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Tobacco imagery in popular films in China from 2001 to 2020: a declining trend

Xuping Li ,¹ Lu Niu ,¹ Yiyi Kuang,¹ Jinglan Mei,¹ Ruimin Li,¹ Tonghe Li,¹ Jing Ding,² Shuiyuan Xiao¹

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¹Social Medicine and Health Management, Xiangya School of Public Health, Central South University, Changsha, Hunan, China

²School of Journalism and Communications, Communication University of Zhejiang, Hangzhou, Zhejiang, China

Correspondence to

Dr Shuiyuan Xiao, Central South University, Changsha, Hunan 410017, China; xiaosy@csu.edu.cn

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ABSTRACT

Background Exposure to tobacco imagery in films can result in tobacco use among adolescents and young adults. Efforts have been made to limit tobacco imagery in films in China. Our study investigates the level and trend of tobacco imagery in popular films in China from 2001 to 2020.

Methods The running time of the 20 top-grossing films in China annually from 2001 to 2020 was divided into 5 min intervals, and those containing tobacco imagery were coded for the following aspects: country of origin, presence of warning, presence of minors and the presence of tobacco brands.

Results We coded 9423 five-minute intervals across 400 films. Tobacco imagery occurred in 1344 intervals across 239 films. There was a declining trend in the proportion of films ($r=-0.515$, $p=0.022$) and the proportion of intervals ($r=-0.004$, $p<0.001$) with tobacco imagery over time. None of the films with tobacco imagery contained a warning for their audience against smoking. Chinese films contained more tobacco imagery than international films, and tobacco imagery related to minors and tobacco brands were present despite regulations.

Conclusion Tobacco imagery remains in films in China. The relevant authorities and film producers should ban films with tobacco imagery in China; for example, they should ban films with tobacco imagery from participating in awards, add warnings to films with tobacco imagery and give films containing tobacco imagery a default 'R' classification.

INTRODUCTION

Tobacco use is one of the largest avoidable causes of death and disability around the world, as it results in over 8 million deaths every year.¹ In China, there were more than 300 million smokers,² with roughly more than 2.3 million deaths attributed to tobacco use in 2019.³

Tobacco use is affected by many social and cultural factors,⁴ which means that attitudes towards tobacco use may differ across countries and societies.⁵ In China, tobacco use is acceptable because it takes an important role in social activities and is even seen as social currency.⁶ As a media tool, tobacco imagery in films can influence the audience's desire for tobacco,⁷ and this effect is even more pronounced among young people. A systematic review and meta-analysis reported that higher exposure to tobacco imagery in films was associated significantly with increased risk of trying smoking (relative risk=1.93, 95% CI 1.66 to 2.25).⁸ Exposure to tobacco imagery in films has

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Tobacco imagery is present in films in many countries. Although great efforts are being made to reduce tobacco imagery in films in China, to date, no studies have reported the levels and trends of tobacco imagery in popular films in China.

WHAT THIS STUDY ADDS

⇒ This paper reports four main findings: (1) there are declining trends in tobacco imagery in films in China between 2001 and 2020 regarding the proportion of films and the proportion of intervals, (2) none of the films with tobacco imagery in this study provided warnings about smoking, (3) Chinese films contain more tobacco imagery than international films, and (4) and tobacco imagery related to minors and tobacco brands were present in films despite regulations.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study's findings suggest that further and continued efforts must be made to limit tobacco imagery in films in China; specifically, its particular insights (listed above) offer directions for policymakers (eg, warnings need to be added to all films with tobacco imagery). Future research can measure exposure to tobacco imagery in Chinese adolescents and young adults and explore the correlation and mechanism between tobacco imagery in films and smoking behaviours among youth.

also been identified as a cause of smoking in adolescents and young adults.⁸⁻¹⁰ Many governments and relevant industry groups have introduced policies to limit tobacco imagery in films. For example, a tobacco-free film rule was implemented from 2012 in India.¹¹ In America, all major film companies must abide by policies to reduce tobacco depictions in youth-rated movies.¹² In China, a year after ratifying the WHO Framework Convention on Tobacco Control in 2005,¹³ the National Radio and Television Administration of China (NRTA) issued a rule on film screenplay registration and film administration,¹⁴ which requires that 'excessive' tobacco imagery in films be cut or modified. In 2011, the NRTA issued a notice strictly limiting on-screen tobacco imagery in films and television drama, which replaced the 2009 notice that was limited to television drama only.¹⁵ It forbade the



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display of tobacco brands, tobacco imagery with minors present, and restricted instances of tobacco imagery. In the same year, the Chinese Association on Tobacco Control awarded the first satirical award 'dirty ashtray award' to limit tobacco imagery in films.¹⁶

Studies on popular films in other countries have demonstrated that tobacco imagery is very common.¹²⁻¹⁷⁻¹⁹ For example, using a 5 min coding method, tobacco imagery occurred in 8% of 5 min intervals across 41% of the most commercially successful films from 2009 to 2017 in the UK.¹⁸ Among the 595 top-grossing films in America from 2010 to 2018, 48% included tobacco imagery¹²; 79% of all youth-rated popular Mexican films in Mexico and Argentina from 2004 to 2012 contained tobacco imagery.¹⁹ Yet, the number of tobacco imagery in films had different trends over time in various countries. A study of tobacco imagery in popular UK films showed a declining trend over time ($r=-0.789$, $p<0.01$) over the past three decades.¹⁸ Yet, the trend remained stable for top-grossing films in America from 2010 (45%) to 2018 (46%).¹² In China, the Chinese Association on Tobacco Control has monitored smoking imagery in top 30 popular Chinese films since 2007. Of the 30 most popular Chinese films in 2020, 60% contained tobacco imagery.²⁰ However, the Chinese Association on Tobacco Control did not monitor tobacco imagery in international films released in China despite their large market share in the country. The level of tobacco imagery in international films shown in China and how effectively the government and other non-profit organisations managed to limit tobacco imagery in such films remain unknown. Hence, this study ascertains the level and trend of tobacco imagery in popular films in China from 2001 to 2020.

