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**PUBLIC HEALTH EDUCATION THROUGH POSTERS IN
TWO WORLD CITIES:
A MULTIMODAL CORPUS-BASED ANALYSIS**

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Public Health Education Through Posters in Two World Cities:

A Multimodal Corpus-Based Analysis

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**A thesis submitted in partial fulfilment of the requirements for the
degree of Doctor of Philosophy**

April 2017

CERTIFICATE OF ORIGINALITY

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Abstract

In this thesis, I will attempt to create multimodal understanding of public health posters used in two global cities – New York City and Hong Kong. In contrast to prior research that is either the case study that has focused on so few public health posters which is quite difficult to unravel the representative patterns of such data and is a threat to the analysis's validity, or the exclusively qualitative or quantitative exploration of a pool of data, I draw upon both qualitative and quantitative research methods to conduct a more holistic study. The thesis examines both linguistic and non-linguistic resources that a total of 60 selected public health posters make use of in the construction of health-related messages for public health education from three different vantage points of below, roundabout and above. In the first, following Hallidayan systemic-functional semiotics, I investigate the semiotic labour performed by each of the individual semiotic systems (i.e. language and image) on the pages of the sampled public health posters. I analyse experiential meaning and interpersonal meaning that the different semiotic resources make. In the second area of investigation, I annotate the content, layout structure, and rhetorical organisation of each of the poster pages and build an XML-based multimodal corpus CPHP. The annotated corpus provides me with a reliable empirical basis to analyse the various semiotic resources for realising logico-semantic relations as tactic patterns, to explore the possible effect of matching/mismatching hierarchical rhetorical and layout organisations. Subsequently, these two areas are complemented by a further contextual analysis, which as a whole explores how the public health posters educate the general public in the City of New York and Hong Kong. This study will contribute to a more refined understanding of public health education through posters in world cities, and it will also add to our understanding of the relationship not only between language and images but also between rhetorical organisations and layout structures. The outcomes of this study will also be used to help improve the information design of public health education materials and propose web-based annotation tools applied to enhancing the multimodal corpus building in the future.

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List of Abbreviations

CPHP	Corpus of Public Health Posters
CPHP-HK	Corpus of Public Health Posters – Hong Kong sub-corpus
CPHP-NYC	Corpus of Public Health Posters – New York City sub-corpus
GeM	Genre and Multimodality
RST	Rhetorical Structure Theory
SFL	Systemic Functional Linguistics
XML	eXtensible Markup Language

Chapter 1 Introduction

The research presented in this thesis is concerned with public health education through a key channel of communication – the public health poster, with a comparison of the City of New York and Hong Kong. Public health posters communicate information about health issues to the public employing language and images, oriented towards different segments of the public. In other words, public health posters disseminate health-related knowledge and recommendations, imperceptibly-but-perceptibly-enough educate members of the general public in order to promote community health and wellness. Designers of such posters convey key messages by combining language and images in various ways, but little is known about the role that individual semiotic resources play and how these resources work together in public health education. So, this study aims to advance knowledge of semiotic resources such as verbal and visual elements in public health posters, as well as the ways these resources integrate to create meaning in such multimodal posters. More specifically, the present study takes a multimodal corpus-based approach to exploring public health education, contributes to the analysis of text-image relations in the public health posters – the coordination and complementarity of language and images in conveying information on public health issues and popular health topics, and casts light on similarities and differences in these two complex societies which the public health posters are designed for.

To that end, a collection of 60 public health posters used in New York City and Hong Kong is annotated manually at several main descriptive layers (i.e. content, rhetorical structure, and layout structure) to create a multimodal *Corpus of Public Health Posters* (CPHP). All analytical layers are annotated using the framework and schema proposed in the Genre and Multimodality (GeM) model by Bateman (2008; cf. also Henschel, 2003), and the GeM-annotated multimodal corpus CPHP is visualised using gem-tools by Hiippala (2015a). Rhetorical relations among multimodal segments are described using the system of rhetorical relations (cf. e.g. Matthiessen, 1995b, 2002, in prep.; Matthiessen and Teruya, 2015; Matthiessen and Thompson, 1988) which is the revised version of Rhetorical Structure Theory (RST) (cf. e.g. Mann and Thompson, 1988; Mann and Matthiessen, 1991; Mann,

Matthiessen and Thompson, 1992). This corpus-based analysis of meaning-making patterns realised by semantic resources of various semiotic systems is complementary to the exploration of different meaning-making roles played by individual systems of language and image. In addition to the examination of both individual-play and co-play of semiotic resources in the strata of grammar and semantics, this project will identify the social and semiotic processes unfolding in the public health posters in terms of the field parameter of context. In sum, such posters will be analysed trinocularly to see how they represent health-related information and educate the general public in New York City and Hong Kong.

The present study is largely a qualitative one – it applies what we know from linguistics, especially the systemic functional linguistics (cf. Halliday and Matthiessen, 2014) and its variants (e.g. visual grammar, cf. Kress and van Leeuwen, 1996/2006) to the public health posters; meanwhile, it is an empirical research – it creates the multimodal corpus CPHP and extends what we know from linguistics to multimodality. The journey of building the GeM-annotated corpus of the public health posters used in two world cities will help improve the current GeM annotation schema and relevant technologies, and open up more exciting new areas for systematic empirical analysis.

1.1 Research Motivation and Rationale

This doctoral project aims to bridge some of the important gaps in our knowledge of specific areas of public health education and multimodality, as well as engage with the recent trend – corpus-based approaches in studies of multimodality. In this section, first, I introduce the general notion of public health, identify essential aspects of public health education, and present the motivation for conducting this health-related project. Then, I discuss the rationale behind carrying out this corpus-based multimodal study of public health education through posters after inventorying several major approaches to multimodality and enumerating studies within a wide range of domains of multimodal phenomena and issues of general importance to multimodal studies.

1.1.1 Public Health Education Through Posters

1.1.1.1 Public Health Education

The present project is situated within the field of research into health communication, more specifically health education of the public. In the United States and the beyond, the modern era of public health education is usually attributed to the Welch-Rose report of 1915 (Welch and Rose, 1915; cf. also Hunter and Frenk, 2015: 1105; Thomas, 2016: 354), which lays out plans for a system of public health education that is independent of medicine but with close ties to. Charles-Edward Amory Winslow, a seminal figure in the field of public health, “not only in his own country, the United States, but in the wider Western world” (Breslow, 2002: 1313), sets forth a definition of public health as a science and an art (Winslow, 1920: 30):

... of preventing disease, prolonging life, and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organization of medical and nursing services for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health.

Winslow’s (1920) definition encompasses basic substances and goals that public health system throughout an area or of any international organization fulfils to enable every citizen can be healthy. Thus, it has been reflected in different subfields of public health (e.g. hygiene, epidemiology, biostatistics and social medicine), has provided the basis for the values and missions of social institutions dealing with the prevention of diseases, the prolongation of life, and the promotion of health. Winslow’s (1920) classic definition is still used today – featuring as the official statement of public health across many regions and countries (e.g. Acheson, 1988; Mullner, 2009; Pan American Health Organization, 2002; Rayner and Lang, 2012; Schneider, 2014).

As a core component of the public health system, health education often begins in the family, continues through schools, and is also conducted in the community and with subsets of the population, including all members of the general public (cf. Last,

2007). According to a dictionary developed for students and professionals in the area of public health education and promotion, health education is defined as an educational process “concerned with providing a combination of approaches to lifestyle change that can assist individuals, families, and communities in making informed decisions on matters that affect the restoration, achievement, and maintenance of health” (Modeste and Tamayose, 2004: 58). And a substantial range of health-related aspects is touched in the educational process, including, for instance, basic sanitation and hygiene, care and treatment of teeth, nutrition and emphasis on exercise, ways to cope with one’s sexuality and social relationships, information on smoking, alcohol and drugs.

In addition, there are other attempts to define public health education. Downie, Fyfe and Tannahill (1990: 28) define it as a “communication activity aimed at enhancing positive health and preventing or diminishing ill-health in individuals and groups through influencing the beliefs, attitudes and behaviour of those with power and of the community at large”. Another view by Green and Kreuter (2005) is public health education as a deliberately planned combination of learning experiences produced to predispose, enable, and reinforce voluntary behaviour for health enhancement in individuals, groups or communities. The World Health Organization (2018) simplifies the definition of health education as any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes.

Over the past hundred years after the birth of public health education, there are many discussions about it and the aforementioned is only part of them. Nevertheless, it is obvious that public health education includes not only a factual account of information, but also a health belief that may influence health behaviour takes priority over the pure form of knowing health-related knowledge. Different from some other disciplines in educational fields whose focus is almost exclusively on knowledge, health education covers all information and experiences that affect the ways people think and feel about their health as well as the requisite life skills necessary to apply that knowledge – while developing appropriate attitudes – to result in healthy behaviour choices or behaviour changes as needed (Gilbert, Sawyer and McNeill, 2011: 3; cf. also McKenzie, Pinger and Kotecki, 2011; Modeste and Tamayose, 2004).

Drawing out common features of the aforementioned definitions, I conclude that the objectives of public health education should be set by taking account of three aspects: (1) knowledge about the behaviour, (2) beliefs and attitudes associated with the behaviour, and (3) skills necessary to enable behaviour adaptation (cf. also Gilbert et al., 2011). Thus, public health education is the process by which we obtain and process basic health information needed to make appreciate health decisions; and these health-related knowledge is packaged with all three aspects as a whole to raise awareness, stimulate thoughts and change behaviour on health-related issues in the population.

One probably wonders why public health education and promotion still matter so much, since scientists and researchers have been committing to accelerating basic scientific research to cure different kinds of diseases. For example, biological medicines have revolutionised the treatment of a number of diseases and illnesses that were previously untreatable. In addition, some powerful tools such as genome editing with CRISPR-Cas systems (cf. e.g. Cox, Platt and Zhang, 2015; Cox et al., 2017; Hsu, Lander and Zhang, 2014) have been developed to understand the genetic basis of disease, which will ultimately lead to major breakthroughs in the next few decades. However, many communicable and non-communicable diseases, while some of them are treatable, still have no cure.

According to the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) – the most comprehensive worldwide observational epidemiological research project of disease burden to date led by Professor Christopher Murray in the Institute for Health Metrics and Evaluation (IHME) at the University of Washington – the global leading causes of deaths facing people of both sexes and all ages in 2016 (Figure 1.1) are non-communicable diseases (72.3%), followed by communicable diseases (19.3%) and injuries (8.4%) (cf. Naghavi et al., 2017: 1151). Figure 1.1 is a treemap visualised by interactive tool GBD Compare (IHME, 2017), and the size of each box in this square pie chart is proportionate to the burden displayed. However, deaths don't tell the whole story – what ails you isn't necessarily what kills you. Health is a lot more than simply avoiding death, it is also about wellness – the state of being in good health. GBD studies also enable comparisons of health loss over time and across causes/risks, age-sex groups, and countries; therefore, it can be used to generate measures such as disability-adjusted life years (DALYs) –

the number of years of life lost due to health conditions of varying severity: ill-health, impaired health, disability or early death (Figure 1.2, cf. also Hay et al., 2017: 1261). By 2016, as shown in Figure 1.1, the three leading causes of deaths are ischemic heart disease (IHD), cerebrovascular disease (such as a stroke) and chronic obstructive pulmonary disease (COPD); and the three leading causes of DALYs are IHD, stroke and lower respiratory infection (LRI), which are shown in another treemap Figure 1.2. In addition, worldwide, from 1990 to 2016, for most of the non-communicable diseases, deaths and DALYs have been increasing; whereas for all the communicable, maternal, neonatal, and nutritional disorders, except for HIV/AIDS and Dengue, global deaths and DALYs have declined.

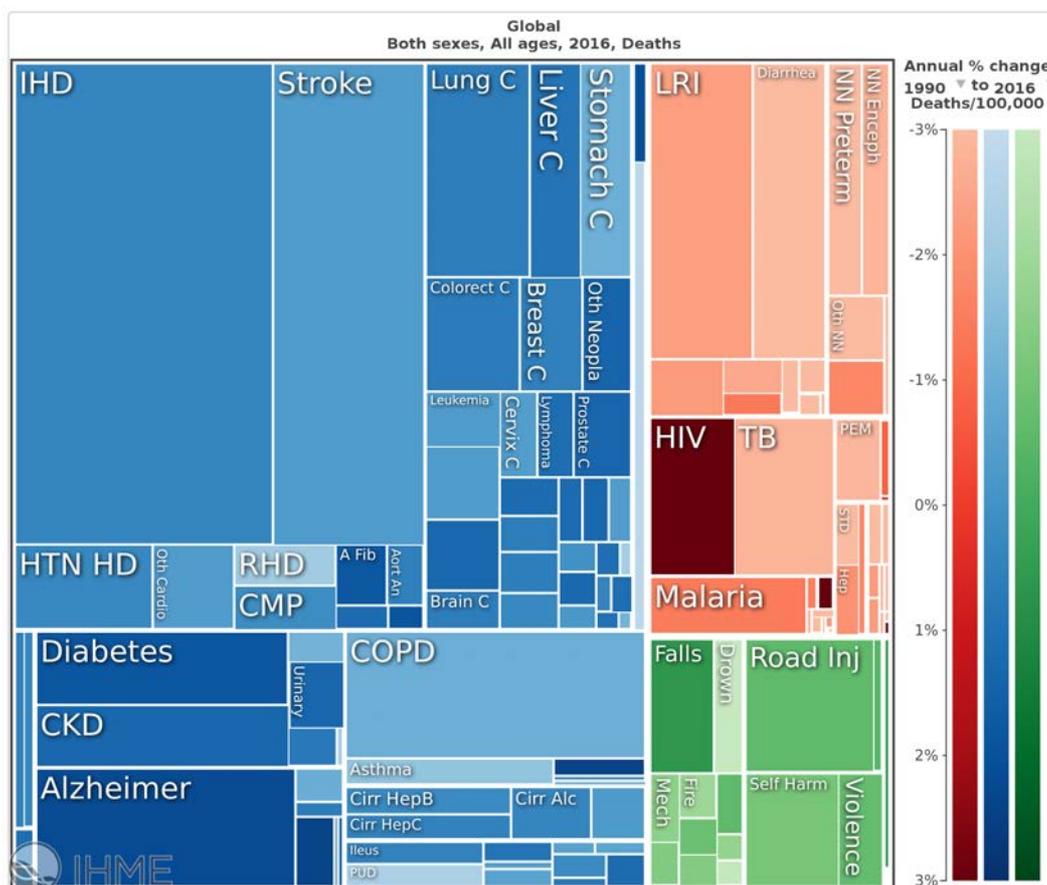


Figure 1.1 Leading causes (diseases and injures) of deaths at the global level, in 2016, both sexes and all ages combined; and their annual % changes per 100,000 people from 1990 to 2016 (Blue = non-communicable causes, red = communicable, maternal, neonatal and nutritional causes, green = injuries) (IHME, 2017)

Most causes of deaths and DALYs listed in Figure 1.1 and Figure 1.2 can actually be prevented or postponed, and millions of lives and healthy years can be saved if public health education helps equip the public to take effective steps to live healthier

lifestyles. Although progress has been made in treating and curing some diseases, public health education is of great importance because health education and disease prevention can reduce the amount of diseases, deaths and disease-produced discomfort and disability in the population. Health education can be delivered through different channels: face-to-face clinician-patient encounters, various types of public health campaign materials (e.g. public service announcements or campaign videos, posters or billboards, banners and placards, leaflets or pamphlets, brochures or factsheets, flyers), etc. Public health posters remain one of the most common tools for public health education. Although the research objectives in the present study are not to evaluate the effectiveness of such posters, this study addresses how language and images are used together to construct public health messages (i.e. knowledge, skills, and beliefs) and how these two different semiotic systems accomplish the educational purposes together.

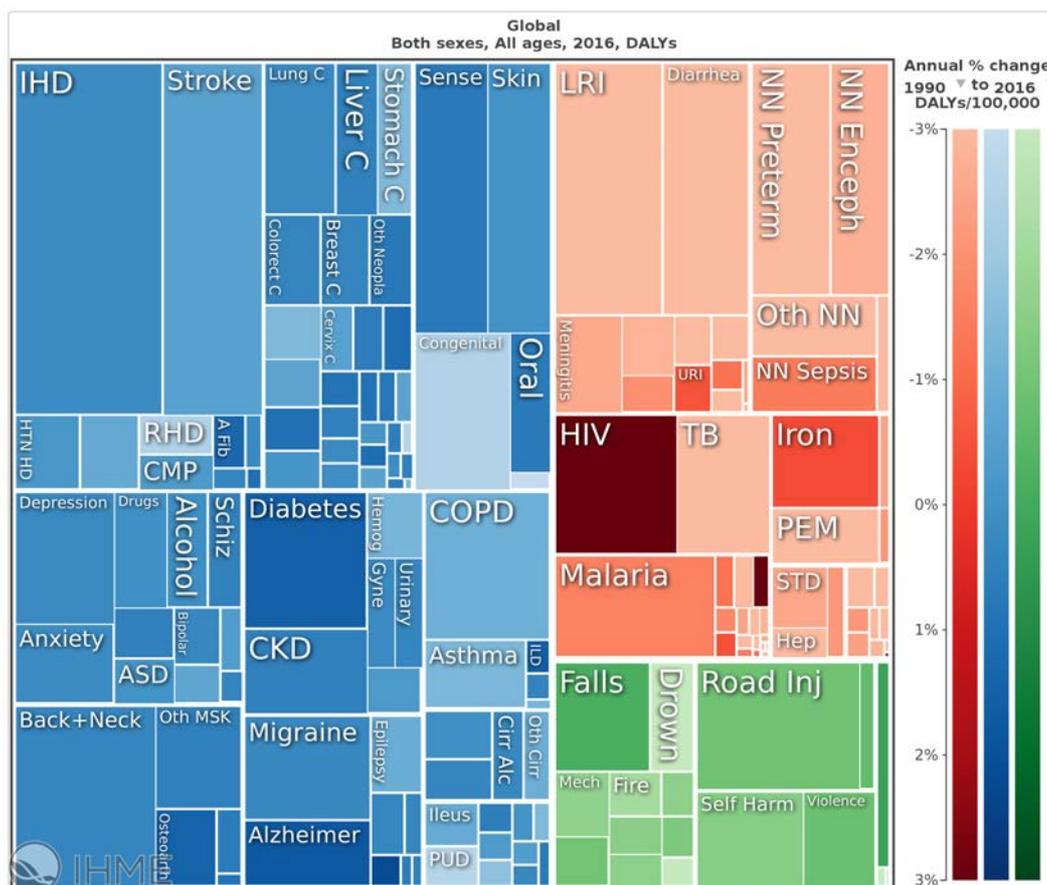


Figure 1.2 Leading causes (diseases and injures) of DALYs at the global level, in 2016, both sexes and all ages combined; and their annual % changes per 100,000 people from 1990 to 2016 (Blue = non-communicable causes, red = communicable, maternal, neonatal and nutritional causes, green = injuries) (IHME, 2017)

1.1.1.2 Why Public Health Posters?

Normally, the website of a governmental health agency is the portal for health-related resources and news from the government. On such official site, press release of health schemes, latest update on epidemic situation, links for deeper and fuller understanding of health issues, etc. are easily accessible to the public. Governmental health agencies, and non-governmental organisations that also participate in the delivery of public health services, provide the public with comprehensive and up-to-date information on various health topics and issues, such as causes and risk factors of communicable and non-communicable diseases. Such health-related information pertaining to all aspects of health system is communicated through a range of media: health campaign videos, public service announcements, mobile apps, radio spots, podcasts, brochures, posters, hotline, billboards, bulletins, fact sheets, pamphlets, handy books, medical leaflets, transit placards, infographics, pocket guides, and matte articles.



(a) *Seasonal Influenza Vaccination 2014/2015* (DH, HKSAR, 2014)

(b) *Guard Against Middle East Respiratory Syndrome* (DH, HKSAR, 2017)

Figure 1.3 Examples of public health posters with almost total texts

My interest in studying public health posters, rather than other aforementioned media, stems from the very nature of this traditional tool itself. Today it is no

exaggeration to say that almost everyone in our communities has embraced the power of posters, which is reflected in at least four aspects: (1) multimodal composition, (2) informational and functional orientation, (3) easy accessibility, and (4) cultural characteristics. First of all, posters address viewers not only in verbal language, but also appeal to them with eye-catching visual elements. It is almost impossible to design a poster by one semiotic system. For example, as shown in Figure 1.3, a notice style vaccination poster and a fact-sheet style viral respiratory illness poster released by the Department of Health (DH) of the Government of the Hong Kong Special Administrative Region (HKSAR) use fair chunks of texts to announce explicit messages. Some gallery posters advertise art exhibitions employing solely images such as close-ups of artworks to grab attention. Nevertheless, most posters are multimodal artefacts and deploy a combination of more than one semiotic resource.

Second, posters are informational and functional in nature. Throughout history, posters have been used to exhort, sell, educate, convince, and to appeal to passers-by (Stermer, 1970). Most posters do not solely convey messages, or rather, they also implant ideas, influence attitudes and catalyse actions. Movie posters stimulate box office earnings (e.g. Haidegger, 2017; Maiorani, 2007, 2008), educational posters initiate classroom discussions (e.g. D'Angelo, 2016; Hubenthal, O'Brien and Taber, 2011), and election campaign posters “capture attention for a party or candidate” (cf. Seidman, 2012: 100) to get more votes (e.g. Holtz-Bacha and Johansson, 2017). The third factor in understanding the continued power of posters is the accessibility of its physical deployment (Timmers, 1998). According to Teo (2004), whether regarded as an art gallery or eyesore in public spaces, poster advertising is a ubiquitous phenomenon in modern societies. It is present everywhere in community locations that we inhabit – streets, public transportation stations, schools and factories, shops and fairs, theatres and cinemas, clinics and physicians' offices, etc. Fourth, posters are cultural artefacts. Poster designers don't work in a vacuum, so it's essential to consider the sociocultural backgrounds of viewers as well. After the initial function is over (e.g. the concert happens, the sale is over, the business is forgotten, the candidate loses), what does a poster become? Graphic designer Art Chantry explains, it is “the truest art form of an industrial marketing culture, a direct link to our everyone lives, real folk art” (Foster, 2012: 4).

Thus, as one of the print outreach of health education, most public health posters are designed multimodally to attract public interest, to increase health knowledge and awareness, and to motivate behaviour change. The educational messages through such posters can be part of larger programmes, initiatives, and campaigns developed and implemented by health agencies. Public health posters are displayed in bus shelters, subway stations, pharmacies, grocery stores, and telephone kiosks citywide. They can be seen by the public in a viewing distance, can also be downloaded and ordered by the public for proper use just a keystroke away. The public health poster is therefore selected as the object of this study among other types of health education materials.

1.1.1.3 Why New York City and Hong Kong?

In order to conduct a comparative study, I have chosen two global cities from which to sample public health posters – the City of New York and Hong Kong. The present study is actually the first stage in the process of building a multimodal corpus of public health materials used in the world’s top cities including New York City, Hong Kong, London, etc. In the current stage, the public health posters collected from New York City and Hong Kong will be considered. New York City is a metropolitan city in the United States, a rich mix of emigrants but still a typical western city. Hong Kong, although a fusion of East and West, is still a predominantly Chinese society. GovHK (2018), the website of the HKSAR government, lists that people of Chinese ethnicity comprises 91% of the population in Hong Kong.

