

## **What science story do they perform? A comparative study of what science had shown in three different types of Taiwan's TV programs**

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### ***Science in TV programs***

Merging science into everyday life is a key reference for science communication. To fully understand to what degree science has been integrated into daily life, popular culture has played the role of a both *boundary object* and a sensor probe (Huang & Allgaier, 2015).

The various media channels of popular culture — such as television, movies, novels, video games, pop music, animation, cultural activities, etc. — serve as potent bridges between different social worlds. Among such media, television and movies have received the greatest scholarly attention and are viewed as presenting the widest scope and the most profound impact. The literature of science communication has shown that the entertainment media exerts a very important influence on public perception, knowledge, and scientific understanding (Nisbet & Dudo, 2011). Moreover, the impact from science on the entertainment world is extensive, ranging from the public understanding of science, to scientific policy making (National Science Board, 2006), to scientific career interests (Houck, 2006), and to the public's participation (Harris et al., 2006). Fisher and Cottingham (2017) pointed out that fictional television shows and movies convey cultural assumptions about scientists and their research enterprise. As these fictional portrayals might well provide the public with valuable representations of scientific research, many studies have prioritized how such fictional media actually affect people's scientific knowledge (e.g. Reusswig & Leiserowitz, 2005). Two important implications can thus be drawn. First, science in the popular media can motivate the younger generation to become scientists in the future, because children and young people might imagine a possible scientific career in this way. Second, it helps the imagination of the general public to relate science with their everyday life (Long et al., 2001; Steinke, 2005; Van Gorp et al., 2014).

TV is one of the most common channels in Taiwan (Taiwan Communication Survey, 2018). As such, this study asks two questions. How are TV programs related to science? We choose medical TV programs and the most popular scientific topics as samples to follow-up with the next question. How do the different types of medical TV programs present their images of science?

### ***Methods***

#### **Analysis framework**

We base our analysis framework for this study on Huang (2018), which consists of two dimensions: "authentic/fictitious science" and "narrative/expository text" (Figure 1). Therefore, we utilize four representative areas to identify the different types of TV programs.



Figure 1. "Authentic/fictitious science" and "narrative/expository text" framework

According to the framework, we use a 7-point Likert scale (from -3 to 3) to measure the degree of each dimension, with the definition of every cell in the coding system shown in Table 1. The definitions are used for the following coding procedures to identify the different types of TV programs.

Authenticity/fictitious		Narrative/expository	
3	Shows the real and diverse face of science, including its social aspects, cognitive aspects, cultural aspects, etc.	3	Narrative 100%
2	Focuses on the epistemic aspect of science and presents the correct scientific knowledge.	2	Narrative 80%/expository 20%
1	Reflects no mistake, but simplifies scientific knowledge	1	Narrative 65%/expository 35%
0	( nothing to do with science )	0	Narrative 50%/expository 50%
-1	Presents possibly wrong, plausible, and rough scientific knowledge	-1	Narrative 35%/expository 65%
-2	Presents obviously biased scientific knowledge (but not superstitious)	-2	Narrative 20%/expository 80%
-3	Presents superstitious, prejudiced, and seriously wrong scientific knowledge	-3	Expository 100%

Table 1. Coding system of the 7-point scale

### Samples

We select 50 TV programs for the analysis: 20 dramas, 20 general programs, and 10 children's TV programs. The selection of these programs follows the Taiwanese Television Industry Report (2016), which denoted the top 20 dramas and general programs as well as the top 10 children's TV programs. Two coders scanned through the TV programs and compiled that 7 of the 10 general programs, 18 of the 20 dramas, and 1 of 10 children's programs presented science content in their

episodes. The coders together reached a consensus about the scores of the programs for each dimension. These programs are thus selected for the following analysis processing procedure.

As we are particularly interested in those programs directly related to medicine, we select three that are representative and relevant to medical issues, including six episodes in each series and 60 minutes for each episode. All the episodes are divided into different "scenes" as analysis units, and we adopt the thematic content analysis method to investigate what science images are being presented.