METHODS

Selection of films

A descriptive study design was employed. According to the data provided by Boxofficecn,²¹ we included the 20 top-grossing films in Mainland China (without any political consideration, hereafter all referred to as China) annually between 2001 and 2020. Their general information, including running time and original country of each film, was obtained from Douban.²² Films whose original country was not China were categorised as international films. We obtained the video resource of each film through internet platforms such as iQIYI and Tencent Video, and restricted general information on each film consistent with Douban.

Coding method

Data were entered into the online platform WenJuanXing as the films were viewed. Every film was coded and analysed using the 5-min interval method, which has been widely used in studies of a variety of audiovisual media.^{17 18 23} We coded the tobacco imagery in each 5 min interval. Any time less than 5 min at the end of the film was not coded. Tobacco imagery included the following categories:

- ▶ Actual tobacco use: the consumption of any tobacco product (cigarettes, cigars, pipes, electronic cigarettes or others) on screen by any character.
- ▶ Tobacco paraphernalia: the on-screen presence of tobacco or related materials (such as cigarette packets, matches, lighters, ashtrays).
- ▶ Inferred tobacco use: the presence of a verbal or non-verbal inference (such as a comment on smoking or a smoky atmosphere).
- ▶ Tobacco imagery: any of the aforementioned aspects.

If tobacco imagery was present in an interval, we also recorded whether there was a warning such as 'smoking is harmful to your health' and whether this tobacco imagery was related to minors, that is, the smoker was a minor, or a minor was present when an adult smoked. The presence of tobacco brands was also recorded. Brand appearances were defined as the occurrence of branded tobacco products or related advertisements and logos.

For coding purposes, multiple instances of tobacco imagery in the same 5 min interval were considered to be a single event, while instances that spanned consecutive 5 min intervals were coded as separate events. If more than one category occurred in an interval, the prioritising framework was actual tobacco use, tobacco paraphernalia and inferred tobacco use. The coders were coauthors and volunteers, and all films were double coded by two coders independently. After 40 film coding exercises for every coder, we found that the reliability of coding each film was above 85%. To avoid missing data, the data of each film used for analysis were the union set of the two coders' data.

Data analysis

Data were analysed using basic descriptive procedures, comparison between groups and regression analysis in Microsoft Office Excel 2019 and IBM SPSS V.22.0. The proportion of films with tobacco imagery was calculated by dividing the number of films containing tobacco imagery by 20 (the total number of films included in each year). The proportion of intervals with tobacco imagery was calculated by dividing the sum of tobacco intervals in each film by the number of included films. The χ^2 test was used to compare the prevalence of tobacco imagery in films and in intervals across years. General linear regression analysis was used for temporal trend analysis. All tests were two sided and the test level was $\alpha=0.05$.

RESULTS

Films included

The 400 films totalled 785.3 hours (47 115 min), with a mean of 117 min (SD=22 min) and a range of 75–200 min. There were 9423 five-minute intervals in the films, with a mean of 23.6 intervals per film, ranging from 15 to 40. Of the 400 films, 203 were produced wholly or mainly by Chinese companies, 178 were produced wholly or mainly by American companies and 19 were wholly or mainly produced by others. Detailed information on these films can be found in online supplemental table S1. The 20 most popular films accounted for 47%–96.2% of each year's gross Chinese cinema box office, with a median of 67.1%.

Films with tobacco imagery

The proportion of films with tobacco imagery was 59.8% (95% CI 54.5% to 65%), and it varied from year to year. The proportion of films with tobacco imagery was highest in 2001 at 85%. The films with minimal tobacco imagery appeared in 2013 and 2017 at about 40%. Although there was no significant statistical difference between the proportions of all films with tobacco imagery in 2001 and 2020 ($\chi^2=2.133$, $p=0.144$), a significant declining trend was observed. The proportion trend of films with tobacco imagery from 2001 to 2020 is shown in figure 1 ($r=-0.515$, $p=0.022$). There was a clear declining trend in all films from 2001 to 2013 before a period of fluctuation.

Intervals of films with tobacco imagery

Tobacco imagery was present in 14.3% of all intervals (95% CI 12.2% to 16.4%). Actual tobacco use occurred in 11.1% of intervals (95% CI 9.4% to 12.9%). Tobacco paraphernalia was