Selecting two different locales could simply meet the requirements of conducting a comparative analysis of public health posters. However, several factors have also been taken into consideration, including government investment in public health, languages employed in public health materials, etc. Despite the cultural differences, these two world cities are alike in many ways. Both New York City and Hong Kong are densely populated harbour cities and have a large floating population, so the New York City government and its HK counterpart have poured huge human, material and financial resources into health services to the maintenance and improvement of the health of the general public through collective or social actions. In addition, English is used in the selected public health posters because it is the

official language in both cities. In Hong Kong, most public health posters are designed bilingually in Chinese (in traditional characters. i.e. traditional Chinese) and English; and in the City of New York, public health posters are in English and other languages such as Spanish (Español), Chinese (繁體中文/简体中文), Korean (한국어), Arabic (العربية), Haitian Creole (Kreyòl ayisyen), and Russian (Русский).

1.1.2 Multimodality: Approaches, Issues, and Trends

As a phenomenon, multimodality “approaches representation, communication and interaction as something more than language” (Jewitt, 2014d: 1). With the unprecedented rate of change in the means of technologically-mediated information representation and dissemination, the production and consumption of multimodal messages have become a more deeply pervading feature in public communication than it had ever been before. Such messages can no longer be adequately analysed without paying attention to non-linguistic semiotic modes (e.g. image) in the contemporary era of multimedia. Interestingly, Stöckl (2004: 9) calls the currently gaining research on multimodality “the late discovery of the obvious”. Multimodality is in essence an inherent feature of all aspects of our lives throughout human evolution (Matthiessen, 2007b). The semiotic system of language is an inherently multimodal one if we explore the primary semiotic phase of language’s evolution – protolanguage, which involves both vocalization and gesture (Matthiessen, 2004).

Multimodality, in common parlance, draws researchers’ attention to a full repertoire of communication or expression methods such as verbal, visual, kinetic, spatial, and aural. The notion of multimodality has been perfunctorily defined (cf. interview with van Leeuwen in Andersen, Boeriis, Maagerø and Tønnesen, 2015: 101), and after a wide-ranging review of its definitions by different scholars (cf. e.g. Jewitt, 2014c: 127, 2014d: 2; Kress, 2007: 18, 2010: 54; van Leeuwen, 2015: 448-449), what it boils down to, is that: multimodality names a field of enquiry and marks a domain to be theorized, in which multimodal phenomena can be explored within a wide variety of disciplinary areas such as psychological, linguistic, sociological, pedagogical and anthropological.

Multimodal research expanded rapidly from the mid-2000s onwards and has benefited from insights from a wide array of disciplines (Djonov and Zhao, 2014: 2; O'Halloran, 2011: 123). Scholars with different fields have built on their **approaches** to explore different **issues** and have extended their research into various **domains** of multimodal phenomena. And the rationale behind the present study is to extend precious research into one specific issue – the interplay of semiotic resources – in public health posters, and to take a step in this direction by following one of the **trends** in studies of multimodality – multimodal corpus-based research. The research in this thesis, in short, is an empirical analysis of multimodal meaning-making constructed by different sets of semiotic resources in the posters for public health education.

1.1.2.1 Approaches to Multimodality

Over the past two decades, more and more researchers in diverse fields of study, for instance, linguistics and its satellite disciplines, social semiotics, communication and media, anthropology, have described different semiotic modes and investigated the relationships between these modes in multimodal texts and communicative events. Judging from the historical influences and directions that have shaped them, as well as the degree of emphasis each gives to context, system and sign-maker, Jewitt (2014a) differentiates three notable approaches within multimodality: (1) the social semiotic approach to multimodal analysis (e.g. Kress and van Leeuwen, 2001, 1996/2006; van Leeuwen, 2005), (2) systemic functional multimodal discourse analysis (SF-MDA) (e.g. Baldry and Thibault, 2006a, 2006b; O'Halloran, 2004, 2005; O'Halloran and Lim, 2014; O'Toole, 1994/2011), and (3) multimodal interaction analysis (e.g. Norris, 2004, 2012, 2013; Norris and Jones, 2005; Scollon and Scollon, 2003) (for further discussion, cf. Jewitt 2014a: 39). I return to these three primary approaches below.

Halliday's (1978) theory of social semiotics "argues against the traditional semiotic separation between language as a formal system and its use in the context of social relations and processes including power and ideology" (Jewitt, 2014c: 132). Halliday developed systemic functional linguistics (hereafter SFL) (cf. Halliday, 1985, 1994; Halliday and Matthiessen, 2004, 2014; Matthiessen and Halliday, 2009) in the early 1960's (seminal paper, cf. Halliday, 1961/2002). In the period of

Halliday's (1978) seminal book, *Social Semiotics*, was very much part of SFL. It was Halliday's attempt to provide a complementary alternative to the increasingly dominant discipline of cognitive science – an alternative where the social nature of semiotic systems is foregrounded (e.g. with the emphasis on interaction and intersubjectivity) and where phenomena of the next order are interpreted as meaning (i.e. semiotic) – rather than (only) as knowledge (i.e. cognitive) (cf. Halliday and Matthiessen, 1999/2006: 2). Since Halliday's (1978) contribution in introducing the theme of social semiotics, it has been taken in various directions, the mainstream arguably being one where some of the explicitness of SFL and deep insights into language have been forgotten, leading to a kind of diluted version (e.g. Hodge and Kress, 1988) of Halliday's original notion of the theme of social semiotics (cf. Matthiessen, 2017: 467-469).

A primary analytical focus of the social semiotic approach to multimodality is how meaning potentials are selected and orchestrated to shape meaning by people in the context of communication to realise social meaning (Jewitt, 2014a). The SF-MDA approach to multimodality focuses on “the ‘grammatics’ of semiotic resources with a view to understanding the contribution of different resources and the meanings which arise as semiotic choices combine in multimodal phenomena over space and time” (O'Halloran and Lim, 2014: 137). Multimodal interaction analysis not only focuses on the integration of different semiotic resources, but also studies real people interacting with others, with technology, and with the environment (Norris, 2013).

So, the social semiotic approach to multimodal analysis and SF-MDA are closer to one another than either is to multimodal interaction analysis, the social semiotic approach to multimodality being in a sense an offshoot of SF-MDA. Despite their different theoretical emphasis, all these three approaches assume that people use a full repertoire of semiotic resources both to produce representational artefacts and communicative acts and to interpret them, and the represented meanings and communicative functions realised from the multimodal ensembles are social. Other scholars (e.g. Bateman and Schmidt, 2012; Lemke, 1998; Liu and O'Halloran, 2009; van Leeuwen, 2005) put aside the differences in historical influences and theoretical emphasis and suggest that these three approaches to multimodality are broadly drawn from a socio-functional perspective.

Jewitt, Bezemer and O'Halloran (2016: 185) explore “the analytical potential of bringing approaches to multimodality into contact with other methodological or theoretical frameworks”, and present frameworks that have combined multimodal concepts with other approaches to examine multimodal artefacts, that “have some settled conventions and practices and an (emergent) research community, and that have made a distinct contribution to extending the scope of multimodality”. According to the criteria, here I list a few approaches that combine multimodality with other theories and methods: the cognitive approach to multimodality (e.g. El Refaie, 2003, 2013, 2017; Forceville and Urios-Aparisi, 2009; Holšánová, 2012, 2014; Pinar, 2013), the corpus-based approach to multimodality (e.g. Bateman, 2008, 2013b, 2014c; Hiippala, 2015b), etc. (for more approaches to multimodality, see e.g. Jewitt et al., 2016: 109-129).

The cognitive approach to multimodality combines psychological concepts and methods to examine the perception of multimodal artefacts. The corpus-based multimodal analysis combines corpus analysis methods to “empirically evaluate, critique and validate multimodal hypotheses and theories of meaning making through the analysis of multimodal artefacts and interaction” (Jewitt et al., 2016: 121-122). Thus, the cognitive approach involves a theoretical stance in the first instance (with implications for methodology) whereas the corpus-based approach involves a methodological stance in the first instance (with implications for theory). Corpora are used as part of the library of methodology in linguistic research from many perspectives. As far as SFL is concerned, it has always emphasised studying language in use – the analysis of naturally occurring language data, so in this sense the corpus-based approach has been part of the methodological framework from the start in SFL (e.g. Halliday, 1959/2006) and used since the 1950s (e.g. Coffin, Hewings and O'Halloran, 2004; Fawcett, 1973/1981; Fawcett, Tucker and Lin, 1993; Henrici, 1966/1981; Matthiessen, 2006b; Matthiessen and Bateman, 1991; O'Donnell and Bateman, 2005; Teich, 1999; Thompson and Hunston, 2006; for detailed reviews, see Bateman and O'Donnell, 2015; Sharoff, 2017). And the corpus-based approach to multimodality has been undertaken to a large extent by SFL scholars (e.g. Baldry and Thibault, 2006a, 2006b; Bateman, 2008; Bateman, Delin and Henschel, 2004).

Nevertheless, the distinction between approaches in the field of multimodality is not a matter of fundamental importance as the primary theory underpinning the present study is SFL. SFL's key principles and concepts have been applied to semiotic analyses of visual images, architecture and sculpture (e.g. Kress and van Leeuwen, 1996/2006; O'Toole, 1994/2011). Before the discussion of SFL-informed studies of multimodality proceeds, the theoretical basis of SFL deserves brief clarification. SFL characterises language as *meaning potential*; it views the grammar of a language as a social semiotic *resource* for making meanings, more specifically for constructing meanings as wordings, rather than a code or *a set of rules* for producing correct sentences (Halliday, 1978: 192). This entails some fundamental principles which distinguish it from other linguistic theories.

First, language is modelled as a semiotic system that people exploit to function in given contexts of situation. The process of language use is a process of making meanings by choosing from options (Halliday, 1966/2002, 1978: 46), and hence language is interpreted as a system of paradigmatic relations. The conceptualization of language as a system further entails the second central notion of stratification. SFL theorises language as a four-stratal system, consisting of two content plane strata (semantics and lexicogrammar) and two expression plane strata (phonology and phonetics, or graphology and graphetics) (cf. Halliday and Matthiessen, 2014: 26). The stratification of the expression plane is important in the context of multimodal studies, since one needs to explore how linguistic resources of expression relate to and interact with those of other systems (e.g. in calligraphy involving Arabic or Chinese scripts). Third, the semantic system is organized metafunctionally as simultaneously construing ideational, enacting interpersonal and presenting textual meanings.

The fundamental theoretical concepts of SFL not only make up the architecture of a language, but viewing language as a system of semiotic choices and the performance of social functions in context has provided SFL theory with the advantage of being *applicable* (Halliday, 2007, 2008) and applied to the description and understanding of other semiotic resources. In fact, because of the applicable potential of SFL, the theoretical concepts of SFL have been constructively applied to multimodality and multimodal studies thus have been developed within SFL. Various applications are inventoried in the next section; and the detailed

justification for using social semiotic perspective to analyse the public health posters is presented in Chapter 3.

1.1.2.2 Domains and Issues of Multimodality

O'Toole (1994) and Kress and van Leeuwen (1996) have made pioneering efforts in the application of systemic functional theory to multimodality. Since the multimodal turn in linguistics and communication studies, scholars have combined concepts and methods from SFL and elements of other disciplines to explore domains as diverse as films, music, performing arts, textbooks, newspapers, websites, built environment, and many different kinds of multimodal artefacts and events in our everyday lives; and have investigated more finely categorised theoretical and analytical issues.

Specifically, scholars have examined films (e.g. Bateman, 2007, 2013a; Bateman and Schmidt, 2012; Tseng, 2013; Wildfeuer, 2014, 2018; Wildfeuer and Bateman, 2017), and telecinematic discourse such as film trailers (e.g. Maier, 2009, 2011) and corporate marketing films (e.g. Maier, 2014; Tan, 2009). Regarding acoustic resources, scholars have approached music (e.g. Machin, 2010; van Leeuwen, 1999; Way and McKerrell, 2017), and presented models of rhythm (e.g. Martinec, 2000a; van Leeuwen, 1999, 2005), rhythmic patterns in speech (e.g. Martinec, 2002; van Leeuwen, 1992) and rhythm in other temporally-based semiotic modes such as rhythm in music (e.g. Machin, 2013; Martinec, 2000a). Other dynamic meaning-making data such as performing arts (e.g. Sindoni, Wildfeuer and O'Halloran, 2016, 2017), movement (e.g. Martinec, 1998, 2000b), gesture (e.g. Lim, 2017; Martinec, 2004; Norris, 2011), and bodily postures and movements (e.g. Hood, 2011; Wöllner, 2017) have also been investigated.

More domains include tourism discourse such as travel websites and tourist brochures (e.g. Francesconi, 2014; Gotti, Maci and Sala, 2017; Hiippala, 2012, 2015b; Krisjanous, 2016; Nekić, 2015); print advertisements (e.g. Cheong, 2004; O'Halloran, 2008); comics (e.g. Bateman and Wildfeuer, 2014; Borkent, 2017; Dunst, Laubrock and Wildfeuer, 2018; Jacobs, 2013, 2015; Tseng and Bateman, 2018; Veloso and Bateman, 2013) and cartoons (e.g. El Refaie, 2009; Pinar, 2008); paper and online news discourse (e.g. Bednarek and Caple, 2012, 2017; Caple, 2013;

Knox, 2007, 2010, 2014); websites (e.g. Adami, 2015; Baldry and Thibault, 2006b; Djonov, 2007, 2008; Lemke, 2002; Martinec and van Leeuwen, 2009; Zhang and O'Halloran, 2012; Zhao, 2010); social media technology (e.g. Poulsen, Kvåle and van Leeuwen, 2018) and social media discourse (e.g. selfies, images, posts, videos) published on social network sites such as Facebook (e.g. Georgalou, 2017; Moschini, 2016), YouTube (e.g. Benson, 2017), and Instagram (e.g. Veum and Undrum, 2018; Zappavigna, 2016; Zhao and Zappavigna, 2018). In recent years, there are multimodal explorations of software such as PowerPoint (e.g. Djonov and van Leeuwen, 2011, 2013, 2018; van Leeuwen, 2009; van Leeuwen, Djonov and O'Halloran, 2013; Zhao, Djonov and van Leeuwen, 2014) and Microsoft Word (e.g. Kvåle, 2018).

Some scholars, mostly coming from the school of SFL, have applied multimodal analysis to education fields; and hence their data include: classroom discourse (e.g. Danielsson, 2016; Jewitt and Cowan, 2014) and textbooks (e.g. Bezemer and Kress, 2016b), more specifically, discourse in science (e.g. Bezemer and Kress, 2008; Jones, 2007; Lemke, 1998; Liu and Owyong, 2011; Roehrich, 2016) and mathematics (e.g. Alshwaikh, 2015; O'Halloran, 1998, 2005, 2015b), discourse in finance (e.g. Alyousef, 2013, 2016a, 2016b) and engineering (e.g. Collinge, 2018; Karlsson, 2004; Simpson, 2016; Simpson and Archer, 2017, 2018), and textbooks for English-language (e.g. Chen, 2010), history (e.g. Coffin and Derewianka, 2009; Insulander, 2017), geography (e.g. Martin and Rose, 2008), physics (e.g. Doran, 2018; Pantidos, Valakas, Vitoratos and Ravanis, 2010), chemistry (e.g. Matthiessen and Pun, 2017), biology (e.g. Guo, 2004), and pharmacology (e.g. Weiss and Archer, 2014). There are also studies of children's narratives such as picture books (e.g. Moya, 2014; Painter, 2007, 2018; Painter, Martin and Unsworth, 2013; Serafini, 2010). More multimodal narrative analysis of print, digital, and audio-visual texts can be found in Page's (2010) collection.

Apart from two-dimensional static and dynamic multimodal artefacts explored in the studies above, three-dimensional architecture and space (e.g. O'Toole, 1994/2011; Ravelli, 2000, 2008; Ravelli and McMurtrie, 2016; Ravelli and Stenglin, 2008; Stenglin, 2011; Ventola, 2011) have prominently been investigated, especially the space in museums (e.g. Hofinger and Ventola, 2004; Martin and Stenglin, 2007; Ravelli, 2006; Stenglin, 2009a, 2009b) and the movement in such

space (e.g. McMurtrie, 2017). The inventory listed above is incomplete. It is, nevertheless, apparent that the scope of meaning-making domains that multimodal studies engage with is wide-ranging.

In addition, multimodal studies have explored the dynamics of the interplay between different semiotic systems (e.g. Martinec and Salway, 2005; Royce, 1998, 2007), developed research tools (e.g. Aubert and Prié, 2005; Baldry, 2007; Hiippala, 2015a; Kappelhoff and Bakels, 2011; O'Halloran, 2015a; O'Halloran, Podlasov, Chua and E, 2012; O'Halloran, E and Tan, 2014), and have “successful application across a range of topics or contexts including technology-mediated interaction, questions of knowledge, pedagogic practices and literacy, as well as the production of identity” (Jewitt, 2014b: 17). Regarding the issues considered in research areas of multimodality, they fall roughly into three divisions (cf. O'Halloran, 2011: 124): (1) describing non-linguistic semiotic resources, (2) investigating intersemiotic or multisemiotic relationships among different modes in multimodal phenomena, and (3) analysing *resemiotization* (cf. Iedema, 2001, 2003) of multimodal phenomena as social practices unfold.

O'Halloran's (2011) rough summative classification needs to be supplemented. First, it does not include what Matthiessen (2007b, 2009a, 2009b; see also Andersen et al., 2015; Halliday and Matthiessen, 2014) has emphasized at various points, viz. that in addition to intersemiotic relations we also need an account of the division of labour among semiotic systems in making meanings of different kinds in a complement way. Second, it does not cover intersemiotic translation. Accounts of translation seem to be confined to translation between languages rather than translation between semiotic systems in general (cf. Matthiessen, 2001: 42), so translations among different kinds of semiotic system need to be explored (cf. Baltrušaitis, Ahuja and Morency, 2018).

Among the three major issues and other concerns in the field of multimodality, the relations between and across modes in multimodal phenomena are “a central area” (Jewitt, 2014b: 18). Most of the analyses of intersemiotic relations have been carried out within the SFL theoretical framework, especially “have tended to analogise from the text-forming resources of language” to model intersemiotic mechanisms (Painter et al., 2013: 134). Some representative works have used SFL lexical-

cohesive relations (e.g. Royce, 1998, 2007), logico-semantic relations (e.g. Lemke, 2002; Martinec and Salway, 2005; Matthiessen, Kobayashi and Zeng, 1995; Matthiessen et al., 1998; Unsworth, 2010, 2013) or rhetorical relations (e.g. Bateman, 2008; Matthiessen, 2007b), information structure (e.g. Kress and van Leeuwen, 1996/2006), and modelled intersemiosis on ideational categories of relational transitivity (e.g. Unsworth and Cléirigh, 2014).

As far as logico-semantic types and rhetorical relations concerned, once researchers recognise that semantic system construes phenomena according to *fractal* principles – recurrent systemic patterns manifested in different grammatical domains (Matthiessen, 1995b; Halliday and Matthiessen, 1999/2006; see also Matthiessen, 2015a), and that logico-semantic relations such as expansion and projection are manifested in different environments throughout the content systems of languages, then it is hardly surprising the researchers have picked up and run with one or other of these manifestations in exploring intersemiotic relations. The issue of intersemiotic relations is elaborated by comparatively reviewing different models in Chapter 2. Motivated by contributing to the development of modelling intersemiotic relations, the present study outlines in-depth delineation of theoretical and analytical approaches based on social semiotics and SFL, focuses on text-image links in print multimodal artefacts (i.e. public health posters), and throws light on a comprehensive account of meaning construction in the domain of public health education.

1.1.2.3 Trends in Multimodality

Multimodality has drawn attention to a diversity of domains, covered various issues, and has been approached from various perspectives. Nevertheless, this young and vast field of enquiry has many limitations and challenges to overcome. One charge often levelled at the study of multimodality is that it is a kind of *linguistic imperialism* (e.g. Herman and Page, 2010: 218; McDonald, 2013) since most of the analysts entering this field are from the linguistics. Jewitt (2013: 263) argues that the critics overlook the fact that much of the work on multimodality has its origins in social semiotic theory of representation and communication, and the social component of this perspective sets it apart from narrower linguistic concerns (see more discussion of the criticism in, e.g. Bateman and Schmidt, 2012: 30-38). If any

multimodal artefact or communicative situation, whether an old-fashioned print representation or a trendy online interaction, has been investigated, the relationships between the multimodal phenomenon and the contextual, social and cultural elements are fundamental. Hence, this charge is simply not tenable within the research area of multimodality.

Another challenge made of multimodality is that most of the analyses are case studies providing painstakingly detailed descriptions of multimodal phenomena and these performed analyses “rarely formulate generalisations or make predictions about the nature of multimodality” (Hiippala, 2015b: 3). This does not imply that the detailed analysis of multimodal phenomena plays an unnecessary or supplementary role in theory building. Many theories of multimodality certainly have been refined from the detailed descriptions, but this is not enough for a holistic theoretical development. These bottom-up analyses must be complemented by top-down conceptualisations to avoid the limitation of “infinite detail” (Forceville, 2007: 1236).

In little more than a decade, there has been a trend of developing analytical tools, for example, a multimodal concordance *Multimodal Corpus Authoring* (MCA, cf. Baldry, 2004, 2007; Baldry and Thibault, 2006a, 2008) and its applications in films and videos, in order to explain multimodality more generally. According to O’Halloran and Smith (2011: 2), this formulation of generalisations shall be “applicable beyond the particular concerns of those studying within particular domains of reference or with particular academic backgrounds and with application to the study of multimodal phenomena in general”. And a series of software applications has been developed in the Multimodal Analysis Lab in the Interactive and Digital Media Institute at the National University of Singapore. Such software is designed to approach new media texts with the objective of attaining the ability to critically read, view and analyse a wide range of informational and functional multimodal artefacts that we may encounter in everyday contexts; and is developed to systematically identify the main features, structures, and ideas in these multimodal artefacts and produce insights into the nature of the multimodal phenomena (cf. O’Halloran, Tan and E, 2017; cf. also O’Halloran et al., 2012; O’Halloran, E and Tan, 2014, 2015; O’Halloran et al., 2014; Podlasov, Tan and

O'Halloran, 2012; Smith, Tan, Podlasov and O'Halloran, 2011) (for more tools, see e.g. Baldry and O'Halloran, 2010; Rohlfing et al., 2006; Taylor, 2004).

This trend represents conducting empirical research into multimodality. Combining multimodal analysis with corpus-based approaches is a way to empirically investigate patterns of use in multimodal artefacts and communicative situations. Within the broad category of multimodal corpora, the level of development varies from area to area due to the different types of multimodal data and the complexity of multimodal phenomena. Some areas are considerably more developed than others – the clearest example is offered by spoken corpora (Bateman, 2013c). The studies in this strand (e.g. Adolphs, 2008; Adolphs and Carter, 2013; Adolphs and Knight, 2010; Allwood, 2008; Allwood, Grönqvist, Ahlsén and Gunnarsson, 2003; Gibbon, Mertins and Moore, 1997; Hill, 2000; Taylor, Néel and Bouwhuis, 2000) aim to understand the nature of human communication across different speakers and environments; so, intonation, hesitation, gesture and even context are captured in spoken corpora.