### Results and discussion

The distribution of Taiwanese TV programs

It is surprising that among the 50 most popular TV programs, about half of them present at least one scientific or medical scene. This suggests that science or medicine may serve as an important element of popular culture, at least in the TV entertainment industry.

To describe the distribution of the framework, we identify the idea of *accessible probability*, which denotes the possibility of the public viewing the programs when they have turned on their TV during a whole year. The occupied area represents *accessible probability* as shown in Figure 2, which is defined as *the audience rating* multiplied by the *length of time*. For example, if a program's average rating is 4.67 and length of time for one year is 514 hours, then the occupied area (*accessible probability*) will be 2,400.

We sum up the occupied area and transfer it into percentage terms under the different styles of the framework (Figure 1), with the results shown in Figure 2. It illustrates that pure narrative and presenting superstitious, prejudiced, and seriously wrong scientific knowledge [type (3, -3)] is the most popular type among Taiwanese TV programs. The fictitious-narrative style occupies more than 70% of our analyzed programs.

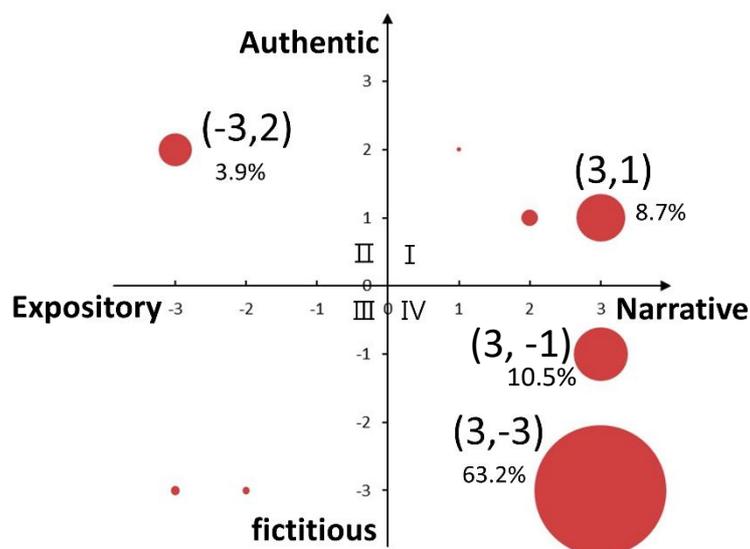


Figure 2. The accessible probability of the model framework

TV programs presenting medical scenes

As our study focuses on TV programs related to medicine, we select three representative styles - "medical knowledge program" (expository and authentic type), "medical TV drama series"

(narrative and authentic type), and "soap opera related to medicine" (narrative and fictitious type) - for the next step of analysis. Different kinds of programs may emphasize stereotypes of medical activities in different ways. Based on the theoretical framework of Huang and Jian (2017), we include four categories, technoscience knowledge, collective emotion, personal mood, and the human cultural environment, and develop them as the framework to explore the features of the different TV programs. Our preliminary results suggest that the selected TV programs do feature medical activities rather differently. Compared to a drama series and soap opera, a medical knowledge program introduces the most accurate medical knowledge. However, the figures in a medical knowledge program reveal less personal characteristics and emotion. Medical knowledge programs also reflect less on the cultural context in Taiwan than do drama series and soap operas.

## Conclusions

Our primary analysis suggests that science and medicine are in fact well integrated into Taiwan's pop culture, while narrative and authentic TV programs seem to be neglected by the TV programming industry and the public. Two main points can be addressed from our findings. First, there is still plenty of room to present authentic science in TV programs, both in the narrative or expository text. Second, the quality and diversity of ways to merge science into TV programs still needs improvement by Taiwan's TV industry.

We note that audience reception of these TV programs is beyond the scope of this current study. Therefore, it is worthwhile for follow-up investigations to look into how audiences view and comprehend the different types of TV programs.

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