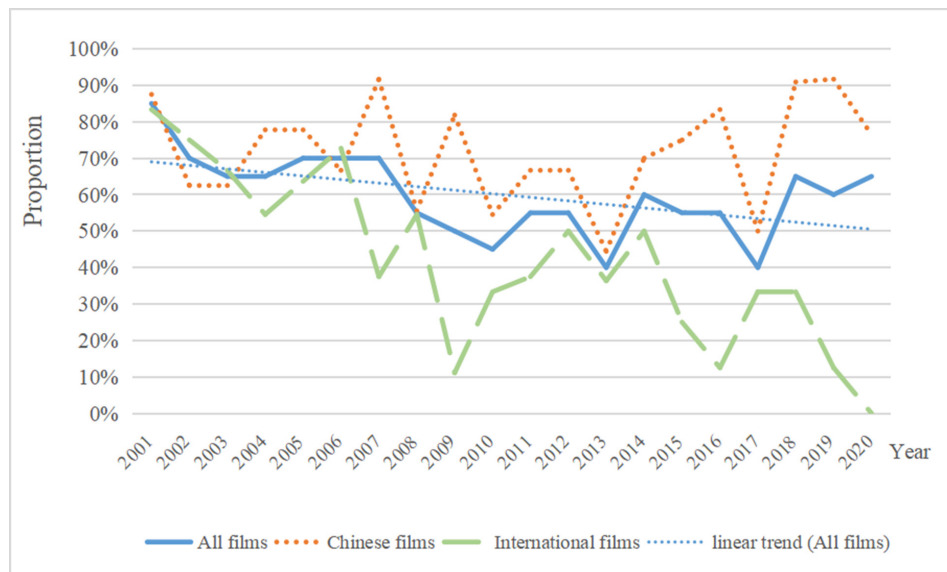


Figure 1 The proportion of films with tobacco imagery.

present in 2.6% of all intervals (95% CI 2.1% to 3%). Inferred tobacco use occurred in 0.6% of all tobacco intervals (95% CI 0.4% to 0.8%). As with the proportion of films with tobacco imagery, the proportion of intervals with tobacco imagery varied from year to year as well. The maximum was 20.8% in 2001, and the minimum was 6.5% in 2015. There was a significant difference of the proportion of intervals with tobacco imagery between 2001 (20.8%) and 2020 (15.8%) ($\chi^2=3.878$ $p=0.049$), and a significant downward trend between 2001 and 2020 ($r=-0.004$, $p<0.001$). The proportion of actual tobacco use was the highest, followed by the proportion of tobacco paraphernalia and the proportion of inferred tobacco use. **Figure 2** reveals the proportion of intervals with different tobacco imagery. The proportion of tobacco imagery in films showed a significant downward trend from 2001 to 2013, fluctuated from 2014 to 2017 and increased to a certain extent in the following 3 years.

Warnings about tobacco imagery

Although we tried to code the data of warnings on tobacco imagery, such as ‘smoking is harmful to health’ in films, none

of the films with tobacco imagery included a warning such as ‘smoking is harmful to health’.

Comparison between Chinese and international films

There were 973/4548 (21.4%) of intervals in 148/203 (72.9%) of Chinese films containing tobacco imagery and 371/4875 (7.6%) of intervals in 91/197 of (46.2%) international films containing tobacco imagery. Chinese films were more likely than international films to have tobacco imagery in films ($\chi^2=29.666$, $p<0.001$) and in 5 min intervals ($\chi^2=365.564$, $p<0.001$). The detailed data are shown in online supplemental table S2.

Tobacco imagery related to minors

There were 49/400 (12.3%) films containing tobacco imagery related to minors over the past 20 years. It varied from year to year, ranging from 0/20 in 2014 to 6/20 (30%) in 2019. There was no obvious upward or downward trend over time. **Figure 3** reveals the number of films with tobacco imagery related to minors each year.

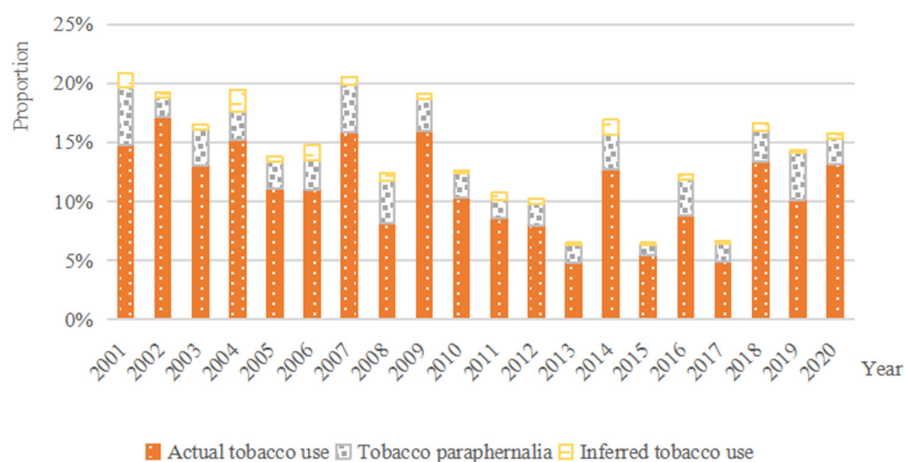


Figure 2 The proportion of intervals with tobacco imagery.

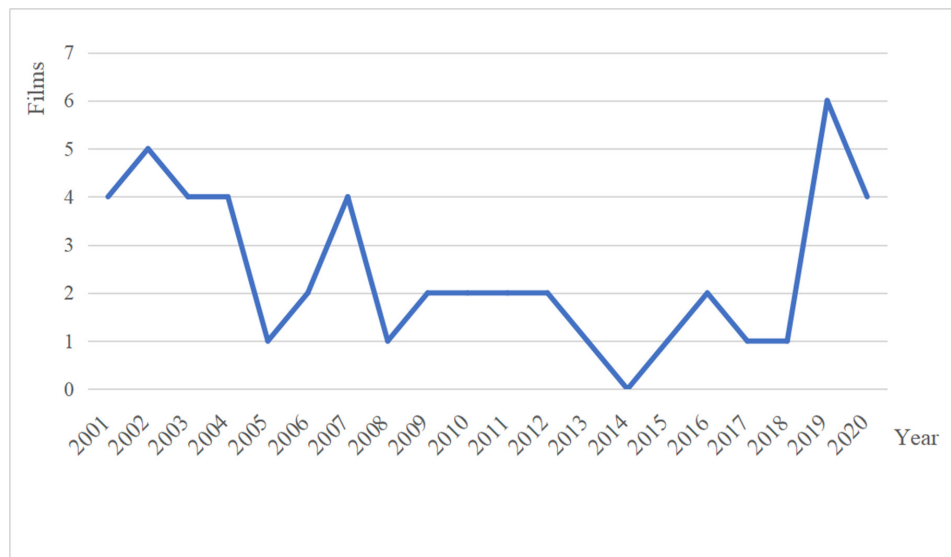


Figure 3 The number of films with tobacco imagery related to minors.