The recordings of language in spoken corpora are *real-time data* (cf. e.g. Holšánová, 2008; Matthiessen, 2009b; Smith, 2011), processed in real time and unfolding along the single dimension of time; while most of the other multimodal artefacts or products of processes (although the processes involved in producing them do have temporal staging), whether static or dynamic, are *non-real-time data* which have “no single organising dimension” (Bateman, 2014e: 243), either in time or in space. However, the extension of corpus-enabled methods is limited to the real-time data, the discussion of non-real-time multimodal artefacts' corpora is in fact in “experimental” condition (Bateman, 2013c). Tools and mechanisms that work well with real-time data turn out to be inadequate or unusable with non-real-time data. In what follows, we shall first explore the nature of a non-real-time multimodal artefact and outline an analytic framework in which the multimodal phenomenon can be appropriately anatomised and modelled (Gu, 2006).

Despite the challenges, the Genre and Multimodality project (GeM, cf. Bateman, 2008; Bateman et al., 2004; Delin, Bateman and Allen, 2002) has developed corpus-based approaches to describing the structure of multimodal documents including traditional print newspapers, web-based newspapers, instruction manuals, and

illustrated booklets – particularly bird field guides. Treating any multimodal page as a multi-layered semiotic artefact, Bateman (2008) characterises four principal analytical layers in the GeM model: the base, layout, rhetorical and navigation layers. The description of the GeM model and the building of the GeM-annotated CPHP will be presented in Chapter 5. One challenge in the present study is how to apply the current annotation schema provided by the GeM model (Henschel, 2003) to a particular genre – public health poster, in order to provide a corpus-based investigation into meaning-making in the selected posters. The empirically grounded insights arising from computerised analysis provide a basis for understanding the construction of health-related messages created by the text-image combinations, and at the same time offer a high degree of reliability and validity to the present study.

Multimodality can be a tool for cultural study since “multimodal research in itself is a cultural product” (Lane, 2013), so there is a need for enhancing our understanding of cultural diversity through multimodal phenomena within different cultural contexts, especially non-English speaking contexts (for exploration of texts and contexts from a wealth of cultures and languages, cf. Bowcher, 2012b). There is also a trend towards elaborating the relationship between multimodality and culture, by analysing different semiotic modes in broader context of culture, not just the immediate context of situation (e.g. O’Halloran, Tan and E, 2014; van Leeuwen, 2011). This study examines the public health posters used in the City of New York and Hong Kong, compares and contrasts these documents in order to help shed light on cultural differences in these two societies in future studies. Multimodality, by its very nature, is multi-disciplinary. Thus, it is also important to notice other trends, or rather, challenges, and to keep track of what is happening within and across a range of disciplinary sites.

1.2 Research Design

1.2.1 Objectives and Research Questions

In this thesis, the overall aim is to work towards a general picture concerning public health education through posters by establishing links between social semiotic analysis and corpus-based empirical research in multimodality. To put it simply, the present study is designed to explain meaning construction by language and images employed in public health posters, which inform and educate the public about various health issues. While I focus on meaning-making brought about by language and images, I also investigate the issue of intersemiotic interaction in reference to the text-image relations in the public health posters sampled in New York City and Hong Kong. Thus, once this study has been carried out, I have a closer consideration of how the public health posters educate the general public and the role that text-image relations play in this. The results of the present study, it is hoped, will help to obtain a comprehensive understanding of the meaning construction and the text-image relations in the public health posters, contribute to the field of multimodality by building on existing research, and provide guidelines for design practices involved in public health education.

The overarching question that guides the study is:

How do public health posters use language and images to represent health-related information and educate the public?

This research focus is specified further as a series of subordinate questions in two general directions and the other one for implications:

About meaning-making and text-image relations in the public health posters:

- 1) How do language and images differ in the ways of making meaning?
- 2) What kinds of relations are established between language and images?
- 3) How do these text-image relations shape public health education?

About comparative studies of the public health posters:

- 4) What, if any, are the differences of meaning-making in such posters used in New York City and Hong Kong?

About implications for multimodal research and public health education:

- 5) How can the findings inform the multimodal corpus-based studies?
- 6) How can the findings be applied to the design of public health posters?

1.2.2 Methodology

In order to fulfil the research objectives and answer the research questions mentioned above, I analyse the entire collection of 60 public health posters used in metropolitan areas – the City of New York and Hong Kong (30 posters each), at different strata, i.e. lexicogrammar, semantics, and contextual. Where to collect – the sources of the public health posters, and how to collect – the criteria for including such posters in the corpus CPHP to create a representative sample of the educational posters in question will be introduced in Section 4.1. CPHP comprises New York City sub-corpus (CPHP-NYC) and Hong Kong sub-corpus (CPHP-HK). Basic information about CPHP-NYC and CPHP-HK is documented in Table A.1 and Table A.2 in Appendix A, including the corpus number (e.g. NYC-1, HK-1), headline, source, year of printing (indeterminate in some cases), public health campaign (or agenda, programme, initiative, signature event, the public education project, etc.) that involves the selected poster, a brief description, available version(s) in different language(s) and size(s) that can be ordered.

The analysis of the public health posters in terms of lexicogrammar discovers what kinds of meaning tend to be constructed more linguistically and what kinds of meaning tend to be constructed more pictorially, which provides a complement to the corpus-based generalisation in terms of semantics (rhetorical relations identified among segments in each of the posters). For this semantic analysis at the content plane, I build GeM-annotated sub-corpora applying GeM model (Bateman, 2008) and its annotation schema (Henschel, 2003). The corpus annotation and visualisation are proceeded with software of markup language editor and other computational tools. By using an XML (eXtensible Markup Language) editor called oXygen, I annotate the content, the layout and the rhetorical organisation of each of the public health posters. To improve the code readability, for each poster, I visualise three discourse structures (i.e. rhetorical structure, layout structure, rhetorical-layout structure) with the gem-tools developed by Hiippala (2015a). All

the visualisation graphs and statistics provided by the gem-tools make it effective to search the sub-corpora for patterns relevant for the research questions. I then discuss how the health-related information is constructed through the intersemiotic meaning-making in the selected public health posters.

The discussion continues to probe into the persuasive strategies realised in the choice of different semiotic modes and the intersemiotic characteristics between language and image used to construct and disseminate health-related messages in order to promote healthy behaviour and habits in New York City and Hong Kong. This comparison will also be the basis of an interpretation of similarities and differences in reference to the contexts of culture in which the public health posters operate in future studies. In short, this study is largely a qualitative one while empirical generalisation is conducted to ensure that the results represent as truly as possible the status quo in this particular genre of public health education.

1.3 Thesis Organisation

This thesis consists of seven chapters. Chapter 1 is a brief overview of the research field of multimodality, where the present study is conducted within a niche that has previously not been given systematic attention. The chapter begins with a sketch of pivotal concepts of public health education, gives a general account of approaches to multimodality, inventories domains and issues of multimodality, discusses challenges, research directions and trends in multimodality, then establishes a niche – multimodal corpus-based approach to public health education through posters, and follows an introduction of research design. The latter part of this introductory chapter clarifies why the public health poster is chosen as the study text among various types of public health education materials, describes where to position the present study in a diverse field of multimodality, and discusses why and how to merge the corpus-based approach into actual multimodal instances where different semiotic resources (e.g. language and images) are employed in conjunction to make meaning.

Chapter 2 gives us a detailed review of studies of intersemiotic relations (i.e. relations between contributions from different semiotic systems operating together

in the same context to produce multi-semiotic texts) conducted from a range of points of view, and offers a broad survey of the relevant research revealing different aspects of text-image interaction in educational texts and print materials including posters. Additionally, we have recently seen the development of corpus-based methods that take the discourse structure of multimodal text into account, so this chapter also looks at empirical studies that perform corpus-based analysis of page-based multimodal documents. Chapter 3 elaborates the theoretical foundation on which the present study is based, including SFL, RST, and visual grammar. Chapter 4 examines semiotic systems – language and image, and the major contribution of each individual semiotic system to the meaning-making in the public health posters.

Chapter 5 refers to the GeM framework and gem-tools used to build and visualise the annotated corpus, and I follow up corpus building in more detail with examples. The GeM model has been developed for documents (such as illustrated books, instruction manuals, traditional and electronic newspapers) rather than for posters which are not always grid-based. All print and scrollable documents selected in the GeM project have grid-based design, but the public health posters in the present study differentiate from the print and web pages annotated in the GeM project. Thus, one significant issue of multimodal corpus annotation is above all to extricate how to break out base units of the public health posters and how to identify their layout units and RST segments. The difference is also significant on the content plane, in terms of how many and what kinds of meaning can be accommodated within the frame provided by the document on the expression plane. In Chapter 5, I also present the whole XML files of two poster examples, to describe how to build the multimodal corpus of the public health posters in multi-layered annotations. Moreover, discussions are undertaken to build on the existing GeM annotation schema by explaining how to cope with certain RST structures and suggesting how to describe complex layout structures in the public health posters.

The comprehensively multi-layered annotations allow me to search for statistics and patterns and zoom in on specific features of the public health posters in the multimodal corpus. Chapter 6 thus begins by presenting the results of the complete annotations of the entire data set, summarising various statistics, identifying the similar and different discourse structures in two sub-corpora CPHP-NYC and CPHP-HK. It continues by studying the statistics extracted from CPHP. These

statistical explanations provide a foundation on which a deeper understanding can be built to examine public health education through posters. The empirical investigations in Chapter 6 and the in-depth qualitative descriptions in Chapter 4 can interpret how different semiotic resources work together to shape public health education, as well as drawing a preliminary comparison between the public health posters collected from New York City and Hong Kong. Chapter 7 concludes the thesis by answering all the research questions and discussing the implications (both theoretically and pragmatically) of this corpus-based multimodal analysis, proposes the continuing research agenda.

Chapter 2 Literature Review

Barthes (1977) observes how text and image relate to one another and the seminal essay ‘Rhetoric of the Image’ earned him a pioneering role in interpreting text-image relations. Barthes (1977: 32-51) distinguishes between a text-image relation in which the text extends the image by adding new and different meanings, or vice versa, and a text-image relation in which the text elaborates the image by restating the same meanings, or vice versa. In the former extension process, image and text stand in a complementary relationship that is called *relay*. In the latter elaboration process, image and text share a relation of *anchorage* if the image is the main source of information and the text serves the function of supporting and elucidating the image; or share a relation of *illustration* if the situation is reversed. Although Barthes’ (1977) semiotic approach to text-image relations is too general to account for the dynamics of text-image relations in multimodal artefacts (for the interpretation of Barthes’ distinction in terms of Halliday’s logico-semantic relations, cf. Matthiessen, 2007b: 35), Barthes’ work has influenced subsequent multimodal studies (e.g. Royce, 1998; Martinec and Salway, 2005; van Leeuwen, 2005).

Using Barthes’ (1977) study as a starting point in structuring literature maps, I trace the theoretical developments in modelling relations between language and other semiotic resources such as images concerned with various perspectives and compare several models of intersemiotic relations (Section 2.1 and Section 2.2). One criterion for classifying such models could be their view on how semiotic systems integrate. There are several perspectives to theorise a framework of relationships between verbal and visual semiotic resources: deploying resources of cohesion (e.g. Liu and O’Halloran, 2009; Royce, 1998, 2007), using metaphor for intersemiotic relations (e.g. O’Halloran, 1998, 1999a, 2005, 2008), treating intersemiotic relations as semantic resources – logico-semantic or rhetorical relations (e.g. Martinec and Salway, 2005; Matthiessen, 2007b; Matthiessen et al., 1995), etc. (see also Bateman’s, 2014d, 2016b: 320-321, comprehensive introduction of well-demarcated categories of approaches to modelling multimodal relations).

Despite the differences, each perspective is not an either/or choice; for example, O'Halloran (1999a, 2005, 2008) not only uses metaphor as a basic process for capturing the meaning-making across semiotic resources, but also borrows logico-semantic relations for systemic descriptions in her studies. In addition, I review studies relating to the present study in certain respects (Section 2.3): (1) recent studies within corpus-based approach to multimodality, (2) applications of RST in multimodal documents, (3) studies of posters that are not confined to the public health posters, and other static print materials, and (4) studies of public health education and promotion materials. All these have provided me with a handy guide to all relevant topics and acted as a stepping stone to the present analysis of the public health posters.

2.1 Modelling Intersemiotic Relations on Cohesion and Metaphor

Royce (1998) paraphrases Barthes' concepts of *anchorage* and *relay* into *text-image dependency* and *text-image co-operation*. Influenced by semioticians' preliminary explorations of text-image relations (e.g. Barthes, 1977; Schapiro, 1973) and visual grammar proposed by Kress and van Leeuwen (1996), Royce (1998) investigates how visual message elements and language semantically *complement* each other to project a unified, coherent message in page-based multimodal text. In addition, drawing on categories of lexical cohesion developed by Halliday and Hasan (1985/1989), Royce (1998) proposes that the synergistic relationship between visual and verbal modes is characterised by *intersemiotic complementarity*, which can be identified through the analysis of cohesive relations across semiotic modes.

Royce's model of intersemiotic complementarity (cf. 1998: 29; 2007: 68-69) shows a range of potential ways in which intersemiotic metafunctions reflect relations between visual and verbal semiotic systems in page-based multimodal texts. With regard to ideational meaning, Royce identifies participants, processes/activity, circumstances, and attributes/qualities/characteristics of the represented participants in both semiotic systems, and relates them through lexico-semantic sense relations of repetition, synonymy, antonymy, meronymy, hyponymy, and

collocation. As for interpersonal meaning, the intersemiotic relations are established through mood and modality that function to reinforce address and attitudinal congruence/dissonance. In relation to textual meaning, Royce considers the layout and composition through information value, salience, framing, inter-visual similarity, and reading paths.

Royce's analytical framework for intersemiotic complementarity has been adapted for examining multimodal meaning-making via the text-image analysis in various types of page-based multimodal texts, such as magazines (e.g. Bowcher, 2007; Royce, 1998, 2007), legal cartoons (e.g. Royce, 2015) and print magazine advertisements (e.g. Royce, 2016). Bowcher and Liang (2013) reveal the *internal* and *extended cohesion* in a front-back tourist site entry ticket. The internal cohesion is what Royce (1998, 2007) calls intersemiotic complementarity, which is semantically established through a series of cohesive ties between visual and verbal modes within the material frame of multimodal artefact itself, including the front and the back of the ticket. They extend Royce's notion of multimodal cohesion by demonstrating the way in which the ticket integrates into, and mediates, a touristic experience, and this integration with semiotic-distinctive practices of its ecosocial environment is the extended cohesion.

However, the participants, processes, circumstances and attributes that are conflated into the visual message elements in Royce's model of intersemiotic complementarity (1998, 2007) are defined by drawing on a visual re-working of the *transitivity system* (cf. Halliday and Matthiessen, 2014: 213-224). Bateman (2014d) thus questions the methodological practicability of decomposing visual messages elements, and also the effect of multimodal cohesive relations. In certain respects, it is problematic to decide the extent required for fine-grained multimodal cohesion – if one uses the interaction with textual information to guide recognition of visual message elements, then this begins to provide more analytical control of just what will be picked out of an image to attend to in analysis and what will not (cf. Bateman, 2014d: 172-173). Bateman (2014d: 174) also points out that it is a sort of indeterminate value, between cohesive ties and meaning-making effectiveness of multimodal artefacts under study – finding a profusion of the cohesive ties used between text and images does not necessarily tell us very much concerning how a multimodal text is working.

In order to understand how meaning expansion arises across selections from different semiotic resources of language, symbolism and visual display in mathematical texts, O'Halloran (1998, 1999b) extends Halliday's (cf. 1985, 1994) concept of *grammatical metaphor* to describe the shifts in meaning between codes as *semiotic metaphor* – “the phenomenon where semantic shifts occur when functional elements are reconstrued in another semiotic” (O'Halloran, 1999a: 317). Such meaning shifts from one semiotic system into another would be *translation* as in Matthiessen (2001) rather than metaphor; metaphor would need to involve the reconstrual of one form of semiotic in terms of another form (Halliday and Matthiessen, 1999/2006). For example, Halliday and Matthiessen (cf. 1999/2006: 276-278) discuss the lexicogrammatical metaphor used in the discourse of economics where quantity changes in degree is reconstrued as if they were location or movement in space, and this can then be translated into visual representations in graphs.

O'Halloran (1999a, 2003) applies the notion of semiotic metaphor to discuss the process of the semantic reconstrual which occurs intersemiotically in mathematics and science. Different types of semiotic metaphor are distinguished – parallel and divergent, which can be seen “to function as opposite ends of a cline” (Lim, 2004: 241). The former refers to “the situation where an overlay in meaning occurs in the more restricted sense of what we understand metaphorical representation to be”, and the latter is “the situation where the meaning arising from the reconstrual of elements in a second semiotic are more far-reaching than those which occur with parallel semiotic metaphor” (O'Halloran, 1999a: 348). The harmonisation across different semiotic systems is, therefore, not the universal principle of the multimodal integration of semiotic resources. With a movement between semiotic codes, one of the two poles of the cline could be predicted as possible by-product of the meaning made through parallel semiotic metaphor – semantic redundancies; the other could be the surfacing of conflicting meanings which previously do not exist.

As also pointed out by Thibault (2000: 321), different modalities may not go in a single direction; it is possible for them “to produce meanings which are in conflict with each other in the same text”. Between these two poles there are intermediate patterns which have been suggested by Cheong (2004) that they could be measured

through a scale known as contextualisation propensity. However, how to measure the degree or extent of contextualisation propensity is not precisely defined, thus reducing the analytical effectiveness of Cheong's proposal and leaving it "rather elusive" (Liu and O'Halloran, 2009: 385). Different from Cheong's relatively vague concepts such as high or low contextualisation propensity, intersemiotic mechanisms (e.g. O'Halloran, 2005, 2008; Royce, 1998, 2007) help to reveal the nature of these relations between language and other semiotic resources in multimodal texts. And semantic expansion can occur through a collection of the intersemiotic mechanisms: semiotic cohesion, semiotic adoption, semiotic mixing, juxtaposition and spatiality, semiotic transition, and semiotic metaphor (for detailed descriptions of six intersemiotic mechanisms, see O'Halloran, 2005: 169, 2008: 453).

In addition, O'Halloran (2005: 165) values Royce's (1998) metafunctionally-based analytical framework as "a point of departure for the description of intersemiotic mechanisms which extend beyond those proposed for language and visual images". In a parallel manner, O'Halloran (2005) investigates the intersemiotic mechanisms residing within and across semiotic choices of language, visual images, and symbolism in mathematical discourse, and provides a detailed description of intersemiotic systems at discourse, grammar and display strata in terms of the four metafunctions – textual, experiential, interpersonal, and logical meanings (cf. O'Halloran, 2005: 167-170). For example, intersemiotic experiential meaning can be construed across language and visuals on the discourse plane as a way to capture the activity sequences and relations, the construction of interpersonal meaning is realized on the discourse plane through intersemiotic negotiation and appraisal across semiotic systems, while juxtaposition contributes to textual and experiential meaning on the expression plane.

While also following Martin's (1992, Martin and Rose, 2003) approach to language, context and ideology, O'Halloran (2005, 2007) goes on to propose a framework for mathematical discourse which specifies that different semiotic choices complement each other for a joint construction of meaning across the expression/display plane (i.e. typography/graphology and graphics), the content (i.e. grammar and discourse) plane, and the context plane (i.e. register and genre). Based on her preliminary framework (cf. O'Halloran, 2005: 160, 2007: 87) for the analysis of mathematical

texts, O'Halloran (2008: 456) adjusts the framework for exploring intersemiotic mappings in printed multimodal texts that involve both linguistic and visual forms, and demonstrates how semiotic choices from these systems result in a multiplicative expansion of ideational meaning in an AIDS campaign advertisement. Not only does O'Halloran (2008) model semantic expansion of meaning on metaphorical shifts, she also synthesizes diverse research perspectives by locating intersemiosis at different strata and within the metafunctional dimensions as well.

Drawing on insights particularly from Hasan's (cf. Halliday and Hasan, 1985: 70-96) formulation of linguistic texture, Martin's (1992; Martin and Rose, 2003) dynamic view of texture, and the models of Royce (1998) and O'Halloran (2005), Liu and O'Halloran (2009) further explore the semantic nature of text-image relations in multimodal discourse. Specifically focusing on how the text-image relations are metafunctionally orchestrated across experiential, textual and logical meanings at the discourse stratum, Liu and O'Halloran (2009) propose *intersemiotic texture* as the crucial property of coherent multimodal texts and summarise a preliminary framework (cf. Liu and O'Halloran, 2009: 371) of cohesive devices between language and images for the analysis of intersemiotic texture in multimodal discourse. Through their study, Liu and O'Halloran (2009: 385) reveal that, the essential property of multisemiotic texts – intersemiotic texture – is realized through intersemiotic cohesion which “generates semantic ties between linguistic and pictorial components, and thus integrates different modalities together into a coherent product”.

Before engaging in modelling intersemiotic relations at the strata of grammar and discourse, I think it is worthwhile to mention the following studies of multimodal integration of multiple semiotic resources although they are unconnected with either cohesion or metaphor. Thibault (2000) extends Gregory's (cf. 1995, 2002) notion of phasal analysis (see also Martinec (1998) for a similar approach) to reveal how a consistency of co-patterning over a television advertisement is achieved through the multimodal integration of language, visual images, body movements and soundtrack. Meaning-making among these numbers of distinct semiotic resource systems refers to a contextualising process of making patterned relations among different classes of co-played elements.

Further to the above study conducted by Thibault (2000), Lim (2004: 239) interprets intersemiosis as a result of the contextualisation relations. He also develops two types of contextualisation relations and proposes that semiotic modalities can either co-contextualize or re-contextualize each other. On the one hand, in cases where the meaning of one modality reflects the meaning of the other through some type of convergence, the two resources share co-contextualising relations; on the other hand, in cases where the meaning of one modality is at odds with or unrelated to the other through some type of divergence, here the resources share re-contextualising relations (Lim, 2004: 239). The dichotomous differentiation between co-contextualisation and re-contextualisation relations is rendered into metaphorical representation to further elucidate the nature of contextualization relations in multimodal discourse by O'Halloran (e.g. 2005, 2007).

Lemke (1998) offers the notion of *multiplying meaning* to refer to the synergy across the resources of multiple semiotic systems (e.g. figure and main text) in scientific texts. Meanings made with each functional resource in each semiotic system can “modulate meanings of each kind” in each other semiotic system, thus “*multiplying* the set of possible meanings that can be made” (Lemke, 1998: 92). While Lemke’s (1998) notion explains the outcome of semiotic transitions (Thibault, 2000: 312; O’Halloran, 2007: 90), the concrete mechanisms of the meaning multiplication that operates in the scientific discourse are uncovered.

One may get *resemiotization* when entering ‘intersemiotic or intersemiosis’ as the keyword to search by for literature. Iedema (2001, 2003) refers to intersemiotic shifts as resemiotization, which is about how semiotics are translated or represented from context to context, from practice to practice. His focus is not on the complexity and intricacy of the interplay between different semiotic systems, but on tracing how meaning-making shifts from one into the other as socially situated processes unfold. It is noteworthy that “multimodal analysis should be complemented with a dynamic view on semiosis” to consider “how it is that such constructs come about, or how it is that they transmogrify as (part of larger) dynamic processes” (Iedema, 2003: 30). The dynamic emergence of those kinds of translation or representations has no relevance to the present study.

