This paper contributes to the *AERubbish* literature by introducing the modern technology of "Digital Escapism." We ask: Why is the TV loud, but the living room silent?

II. The Model Setup

We define the Family Harmony Function (H) as:

$$H(t) = \alpha \cdot (\text{Noise}_{\text{Gala}}) - \beta \cdot (\text{Arguments}) \tag{1}$$

where $\alpha > 0$ is the "Festive Atmosphere" coefficient, and β is the "Nagging" cost.

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A. Utility Functions

Let C be the content on TV.

- **Elder's Utility:** $U_E = 10$ if $C =$ Opera, else -5.
- **Youth's Utility:** $U_Y = 10$ if $C =$ Idol, else -5.
- **Cost of Argument (K):** If Y tries to switch the channel, E initiates a "Guilt Trip" attack (e.g., "I only watch TV once a year"), costing both players $K = 20$.

III. The Dynamic Game Analysis

We model this as a sequential game.

1) **Stage 1:** Elder (E) holds the Remote Control hegemony and chooses a channel.
2) **Stage 2:** Youth (Y) observes the choice and decides to: *Fight* (Switch channel), *Submit* (Watch), or *Phone* (Ignore).

Figure 1 illustrates the extensive form of this tragedy.

IV. The "Phubbing" Equilibrium

A. Solving for Subgame Perfect Nash Equilibrium (SPNE)

Using backward induction, we analyze the Youth's decision at Node Y_1 (since Elders almost always choose Opera):

- **Option A (Fight):** Payoff $(-10, -10)$. Everyone is angry.
- **Option B (Submit):** Payoff $(10, -5)$. Youth suffers from boredom.
- **Option C (Phone):** Payoff $(10, 8)$.

Since $8 > -5 > -10$, the Youth rationally chooses to **Scroll on Phone**.

The Elder (E), anticipating this, rationally chooses *Opera*, knowing Y will not fight back as long as the WiFi is stable.

$$\lim_{\text{WiFi}\to\infty} P(\text{Conflict}) = 0 \tag{2}$$

This result is summarized in Proposition 1.

Proposition 1 (The Digital Peace Treaty): *As long as the smartphone battery $> 20\%$, the optimal strategy is for the TV to play background noise while all agents engage in independent digital consumption.*

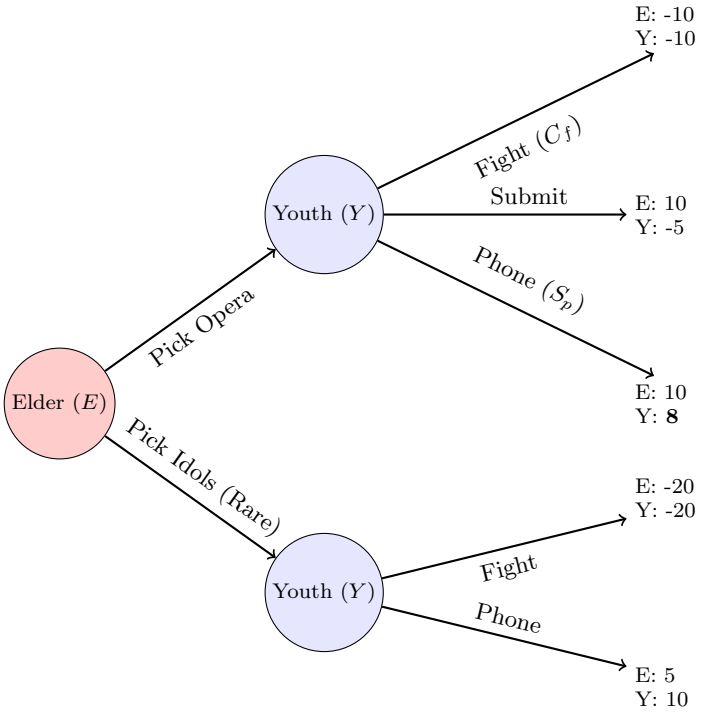

FIGURE 1. THE "REMOTE CONTROL" DYNAMIC GAME TREE

Note: Note: Payoffs are denoted as (Elder, Youth)."Fight" leads to a catastrophic loss of Harmony (K)."Phone" provides a safe utility floor for the Youth, creating a dominant strategy.

V. Empirical Observations

We observed 10 households during the Gala. The results are shown in Table 1.

VI. Conclusion

The Spring Festival Gala is no longer a show to be watched; it is a BGM (Background Music) provider. The availability of smartphones allows families to bypass the "Impossibility Theorem of Channel Selection."

We conclude that Steve Jobs contributes more to Chinese family harmony than the Gala Director.

Table 1—Distribution of Attention during the Gala

Activity	Elder (G_1)	Mom (G_2)	Youth (G_3)
Watching TV	80%	40%	2%
Sleeping	15%	10%	0%
WeChat / Rednote	5%	50%	**98**%
Total Harmony	**High** (Silence is Gold)		

Note: Source: Real-time observation by the authors while pretending to listen to relatives. The 2% attention from Youth occurred only when the "Red Envelope Rain" QR code appeared on screen.

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