Tobacco brands in films

Tobacco brands typically appearing on tobacco packs or mentioned by film characters were present in 14/9423 (0.1%) intervals across 11/400 (2.8%) films, all of these films were Chinese films. Thirteen tobacco brands appeared, eight of which were Chinese brands. Hongta Mountain (Hong Ta Shan) was the only brand to appear in more than one film ($n=2$). Films containing tobacco brands are shown in online supplemental table S3.

DISCUSSION

Coding tobacco imagery of the 20 top-grossing films each year in China from 2001 to 2020, our study found that tobacco imagery occurred in 14.3% of all intervals across 59.8% of all films. The proportion of films and the proportion of intervals with tobacco imagery varied from year to year. Both indexes showed a declining trend between 2001 and 2020. Comparing the proportion of films with tobacco imagery between China and other countries, it was higher in China (59.8%) compared with 41% in the UK and 48% in America. At the interval level, using the same 5 min interval coding method, tobacco imagery was also present in more intervals (14.3% in China, 8% in the UK). More attention must be paid to limiting tobacco imagery in films released in China.

The behaviour of film characters affects the behaviour of the audience, especially for adolescents and young adults. When tobacco imagery is present, a warning such as ‘smoking is harmful to your health’ could remind the audience not to smoke. Unfortunately, none of the films had such warnings. Adding the warning to films with tobacco imagery might be helpful to reduce the influence of tobacco use on audiences.

More tobacco imagery in Chinese films than that in international films may be directly due to the rating system of films in America, the UK and some other countries.^{12 17} As the target audience of international films is wider, the tobacco imagery in films is restricted during production. Inadequate implementation and enforcement of related policies may be an underlying cause of the high level of tobacco imagery in Chinese films.

Imagery in the media relevant to young people can influence their attitudes and behaviours.^{12 24} In the context of tobacco control actions, both the WHO and the NRTA have established

relevant national regulations and policies to clearly limit the exposure of tobacco imagery to minors. Our study found that from 2001 to 2020 (except for 2014), there were films with tobacco imagery related to minors every year. In 2019, there were six films with tobacco imagery with minors present. It is a notable aspect that requires more attention in the future.

The notice published in 2011 by NRTA required that no brand should appear in the films. Our study found that tobacco brands were still present even in films made after 2011. All 11 films with tobacco imagery were Chinese films. Although not quite rising to the level of direct advertising, possible indirect advertising is also worth the attention of the relevant regulatory authorities. Thus, the NRTA should pay more attention to the enforcement of the notice to limit tobacco brands in films, especially Chinese films.

To limit tobacco imagery in films in China, the relevant authorities should fully implement the notice issued by NRTA on strictly controlling smoking imagery in films, strengthening supervision and examination of films during the process of approval, production and before their release. Film producers should actively assume their social responsibilities and abide by the notice. Film-related industry associations should consider tobacco imagery in films as an indicator of merit and restrict films with tobacco imagery from participating in awards. A warning that smoking is harmful to one’s health can also help discourage tobacco use among audiences when the situation does require a tobacco imagery. In addition, giving films containing tobacco imagery a default ‘R’ classification may be another effective measure to reduce tobacco exposure to adolescents and young adults in China. Future research could measure exposure to tobacco imagery in Chinese adolescents and young adults and explore the correlation and mechanism between tobacco imagery in films and smoking behaviours among youth.

Limitation

This study was limited by coding resources to the 20 most popular films each year in China, but they were likely to reflect the prominent pattern of tobacco exposure in popular films in China as they represented 47.0%–96.2% (median 67.1%) of annual box office revenues. To code the occurrence of tobacco imagery in films and television works, different methods have

been adopted by previous authors. Coding scene changes as separate imagery in 1, 3 or 5 min intervals as well as other methods of continuous measurement have been employed to varying effectiveness.^{12 25 26} To code tobacco imagery in films in our study, we used the 5 min interval coding method to generate semiquantitative measures and used double coding to ensure the validity. This method is reliable and sensitive to relative changes in behaviour levels. However, it may also lead to both underestimation (if high-frequency appearances are concentrated in short period of time) and overestimation (if short appearances transition into two intervals).

CONCLUSION

Our study found that tobacco imagery was present in popular films in China from 2001 to 2020. There was no difference in the proportion of films with tobacco imagery between 2001 and 2020 but the proportion of intervals with tobacco imagery in 2020 was significantly lower compared with 2001. Both indexes showed a declining trend from 2001 to 2020. Chinese films contained more tobacco imagery than international films, while films with tobacco imagery related to minors and tobacco branding are still prevalent despite regulations. Continuous efforts are needed to limit tobacco imagery in films in China.

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Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval The present study did not involve human subjects. The coders of the films were non-smokers. The coders were given health education on the dangers of smoking before, during, and after data coding. The requirement of the approval of the Institutional Review Board was waived.