2.2 Modelling Intersemiotic Relations on Logico-Semantic Relations

Scholars (e.g. Martinec and Salway, 2005; Matthiessen, 2007b; Matthiessen et al., 1995; van Leeuwen, 2005) approach the modelling of intersemiotic relations from grammar-derived or discourse-orientated perspectives. More specifically, attempts to map out intersemiotic interaction have been made by the resource of semantic organisation of text – logico-semantic, or rhetorical relations. Matthiessen (2007b: 32) indicates that “the resource for linking text and image are rhetorical relations – relations of projection and expansion”. Regardless of the division of semiotic labour between text and image across different types of register, rhetorical relations are used inter-semiotically as: text may project/expand image; and image may project/expand text (Matthiessen, 2007b: 33).

Martinec and Salway (2005) develop a system for text-image relations in new and old media based on Barthes’ (1977) original study and Halliday’s (1985, 1994; cf. also Halliday and Matthiessen, 2004, 2014) logico-semantic relations. More specifically, drawing on lexico-grammatical formulation of interdependency and logico-semantic relations between clauses, Martinec and Salway (2005: 358) combine two kinds of relations – the relative status of images and text, and how they relate to one another in terms of logico-semantics, to present a generalized system of text-image relations which applies to different genres of multimodal discourse in which image and texts co-occur.

First, the relative text-image status is equal when either: both the image and the text are joined equally and modify one another, in which case they are *equal-complementary*; or, both the image and the text can be understood individually, in which case they are *equal-independent* (cf. Martinec and Salway, 2005: 343; Salway, 2010: 57-58). The relative text-image status is unequal when either the image or the text can be understood individually; that which cannot be understood individually is subordinate to the other (Salway, 2010: 58). Second, with regards to the logico-semantic relations – *expansion* and *projection* – between images and texts, Martinec and Salway (2005) identify three main kinds of logico-semantic relations of expansion for text-image combinations: a text elaborates the meaning

of an image, and vice versa, by further specifying or describing it; a text extends the meaning of an image, and vice versa, by adding new, related information; a text enhances the meaning of an image, and vice versa, by qualifying circumstantially with reference to time, place and reason/purpose (cf. Martinec and Salway, 2005: 349-351; Salway, 2010: 58). They also outline and exemplify locution and idea between images and texts as for projection.

Kong (2006: 213) identifies potential relations that bind language and images together by labelling *decoration* as the third type of logico-semantic relation and arguing for a fairly well-differentiated description of their logico-semantic relations with more sub-categories under the three kinds of expansion. In some cases, pictures can simply decorate accompanying messages; they are omissible but can also elicit emotion-laden reactions that may precede cognitive awareness and influence interpretation of messages (cf. Kong, 2006: 212-214). In addition, Kong (2006) considers the different possible combinations of text-image relations and summarises a multilevel network. His proposed taxonomy of text-image relations can be regarded as an all-embracing system because it encompasses six perspectives in terms of several theories – (1) logico-semantic relations, (2) metafunctional distribution of these relations (Halliday, 1994; Halliday and Matthiessen, 2004), (3) hierarchical representation (Mann and Thompson, 1988), (4) spatial arrangement (Kress and van Leeuwen, 1996/2006), (5) the evaluative (Martin and White, 2005), and (6) metaphorical nature (Forceville, 1996; Horn, 1998) of a number of the relations. However, Kong (2006: 226) admits that the potentially subjective and ambiguous nature of some text-image relations will need to be followed up in future empirical studies.

van Leeuwen (2005) classifies the text-image links as relations of *elaboration* and *extension*. The first is further divided into specification and explanation, and the latter is further identified as similarity, contrast, and complement. Pointing out that “every link is, at least in principle, reversible”, van Leeuwen (2005: 230) describes these five visual-verbal links: (1) *specification* – the image makes the text more specific, or the text makes the image more specific, (2) *explanation* – the text paraphrases the image (or vice versa), (3) *similarity* – the content of the text is similar to that of the image, (4) *contrast* – the content of the text contrasts with that of the image, and (5) *complement* – the content of the image adds further

information to that of the text, and vice versa. Compared van Leeuwen's (2005) overview with Barthes' (1977) notion, specification is similar to illustration and anchorage, and complement is similar to relay.

Lemke's (1998) and many of O'Halloran's (e.g. 1999b, 2003, 2005, 2007) studies mentioned in the preceding section are devoted to the investigation of how language combines with other semiotic resources in education. The call for a much broader view of literacy than portrayed by traditional language-based approaches is come up for by the New London Group (1996) – a team of ten academics presents a theoretical overview of the connections between the changing social environment facing students and teachers and a new approach to literacy pedagogy that they call multiliteracies. With the advent of Kress and van Leeuwen's (1996) work on multimodality, conceptual tools have been provided for thinking about teaching and learning beyond language. One of the challenges for educational institutions in dealing with multiliteracies is developing a metalanguage or a grammatics adequate to multimodal communication in the new environments for readers to know how to integrate other semiotic systems with the text (Macken-Horarik, Love and Unsworth, 2011: 18-20; Matthiessen, 2009b: 21).

More scholars involved in educational research (e.g. Chan, 2011; Painter and Martin, 2011; Painter, Martin and Unsworth, 2011, 2013; Unsworth, 2010, 2013; Unsworth and Cléirigh, 2014) describe and systematise the intersemiotic relations at the strata of grammar and discourse, primarily aiming at implications for pedagogy in learning environments in which extensive multimodal texts are engaged than other research. Aligning with the agenda for a pedagogy of multiliteracies proposed by the New London Group (1996; Cope and Kalantzis, 2000), Unsworth (2006, 2008a, 2008b) adopts a systemic functional semiotic perspective in formulating a metalanguage of multiliteracies to enable explicit discussion of the meaning made at the interaction of language and image when teachers and students are engaging with contemporary multimodal texts and texts of electronic multimedia. Unsworth (2008a: 377) points out that text-image relations “contribute to new literacies’ typical representation of meaning in multiple modalities”, therefore a theoretical framework for intermodal relations could facilitate development of the multiliteracies pedagogy appropriate to the multimedia world.

Unsworth's (2006, 2008b) framework of text-image interaction draws heavily on a group of previous studies (e.g. Gill, 2002; Lemke, 2002; Lim, 2004; Macken-Horarik, 2003a, 2003b, 2004; Royce, 1998) which describe text-image relations in various kinds of literacy incorporating a metafunctional perspective; and lays emphasis on describing text-image relations in the construction of ideational meaning. Some types of text-image relations which are shown in the middle column of Table 2.1 are inspired by McCloud's (1993) explication of text-image balance in comics, or, derive directly from Gill's (2002) categories of text-image relations in children's picture books. More sub-types have been elaborated and exemplified as their studies progressed (cf. e.g. Chan, 2011: 157; Unsworth, 2010: 285).

Table 2.1 An overview of the major intersemiotic relations

Metafunction	Unsworth (e.g. 2008b, 2010)	Martinec and Salway (2005)
Ideational	Concurrence (Gill, 2002)	
	• <i>Exposition</i> -----	<i>Exposition</i>
	• <i>Exemplification</i> -----	<i>Exemplification</i>
	• <i>Equivalence</i>	
	• <i>Homospaciality</i> (Lim, 2004)	
	Complementarity	
	• <i>Augmentation</i> -----	<i>Extension</i>
	• <i>Distribution</i> (Gill, 2002)	
	• <i>Divergence</i> (McCloud, 1993)	
	Connection	
• <i>Conjunction</i> -----	<i>Enhancement</i>	
- <i>causal</i>		
- <i>temporal</i>		
- <i>spatial</i>		
• <i>Projection</i> -----		
- <i>verbal</i>		
- <i>mental</i>		
		Expansion
		Projection
Interpersonal	Interpersonal interaction	-
	• <i>Reinforcement of address</i> (Royce, 1998)	
	Evaluative stance (Martin, 2001)	
Textual/ Compositional	Layout resources and features	-
	(Kress and van Leeuwen, 1996/2006)	
	• <i>Given/New, Ideal/Real</i>	
	• <i>Framing</i>	

The text-image relations generalised in Unsworth's model are illustrated with a variety of examples from reviewed articles, picture books, textbooks (Unsworth, 2006, 2008a, 2008b, 2010), and test stimulus materials (Chan, 2011; Unsworth, 2013, 2014; Unsworth and Cléirigh, 2014). This model has been applied to the analysis of data from an Australian government funded linkage project (2006-2008)

investigating multimodal reading comprehension in group literacy tests, and to the development of effective assessment tools testing what new reading strategies students should require to interpret contemporary texts with increased integration of visual images and print (Unsworth, 2013, 2014; Unsworth and Chan, 2008, 2009). Table 2.1 shows that there are similarities between Unsworth's (e.g. 2006, 2008b, 2010, 2013) and Martinec and Salway's (2005) frameworks in that two models draw on logico-semantic relations of expansion and projection derived from the grammar of language (Halliday, 1985, 1994; Halliday and Matthiessen, 2004, 2014). Ravelli (2000, 2016), however, thinks that the coordination of semiosis across different sign systems is more than a set of mechanisms or categories. Based on Hasan's (1989) notion of co-patterning of foregrounded elements, Ravelli (2016: 29) points out that these co-patterns are "re-patterned at the second level of symbolic articulation, leading to more general and deeper levels of meaning", which encapsulates the interaction of multiple systems and gives rise to intersemiosis.

A number of other functional linguists based in Australia are working on educational applications of SFL. Professor Clare Painter, among them, works on child language development, the analysis of images (Painter, 2007; Painter et al., 2011), visual-verbal relations in children's picture books (Painter and Martin, 2011; Painter et al., 2013), etc. As one of significant educational texts, children's picture books can be considered as "a key means of apprenticeship into literary, literature and social values" (Painter et al., 2013: 1). Picture books, especially those in narrative form, have considerable pedagogic power as they use intersemiotic complementarity to scaffold literary ways of reading and provide educationally worthwhile experience for the child (Painter and Martin, 2011). In order to understand how children's picture books accomplish these ends, Painter, Martin, and Unsworth (2013) incorporate a metafunctional perspective to delve into, first, the nature of the meanings conveyed by visual choices by extending Kress and van Leeuwen's (1996/2006) visual grammar within this particular genre (Painter, 2007; Painter et al., 2011); then, follow up an exploration into how these may relate to the structural and verbal components of the narrative text and suggest a framework for analysing a picture book as a visual-verbal unity (Painter and Martin, 2011; Painter et al., 2013).

Unlike all the above-reviewed research whose approaches analogise from the text-forming resources of language to explain intermodality, their approach to analysing intermodal relations is employing the SFL dimension of instantiation (Painter and Martin, 2011; Painter et al., 2013). Instantiation is the relation between the potential for meaning that inheres in the linguistic system (or more generally, semiotic systems) and the specific, actual text which incorporates limited choices and realisations from the overall potential system/s; so in a nutshell, the cline of instantiation relates observable instances of use to the potential from which they derive, and this is a principle of systemic organisation that operates in all semiotic systems (cf. Halliday and Matthiessen, 2014: 27-30; Matthiessen, Teruya and Lam, 2010: 121-125). In Hjelmslev's (1961) terms, this is the relation of system to process (for semiotic systems in general) or language to text (for linguistic system), which functions alongside the relation of content form to expression form (see also Martin, 2011: 250-251).

The region intermediate between instance and potential is “the most useful location for the analysis and description of multimodal patterns” (Matthiessen, 2007b: 55). Different registers, either monomodal or multimodal, operate in this intermediate zone. When the register is multimodal, the division of labour among different semiotic systems varies considerably across registers. This is illustrated by Matthiessen (2007b) through the comparison of semiotic labour division between two registers, namely, health report and news report. But to Martin (2008b: 136), the reason for treating intermodal relations by focusing on the process of instantiation is that “verbal and visual meanings are not realisations of an underlying meaning that we can invoke hierarchy to explain the intermodal synergy; rather they cooperate, bi-modally, in the instantiation of a genre”.

According to Martin's (2008b) claim, different systems would seem to be treated in the same way as the simultaneous metafunctions. However, they are not different metafunctional modes of meaning; they can be highly coordinated and integrated resources for meaning ideationally, interpersonally and textually. Between the coordination and integration within the context of semiotic systems and the diversification within the expression plane of semiotic systems, Matthiessen (2009b: 15-22) recognises different degrees of integration within the content plane of semiotic systems, which form a cline of integration of semiotic systems. This cline

of semiotic integration is defined by the poles of maximal and minimal integration; and intermediate between the two poles are cases “where two or more semiotic systems can be modelled as integrated into one system at the stratum of semantics” (Matthiessen, 2009b: 18). Thus, Martin’s (2008b) claim would relate to very loosely integrated semiotic systems if one does not try to model multi-semiotic meaning-making explicitly as in work on multimodal presentation generation (e.g. Bateman, Kamps, Kleinz and Reichenberger, 1998, 2001; Matthiessen et al., 1995; Matthiessen et al., 1998).

Painter and her colleagues (Painter and Martin, 2011; Painter et al., 2013) also take up Martin’s (2008a, 2010, 2011) notions of commitment and coupling to track the way each semiotic instantiated in the children’s picture books so as to compare their relative contributions to the overall meanings. Martin uses commitment to refer to the amount of meaning potential that is committed in the process of instantiation; and coupling to refer to the repeated co-patterning within a text of realisations from two or more systems. Therefore, they discuss the degrees of meaning potential committed, and couplings in terms of convergence (e.g. ideational concurrence, interpersonal resonance, and textual synchrony) or divergence between image and language (Painter and Martin, 2011; Painter et al., 2013).

Although their approach opens up possibilities for modelling multimodal text as a logogenetic process, Zhao (2011) challenges the operability of their modelling strategies. Taking Martin’s concept of commitment as an example, since it is defined by the degree to which meanings in optional systems are taken up and the degree of delicacy selected within systems, however, Zhao (2011: 132) comments that “it is not clear how the degree of commitment can be measured accurately since instances of different semiotic systems are involved, and the meaning making potential of the two systems are not necessarily comparable”. Thus, this type of analysing intersemiotic complementarity requires further investigation to offer a metalanguage which is manageable and can be easily adapted for the practices of multiliteracies (Zhao, 2010, 2011).

To sum up, with the pedagogic implications as the primary objective, their studies are of important significance in today’s multimodal education environment, but most of the above-reviewed analytical frameworks developed by the educational

linguists are register-specific. As Painter and Martin (2011) acknowledge, for instance, their work on both visual meaning and on intermodal complementarity has been influenced both by the nature of the data – children’s picture book narratives – and their goal of contributing insights into better understanding of this type of enlightened reading material. This section and the previous one have provided a general overview of some intersemiotic models and all these reviewed studies have contributed by attempting to explore the relationship between language and other semiotic resources from several perspectives: cohesion, metaphor, and logico-semantic relations.

2.3 The Continuing Review: Relevant Studies

2.3.1 Multimodal Studies Within the GeM Model

The GeM model (Delin et al., 2002; Bateman, 2008; Bateman et al., 2004; and cf. Bateman (2014a) for his personal account of the impetus for the establishment of the GeM research project) is primarily developed to provide a framework for the systemic and empirical analysis of static multimodal artefacts, although it is later considered in Bateman (2013b) as a foundation for treating non-static multimodal artefacts and extended to analyse filmic artefacts. The present study works with the multimodal corpus annotated using the GeM model to penetrate the multimodal meaning-making practices in public health posters. I focus the review on the multimodal studies within the GeM framework in this subsection.

Treating any multimodal page as a multi-layered semiotic artefact, Bateman (2008) characterises four principal analytical layers in the GeM model: base, layout, rhetorical, and navigation layers. Using one or more analytical layers of the GeM model, scholars describe and identify the characteristics of many areas of static multimodal documents – bird field guides and technical manuals (Bateman, 2008), print and online newspapers (Bateman, 2008; Bateman, Delin and Henschel, 2007; Kong, 2013), tourist brochures (Hiippala, 2012), a print advertisement (Mazzali-Lurati and Pollaroli, 2014), a municipal website (Paganoni, 2015) and tourism websites (Nekić, 2015), research monographs (Hiippala, 2016a), annual reports

(Hiippala, 2016b), etc. Taking inspiration from Bateman (2008) rather than actual application, Seizov (2014) develops a five-layer annotation schema ‘Imagery and Communication in Online Narratives’ (i.e. iconographical, material, production, communication, and multimodal layers) and applies it to political communication online from a visual standpoint. The prominent application is Thomas’ (2009, 2014) and Hiippala’s (2015b) attempts to create fully GeM-annotated corpora for their respective studies of product packaging and tourist brochure.

Kong (2013) fulfils his earlier empirical call (see Kong, 2006) by selecting and pairing up 110 international news items from Chinese- and English-language newspapers in Hong Kong and the UK – *the Oriental Daily* and *The Sun*. Primarily focusing on the verbal-visual composition and arrangement, Kong (2013) identifies base units in the selected news items and the exact semiotic level at which they are used, to explore the similarities and differences of multimodal features in the two tabloid newspapers. This corpus-based study finds that “an atomization approach is preferred in Chinese news, whereas a graphic composite approach is dominant in English news” (Kong, 2013: 192). His findings have an important implication in relation to culture, so future studies should be carried out to account for the correlation between layout preferences and culture.

Drawing on the GeM model and its XML-based annotation schema, Thomas (2009, 2014) annotates 24 packs collected from Taiwan and the UK and conducts an in-depth cross-cultural multimodal analysis. He adds a message-type layer to the original GeM model; and the addition of such layer “provides a principled basis on which to compare the different graphic resources used to realise messages of similar types across texts or sets of texts by locale or brand” (Thomas, 2014: 175). This corpus-based analysis sheds light on the genre of pack messages in general and on cross-locale variation in particular, and offers opportunities for improving current designs and design processes. Aiming for modelling the structure of multimodal artefacts – how language, images, layout, and other forms of communication work together to convey meaning, Hiippala (2015b) annotates 89 tourist brochures published by the city of Helsinki and thus adopts the data-driven approach to address the factors that shape the artefact structure and the role of structure in the recognition and interpretation of the artefacts.

2.3.2 Multimodal Applications of RST

RST, as developed originally in the early 1980s by William C. Mann, Christian M.I.M. Matthiessen and Sandra A. Thompson at the Information Sciences Institute of the University of Southern California (cf. Mann and Thompson, 1986: 85), is a theory of text organisation (cf. e.g. Mann and Matthiessen, 1991; Mann et al., 1992; Mann and Thompson, 1988; Matthiessen, 1995b, 2002, in prep.; for the overview of RST and applications of it, cf. Bateman and Delin, 2006; Taboada and Mann, 2006a, 2006b; and a detailed account of RST is later presented in Section 3.2). It has led to areas of application beyond covering the domain of linguistic description to do with text structure, since its ultimate goal is “the development of an account of text organisation that could be used as a resource in the text planning component of a computational text generation system” (Matthiessen, in prep.). More specifically, its applications have been diversified into computational linguistics (e.g. text generation, speech synthesis, text parsing), quantitative linguistics (e.g. relational dimension, distribution patterns), cross-linguistic studies, dialogue and multimedia (e.g. layout and design) (cf. Bateman and Delin, 2006: 594-596; Taboada and Mann, 2006a).

When it comes to the creation of multimodal documents, graphical elements, page layout and typography, etc. cannot be evaded. In one of the publications of the GeM project (1999-2002), Delin and Bateman (2002) demonstrate that both content and rhetorical structure provide good motivators for layout and typography, and documents can be critiqued, and presumably improved, by looking at the ways in which their visual appearance either fails to signal these levels of structure, or actively violates them. Delin and Bateman (2002) also show that the classical RST is not sufficient to describe multimodal documents, so relations have been added to deal with things such as diagrams with text labels, or pictures with captions that would remain unanalysed in classical RST. This major theoretical contribution of the GeM project – the multimodal extension to RST, is summarised in Bateman (2008: 151-176) where he also sets out four problematic areas that one needs to consider when RST meets multimodality (discussed in Chapter 3).

Taboada and Habel (2013) follow Bateman’s (2008) framework in using RST, and extend it by applying RST to a corpus comprising three different genres: print and/or

online newspapers, scientific magazine articles, and scientific articles. They identify depictive elements (579 instances of pictures, figures/graphs, tables, and maps in about 1500 pages), and determine the relations holding between these graphic elements and text. The types of such relations are of only a handful in their multimodal documents: pictures for preparation and elaboration in newspapers; figures are most often used for elaboration, pictures for motivation, and tables stand in evidence relation to the text in articles.

However, some scholars (e.g. Martinec, 2013; Pastra, 2008) believe that RST, as it had been developed just for text segments, is inappropriate for describing multimodal artefacts. Martinec (2013) develops the Martinec and Salway's (2005) system of text-image relations by focusing on nascent uses of the text-image relations, i.e. uses that have not yet stabilized and that could benefit from a semiotician's intervention. It's a paradox that Martinec (2013: 150) interprets RST as a cognitive model "rather than semiotic" in the article where he further develops the system formed by sub-systems of status and logico-semantics. The application of RST to mapping out text-image relations is challenged by him because it seems difficult for types of relations to be reliably identified without observable criteria. Martinec (2013: 150) also argues that RST suffers from another weakness because of the uneven emphasis given to equal-status relations between nuclei and unequal-status nucleus-satellite ones.

Matthiessen (2007b) and Bateman (2008) explicate the linking of different semiotic systems within a multimodal text through the systemic description of their rhetorical relations for developing a multimodal text. These relations within RST can be interpreted in terms of the very general logico-semantic relation types identified by Halliday (Matthiessen, 2007b: 33). As the resources of the semantic system of languages, RST has advantages of approaching multimodal artefacts, more than being appropriate. First, rhetorical relations are not confined to language but are pervasive in the organisation of multimodal documents; they are not only used intra-semiotically in the development of sequences of passages or images, but also inter-semiotically between text and image (Matthiessen, 2007b). Second, the selection of minimal analytical unit in RST is flexible, and logical relations thus work at different strata. Analytical units "may vary depending on the purposes for which an

analysis is undertaken; it may be fixed as sentences, as grammatical clauses, or as entire paragraphs” (Bateman, 2008: 151).

2.3.3 Studies in Posters and Print Materials

In this subsection, I focus on cases where multimodal artefacts that have similarities to public health posters are studied. Although the public health poster can be called a genre, one will be able to tell at a glance that it is a hybridised or blended one since it bears some resemblance in form, style, structure, content, and target population to different genres of multimodal artefacts of static and spatial arrangements, ranging from various types of poster (e.g. event poster, movie poster, political poster) to print advertisements to comic books to picture books. In addition, some elements in public health posters such as sequences and diagrams can be commonly found in other genres – instructions, recipes, test reports, etc. A detailed retrospective overview of studies of all such genres is unnecessary here, but I list some studies relevant to the present study and review rather closely a few of them engaging with static print materials.

Almost all the aforementioned genres and more domains of print multimodal artefacts that have been covered include, among others, posters (e.g. Barron, 2012; Degano, 2014; Hansen, Eisner, Pfaller and Schicktanz, 2018; Jones, 2014; Maiorani, 2007, 2008; Sifaki and Papadopoulou, 2015; Teo, 2004; Williams, 2012) and placards (e.g. Bowcher, 2012a), pamphlets (Weiss, 2014), print advertisements (e.g. Al-Momani, Migdadi and Badarneh, 2016; Berazhny, 2012; Blanco Ramírez, 2016; Cheong, 2004; Lick, 2015a, 2015b; Lock, 2003; O’Halloran, 2008; Ravelli, 2016; White, 2010), not-for-profit organizations’ fundraising letters (e.g. Lipovsky, 2016), instruction manuals (e.g. Bateman, 2008; Bezemer and Kress, 2016a; Martinec, 2003), recipes (Bowcher, Liang and Wen, 2013; Halliday and Matthiessen, 1999/2006; Martinec, 2003), product packaging (e.g. Brierley and Elliott, 2017; Jones, 2014; Thomas, 2014; Wagner, 2015), comics (e.g. Cohn, 2013a, 2013b; Wartenberg, 2012) and serialized manga (e.g. Huang, 2014; Yang and Webster, 2015), tourist postcards (e.g. Francesconi, 2011, 2013) and entry tickets (e.g. Bowcher and Liang, 2013), and children’s picture books (e.g. Moya, 2011, 2014; Moya and Pinar, 2008, 2009; Painter, 2007, 2018; Sunderland and McGlashan, 2013; Wignell, 2011).

Analyses of various types of posters have been carried out within different theoretical frameworks of, for example, genre analysis (e.g. Barron, 2012; Degano, 2014), social semiotic analysis (e.g. Maiorani, 2007, 2008; Oyeboade and Unuabonah, 2013), critical discourse analysis (e.g. Teo, 2004), semiotic analysis (e.g. Jones, 2014; Sifaki and Papadopoulou, 2015; Williams, 2012), and ethical analysis (e.g. Hansen et al., 2018). Barron (2012) conducts a contrastive genre analysis of public information messages including health campaign posters used in Irish and German. Maiorani (2007, 2008) investigates the interplay between verbal and visual semiotics in movie promotional posters from *The Matrix* trilogy and shows how these posters encode different kinds of promotional messages according to the social impact of each movie. Teo (2004) gives a detailed exegesis of the interpersonal and ideational meaning-construction of three Singapore's national campaign posters from a critical discourse analysis perspective. Employing Kress and van Leeuwen's (1996) framework of visual grammar, Teo (2004: 190) deconstructs the posters "in a bid to unravel the interactions" between the verbal messages and visual images. His real aim, however, is "to uncover possible ideological interests and meanings woven into the semiotic fabric" of the national campaign posters.

Through a semiotic deconstruction of visual images and textual messages employed in four advertising posters, Sifaki and Papadopoulou (2015) examine the effectiveness of a traditional marketing tool, i.e. the poster to boost audience's visit to the Tate Gallery in London. Similarly, based primarily on semiotics, Jones (2014) decodes the messages of political campaign posters in Thailand. Williams (2012) examines anti-alcohol campaign posters in Soviet Russia to explore how historical context and other factors shaped the content of the posters, and to assess the impact and effectiveness of the posters as part of a broader campaign of Soviet health promotion in relation to drink and alcoholism.

For the studies of intersemiotic relations in print advertisements, O'Halloran (2008) analyses intersemiotic phenomena engaging with an AIDS campaign advertisement reproduced from *Cleo Singapore* magazine; Al-Momani et al. (2016) interpret the intersemiotic complementarity borrowings from other genres and fields of discourse (e.g. pop culture, mundane situations, religious discourse, cultural memory, scientific discourse) in print advertisements collected from Jordanian newspapers.

For the studies of print advertisements displayed in urban public transportation systems, Blanco Ramírez (2016) explores verbal and visual rhetoric as multimodal branding strategies in university advertisements collected from a city's subway system in the United States; Lock (2003) explores how language and images are deployed together to create coherent and bimodal advertising texts collected on Hong Kong Mass Transit Railway, with neither mode being necessarily prior.

Moya and Pinar (2008) employ a multimodal analysis in a children's picture book to ascertain the extent to which visual and verbal components create meaning. Their paper shows that visual and verbal modes help to avoid monotony in an attempt to make the tale easy to understand, and in turn, attractive to young children. Building on theories from linguistics and cognitive psychology, Cohn (2007, 2013b) points out that comics are written in a visual language of sequential images that combines with text. Specifically looking at the enclosed graphic containers in comics from a structural perspective, Cohn (2013a) examines the multimodal interfaces between text and image in these graphic signs – speech balloons, thought bubbles, diagrammatic boxes, and sound effects; and details four types of interfaces that characterise the connections between modalities: inherent, emergent, adjoined, and independent relationships. His studies are helpful in decomposing comics-like units for annotation and determining some multiple modalities as a single unified whole.

2.3.4 Studies in Public Health Education Materials

Both static and dynamic public health education and information materials have been analysed qualitatively and quantitatively from different perspectives, such as statistical perspective to evaluate their effectiveness (e.g. Bleakley et al., 2015), integrating design science theory and methods to improve their effectiveness (e.g. Neuhauser and Kreps, 2014), and critical sociological perspective to understand the relationship between health-related information construction and different communicative channels (e.g. Koteyko, Hunt and Gunter, 2015).

In the fields of public health education and communication, the strategies that can effectively reach the desired goals (e.g. preventing or controlling immediate/long-term health problems) of such health education and communication materials have been investigated. For example, Griffin (2015) analyses 92 public health posters

produced by the Federal Art Project (1935-1943) in the US and reveals that representative strategies and visual tropes of these posters support their pragmatic and ideological goals. The use of emotional appeals such as fear, disgust, sad, happy, content, and humour has been investigated to test the effects of these tactics (e.g. Bleakley et al., 2015; Brookes and Harvey, 2015; Gagnon, Jacob and Holmes, 2010; Lupton, 2015). Using an online randomised experiment, Bleakley et al. (2015) examine the effects of emotional appeals in US CDC public service advertisements on adolescents' intention to reduce consumption of sugar-sweetened beverages.

Using approaches and methods from the fields of linguistics and multimodality, scholars have examined health education and communication materials from wider perspectives. Analysing the same genre – sex education picture books for preschool children in Mainland China, Liang, Tan, and O'Halloran (2016) conduct a social semiotic analysis to examine verbal and visual representations of biological knowledge about human reproduction and their analysis reveals a compromise of bio-sexuality to morality concerns; Liang, O'Halloran, and Tan (2016: 179) adopt a cognitive approach to examine verbal, pictorial, and multimodal metaphors and identify three types of metaphor – personification, domestication, and cross-experience metaphors that “not only facilitates young children's understanding of scientific concepts but also instills in them values and moralities that are socio-culturally conditioned”.

By applying critical discourse analysis, Lupton (2015) examines the ethical, moral and political implications of using disgust in an Australian anti-obesity campaign video and critiques the use of disgust appeals that poses challenge to human dignity and reinforces negative attitudes towards already marginalised individuals and groups. Mulderrig (2017) analyses the launch TV advert and surrounding policy documents of a UK anti-obesity social marketing campaign – *Change4Life*, and uncovers the information-reframing in public health policy because the target people are ‘nudged’ into personal responsibility for obesity prevention. Törrönen and Tryggvesson (2015), also through a detailed critical discourse analysis, analyse a pamphlet and a brochure from two Swedish public health campaigns targeting pregnant women's drinking, and argue that public health campaigns are part of larger process of bio-power – health governmentality.

Integrating multimodality into critical discourse analysis, Gibson, Lee and Crabb (2015) examine how breast cancer information is constructed through visual and verbal choices and support services on Australian breast cancer websites; Hunt (2015) draws on a sample of posts to diabetes-related Facebook pages established by UK organisations to explore how organisations' agendas are realised through the multimodal representations. In addition, Hunt and Harvey (2015) use corpus linguistics techniques (keyword, collocation and concordance) to identify lexis that signpost the ways that complex psychological health concerns are framed in eating disorder discourse. El Refaie (2015) uses key concepts in conceptual metaphor theory to describe metaphors in children's comics books to support tuberculosis campaigns on the basis of their experiential, internal, external, and narrative coherence.

2.4 Concluding remarks

To sum up, the extensive review in this chapter at least gives me four impressions. First, within multimodality, models for explaining intersemiotic relations have been proposed from very different theoretical backgrounds and methodological approaches. Theories and approaches are also weaved to characterise the relations between different semiotic resources since multimodality itself is a multidisciplinary subject. However, the extent to which the reviewed individual models succeed or not in providing revealing and predictive analyses and supporting more reliable application is still a matter of debate and experimentation (Bateman, 2016b: 320). Thus, the present study will investigate into the public health posters to help to articulate theoretical underpinnings and develop stronger empirical methodologies.

Second, despite the calls for the application of empirical methods in the field of multimodality, we cannot fail to sense that very few multimodal studies have invested in good size corpora (e.g. Hiippala, 2015b; Thomas, 2009). Most of the annotations are made manually, so the annotation process is labour-intensive and time-consuming. This is probably one of the reasons that we find creating good size corpora is not very often. Thus, projects within multimodality, particularly those

linked to the multimodal corpora, will help to develop both software and computational tools for more effective coding, annotation, visualisation, etc. The present study, for example, is useful to test and improve the current GeM annotation schema and visualisation tools. Third, the reviewed studies unravel the intersemiotic relations in a diversity of multimodal artefacts, however, the division of labour between language and other semiotic systems is not covered in the majority of these studies. Fourth, the present project aims at conducting a corpus-based analysis of the public health posters to investigate the public health education through such posters in two world cities. However, my survey among relevant literature reveals that public health posters haven't been examined so much in the fields of multimodality. Facing all those problems and setting myself those goals, I first introduce the theoretical framework in the ensuing chapter.

Chapter 3 Towards a Social Semiotic View of Multimodality

According to SFL, language is a resource for making meaning – it is a higher-order semiotic system, in an ordered typology of systems operating in different phenomenal realms: semiotic systems (higher-order [language] > primary [protolanguage]) > social systems > biological systems > physical systems (Halliday, 1996/2002, 2003, 2005b; Halliday and Matthiessen, 1999/2006: Chapter 15; Matthiessen, 2007b: 545-547; see also Matthiessen, 2004, 2007a, 2017, 2018). The advantage of this approach is that the properties of language can be ‘derived’ from its location in this ordered typology of systems. More specifically, we can model language from different points of view: “a language is a semiotic system, but also a social system [studied in sociolinguistics], a biological system [studied in neurolinguistics and articulatory/auditory phonetics], and a physical system [studied in acoustic phonetics]” (Matthiessen, 2001: 49).

As I have mentioned in Section 1.1.2, a number of other non-linguistic semiotic systems such as visual semiotics have been investigated and described from a systemic functional point of view (see e.g. Kress and van Leeuwen, 1996/2006; Matthiessen et al., 1995; O’Toole, 1994/2011). The meaning potential of the other higher-order semiotic systems can be mapped out by means of system networks and can also be defined by the comprehensive typology of all phenomenal realms, just as in language. A multimodal system is thus a system of the same order (Matthiessen et al., 1995).

Since meaning in semiotic systems is manifested socially, biologically and physically (Matthiessen 2017; see also Halliday, 2003). I can attend to the public health posters as products of the fourth-order of complexity – being semiotic, social, biological and physical. The health-related messages in such posters are socially constructed by resources from different semiotic systems, and “biologically activated and exchanged” (Halliday, 2003: 2) through their physical manifestation and habitats in different physical environment (e.g. on subway cars). We can thus analyse the public health posters from these different points of view accordingly.

But in the present study, I am particularly concerned with how language and images work together to create the health-related information and how they differ in meaning construction in the public health posters.

In this chapter, I will outline the analytical framework needed to conduct the research project described in Section 1.2 – analysing the verbal and visual semiotic resources; and leave the part of building the multimodal corpus of the public health posters to empirically study the public health education in Chapter 5. The following first three sections will provide an overview of the principles of SFL theory and the description of grammar (i.e. the grammar of English) based on SFL theory (Halliday, 1985, 1994; Halliday and Matthiessen, 2004, 2014), variants within SFL including rhetorical system and structure theory – the semantic system of rhetorical relations (Matthiessen, 2002, in prep.), and the grammar of visual design – the systemic-functional semiotic approach to images (Kress and van Leeuwen, 1996/2006).

3.1 SFL Theory

3.1.1 Main Pillars of SFL

Semiotic systems are social systems (and hence also biological and physical) with the added property of meaning – they are social systems that either carry meaning (primary semiotic systems) or create meaning (higher-order semiotic systems) (cf. Matthiessen, 2001, 2017; cf. also Halliday, 2005a, for the distinction between primary semiotic systems and higher-order ones). To create meaning, language, this complex system of higher-order human semiotic, has to be stratified into various levels, or strata – content and expression. **Stratification** is “a kind of organization that distinguishes semiotic systems from systems of all other kinds” (Matthiessen, 2001: 49). As I have discussed briefly in the last two paragraphs of subsection 1.1.2.1, in SFL, language is organised into four strata and the language system is meta-functional. In this section, I will present some of the main pillars of systemic functional grammar, including the hierarchy of stratification, the cline of instantiation, metafunctional diversification, and contextual variables.

Let me return to stratification first. The content level is further stratified into semantics and lexicogrammar; and the expression level is further stratified into phonology and phonetics, or graphology and graphetics. And semantics is the interface of language to context; that is, context is realised by semantics viewed from the top and semantic realises context viewed from the bottom (Halliday and Hasan, 1985/1989; Halliday and Matthiessen, 1999/2006; Hasan, 1984; Martin, 1992; cf. also Berry, 2017; Matthiessen, 2016). Each stratum is characterised by its own internal organisation and is ordered stratally in relation to one another along the hierarchy of stratification: context – semantics – lexicogrammar – phonology (graphology) – phonetics (graphetics); and the relationship among the strata – the process of linking one level of organisation with another – is called **realisation** (cf. Halliday and Matthiessen, 2014: 24-27).

I have briefly introduced **instantiation** (cf. also Halliday, 1991/2007, 2005a) in Section 2.2 when reviewing Painter and her colleagues' (cf. Painter and Martin, 2011; Painter et al., 2013) approach to understanding intermodal relations by employing the concept of instantiation. The relationship between language system and texts is the cline of instantiation (Halliday and Matthiessen, 2014: 28). Looking at instantiation from the other end, Matthiessen (1993: 270-273) calls it potentiality. At both ends of abstraction, texts and system are respectively embodied in the instantial – observable language in use, and in the potential – the resources for making meaning that lie behind the actual texts. Therefore, in terms of these two semiotic dimensions of language – the hierarchy of stratification and the cline of instantiation, a text is related to the contexts as a unit of meaning that realizes patterns in a context of situation; and at the same time related to the system of language as a unit instantiating the meaning potential of a language.

The cline of instantiation and the hierarchy of stratification are independently variable (Halliday, 2005a); that is, any point along the cline of instantiation can be intersected with any level within the hierarchy of stratification – and vice versa (Matthiessen, 2016). Based on the stratal organisation of language in context, a text can thus be analysed 'from above' (from the level of context), 'from roundabout' (from the level of semantics), and 'from below' (from the level of lexicogrammar) (cf. Halliday, 1978: 130-131, 1996/2002: 26-27/408-409, for Halliday's principle of **trinocular**ity; see also Halliday and Matthiessen, 2004, 2014; Matthiessen,

1995b, 2015a; Matthiessen and Halliday, 2009). Because higher-order semiotic systems are stratal and they are able to create more than one mode of meaning at a time, so for example, if we are moving a text from above – moving through the clause in its environment and the text, we can detect patterns of meaning organised according to different functions. These functions are known as **metafunctions** and they reveal the different contributions that the clause makes to construction of meaning as the text unfolds.

More specifically, in SFL, language is conceived of as a resource for making meaning, and its meaning potential has evolved around three motifs, i.e. when human beings deploy language, they are making three different kinds of meaning simultaneously – **ideational** (experiential and logical), **interpersonal**, and **textual** meaning (Halliday and Matthiessen, 1999/2006: 511). Language in social context thus recognises three general functions that we use language for: (1) the ideational metafunction to construe our experience of the world around us and inside us, (2) the interpersonal metafunction to enact our roles and relationships, and (3) the textual metafunction to organise our ideational meaning and interpersonal meaning as a flow of information in context (cf. e.g. Halliday, 1973, 1979/2002; Halliday and Matthiessen, 2014: 30-31). This is the functional organisation of language system – the spectrum of metafunction (cf. Matthiessen, 2006a, in prep.; cf. also Firth, 1968: 108); and we see the metafunctional analysis of any texts as analogous to the dispersion of white light. Just as a prism splits a beam of light into a range of its constituent colours called the spectrum, so the metafunctional analysis affects the dispersion of meaning into different modes including experiential, logical, interpersonal, and textural meaning.

These different kinds of meaning made are influenced by context in which the system of language operates. Like language, **context** extends along the cline of instantiation from the overall contextual potential of a community (i.e. context of culture) to the contextual instances involving particular people interacting and exchanging meanings on particular occasions (i.e. context of situation); and like language, it is functionally diversified (Halliday and Matthiessen, 2014: 32-33). If we disperse a given type of situation through the prism of function diversity, it consists of three contextual variables: **field** – what’s going on in the situation, **tenor** – who is taking part in the situation, and **mode** – what role is being played by

language and other semiotic systems in the situation (Halliday and Matthiessen, 2014: 33-34; cf. also Halliday and Hasan, 1985/1989; Martin, 1992). They resonate with the three metafunctional components of semantics: field resonates with experiential meanings, tenor with interpersonal ones, and mode with textual ones; and each one of the contextual variables determines the selection of options in the corresponding component of the semantics (Halliday, 1978: 142-145; cf. also Halliday and Hasan, 1985: 26; Halliday and Matthiessen, 2014: 34; Matthiessen, 1993, 2006a: 38-39).

The combinations of field, tenor and mode thus “define a multi-dimensional semiotic space – the environment of meanings in which language, other semiotic systems and social systems operate”; in this way, the systematic correspondences between context and language are “based on the functional organisation of both orders of meaning” (Halliday and Matthiessen, 2014: 34). Therefore, based on the perspective ‘from above’ – from the vantage point of context, Matthiessen (2006a: 46, Matthiessen, Teruya and Wu, 2008: 191; see also Matthiessen and Teruya, 2016: 206-209; Matthiessen et al., 2010: 177) proposes a functional typology of texts. In terms of field, eight primary types of socio-semiotic processes are recognised (each with various subtypes) and grouped into three superordinate categories based on whether the field of activity is constituted in some process of behaviour (*social*: doing), in some process of making meaning (*semiotic*: expounding, reporting, recreating, sharing, and exploring) or as a transition between the two – semiotic processes leading to social processes (enabling, recommending).

Matthiessen and Teruya (2016) elaborate on the notion of indeterminacy (cf. Halliday and Matthiessen, 1999/2006; Matthiessen, 1995a), formulate a typology of registerial indeterminacy/hybridity – the mixing of registers – in terms of the fields of activity, including ambiguities, overlaps, blends, neutralizations and complementarities, and explore the first four of these types of registerial indeterminacy with texts from different domains. The context-based text typology is based on field values in the first instance, contextual parameters within tenor and mode are combined and detailed in Matthiessen (2009b, 2015b, 2015c; see also Halliday and Matthiessen, 2014). Tenor considerations include “the range of voices taking part in the different socio-semiotic activities, including degrees of expertise and of professionalism”; and mode considerations “intersect the socio-semiotic

activity types with different combinations of turn (dialogic vs. monologic) and medium (written vs. spoken)” (Halliday and Matthiessen, 2014: 37-38).

3.1.2 Into the Grammar: Clause as Metafunctional Construct

The previous subsection introduces some of the theoretical pillars of the architecture of SFL (cf. Matthiessen, 2007a, for the development of the systemic functional model of the architecture of language since the 1970s). Here, I focus on both theoretical and descriptive categories used in the metafunctional analysis (cf. Halliday, 1992/2003, for the difference between theoretical and descriptive categories) by presenting systems and system networks that conceptualise how a clause unifies the three different strands of meaning – “the realization of a message (textual), a move (proposition/proposal; interpersonal) and a figure (experiential)” (Matthiessen et al., 2010: 72).

3.1.2.1 Textual: Clause as Message

The textual metafunction creates text – this is a clause as a message as quantum information in the flow of information that unfolds with the text in its context. Within the textual metafunction, textual statuses such as thematicity and newsworthiness assigned by textual systems THEME and INFORMATION make contributions from both the speaker’s and the listener’s points of view in organising a clause in the guise of message (cf. Matthiessen, 1995c; cf. also Matthiessen et al., 2010: 220-221). According to the THEME system – the choice of Theme and Rheme, a clause is organised as a message into **Theme** and **Rheme**. Theme is the element that serves as the point of departure of the message; and Rheme is the reminder of the message – the non-thematic part in which the Theme is developed (Halliday and Matthiessen, 2014: 89; Matthiessen et al., 2010: 223).

The system of INFORMATION is a system not of the clause, but of the information unit that is a structure made up of **Given** and **New**. Given is the information presented as recoverable to the listener because it is already known or accessible; New is not recoverable to the listener. The thematic progression and the information organisation are related, but not the same thing: “Theme + Rheme is speaker-oriented, whereas Given + New is listener-oriented” (Halliday and Matthiessen, 2014: 118). In the unmarked situation, the orderings of Theme ^ Rheme and Given

^ New are consistent, in other words, the Theme falls within the Given information, while the New information is conflated with the Rheme. Though the analysis of the thematic and the information structures, we can identify the relation of each part of a text to the structure of the text as a whole.

The textual resources of the lexicogrammar of English fall into two categories: (1) those that engender grammatical structure (theme and information discussed above), and (2) those that do not create grammatical structure – the system of COHESION (Halliday and Matthiessen, 2014: 650; Matthiessen et al., 2010: 74). Expressing relations within text, the cohesive resources include conjunction, reference, substitution/ellipsis and lexical cohesion (cf. Halliday and Hasan, 1976; Halliday and Matthiessen, 2014: 603). The comprehensive textual interpretation therefore provides insights into the structural and cohesive features of the message (for the intersection of the two categories of textual resources, cf. Halliday and Matthiessen, 2014: 650-652).

3.1.2.2 Interpersonal: Clause as Move

According to Halliday (1973: 91), the interpersonal component is “the grammar of personal participation; it expresses the speaker’s role in the speech situation, his personal commitment and his interaction with others”. Within the interpersonal metafunction, in short, language is organised as a resource for enacting roles and relationships with the other people around us (cf. Halliday and Matthiessen, 2014: 30; Matthiessen et al., 2010: 126-128). This is a clause as a move, an ongoing exchange between a speaker/writer and an addressee, a move whether the speaker/writer initiates or responds. And the notion of move (in exchange) is described in the semantic system of SPEECH FUNCTION that is realised by the typical grammatical clause types in the system of MOOD (Table 3.1), which I will explain below.

If we observe the possible moves in exchange (e.g. in dialogues), we can recognise that the speaker may be either *giving* something to the addressee or *demanding* something of the addressee. Giving and demanding are the most fundamental types of speech role. As for the nature of the ‘something’ – the commodity being exchanged, it is either *goods-&-services* or *information*. The distinction between

giving and demanding, plus the difference between the nature of the commodity being traded, define the four basic speech functions of offer, command, statement and question. Examples are given in Table 3.1. Notice that if you are offering a teapot, you may simply give the teapot without the help of language; and the other three basic speech functions (in particular the exchange of information) are all constituted in language and have “no existence outside the symbolic exchange” (Martin et al., 2010: 106). This is why “an act of speaking is something that might more appropriately be called an interact: it is an exchange, in which giving implies receiving and demanding implies giving in response” (Halliday and Matthiessen, 2014: 135).