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ORCID iDs

Xuping Li <http://orcid.org/0000-0003-0315-0621>

Lu Niu <http://orcid.org/0000-0001-6945-4412>

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Table S1. Films included from 2001 to 2020

Number	Year of release	Film	Origin	Running time (min)	Intervals
1	2001	Pearl Harbor	America	183	36
2	2001	Happy Funeral	China	103	20
3	2001	The Accidental Spy	China	108	21
4	2001	Roots and Branches	China	95	19
5	2001	The Munny 2	America	130	26
6	2001	Vertical Limit	America	124	24
7	2001	The Legend of Zu	China	104	20
8	2001	Enemy at the Gates	the UK	131	26
9	2001	Rush Hour 2	America	90	18
10	2001	Swordfish	America	99	19
11	2001	Tomb Raider	America	100	20
12	2001	Charlie's Angels	America	98	19
13	2001	Moulin Rouge	Australia	127	25
14	2001	Pavilion of Women	China	116	23
15	2001	Para Para Sakura	China	96	19
16	2001	Proof of Life	America	135	27
17	2001	The Bone Collector	America	118	23
18	2001	The Mask of Zorro	America	136	27
19	2001	Gua Sha Treatment	China	100	20
20	2001	China Strike Force	China	103	20
21	2002	Hero	China	93	18
22	2002	The Lord of the Ring	New Zealand	179	35

23	2002	Harry Potter and the Philosopher's Stone	America	152	30
24	2002	Prequel Trilogy	America	144	28
25	2002	Spider-Man	America	121	24
26	2002	Windtalkers	America	134	26
27	2002	Legend of Divine Mountain	China	103	20
28	2002	Impossible II	America	123	24
29	2002	Chinese Odyssey	China	95	19
30	2002	The Lion Roars	China	100	20
31	2002	Zhou Yu's Train	China	96	19
32	2002	Jurassic Park III	America	92	18
33	2002	Stuart Little	America	77	15
34	2002	Bad Company	America	116	23
35	2002	The Crimson Rivers	France	106	21
36	2002	The Tuxedo	America	99	19
37	2002	Marry A Rich Man	China	93	18
38	2002	The One	America	87	17
39	2002	Together	China	116	23
40	2002	I Love You	China	97	19
41	2003	Cell Phone	China	107	21
42	2003	Harry Potter And the Chamber of Secrets	the UK	161	32
43	2003	The Matrix Revolutions	America	129	25
44	2003	The Matrix Reloaded	America	138	27
45	2003	Warriors of Heaven and Earth	China	120	24
46	2003	Infernal Affairs 3	China	117	23

47	2003	Finding Nemo	America	100	20
48	2003	Terminator 3: Rise of the Machines	America	109	21
49	2003	Pirates of the Caribbean	America	143	28
50	2003	The Medallion	China	88	17
51	2003	The Lord of the Rings: The Two Towers	America	179	35
52	2003	Cat and Mouse	China	92	18
53	2003	The Recruit	America	115	23
54	2003	The Italian Job	America	111	22
55	2003	Charlie's Angels 2	America	106	21
56	2003	Running On Karma	China	92	18
57	2003	Welcome to the Punch	China	100	20
58	2003	Shanghai Knights 2	America	114	22
59	2003	Catch Me If You Can	America	141	28
60	2003	Xiaoping Deng	China	110	22
61	2004	Kung Fu Hustle	China	100	20
62	2004	House of Flying Daggers	China	119	23
63	2004	A World Without Thieves	China	121	24
64	2004	The Lord of the Ring 3	America	201	40
65	2004	The Day After Tomorrow	America	124	24
66	2004	Troy	America	196	39
67	2004	Spider-Man 2	America	127	25
68	2004	New Police Story	China	123	24
69	2004	Side Zhang	China	110	22
70	2004	Harry Potter and the Prisoner of Azkaban	the UK	141	28

71	2004	King Arthur	America	142	28
72	2004	Cold Mountain	the UK	154	30
73	2004	The Twins Effect II	China	106	21
74	2004	Master and Commander	America	138	27
75	2004	The Game of Killing	China	92	18
76	2004	Garfield	America	80	16
77	2004	S.W.A.T.	America	117	23
78	2004	Baober in Love	China	95	19
79	2004	I, Robot	America	115	23
80	2004	Yesterday and More	China	98	19
81	2005	The Promise	China	121	24
82	2005	King Kong	New Zealand	187	37
83	2005	The Myth	China	122	24
84	2005	Harry Potter and the Goblet of Fire	the UK	157	31
85	2005	Seven Swords	China	153	30
86	2005	Star Wars: Episode III - Revenge of the Sith	America	140	28
87	2005	Initial D: First Stage	China	109	21
88	2005	Mr and Mrs Smith	America	120	24
89	2005	World War	America	116	23
90	2005	A Chinese Tall Story	China	103	20
91	2005	Seoul Raiders	China	95	19
92	2005	National Treasure	America	131	26
93	2005	The Legend of Zorro	America	129	25
94	2005	Perhaps Love	China	108	21

95	2005	Riding Alone for Thousands of Miles	China	107	21
96	2005	Madagascar	America	86	17
97	2005	The Interpreter	America	128	25
98	2005	Stealth	America	121	24
99	2005	Changxia Ren	China	104	20
100	2005	Anacondas:The Hunt For the Blood Orchid	America	97	19
101	2006	Curse of the Golden Flower	China	114	22
102	2006	The Banquet	China	131	26
103	2006	The Da Vinci Code	America	149	29
104	2006	Fearless	China	100	20
105	2006	Rob-B-Hood	China	125	25
106	2006	Mission: Impossible III	America	126	25
107	2006	Confession of Pain	China	110	22
108	2006	Poseidon	America	98	19
109	2006	Battle of Wits	China	133	26
110	2006	Night at the Museum	America	108	21
111	2006	The Chronicles of Narnia: The Lion, the Witch and the Wardrobe	the UK	143	28
112	2006	Superman Returns	America	154	30
113	2006	Garfield: A Tail of Two Kitties	the UK	78	15
114	2006	Eight Below	America	120	24
115	2006	Dragon Tiger Gate	China	94	18
116	2006	Ice Age: The Meltdown	America	91	18
117	2006	The Knot	China	117	23