Table 3.1 Primary SPEECH FUNCTION choices and MOOD realisations (based on Halliday and Matthiessen, 2014: 136; Martin, Matthiessen and Painter, 2010: 107)

<i>Commodity exchanged</i>			
		goods-&-services	information
Role in exchange	<i>giving</i>	‘offer’ ☞ (various) would you like this teapot?	‘statement’ ☞ ‘declarative’ he’s giving her the teacup.
	<i>demanding</i>	‘command’ ☞ ‘imperative’ give me that teapot! come in!	‘question’ ☞ ‘interrogative’ – ‘WH-’ what is he giving her? – ‘yes/no’ will the leader come in?
		<i>Proposal</i>	<i>Proposition</i>

When language is used to exchange goods-&-services, the clause takes the semantic function as a *proposal*; while when language is used to exchange information, the clause takes the semantic function as a *proposition* that can be argued about (Halliday and Matthiessen, 2014: 138-139). In Table 3.1, the southeast arrows represent the realisation in the lexicogrammar by different types of clause. These semantic functions are thus realised by grammatical MOOD options, in other words, the system of MOOD is the grammaticalisation of the semantic system of SPEECH FUNCTION. As one of the interpersonal systems of the clause, MOOD options consist of (1) imperative mood that concerns with the performance of an action to provide a service or to exchange goods, negotiation of proposals either as a command or offer (Matthiessen et al., 2010: 116), and (2) indicative mood that concerns about exchanging information, negotiation of propositions either as a statement (declarative mood) or question (interrogative mood) (Matthiessen et al.,

2010: 117). The features of different mood types are expressed by the presence of Mood element consisting of Subject and Finite, and the order of them (cf. Halliday and Matthiessen, 2014: 143). As shown in Table 3.1, in the typical instance, a statement is expressed by a declarative clause; a question by an interrogative clause (either a WH-interrogative or a ‘yes/no’ interrogative); a command by an imperative clause; and an offer by an interrogative clause, where the Finite is formed by a modal verb (cf. Halliday and Matthiessen, 2014: 143; see also Andersen, 2017: 117).

The speech functions are also associated with system of POLARITY (positive/negative) and system of MODALITY (intermediate degrees between positive and negative). The first is the resource for “assessing the arguability value of a clause: yes or no – the validity of a proposition (‘it is/it isn’t’) or the actualization of a proposal (‘do/don’t!’)” (Matthiessen et al., 2010: 161); and the latter system is used to “construe the region of uncertainty that lies between ‘yes’ and ‘no’” (Halliday and Matthiessen, 2014: 176) in order to express the speaker/writer’s judgement. One type of modality is **modalisation**, which concerns concerning the degrees of propositions (statements, questions) on the scale between positive (‘it is so’) and negative (‘it isn’t so’) polarity; the other type is **modulation**, which concerns the degrees of proposals (offers, commands) on the scale between positive (‘do it’) and negative (‘don’t do it’) polarity (Halliday and Matthiessen, 2014: 176-178, 689-698; Matthiessen et al., 2010: 144, 145). In addition, interpersonal meaning is embodied in modal Adjuncts – mood Adjuncts and comment Adjuncts (cf. Halliday and Matthiessen, 2014: 183-193), which is used to express the speaker/writer’s assessment.

3.1.2.3 Experiential: Clause as Figure

The ideational metafunction is concerned with the expression of experience, including “both the processes within and beyond the self – the phenomena of the external world and those of consciousness – and the logical relations deducible from them” (Halliday, 1973: 91). Therefore, the ideational metafunction comprises two modes for construing experience, the experiential and the logical subtypes. In this subsection, the focus will be on the experiential mode, which construes the flux of experience as quanta of change in the flow of events. And we model a quantum of change in our experience of a flow of events as “a figure, or configuration of a

process, participants involved in it and any attendant circumstances” (Halliday and Matthiessen, 2014: 212).

There are figures of happening, doing, sensing, saying, being and having (cf. Halliday and Matthiessen, 1999/2006), and all such figures are realised by grammatical resource in the system of TRANSITIVITY that construes the world of experience into a set of six PROCESS TYPES: (1) material, (2) mental, (3) relational, (4) behavioural, (5) verbal, and (6) existential (Table 3.2). Each type of process has its own characteristics. Briefly speaking, material processes are concerned with our experience of the material world, while mental ones are concerned with our experience of the world of our consciousness. Relational processes are about attribution and identification. And as the terms suggest, behavioural processes are the ones of physiological and psychological behaviour; verbal processes are about saying; and existential ones represent that something exists or happens.

Table 3.2 Examples of different process types

PROCESS TYPE	Participant	Example (Participants underlined; Process in bold)
Material	Actor, Goal	<u>portions</u> have grown so has <u>obesity</u> , which can lead to any health problems
Mental	Senser, Phenomenon	Do <u>you</u> want your healthcare needs to worry him tomorrow?
Relational - attributive - identifying	Carrier, Attribute Token, Value	I'm so <u>relieved</u> as I went for regular health check. <u>2000 calories a day</u> is <u>all most adults should eat</u>
Behavioural	Behaver	<u>Kaela</u> is laughing
Verbal	Sayer	<u>apple</u> says , “take me with you”
Existential	Existent	If this is lunch, is <u>there room</u> for dinner?

Among them, material, mental and relational are the principle types of process in the English transitivity system, and each of the three general types has a small set of sub-categories. Material clause is a clause of doing-&-happening, construing “a quantum of change in the flow of events as taking place through some input of energy” (Halliday and Matthiessen, 2014: 224), and it includes creative and transformative subtypes. Mental clause is a clause of sensing, construing “a quantum of change in the flow of events taking place in our own consciousness” (Halliday and Matthiessen, 2014: 245), and it has four subtypes of sensing:

perceptive, cognitive, desiderative and emotive. And relational clause serves “to characterise and to identify” (Halliday and Matthiessen, 2014: 259), including intensive, possessive and circumstantial subtypes of relation. The other three processes are recognised as subsidiary process types “located at each of the boundaries: behavioural at the boundary between material and mental, verbal at the boundary between mental and relational, and existential at the boundary between relational and material” (Halliday and Matthiessen, 2014: 216, 300).

Each of the six types of process has its own participant roles (Table 3.2; cf. Halliday and Matthiessen, 2014: 355, for the whole system network of process type), for example, a material clause involves an Actor and possibly a Goal. Examples of different process types mostly from my corpus is also shown in Table 3.2. In addition, the configurations organising quanta of change in the flow of events are determined by different types of circumstantial element: extent, location, manner, cause, contingency, accompaniment, role, matter and angle (cf. Halliday and Matthiessen, 2014: 313-314). In this way, the processes and the participants in them, plus the attendant circumstances all make their own distinctive contributions; the whole clause thus determines experiential semantics.

Table 3.3 Overview of systems within semantics and lexicogrammar

context	field	mode	tenor		
language:	experiential	logical	textual	interpersonal	
content	semantics	IDEATION; CONFIGURATION	IDEATION; RHETORICAL RELATIONS	PROGRESSION [CONJ. RELATIONS; TEXTUAL STATUSES]	NEGOTIATION
	lexico- grammar	TRANSITIVITY	CLAUSE COMPLEXING	THEME; INFORMATION; COHESION	MOOD

In this subsection, I gave a brief introduction to the functional organisation of grammar, in particular, the lexicogrammar resources for making three strands of meaning: textual, interpersonal and experiential in systemic theory; and I sum up by quoting Halliday’s (1979/2002: 215-216; cf. Table 3.3 for the whole picture) words:

As an experiential construct, the clause is the locus of transitivity: it is the representation of the processes, participants and circumstances that constitute our experience of the real world. As an interpersonal construct, it is the locus of mood and modality: the speaker’s adoption and assignment

of speech roles and his judgement of the validity of the proposition. As a textual construct, it is the locus of theme and, typically, of information structure: the message as expression of the speaker's concern and his presentation of what is "news".

Another mode of ideating – logical metafunction, represents “the ensemble of resources by which we make sense through order, combination and the forms of complex sequence in our syntagmatic expectations ... and these resources are dispersed systemically cross the strata and the rank scales of the architecture of a natural language.” (Butt and Webster, 2017: 104). In the experiential metafunction, our experience of the world is construed **configurationally** as units are constituted as organic wholes with their distinctive functions (cf. Halliday and Matthiessen, 1999/2006; 2014: 22); while in the logical metafunction, our experience is construed **serially** as chains of elements linked by logico-semantic relations (cf. Matthiessen, in prep.; Matthiessen et al., 2010: 132). From the level of semantics, the logical metafunction engenders the rhetorical relationships of complexes of units (as shown by RST); while from the level of lexicogrammar, it engenders taxis (i.e. parataxis and hypotaxis) and logico-semantic relationships of clause complexes (cf. Table 3.3). I will further discuss how language construes logical relations when presenting system of rhetorical relations in subsection 3.2.2.

3.2 Rhetorical System and Structure Theory

3.2.1 A Brief Introduction to RST

As introduced earlier in Section 2.3.2, RST is initially defined by Bill Mann, Christian Matthiessen and Sandra Thompson as a model for text organisation that “could serve as a resource in automatic text generation by computer” (Matthiessen, in prep.). More specifically, RST not only is a descriptive framework to comprehensively account for major aspects of the text organisation (i.e. a diversity of functions performed by RST relations; and holistic, relational and syntactic structures), but also provides a linguistically-oriented method that could be used as the basis for generating natural texts. The systemic and explicit descriptions of RST including relations and their definitions, the symbolic mechanisms (i.e. RST

schemas) and the application along with natural examples; the role of RST as a way to account for the functional potential of text; and functions of text and the relationships of such functions to the patterns of text use found in systemic linguistics, are respectively provided in Mann and Thompson (1987, 1988), Mann et al. (1992), and Mann and Matthiessen (1991).

Briefly, “RST characterises a text in terms of **relations** which hold between its parts, which come in various sizes. The parts are called **text spans**, and the minimal spans are called **units**. When two spans are related (**linked**) by a relation, then the pair stands as a span which can be linked to another span” (Mann and Matthiessen, 1991: 233). More specifically, the rhetorical relations identify particular relationships that hold between two non-overlapping portions of a text – the nucleus and the satellite in nucleus-satellite relations; or between, involving, or among two or more portions of the text - nuclei in multinuclear relations.

Mann and Thompson (1987) establish the definitional foundations for RST (for an example of the definition of a rhetorical relation, see Table 3.4) which consists of four fields: (1) constraints on the nucleus, (2) constraints on the satellite, (3) constraints on the combination of nucleus and satellite, and (4) the effect. As for the multinuclear relations, the definitions include three fields: (1) constraints on nucleus, (2) constraints on the combination of nuclei, and (3) the effect.

Table 3.4 Example of the definition of a rhetorical relation: Elaboration (Mann and Thompson, 1987: 52)

<i>relation name:</i>	Elaboration
<i>constraints on N:</i>	none
<i>constraints on S:</i>	none
<i>constraints on the N + S combination:</i>	S presents additional detail about the situation or some element of subject matter which is presented in N or inferentially accessible in N in one or more of the ways listed below. In the list, if N presents the first member of any pair, then S includes the second: <ol style="list-style-type: none"> 1. set: member 2. abstract: instance 3. whole: part 4. process: step 5. object: attribute 6. generalization: specific
<i>the effect:</i>	R recognises the situation presented in S as providing additional detail for N. R identifies the element of subject matter for which detail is provided.
<i>locus of the effect: N and S</i>	N and S

Mann and Thompson (1987) present the definitions of 24 rhetorical relations (i.e. 21 nucleus-satellite relations and 3 multinuclear relations) accompanied by the analysis of a natural example of its occurrence of each relation:

Nucleus-satellite relations

Evidence (pp. 10)	Justify (pp. 11)	Antithesis (pp.12)
Concession (pp. 15)	Circumstance (pp. 48)	Solutionhood (pp. 50)
Elaboration (pp. 52)	Background (pp. 54)	Enablement (pp. 54)
Motivation (pp. 56)	Volitional cause (pp. 58)	Non-volitional cause (pp. 59)
Volitional result (pp. 62)	Non-volitional result (pp. 63)	Purpose (pp. 64)
Condition (pp. 65)	Otherwise (pp. 66)	Interpretation (pp. 69)
Evaluation (pp. 70)	Restatement (pp. 71)	Summary (pp. 72)

Multinuclear relations

Sequence (pp. 73)	Contrast (pp. 75)	Joint (pp. 75)
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The relations above are an open set, not a closed list. The list of rhetorical relations is “susceptible to extension and modification for the purposes of particular genres and cultural styles” (Mann and Thompson, 1987: 48). Based on the rhetorical relations, the RST schemas define patterns in which a span of text can be analysed in terms of other text spans. Put simply, a schema is defined in terms of one relation. Figure 3.1 shows graphic conventions for presenting the schema applications in the RST analysis of a fund-raising letter mailed by Zero Population Growth (ZPG). The thumbnail sketches of the ZPG letter are shown in the left of Figure 3.1 (cf. Mann and Thompson, 1992: ix-x for the original size). The analysis contains 27 applications of 14 different schemas: motivation, evidence, background, concession, elaboration, sequence, non-volitional result, restatement, solutionhood, contrast, purpose, joint, circumstance, and means.

As illustrated in Figure 3.1 for the body of the ZPG letter diagrammed in RST schemas, rhetorical relations are either nucleus-satellite (highlighted in yellow) or multinuclear (highlighted in blue). The arcs represent relations holding, the horizontal lines indicate the scope or domain of one or multiple segments entering into a relation, and the other straight lines represent identification of the nuclei. Notice that in the instantiations of the mono-nuclear and multinuclear schemas, the patterns are different: to take one example of schema application of the text relation of elaboration existing between segments 11A and 11B, we can see that a vertical line points to the nucleus (11A) and the arrow of a curved line shows the direction

from satellite (11B) to nucleus (11A). In short, the nucleus-satellite relation is diagrammed with one arc from the satellite to the nucleus assigning “an **unequal weighting** to the two segments being related”; and the multinuclear relation is diagrammed as descendents from a relation node assigning “an **equal weighting** to the segments being related” (cf. Matthiessen, in prep.; Matthiessen and Thompson, 1988: 289).

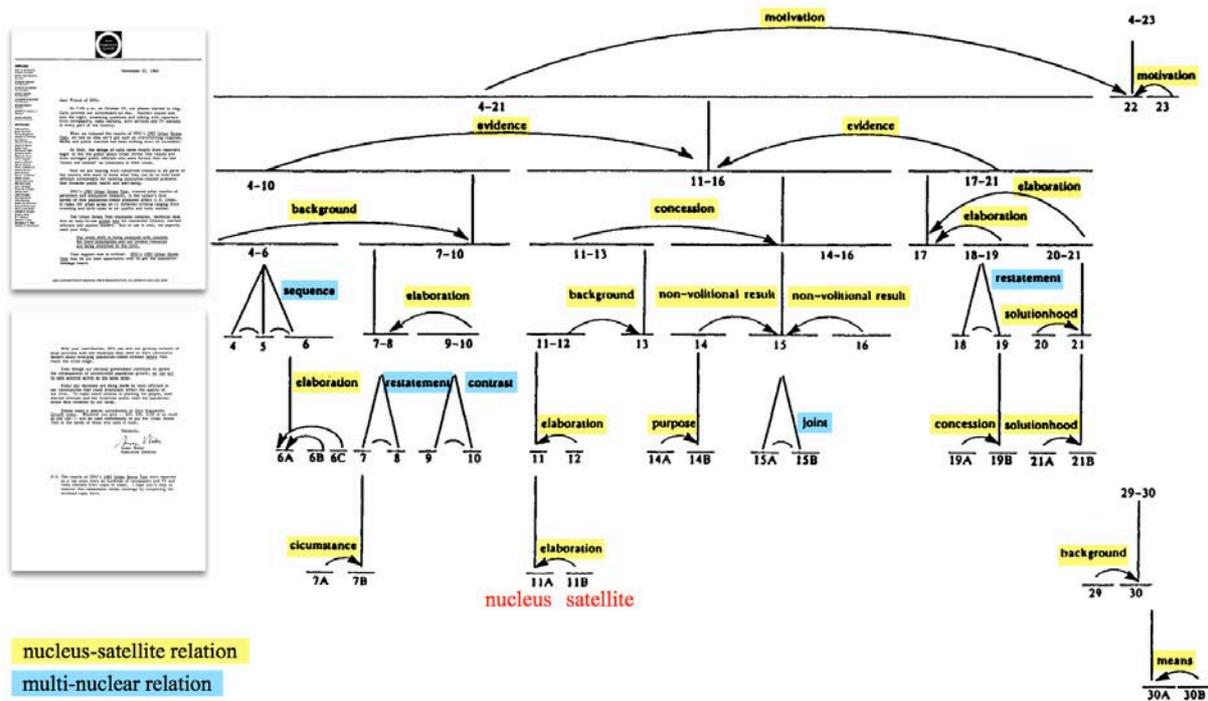


Figure 3.1 The schema application conventions instantiated in the RST analysis of the body of the ZPG letter (based on Mann et al., 1992: 54)

Figure 3.1 not only shows a couple of different types of schema, but also indicates the predominance of nucleus-satellite structural patterns in the RST analysis of the body of the ZPG letter. In addition, a set of text spans constitutes the hierarchical structure of the entire letter, and two evidential satellites plus one text segment in the ZPG letter collectively function as motivational build-ups pointing to the nuclear text segment 22 shown in the upper right region of Figure 3.1. This letter is sent to request the reader to contribute money towards the cost of the organisation’s growing local network (cf. Mann and Thompson, 1992: xiii, for segment 22: “Please make a special contribution to Zero Population Growth today.”). Therefore, other text segments are arranged to increase the reader’s desire to respond to the request clearly presented in segment 22 by making a donation, which is the core and ultimate communicative goal of the ZPG letter.

In persuasive texts such as the fund-raising letter above, “there is often one central or nuclear segment of the text that is the key to the rhetorical effect of the text as a whole”; and “other text segments are brought in to **support** this nuclear segment”; so the letter is organised relationally as a hypotactic combination by means of “nucleus + support relations” (Matthiessen, in prep). From this example of an RST application to one natural text (i.e. Mann et al., 1992), we can see that RST can be used to explain text characteristics through which the text serves the writer’s purpose, since it provides a way to address a functional account of every segment of the text, a plausible effect of each segment and its role in the text as a whole. However, RST is focused on describing the structure of natural text and characterising primarily the organisation of segments in terms of rhetorical relations that hold between adjacent text constitutes. This version of RST concerned the logical **structure** of natural text is “dubbed classical RST” (Taboada and Mann, 2006b: 426). And the revised version of classical RST – **system** of rhetorical relations by Matthiessen (cf. 2015c: 16; Matthiessen and Teruya, 2015: 240; see also Matthiessen, 1995b, 2002, in prep.), will be introduced in the next subsection.

3.2.2 System of Rhetorical Relations

Matthiessen (1995b, 2002, in prep.; Matthiessen and Teruya, 2015; Matthiessen and Thompson, 1988) has been working on and with RST for decades to **systemicise** RST and integrate it within SFL, making RST as a much more holistic “account of logical semantics that was integrated within the overall model of language in context in SFL and as a description of the resources of different languages, with a focus on English in the first instance” (Matthiessen, in prep.). More specifically, the system of rhetorical relations includes revision and development of the classical RST, which Matthiessen (in prep.) groups into four fundamental components: (1) stratal placement, (2) metafunctional placement, (3) registerial coverage, and (4) systemicisation.

The classical RST is modified to be located within the systemic functional theory of the stratal and metafunctional organisation of language, which enables us to relate the system of rhetorical relations to other systems within the overall semantics and lexicogrammar (cf. Table 3.3). In terms of the hierarchy of stratification, the system of rhetorical relations is a system within the semantic stratum located between the

strata of context and lexicogrammar. In terms of the spectrum of metafunctions, the system of rhetorical relations operates in the neighbourhood of the experiential system of configuration and the textual system of progression. Looked at from ‘below’, the taxis and logico-semantic relationships of clause complexes in the logical system (e.g. Mann et al., 1992) are different from the non-structural cohesive features in the textual system (e.g. Martin, 1992).

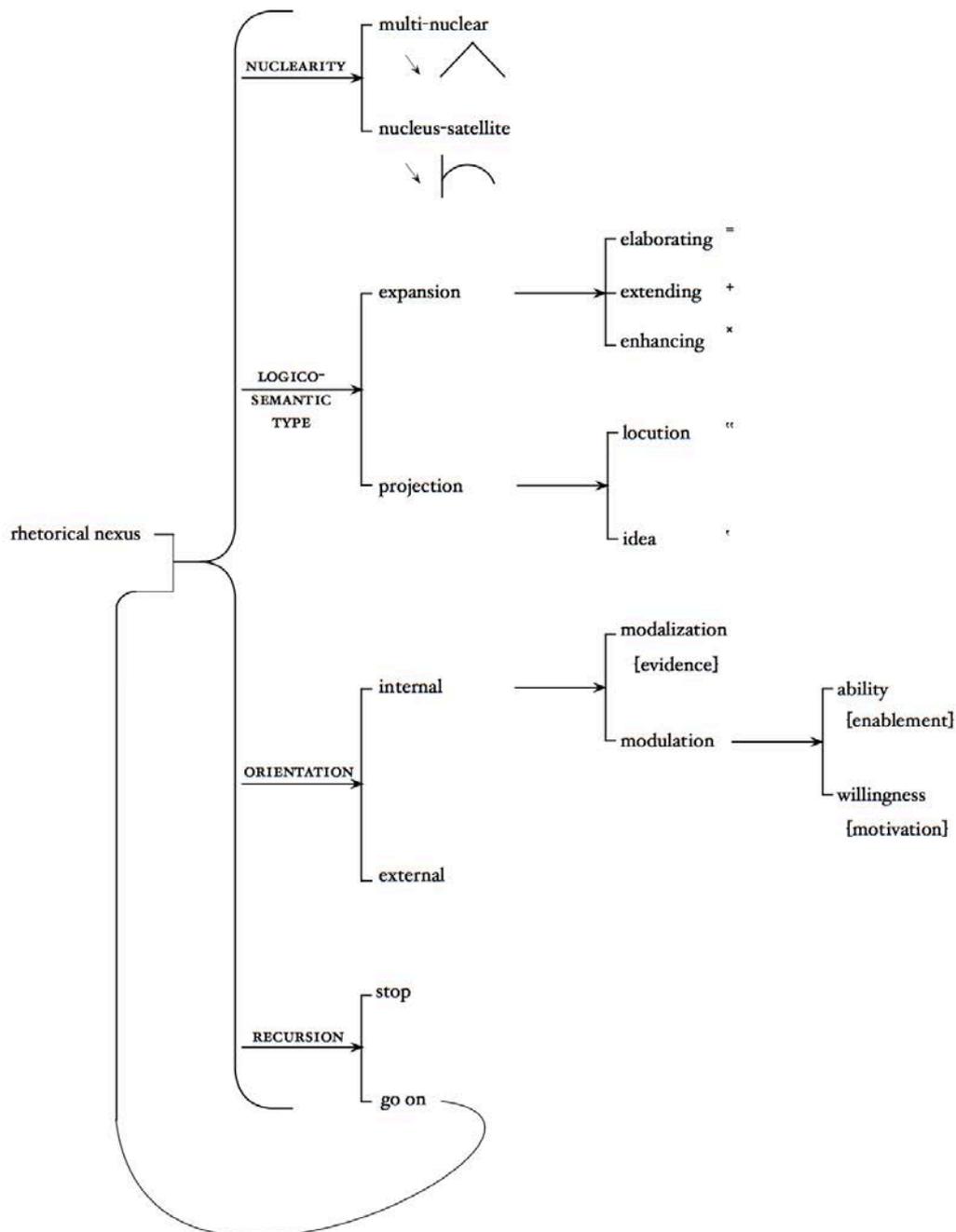


Figure 3.2 The system of rhetorical relations – NUCLEARITY (TAXIS), LOGICO-SEMANTIC TYPE, ORIENTATION and RECURSION (Matthiessen, in prep.; Matthiessen and Teruya, 2015: 240)

In addition, Matthiessen (in prep.; Matthiessen and Teruya, 2015) extends the coverage of texts analysed in terms of RST systematically across a more comprehensive range of registers; and complements the structural orientation in the classical RST and networks RST rhetorical relations. The overall model of logical text-semantics to SFL – the system of rhetorical relations is shown in Figure 3.2 (cf. Table 3.3 for its location within the total system of language in context), including three primary simultaneous systems: NUCLEARITY (TAXIS), LOGICO-SEMANTIC TYPE, and ORIENTATION. The system of NUCLEARITY (TAXIS) is the choice between multinuclear (paratactic) relations and nucleus-satellite (hypotactic) ones; the system of LOGICO-SEMANTIC TYPE is the choice between projecting relations and expanding ones; and the system of ORIENTATION is the choice between external relations and internal ones (i.e. subject-matter relations and presentational ones used in the classical RST, cf. e.g. Mann and Thompson, 1987, 1988) (Matthiessen, in prep.; Matthiessen and Teruya, 2015: 239-240).