118	2006	The Transporter	France	92	18
119	2006	Miami Vice	America	134	26
120	2006	Crazy Stone	China	98	19
121	2007	Transformers	America	144	28
122	2007	The Assembly	China	124	24
123	2007	The Warlords	China	126	25
124	2007	Spider-Man 3	America	139	27
125	2007	Harry Potter and the Order of the Phoenix	the UK	138	27
126	2007	Lust, Caution	China	158	31
127	2007	Pirates of the Caribbean: At World's End	America	169	33
128	2007	Casino Royale	the UK	144	28
129	2007	Protege	China	108	21
130	2007	Eragon	America	104	20
131	2007	Invisible Target	China	129	25
132	2007	Teenage Mutant Ninja Turtles	China	87	17
133	2007	Secret	China	101	20
134	2007	Crossed Lines	China	111	22
135	2007	Flash Point	China	88	17
136	2007	Blood Brothers	China	95	19
137	2007	Brothers	China	93	18
138	2007	The Iron Triangle	China	93	18
139	2007	Ghost Rider	America	114	22
140	2007	Live Free or Die Hard	America	128	25
141	2008	Red Cliff	China	146	29

142	2008	If You Are the One	China	130	26
143	2008	Painted Skin	China	118	23
144	2008	A Hope	China	86	17
145	2008	The Forbidden Kingdom	America	104	20
146	2008	Kung Fu Panda	America	95	19
147	2008	Quantum of Solace	the UK	106	21
148	2008	Forever Enthralled	China	147	29
149	2008	Kongfu Dunk	China	99	19
150	2008	The Mummy: Tomb of the Dragon Emperor	America	112	22
151	2008	Hancock	America	92	18
152	2008	IP Man	China	106	21
153	2008	Iron Man	America	126	25
154	2008	The Chronicles of Narnia: Prince Caspian	America	150	30
155	2008	Wanted	America	110	22
156	2008	Three Kingdoms: Resurrection of the Dragon	China	102	20
157	2008	National Treasure: Book of Secrets	America	124	24
158	2008	Journey to the Center of the Earth	America	93	18
159	2008	The Incredible Hulk	America	112	22
160	2008	Shi Quan Jiu Mei	China	92	18
161	2009	2012	America	158	31
162	2009	Transformers: Revenge of the Fallen	America	150	30
163	2009	The Founding of a Republic	China	138	27
164	2009	Bodyguards and Assassins	China	139	27

165	2009	A Woman, a Gun and a Noodle Shop	China	95	19
166	2009	Red Cliff	China	142	28
167	2009	The Message	China	118	23
168	2009	City of Life and Death	China	132	26
169	2009	Harry Potter and the Half-Blood Prince	the UK	153	30
170	2009	Ice Age: Dawn of the Dinosaurs	America	94	18
171	2009	G.I. Joe: The Rise of Cobra	America	118	23
172	2009	Night at the Museum: Battle of the Smithsonian	America	105	21
173	2009	Terminator Salvation	America	115	23
174	2009	Crazy Racer	China	104	20
175	2009	look for a star	China	117	23
176	2009	On His Majesty's Secret Service	China	98	19
177	2009	Sophie's Revenge	China	107	21
178	2009	Up	America	96	19
179	2009	Overheard	China	100	20
180	2009	Mulan	America	115	23
181	2010	Avatar	America	162	32
182	2010	Let the bullets fly	China	132	26
183	2010	Tang Shan Earthquake	China	139	27
184	2010	If You Are The One 2	China	122	24
185	2010	Inception	America	148	29
186	2010	Detective Dee and the Mystery of the Phantom Flame	China	123	24
187	2010	Alice in Wonderland	America	108	21
188	2010	Harry Potter and the Deathly Hallows: Part 1	the UK	146	29

189	2010	Ip Man 2	China	108	21
190	2010	The Expendables	America	103	20
191	2010	Sacrifice	China	128	25
192	2010	Iron Man 2	America	124	24
193	2010	Clash of the Titans	America	106	21
194	2010	Prince of Persia: The Sands of Time	America	116	23
195	2010	Just call me nobody	China	93	18
196	2010	Little Big Soldier	China	96	19
197	2010	Under the Hawthorn Tree	China	114	22
198	2010	Resident Evil: Afterlife	America	97	19
199	2010	14 Blades	China	112	22
200	2010	The Legend Of Chen Zhen	China	106	21
201	2011	Transformers: Dark of the Moon	America	154	30
202	2011	Kung Fu Panda 2	America	91	18
203	2011	Pirates of the Caribbean: On Stranger Tides	America	136	27
204	2011	The Flowers Of War	China	145	29
205	2011	Beginning Of The Great Revival	China	124	24
206	2011	Harry Potter and the Deathly Hallows: Part 2	America	130	26
207	2011	Flying Swords of Dragon Gate	China	122	24
208	2011	Love is Not Blind	China	110	22
209	2011	The Smurfs	America	103	20
210	2011	Fast Five	America	130	26
211	2011	Battle: Los Angeles	America	116	23
212	2011	Shaolin	China	132	26