For the present study, my main focus of the system of rhetorical relations includes: (1) types of relations of expansion and projection, (2) nuclearity in rhetorical relations, and (3) the external/internal orientations. The system of logico-semantic type is the contrast between two primary types of logical relations, expansion and projection. Relations of expansion “relate text segments that construe chunks of experience on the same order of reality”; while relations of projection “relate text segments that construe chunks of experience on different orders of reality” (Matthiessen, in prep.; see also Matthiessen and Teruya, 2015: 239-240). Relations of expansion, shown in Figure 3.2, cover three subtypes – elaborating, extending and enhancing relations, which are briefly defined with examples in the following (Matthiessen, in prep.; see also Halliday, 1985; Halliday and Matthiessen, 1999/2006, 2014: 444):

- elaborating: one text segment ([complex of] figures or propositions) expands another by elaborating on it (or some portion of it): restating in other words, glossing or interpreting, specifying in greater detail, summarizing, commenting, or exemplifying.
- extending: one text segment ([complex of] figures or propositions) expands another by extending beyond it: adding some new element, giving an exception to it, or offering an alternative.

- enhancing: one text segment ([complex of] figures or propositions) expands another by embellishing around it: augmenting it with some circumstantial feature of time, place, manner, cause or condition.

Each of these three general subtypes is thus differentiated into more rhetorical relations. For example, elaborating relations include elaboration, restatement, summary, etc.; extending ones include addition, disjunction, contrast, joint, etc.; and enhancing ones include circumstance, sequence, evidence, justify, motivation, enablement, means, background, cause (volitional and non-volitional), result (volitional and non-volitional), purpose, solutionhood (problem), condition, otherwise, concession, etc. The expanding relations are the only type represented in classical RST; but the projecting relations are also deployed in the rhetorical, or logico-semantic, organisation of text (Matthiessen, in prep.; cf. also Halliday and Matthiessen, 2014: 508). The set of rhetorical relations is in principle open. Based on the relation definitions listed on the RST website (<http://www.sfu.ca/rst/>) created by Bill Mann and maintained by Maite Taboada, I add more logical relations from Matthiessen (e.g. 1995b, 2002, 2014, 2016, in prep.; Matthiessen and Teruya, 2015) to their list. 25 mono-nuclear relations with the constraints imposed on their respective nuclei and satellites are listed in Table 3.5.

Table 3.5 Nucleus-satellite relations (cf. <http://www.sfu.ca/rst/01intro/intro.html>)

Relation	Nucleus	Satellite
Circumstance	text expressing the events or ideas occurring in the interpretive context	an interpretive context of situation or time
Solutionhood	a situation or method supporting full or partial satisfaction of the need	a question, problem, request, or other expressed need
Elaboration	basic information	additional information
Background	text whose understanding is being facilitated	text for facilitating understanding
Enablement	an action	information intended to aid the reader in performing an action
Motivation	an action	information intended to increase the reader's desire to perform the action
Evidence	a claim	information intended to increase the reader's belief in the claim
Justify	text	information supporting the writer's right to express the text
Cause*	a situation	another situation which causes the nuclear situation
Result*	a situation	another situation which is caused by the nuclear situation
Purpose	an intended situation	The intent behind the situation
Antithesis	ideas favoured by the author	ideas disfavoured by the author

Concession	situation affirmed by author	situation which is apparently inconsistent but also affirmed by author
Condition	action or situation whose occurrence results from the occurrence of the conditioning situation	conditioning situation
Otherwise	action or situation whose occurrence results from the lack of occurrence of the conditioning situation	conditioning situation
Interpretation	a situation	an interpretation of the situation
Evaluation	a situation	an evaluation comment about the situation
Restatement	a situation	a re-expression of the situation
Summary	text	a short summary of the text
Preparation	text to be presented	text which presents the reader to expect and interpret the text to be presented
Means	an activity	a method or instrument intended to make the realisation of the nuclear activity more likely
Manner	an activity	a way in which the nuclear activity is done or happens
Unconditional	action or situation whose occurrence is not subject to the occurrence of any conceivable situation	situation or fact that could affect the realisation of the nuclear situation
Unless	action or situation whose occurrence is not affected provided that the satellite is not realised	a claim
Projection	projecting/projected	projecting/projected

* The volitional/non-volitional distinction is not used in the present study, since it does not contribute a lot of information and it's difficult to assign.

And 8 multinuclear relations are listed in Table 3.6.

Table 3.6 Multinuclear relations (cf. <http://www.sfu.ca/rst/01intro/intro.html>)

Relation	Span	Other span(s)
Addition	an item	an extra item plays a comparable role
Disjunction	an alternative	another alternative (not necessarily exclusive)
Contrast	one alternate	the other alternate
Sequence	an item	a next item
Multinuclear restatement	a situation	a re-expression of the situation
Joint	(unconstrained)	(unconstrained)
List	an item	a next item
Multinuclear projection	projecting/projected	projecting/projected

Based on the cline of interdependence and relatedness (degree of interdependency), we can define whether a relation is mono-nuclear or multinuclear; and based on the nuclearity cline, we can determine which text segment is the nucleus in certain logical relations such as projection and restatement. Matthiessen (in prep.) posits a

nuclearity cline of projection – the poles of the cline are characterised by nucleus-satellite relations with either projecting or projected as the nucleus (Figure 3.3).

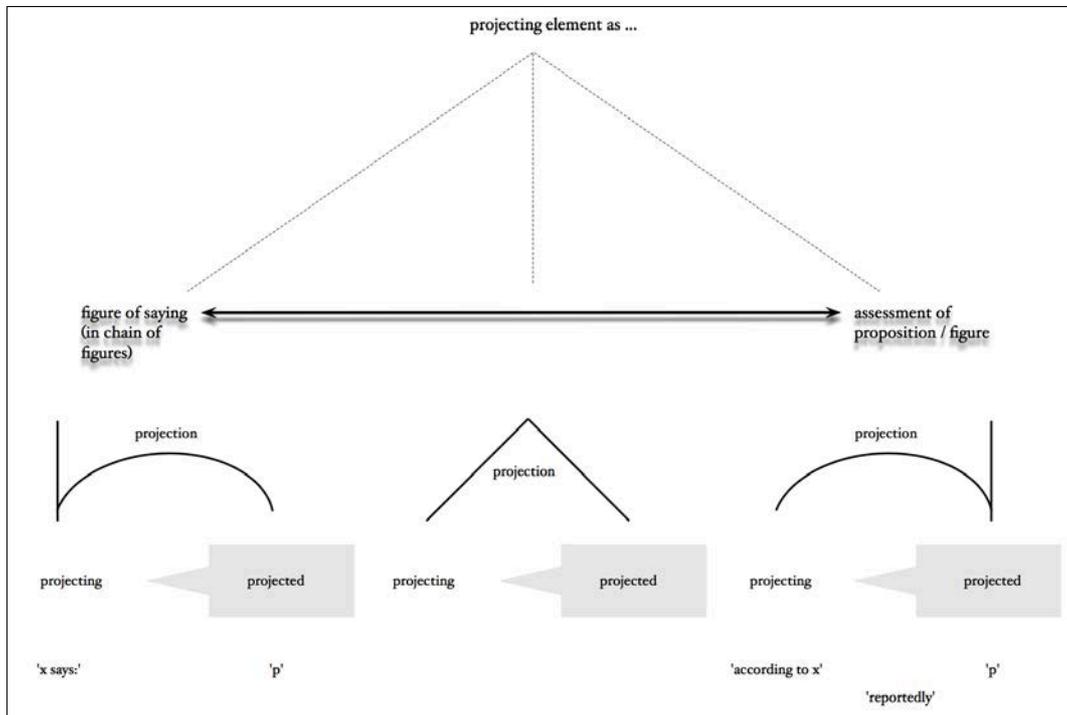


Figure 3.3 The nuclearity cline of projection (Matthiessen, in prep.)

According to Matthiessen (in prep.), the pole to the left is “figure of saying in a chain of figures”; while the pole to the right is “assessment of proposition/figure”. Illustrating with examples from comics and taxonomic reports, Matthiessen (in prep.) specifies that, “if the projecting segment enters into a rhetorical relation such as a temporal sequence with figures of other kinds such as figures of doing-&-happening, the projecting segment is nuclear and the projecting segment is linked to it as a supporting satellite (or as another nucleus)”; in contrast, “if the projected segment enters into a rhetorical relation such as an elaboration or a temporal sequence, the projected segment is nuclear and the projecting segment serves as a satellite qualifying the ‘epistemic status’ of the information given in the nucleus”. The first can be seen as ideational projection; while the second as interpersonal projection. I will discuss the nuclearity of projection and some other relations with examples from my multimodal corpus of the public health posters in Chapter 6, for example, in such posters, whether and how the information is projected ideationally or interpersonally.

And this brings up another aspect in the system network of rhetorical relations – the metafunctional orientation (external or internal). External relations help organise the construal of experience into text, by linking text segments representing aspects of a figure or sequences of figures; and internal relations help organise the enactment of an argument into text, by linking nuclear text segments characterised as interactive moves (i.e. propositions or proposals) or complexes of moves to their supporting moves (Matthiessen, in prep.; Matthiessen and Teruya, 2015: 240-241; for an account of RST relations and the systemic metafunction, cf. Mann and Matthiessen, 1991; for the metafunctionally motivated taxonomy for a collection of relations, cf. e.g. Hovy, 1990; Hovy, Lavid, Maier, Mittal and Paris, 1992; Maier and Hovy, 1991, 1993). As mentioned in Section 3.2.1, when rhetorical relations are defined in classical RST, the function of each relation is included in terms of its intended effect (see the field of the effect and its locus in the definition of elaboration shown in Table 3.4). Each one of rhetorical relations “functions according to just one metafunction”, either ideational or interpersonal; “there are no relations whose function corresponds to the textual metafunction”, but “the order of spans of a relation functions textually” (Mann and Matthiessen, 1991: 244).

External and internal relations “differ significantly in terms of the intended effect” that the speaker/writer desires “the rhetorical nexus with an external or internal relation to have on the addressee” (Matthiessen, in prep.). The intended effect of external relations “has to do with the addressee’s construal of experience” – the addressee’s recognition of the relation between sub-chunks in a chunk of experience; while the intended effect of internal relations “has to do with the addressee’s enactment of a response to a nuclear segment” – the addressee’s acceptance/acknowledgement of a nuclear proposition or the addressee’s readiness to respond favourably to a nuclear proposal (readiness to accept an offer or undertake/comply with a command, in terms of either ability or willingness) (Matthiessen, in prep.). Returning to the relation of elaboration (cf. Table 3.4), a supporting segment is linked to a nuclear segment by adding details to organise fuller chunks of experience. Elaboration is thus a type of external relations, which are oriented towards experiential meanings. Having briefly discussed the three systems of NUCLEARITY, LOGICO-SEMANTIC TYPE, and ORIENTATION in the network of rhetorical relations, the intersection of them is shown in Table 3.7.

And I will turn to address logico-semantic organisation such as whether and how internal and external relations work together in organisation of rhetorical complexes in the public health posters in Chapter 6.

Table 3.7 Typology of rhetorical relations: The systems of NUCLEARITY, LOGICO-SEMANTIC TYPE, and ORIENTATION intersected (based on Matthiessen, in prep.)

ORIENTATION / NUCLEARITY	external	internal
nucleus-satellite	elaboration, concession, circumstance, solutionhood, cause (volitional/non-volitional), result (volitional/non-volitional), purpose, condition, otherwise, interpretation, evaluation, restatement, summary, means, projection	evidence, justify, antithesis, concession, background, enablement, motivation, projection
multinuclear	sequence, contrast, joint, addition, disjunction, list, restatement, projection	-

I have briefly discussed some of the main pillars of the architecture of SFL in Section 3.1 above and system of rhetorical relations here in Section 3.2. Although SFL is centred on the system of language as its primary object of research, it is a theory of meaning as choices, by which any semiotic system is interpreted as networks of interlocking options. As a type of applicable linguistics (Halliday, 2007, 2008; cf. also Matthiessen, 2012, 2013, 2014, 2017), SFL has the potential to be applied to different semiotic systems (cf. Section 1.1.2.2). For example, in the 1990s, O’Toole published the seminal *The Language of Displayed Art* (1994), where he tested the flexibility of SFL on the interpretation of visual works of art (e.g. painting, sculpture and architecture) and proposed that the viewer simultaneously read three different kinds of meaning (i.e. representational, modal and compositional) in such artworks; Kress and van Leeuwen concentrated on multimodal discourse in *Reading Images: The Grammar of Visual Design* (1996) and adapted SFL as their basis for the analysis of multimodal text. In the following section, I will give an overview of how Kress and van Leeuwen (1996/2006) outline the grammar of visual images in terms of the theoretical notion of metafunction from SFL.

3.3 Visual Grammar

3.3.1 Representation: Narrative and Conceptual

Kress and van Leeuwen (1996/2006) define the ideational metafunction as the ability of visuals to represent interactions and conceptual relations between people, places, objects, etc. that are collectively called represented participants. The visual equivalent of the ‘action verb’ in language is introduced as ‘vector’ (real or virtual), which links participants involved in a process of interaction. Two patterns of visual representational structure are distinguished: narrative (vectorial) and conceptual (non-vectorial), and the distinction applies to both naturalistic visuals and diagrams. Narrative representations present “unfolding actions and events, processes of change, transitory spatial arrangements”; whereas conceptual representations represent “participants in terms of their class, structure or meaning, in other words, in terms of their generalized and more or less stable and timeless essence” (Kress and van Leeuwen, 2006: 59).

On the basis of the kinds of vector and the number and kind of participants involved in depicted actions and events, six major types of narrative processes are identified (Table 3.8): (1) action, (2) reactional, (3) speech/verbal, (4) mental, (5) conversion, and (6) geometrical symbolism, which are similar to material, behavioural, mental and verbal processes in the system of TRANSITIVITY. Secondary participants related to the main participants, not by means of vectors, but in other ways, are referred to as circumstances of setting, means and accompaniment (cf. Kress and van Leeuwen, 2006: 72).

In contrast, conceptual processes deal with depicted social constructs rather than social action, and the spatial arrangements are in a constant rather than transitory sense. Three types of conceptual representation are recognised (Table 3.8): (1) classificational, (2) analytical, and (3) symbolic, which approximate to relational and existential processes in the system of TRANSITIVITY. Classificational processes “relate participants to each other in terms of a kind of relation, a taxonomy” (Kress and van Leeuwen, 2006: 79); analytical processes “relate participants in terms of a part-whole structure”, involving two kinds of participants – one Carrier and any number of Possessive Attributes (Kress and van Leeuwen, 2006: 87); while

symbolic processes “are about what a participant means or is” (Kress and Leeuwen, 2006: 105). Typical examples of conceptual representation include diagrams (e.g. tree diagrams, flowcharts, networks, timelines), maps, textbook drawings, images (e.g. fashion shots) displaying the components a ‘whole’ consists of, abstract paintings, etc.

Table 3.8 Representational structures in images (Kress and van Leeuwen, 2006)

Representational visual structure	Process
Narrative representation	Action - Actor, Goal, Interactor
	Reactional - Reactor, Phenomenon
	Speech - Sayer, Utterance
	Mental - Senser
	Conversion - Relay
	Geometrical symbolism - absence of participants, only a vector
Conceptual representation	Classificational <ul style="list-style-type: none"> ▪ covert ▪ overt (single-levelled or multi-levelled)
	Analytical <ul style="list-style-type: none"> ▪ unstructured ▪ structured <ul style="list-style-type: none"> • temporal analytical processes • exhaustive and inclusive analytical processes • conjoined and compounded exhaustive structures • topographical and topological processes • dimensional and quantitative topography • spatio-temporal analytical structures
	Symbolic <ul style="list-style-type: none"> ▪ attributive ▪ suggestive

3.3.2 Interaction and Modality

Kress and van Leeuwen (1996/2006) explore the ways that visuals utilise resources to constitute and maintain a kind of interaction between interactive participants (e.g. the viewer and the producer of an image) and the visuals. Their exploration of interactive meanings in visual grammar involves more search for the ideological underpinning of the images than the interpersonal meanings in the grammar of language. According to Kress and van Leeuwen (cf. 2006: 149), three simultaneous

systems of ‘contact’, ‘social distance’ and ‘attitude’ interact together to create relations between represented and interactive participants (Table 3.9).

Table 3.9 Interaction & modality in images (Kress and van Leeuwen, 2006)

System/dimension	
Interactive meaning	Contact – image act and gaze <ul style="list-style-type: none"> ▪ demand goods-&-services (gaze at the viewer) ▪ offer information (absence of gaze at the viewer)
	Social distance – size of frame <ul style="list-style-type: none"> ▪ intimate/personal (close shot) ▪ social (medium shot) ▪ impersonal (long shot)
	Attitude <ul style="list-style-type: none"> ▪ subjectivity <ul style="list-style-type: none"> • horizontal angle (frontal or oblique) • vertical angle (high, eye-level or low) ▪ objectivity <ul style="list-style-type: none"> • action orientation • knowledge orientation
Modality value	<p><i>Markers of naturalistic modality:</i></p> <p><u>Colour</u></p> <ul style="list-style-type: none"> ▪ colour saturation <ul style="list-style-type: none"> - full colour saturation ↔ the absence of colour ▪ colour differentiation <ul style="list-style-type: none"> - a maximally diversified range of colours ↔ monochrome ▪ colour modulation <ul style="list-style-type: none"> - fully modulated colour ↔ plain, unmodulated colour <p><u>Contextualisation</u></p> <ul style="list-style-type: none"> - the absence of background ↔ the most fully articulated and detailed background <p><u>Representation</u></p> <ul style="list-style-type: none"> - maximum abstraction ↔ maximum representation of pictorial detail <p><u>Depth</u></p> <ul style="list-style-type: none"> - the absence of depth ↔ maximally deep perspective <p><u>Illumination</u></p> <ul style="list-style-type: none"> - the fullest representation of the play of light and shade ↔ its absence <p><u>Brightness</u></p> <ul style="list-style-type: none"> - a maximum number of different degrees of brightness ↔ just two degrees: black and white, or dark grey and lighter grey, or two brightness values of the same colour <hr/> <p><i>Coding orientation:</i></p> <ul style="list-style-type: none"> ▪ <i>technological</i> ▪ <i>sensory</i> ▪ <i>abstract</i> ▪ <i>naturalistic</i>

First, contact is established if represented participants look directly at the viewer’s eyes. The represented participant’s direct gaze (and the gesture, if present) make a ‘demand’ on the viewer, while absence of such gaze constitutes an ‘offer’. However, image acts (demand or offer) differ from the four basic speech acts (cf. Table 3.1). When images demand, they demand goods-&-services; and when images offer, they

primarily offer information. The second interactive recourse through which a visual representation is positioned in relation to the viewer are the use of size of frame – the choice between close-up, medium, long shot, etc. (Table 3.9). For instance, a big close-up where we see the face or head only conveys an intimate sense to the viewer, and even a total stranger for the viewer can be represented at intimate distance. Thus, the familiarity between the viewer and represented participants does not determine the selection of a certain size of frame – how they will be shot, as indicated in Kress and van Leeuwen (2006: 126):

The relation between the human participants represented in images and the viewer is once again an imaginary relation. People are portrayed as though they are friends, or as though they are strangers. Images allow us to imaginarily come as close to public figures as if they were our friends and neighbours – or to look at people like ourselves as strangers, ‘others’.

In addition, patterns of distance can become genre-specific. Represented participants, for example, in a timeline from history textbooks or infographics, are often depicted in a public or impersonal way. The third dimension to the interactive meanings of visual communication is related to the perspective expressing (1) subjective attitudes towards represented participants – horizontal angle expressing involvement (frontal angle) or detachment (oblique angle), and vertical angle expressing power (high angle: viewer power; eye-level angle: equality; low angle: represented participant power), or encoding (2) objective attitudes such as in scientific and technic pictures.

In sum, producing an image involves the choice between image acts (offer or demand), the selection of a certain size of frame, and at the same time, the selection of an angle, a point of view (Kress and van Leeuwen, 2006: 129). The reliability of visual messages – the modality values in visual communication, is also discussed, since visuals “can represent people, places and things as though they are real, as though they actually exist in this way, or as though they do not – as though they are imaginings, fantasies, caricatures, etc.” (Kress and van Leeuwen, 2006: 156).

As is shown in Table 3.9, the degree of naturalness of an image is co-constituted by eight dimensions/scales of visual cues: colour saturation, colour differentiation, colour modulation, contextualisation (presence/absence of background), representation (abstraction/detail), depth (no/deep perspective), illumination

(no/full light and shadow) and brightness. The interplay of the value of these eight modality markers thus determine what counts as verisimilar in naturalistic visuals. However, the same image perceived as real in one context may be less than real in another context. Reality in different contexts is in principle calculated according to the coding orientations – “sets of abstract principles which inform the way in which texts are coded by specific social groups, or within specific institutional contexts” (Kress and van Leeuwen, 2006: 165).

3.3.3 Composition

The previous two sections have introduced the way any given image represents the relations between represented participants it depicts, and the complex set of relations that can exist between the image and its viewer; meanwhile, the composition of the image relates its representational and interactive elements to each other and integrate them into a meaningful whole through three interrelated systems: (1) information value, (2) salience, and (3) framing (Kress and van Leeuwen, 2006: 175-177). Each of these systems, in brief, is respectively concerned with the zone where an element occurs, the degree to which an element draws attention to itself, and the degree to which an element is strongly or weakly framed (Table 3.10). These three principles of composition apply not just to images, but also to “composite visuals, visuals which combine text and image and, perhaps, other graphic elements, be it on a page or on a television or computer screen”; and the product of various semiotic systems is treated as an integrated one rather than the sum of the meanings of the parts in the analysis of its composition (Kress and van Leeuwen, 2006: 177).