213	2011	Overheard 2	China	117	23
214	2011	Eternal Moment	China	103	20
215	2011	My Own Swordsman The Movie	China	92	18
216	2011	Rise of the Planet of the Apes	America	105	21
217	2011	Swordsmen	China	115	23
218	2011	The Sorcerer and the White Snake	China	103	20
219	2011	All's Well Ends Well 2011	China	103	20
220	2011	Let The Bullets Fly	China	132	26
221	2012	Lost in Thailand	China	105	21
222	2012	Titanic 3D	America	194	38
223	2012	Painted Skin II	China	135	27
224	2012	Mission: Impossible - Ghost Protocol	America	133	26
225	2012	Life of Pi	America	127	25
226	2012	The Avengers	America	142	28
227	2012	Chinese Zodiac	China	122	24
228	2012	Men in Black III	America	103	20
229	2012	Ice Age: Continental Drift	America	88	17
230	2012	Journey 2: The Mysterious Island	America	94	18
231	2012	Back to 1942	China	146	29
232	2012	The Dark Knight Rises	America	165	33
233	2012	The Expendables 2	America	102	20
234	2012	The Amazing Spider-Man	America	136	27
235	2012	Battleship	America	132	26
236	2012	John Carter	America	132	26

237	2012	Cold War	China	102	20
238	2012	The Silent War	China	120	24
239	2012	Prometheus	America	124	24
240	2012	The Bourne Legacy	America	1335	27
241	2013	Journey to the West: Conquering the Demons	China	110	22
242	2013	Iron Man 3	America	134	26
243	2013	So Young	China	132	26
244	2013	Pacific Rim	America	131	26
245	2013	Young Detective Dee: Rise of the Sea Dragon	China	133	26
246	2013	Personal Tailor	China	118	23
247	2013	American Dreams in China	China	112	22
248	2013	Finding Mr. Right	China	123	24
249	2013	Tiny Times 1.0	China	116	23
250	2013	Gravity	America	91	18
251	2013	Wild Speed: Euro Mission	America	130	26
252	2013	The Croods	America	98	19
253	2013	Man of Steel	America	143	28
254	2013	Skyfall	America	143	28
255	2013	Star Trek Into Darkness	America	132	26
256	2013	Jurassic Park 3D	America	127	25
257	2013	Chinese Zodiac	China	122	24
258	2013	Police Story 2013	China	108	21
259	2013	Thor: The Dark World	America	112	22
260	2013	G.I. Joe: Retaliation	America	107	21

261	2014	Transformers: Age of Extinction	America	166	33
262	2014	Breakup Buddies	China	118	23
263	2014	The Monkey King	China	119	23
264	2014	Interstellar	America	169	33
265	2014	X-Men: Days of Future Past	America	132	26
266	2014	Captain America: The Winter Soldier	America	136	27
267	2014	Dawn of the Planet of the Apes	America	130	26
268	2014	Dad, Where Are We Going?	China	89	17
269	2014	The Breakup Guru	China	116	23
270	2014	The Continent	China	104	20
271	2014	Guardians of the Galaxy	America	121	24
272	2014	The Amazing Spider-Man 2	America	142	28
273	2014	Back in Time	China	119	23
274	2014	The Man from Macau	China	93	18
275	2014	Tiny Time 3.0	China	126	25
276	2014	Gone With the Bullets	China	140	28
277	2014	Godzilla	America	123	24
278	2014	The Hobbit: The Desolation of Smaug	America	161	32
279	2014	My Old Classmate	China	98	19
280	2014	The Expendables 3	America	126	25
281	2015	Monster Hunt	China	118	23
282	2015	Furious 7	America	137	27
283	2015	Lost In Hong Kong	China	114	22
284	2015	Avengers: Age of Ultron	America	141	28

285	2015	Goodbye Mr. Loser	China	1004	20
286	2015	Jurassic World	America	124	24
287	2015	The Ghouls	China	125	25
288	2015	Jian Bing Man	China	113	22
289	2015	The Man from Macau 2	China	110	22
290	2015	Monkey King: Hero is Back	China	89	17
291	2015	Mission: Impossible - Rogue Nation	China	131	26
292	2015	The Hobbit: The Battle of the Five Armies	America	144	28
293	2015	Dragon Blade	China	127	25
294	2015	Terminator Genisys	America	126	25
295	2015	Wolf Totem	China	121	24
296	2015	Chronicles of the Ghostly Tribe	China	115	23
297	2015	Ant-Man	America	117	23
298	2015	San Andreas	America	114	22
299	2015	Devil and Angel	China	124	24
300	2015	The Martian	America	144	28
301	2016	The Mermaid	China	93	18
302	2016	Zootopia	America	109	21
303	2016	Warcraft	America	124	24
304	2016	Captain America: Civil War	America	148	29
305	2016	The Monkey King 2	China	120	24
306	2016	Operation Mekong	China	124	24
307	2016	From Vegas to Macau 3	China	112	22
308	2016	Time Raiders	China	123	24

309	2016	Kung Fu Panda 3	America	95	19
310	2016	The Great Wall	China	104	20
311	2016	The Jungle Book	the UK	106	21
312	2016	Skiptrace	China	111	22
313	2016	Star Wars: The Force Awakens	America	135	27
314	2016	I Belonged to You	China	113	22
315	2016	X-Men: Apocalypse	America	144	28
316	2016	Book of love	China	131	26
317	2016	Ip Man 3	China	105	21
318	2016	Doctor Strange	America	115	23
319	2016	DETECTIVE CHINATOWN	China	135	27
320	2016	Cold War II	China	110	22
321	2017	Wolf Warriors II	China	123	24
322	2017	The Fate of the Furious	China	136	27
323	2017	NEVER SAY DIE	China	100	20
324	2017	Kung Fu Yoga	China	108	21
325	2017	Journey to the West: The Demons Strike Back	China	108	21
326	2017	Transformers: The Last Knight	America	150	30
327	2017	Wrestling Competition	India	140	28
328	2017	Youth	China	136	27
329	2017	Pirates of the Caribbean: Dead Men Tell No Tales	America	129	25
330	2017	Kong: Skull Island	America	119	23
331	2017	Coco	America	105	21
332	2017	xXx: Return of Xander Cage	America	107	21

333	2017	Resident Evil: The Final Chapter	America	99	19
334	2017	Duckweed	China	102	20
335	2017	Despicable Me 3	America	90	18
336	2017	Spider-Man: Homecoming	America	133	26
337	2017	Buddies in India	China	100	20
338	2017	Thor: Ragnarok	America	130	26
339	2017	War for the Planet of the Apes	America	140	28
340	2017	Logan	America	123	24
341	2018	OPERATION RED SEA	China	138	27
342	2018	DETECTIVE CHINATOWN II	China	121	24
343	2018	Dying to Survive	China	117	23
344	2018	Hello Mr. Billionaire	China	118	23
345	2018	Avengers: Infinity War	America	149	29
346	2018	Monster Hunt 2	China	110	22
347	2018	Venom	America	107	21
348	2018	Aquaman	America	143	28
349	2018	Jurassic World: Fallen Kingdom	America	128	25
350	2018	The Ex-file: The Return Of The Exes	China	120	24
351	2018	Ready Player One	America	140	28
352	2018	Us and Them	China	120	24
353	2018	The Island	China	134	26
354	2018	Project Gutenberg	China	130	26
355	2018	Mission: Impossible - Fallout	America	148	29
356	2018	The Meg	America	115	23

357	2018	Rampage	America	107	21
358	2018	How Long Will I Love U	China	101	20
359	2018	Ant-Man and the Wasp	America	119	23
360	2018	A Cool Fish	China	108	21
361	2019	Nezha: Birth of the Demon Child	China	110	22
362	2019	The Wandering Earth	China	125	25
363	2019	The Avengers 4: Endgame	America	181	36
364	2019	My People, My Country	China	155	31
365	2019	The Captain	China	111	22
366	2019	Crazy Alien	China	116	23
367	2019	Pegasus	China	98	19
368	2019	The Bravest	China	120	24
369	2019	Better Days	China	135	27
370	2019	Hobbs and Shaw	America	137	27
371	2019	Spider-Man: Far From Home	America	127	25
372	2019	The White Storm 2: Drug Lords	China	99	19
373	2019	Bumblebee	America	114	22
374	2019	The Climbers	China	125	25
375	2019	Captain Marvel	America	124	24
376	2019	More Than Blue	China	106	21
377	2019	Godzilla: King of the Monsters	America	132	26
378	2019	Alita: Battle Angel	America	122	24
379	2019	Looking Up	China	147	29
380	2019	The Lion King	America	118	23

381	2020	The Eight Hundred	China	147	29
382	2020	My People My Homeland	China	153	30
383	2020	Legend of Deification	China	110	22
384	2020	The Sacrifice	China	122	24
385	2020	Duo Guan、 Leap	China	135	27
386	2020	Shock Wave 2	China	121	24
387	2020	Caught in Time	China	95	19
388	2020	Adoring	China	108	21
389	2020	Love You Forever	China	115	23
390	2020	Sheep Without A Shepherd	China	112	22
391	2020	Tenet	America	144	28
392	2020	The Rescue	China	134	26
393	2020	Ip Man4	China	107	21
394	2020	Bath Buddy	China	103	20
395	2020	The Croods: A New Age	America	95	19
396	2020	The End of Endless Love	China	102	20
397	2020	Coffee or Tea?	China	97	19
398	2020	Vanguard	China	108	21
399	2020	Mulan	America	115	23
400	2020	A Little Red Flower	China	128	25

Table S2. The numbers of the films and intervals containing any tobacco imagery between Chinese and international films

	Origin	Tobacco imagery		χ^2	<i>P</i>
		With	Without		
Films	Chinese	148 (72.9%)	55 (27.1%)	29.666	<0.001
	International	91 (46.2%)	106 (53.8%)		
Intervals	Chinese	973 (21.4%)	3575 (78.6%)	365.564	<0.001
	International	371 (7.6%)	4504 (92.4%)		

Table S3. The films containing tobacco branding

Films	Release year	Origin	Brands	Branding intervals	Type of brands appearance
The Accidental Spy	2001	China	SALEM	1	Branded cigarette packs visible
Crazy Stone	2006	China	Hongta Mountain	1	Characters mentioned brand
			Yuxi	1	Branded cigarette packs visible
Assembly	2007	China	Da Huang Long	1	Characters mentioned brand
			New China	1	Branded cigarette packs visible
Samsara	2007	China	Baoma	1	Branded cigarette packs visible & Characters mentioned brand
The Founding of a Republic	2009	China	Baisha	1	Branded cigarette packs visible
Legend of the Fist: The Return of Chen Zhen		China	Beauty	1	Advertisement in film
			Maskee	1	Branded cigarette packs visible & Characters mentioned brand
From Vegas to Macau	2014	China	Marlboro	1	Branded cigarette packs visible
My old classmate	2014	China	Liqun	1	Branded cigarette packs visible
The Bravest	2019	China	Hongta Mountain	1	Branded cigarette packs visible
Better Days	2019	China	KENT	1	Branded cigarette packs visible
Caught in time	2020	China	HILTON	1	Branded cigarette packs visible