First, all cultures accord their information values to various spatial dimensions, such as margin and centre, left and right, top and bottom. Kress and van Leeuwen (1996/2006) propose that, in western society, any multimodal artefact is horizontally polarised with a Given left and a New right, or vertically with an Ideal top and a Real bottom; and the centre-margin spatial structure indicates the different statuses of Centre – the nucleus of the information and Margins – these ancillary, dependent elements. Second, degrees of salience help viewers to make judgements about the hierarchy of importance among elements on the basis of a number of visual clues: size, sharpness of focus, tonal contrast, colour contrasts, placement in

the visual field, perspective, and quite specific cultural factors (cf. Kress and van Leeuwen, 2006: 202). Third, elements or groups of elements of the spatial composition are either disconnected “through frame lines, pictorial framing devices, empty space between elements, discontinuities of colour and shape, and other features”, or connected “through the absence of framing devices, through vectors and through continuities or similarities of colour, visual shape, etc.” (Kress and van Leeuwen, 2006: 210).

Table 3.10 Compositional systems in images (Kress and van Leeuwen, 2006: 177)

Composition system	Feature
Information value	The placement of elements (participants and syntagms that relate them to each other and to the viewer) endows them with the specific informational values attached to the various ‘zones’ of the image: left and right, top and bottom, centre and margin. <ul style="list-style-type: none"> ▪ Centred ▪ Polarised <ul style="list-style-type: none"> • Given – New • Ideal – Real
Saliency	The elements (participants as well as representational and interactive syntagms) are made to attract the viewer’s attention to different degrees, as realized by such factors as placement in the foreground or background, relative size, contrasts in tonal value (or colour), differences in sharpness, etc. <ul style="list-style-type: none"> • maximum saliency ↔ minimum saliency
Framing	The presence or absence of framing devices (realized by elements which create dividing lines, or by actual frame lines) disconnects or connects elements of the image, signifying that they belong or do not belong together in some sense. <ul style="list-style-type: none"> • maximum disconnection ↔ maximum connection

3.4 Analysing the Public Health Posters in a Social Semiotic Perspective

The previous sections have presented how language and images are theorised as higher-order semiotic systems for creating meaning. Considering any public health poster is an integration of various semiotic systems (e.g. language, images) in use, I will analyse my collection of the public health posters in the overall account of semiotic systems functioning in context by viewing such collection along the dimensions of the hierarchy of stratification and the cline of instantiation in SFL.

In terms of stratification, the public health posters are located at the semantic stratum, below context and above lexicogrammar. Therefore, they will be analysed trinocularly:

- i. from below (bottom-up), Chapter 4 explores the patterns of certain meaning of the public health posters realised separately in the stratum of grammar by verbal and visual semiotic systems
- ii. from roundabout, Chapter 6 provides a corpus-based analysis of the semantic space of logico-semantic/rhetorical relations achieved together by meaning-making resources of various semiotic systems in the public health posters
- iii. from above (top-down), from the stratum of context projected onto the public health posters, Chapter 6 identifies the social and semiotic processes unfolding in the posters in terms of the field parameter of context

In terms of instantiation, the public health posters are located at the instance pole of the cline. The recurrent multimodal generic features of this situation type identified in the corpus-based investigation will be discussed in Chapter 6. Each of the public health posters thus will be viewed relationally along these two dimensions. Before introducing how to build up and work with the multimodal corpus for empirical analysis in Chapter 5 and Chapter 6, I am going to explore the individual semiotic systems on the bottom-up approach first in the next chapter.

Chapter 4 Analysing Language and Image on the Page of the Public Health Posters

Viewed from below, experiential meaning is my main focus, interpersonal meaning is of secondary importance. Textual meaning will not be considered in the present study; however, it will be addressed in future developments of this study. There is a reason. Kress and van Leeuwen's (1996/2006) set of proposals for information value of multimodal texts (i.e. Given-New, Ideal-Real, and Centre-Margin; cf. Section 3.3.3), is "bold" (Forceville, 1999: 166). When it comes to the poster, the layout is a much more complicated aspect. Kress and van Leeuwen's (1996/2006) principles, such as the distinction between polarised and centred structures, and the opposition between top and bottom, cannot explain it exhaustively or even correctly. My reason for not following their compositional systems can be illustrated with a brief discussion on a couple of public health posters in CPHP.

Dying from Smoking is Rarely Quick... and Never Painless.
(NYC DOHMH, 2011)



(a) When smoking leads to stroke, you can suffer every minute of every day. (NYC-13)



(b) When smoking leads to emphysema, you can suffer every minute of every day.

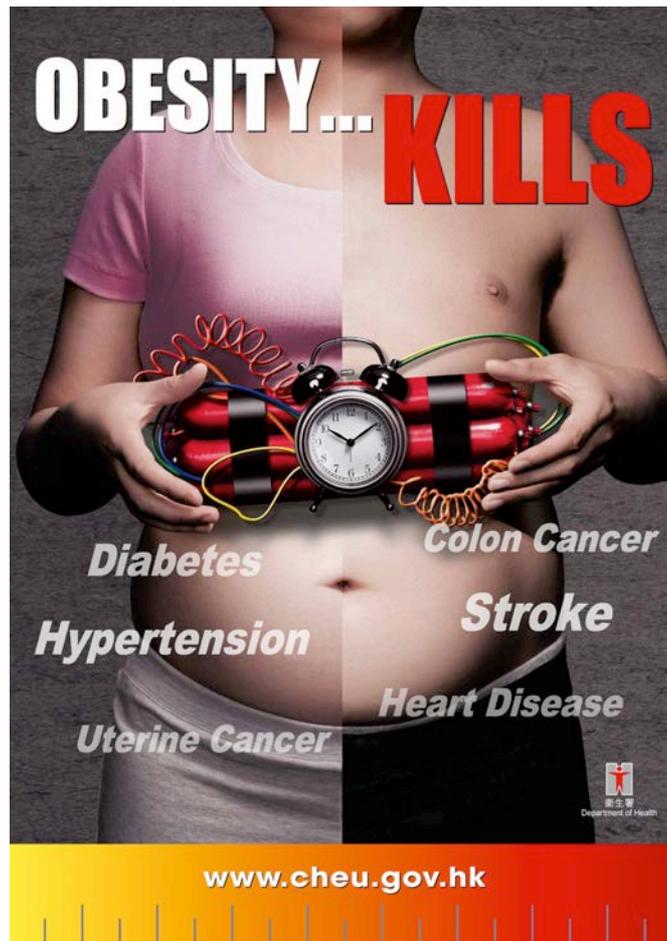
Figure 4.1 Example public health posters with texts over images

The network of composition meaning proposed in Kress and van Leeuwen's framework (cf. 2006: 210) can 'read' most of the public health posters in CPHP. For example, as shown in Figure 4.1, the photographs of two smokers suffering

from stroke (Figure 4.1(a)) and emphysema (Figure 4.1(b)) are arguably the most salient parts of the quitting smoking posters designed for *Suffering Every Minute* campaign, due to placement and size. Each picture is not just placed in the centre, but also occupies the whole page; and texts (i.e. the headline and the line under it) are placed on the picture in the right position to not cover her/his face and at the appropriate size and colour to be clearly noticed by the viewer. However, salience is not wholly defined by placement and relative size. Many factors, including contrasts in tonal value, differences in sharpness, etc. can contribute to salience (cf. Kress and van Leeuwen, 2006: 177, 201-203), and such factors create a hierarchy of salience which contributes to a preferred reading path.

Thus, in NYC-13 (Figure 4.1(a)), its headline and line of call to action (i.e. *QUIT SMOKING TODAY*. in its bottom-left margin) have some salience though, due to the 'Ideal' placement, the high contrast of white print (the font colour of the headline) on dark background and the difference in letter case (letters of the line of call to action are in uppercase), with other elements (e.g. health agency logo) in the space of the 'Real' having less salience. Hence, a reading path is constructed from her face to the headline, to the line of call to action, and then to the other elements. In Figure 4.1(b), while the photograph is large, but it is not as well illuminated. Thus, we could also argue that the primary salience is on the headline, which is centred and bright in contrast. And all the elements create a reading path which invites the viewer to traverse the whole poster.

However, Kress and van Leeuwen's (1996/2006) framework of composition meaning cannot perfectly 'read' the anti-obesity poster HK-6 (Figure 4.2, cf. also Appendix A), which features a composite visual of half man half woman: female in the left, male in the right. The left-right structure in this illustrational composite doesn't play with Kress and van Leeuwen's notion of Given-New dichotomy. One interpretation of this visual image is: the time bomb breaches the frame of this structure, unifying these two halves, as do the listed health effects of obesity (i.e. diabetes, hypertension, uterine cancer, colon cancer, stroke, and heart disease). Therefore, the presence of this framing device indicates that, whether male or female, same serious diseases and health conditions of obesity (*OBESITY... KILLS*) apply to all human beings.



HK-6: *OBESITY... KILLS* (DH, HKSAR, n.d.)

Figure 4.2 Example of a public health poster that features a composite visual

However, this whole visual image can be seen as a diagram that is deployed to make a contrast between male and female. A diagram is often used to represent complex concepts that “are otherwise difficult to portray in a few sentences of text or a natural image” (Kembhavi, Salvato, Kolve, Seo, Hajishirzi and Farhadi, 2016: 235); and according to Bateman, Wildfeuer and Hiippala (2017: 276), “the positioning of the diagrammatic labels is meaningful”. In HK-6, the label *Uterine Cancer* is superimposed on the left side of the composite visual – the female part, which raises an alternative interpretation: the obesity-related health consequences differ between male and female. In HK-6, the only polarisation between left and right is in the headline, as *OBESITY* and *KILLS* are differentiated in terms of colour and size. *OBESITY* functions as a Given, to the New of *KILLS*, presumably the point of the message (cf. Bateman et al., 2017: 276-278 for their discussion of HK-6’s page layout and their viewpoint of allowing multiple perspectives into layout space). Thus, I would further consider textual metafunction (also linguistically, e.g. in terms

of Theme, etc.) in future studies after I set out a schema for the layout resources of this particular genre – public health poster (cf. Section 5.3.4).

Returning to NYC-13, as shown in Figure 4.1(a), according to Kress and van Leeuwen (1996/2006), the photo of the suffering woman depicts the devastating consequences smoking caused on her health, which is an analytical process of ‘*representation*’ (Table 4.1). No eye contact is made between the woman and the viewer, which is a kind of indirect ‘*interaction*’. And the size of the photograph, colour contrasts and other structuring principles determine the meaning within multimodal ‘*composition*’. Systemic functional theory of language has also inspired and informed, at all points, O’Toole’s (1994/2011) semiotic model of visual arts. Lemke (1998) believes that when all meaning-making, whatever semiotic systems are deployed, singly or jointly, is organised around three generalised semiotic functions – presentational, orientational and organizational. As outlined in Table 4.1, despite the term differences, the metafunctionally diversified perspective remains the same in these studies. The present study sticks by ideational (experiential and logical) and interpersonal – being compatible with terms in SFL, to describe the metafunctions in both language and image systems.

Table 4.1 Metafunctions across various semiotic systems

Semiotic system		Metafunction	Construing experience	Enacting roles & relations	Organising text
<i>Language</i>	Halliday & Matthiessen (2014)		ideational	interpersonal	textual
<i>Visual images</i>	Kress & van Leeuwen (1996/2006)		representation	interaction, modality	composition
<i>Visual arts</i>	O’Toole (1994/2011)		representational	modal	compositional
<i>All</i>	Lemke (1998)		presentational	orientational	organisational
<i>Language & images</i>	<i>this study</i>		<i>ideational</i>	<i>interpersonal</i>	-

This chapter begins with the presentation of data collection and sampling scheme to obtain representative data sets consisting of public health posters in New York City and Hong Kong. It follows with the description of a holistic structure of the public health posters. Generic features suggested by the holistic structure are helpful to identify the scope of my analysis of the public health posters; meanwhile, they are useful for corpus building that is described in the chapter following. This chapter then proceeds to present analysis results of the experiential and interpersonal meaning realised via grammatical resources in individual systems, and preliminarily

discusses the results with examples from the public health posters, comparing such posters in CPHP-NYC with the ones in CPHP-HK where possible.

4.1 Getting Data for CPHP

4.1.1 Data Overview

Collected within the period from May 2012 to March 2016, the data consists of in total 60 public health posters as shown in the following collage (Figure 4.3):

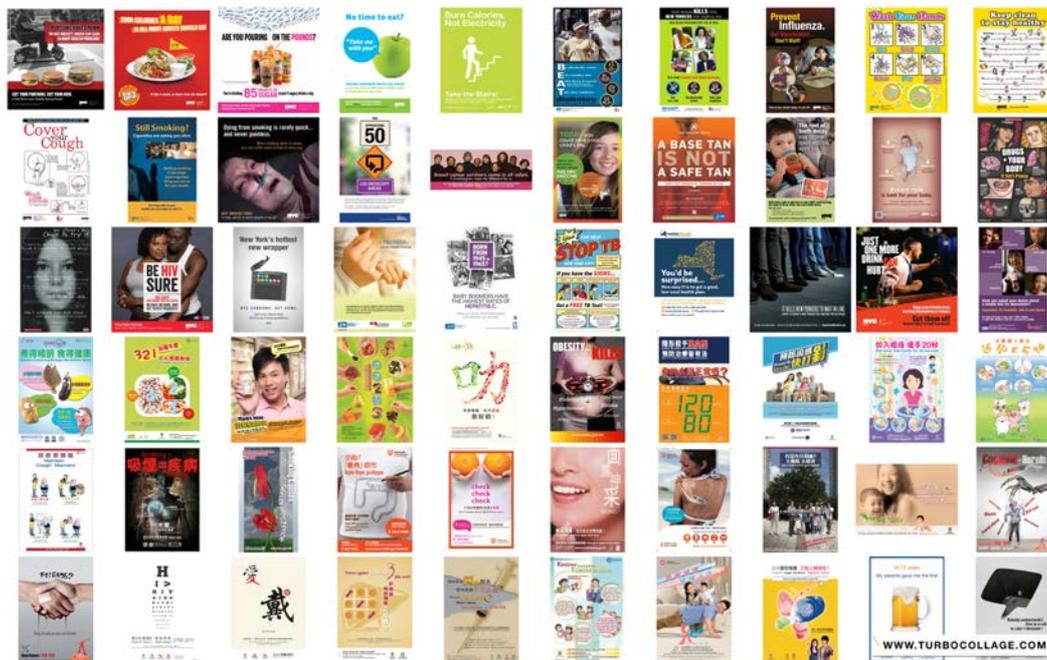


Figure 4.3 Collage of 60 public health posters in CPHP

The public health posters are sampled in equal numbers from two locales – New York City and Hong Kong, so each data set includes 30 posters in number. The first three rows of posters shown in Figure 4.3 are selected from New York City and the remaining three rows are from Hong Kong. Table A.1 and Table A.2 in Appendix A provide the detailed background information on the two sub-corpora of CPHP. As shown in Table 4.2, CPHP-NYC contains the English version of 30 public health posters used in New York City; CPHP-HK contains 24 Chinese – English bilingual version and 6 English version of the public health posters used in Hong Kong, and the Chinese language included in the bilingual posters is traditional characters rather than simplified ones.

Table 4.2 Breakdown of data in CPHP-NYC and CPHP-HK

	Number of total posters	Number of English version	Number of bilingual version
CPHP-NYC	30	30	0
CPHP-HK	30	6	24 (Chinese – English)

It is not possible to determine the exact year of publication for 60 public health posters (Table 4.3; cf. also Appendix A). This information is missing for 6 public health posters in CPHP. One can see which campaign a poster has been created for and can have a rough estimate of the specified period it has been used. One can see when a poster has been uploaded on a web page, but this does not have to be its release or publication date. However, the focus of the present study is not on the changes in patterns over time, so the fact that the exact time of the publication cannot be established is insignificant.

Table 4.3 Numbers of the sampled public health posters published per year

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	n.d.
CPHP-NYC	1	1	5	3	4	2	1	3	4	1	2	1	2
CPHP-HK	2	3	5	2	2	4	0	2	1	1	3	1	4

One can download most of these public health posters from the websites of agencies that I shall specify in next subsection; one can order hard copies free of charge by following the agencies' resource guides and filling out request forms. The majority of the data in CPHP (i.e. 56 posters) is available online as Adobe Acrobat PDF document, JPEG image, or both. There are but a small portion collected via email request (3 PDF posters in print-ready version, i.e. HK-14, HK-15, HK-17) and mail order (1 poster, i.e. NYC-15 after offering the agency a full, verifiable physical US address for shipping).

The information of available sizes is only available for less than a third of the whole collection (i.e. 19 posters; cf. Appendix A). One can either tick in the request form to indicate one's choice of sizes for shipping or collection, or download and print out any appropriate sizes. In fact, the same poster can be used in different sizes at bus shelters, along the NYC MTA or HK MTR tracksides, as well as on the bodies of tramcars. Thus, the precise size – the width and height of each poster is not considered during the corpus annotation (cf. Section 5.3.4) since this information is

not quite clear for most of the data. The next subsection moves towards presenting where the public health posters in CPHP are sourced from and why are these sources.

4.1.2 Access to Data

A list of data sources and numbers of the public health posters collected from these sources for corpus compilation are provided in Table 4.4:

Table 4.4 Data sources and numbers of the public health posters per source sampled

CPHP	Source	Number	
CPHP- NYC (30)	New York City Department of Health and Mental Hygiene (NYC DOHMH)	21	
	NYC Health + Hospitals <i>(formerly the New York City Health and Hospitals Corporation)</i>	1	
	New York State Department of Health (NYSDOH)	2	
	LiveOnNY <i>(formerly New York Organ Donor Network)</i>	1	
	Centers for Disease Control and Prevention (CDC)	3	
	National Institute on Drug Abuse (NIDA)	2	
	<i>Collaborating agencies:</i> AIA New York Chapter (AIANY) (NYC-5), Real Estate Board of New York (REBNY) (NYC-5), Association for Professionals in Infection Control and Epidemiology (APIC) (NYC-11), Scholastic Inc. (Scholastic) (NYC-20, NYC-21), Hep B United (NYC-24)		
CPHP- HK (30)	Food and Health Bureau (FHB) - Department of Health (DH)	1 21	24
	▪ Centre for Health Protection (CHP)		
	- Public Health Services Branch		
	- Tuberculosis and Chest Service (TB & Chest Service)	1	
	- Special Preventive Programme (SPP)		
	- Viral Hepatitis Preventive Service (VHPS)	1	
	- AIDS Unit		
	- Red Ribbon Centre (RRC)	2	
	- Surveillance & Epidemiology Branch (SEB)		
	- Communicable Disease Division		
	- Non-communicable Disease Division		
	- Cervical Screening Programme	1	
	- Central Health Education Unit (CHEU)	3	
	▪ Tobacco Control Office (TCO)	2	
	▪ Dental Service		
	- Oral Health Education Unit	1	
	- Food and Environmental Hygiene Department (FEHD)		
	- Centre for Food Safety (CFS)	2	
	Security Bureau		2
	- Narcotics Division (ND)		
	- Action Committee Against Narcotics (ACAN)		
	Hong Kong Cancer Fund (HKCF)		3
	The Samaritans Hong Kong		1
	<i>Collaborating agencies:</i> The Hong Kong Medical Association (HKMA) (HK-28), Hospital Authority (HA) (HK-28)		

As shown in bold in Table 4.4, the governmental agencies of health in these two metropolitan areas are the New York City Department of Health and Mental

Hygiene (NYC DOHMH), and the Department of Health (DH) that is overseen by Food and Health Bureau (FHB) of the HKSAR government. 70% of the data (i.e. 42 public health posters: 21 in CPHP-NYC and 21 in CPHP-HK) is sourced from the NYC DOHMH and the Hong Kong DH. Some of the data were published by other governmental organisations and voluntary agencies, and some were released together by health organisations and collaborators, as also shown in Table 4.4 (cf. also Appendix A).

In Hong Kong, the FHB is responsible for forming policies on food and health issues, and allocating resources for the running of Hong Kong's health services. Agencies such as the DH, Food and Environmental Hygiene Department (FEHD) and Hospital Authority (HA) all report to the FHB. According to the Director of Health, Chan Hon-ye (2018), the Hong Kong DH is the government's "health advisor and agency to execute health policies and statutory functions", and it safeguards "the health of the people of Hong Kong through promotive, preventive, curative and rehabilitative services". Likewise, the NYC DOHMH has unveiled strategic health agenda *Take Care New York* (TCNY) and launched a series of campaigns to educate all New Yorkers on potential health risks, to improve their health status, and to advance health promoting policies and activities.

The DH in Hong Kong provides its diverse services through a variety of centres, offices, and divisions, such as Centre for Health Protection (CHP) and Tobacco Control Office (TCO). There are six branches in the CHP to deal with various health-related issues, and more divisions under these branches for different spectra of work. Table 4.4 lists only data sources rather than the agency organisation chart. In these two locales, there are also other local governmental public agencies, non-governmental organisations as well as commercial private enterprises that advise the local governments and other bodies on practices and policies to help prevent, detect and treat health-related issues. For instance, the FEHD delivers its quality food and environmental services through Centre for Food Safety (CFS) and other branches to protect the health of the people of Hong Kong. Other non-governmental agencies or statutory bodies (e.g. Hong Kong Cancer Fund (HKCF), the Samaritans Hong Kong) are responsible for the prevention and control of certain diseases and render support in various health education and promotion activities.

For some health topics, neither the NYC DOHMH nor other municipal agencies such as NYC Health + Hospitals that operates the public hospitals and clinics in New York City have published any posters. However, federal or state agencies (cf. Table 4.4, e.g. United States Centers for Diseases Control and Prevention (CDC), National Institute of Drug Abuse (NIDA), New York State Department of Health (NYSDOH)) are involved in working with the local agencies and communities to address a range of public health issues. The public health resources and campaigns developed by these national and state agencies are sometimes recommended and used by the local government and agencies since New Yorkers are part of the target population. Thus, web pages of the local health agencies offer direct links to other pages on the websites of health agencies at state or national level. Under these circumstances, I have sampled and gathered posters from some other agencies after consulting with local agency representatives via email or webchat and by following their suggested links. For example, there is one poster released by LiveOnNY (i.e. NYC-28), a federally designated non-profit organ procurement organisation.

4.1.3 Data

4.1.3.1 Searching for Public Health Posters

Before selecting data for inclusion in CPHP-NYC and CPHP-HK, I have made broader searches to collect all public health posters that were available for download or order over almost four years. Take one major source of CPHP-NYC – the NYC DOHMH as an example, I searched and viewed the contents of its Public Health Detailing Program’s action kits (Figure 4.4) which contain clinical tools, resources for providers and patient education materials. Between 2003 and 2010, the public health detailing program within the NYC DOHMH completed a total of 49 campaigns (Dresser et al., 2012). Each kit focuses on a single topic and the topics have been chosen by the health program officials based on “most recent New York City data on health risks, their anticipated effect on morbidity and mortality, and other public health priorities” (Dresser et al., 2012: 342; Larson et al., 2006: 230).

Many resources are available through these action kits to promote awareness about the importance of, e.g., influenza and pneumococcal vaccination, breastfeeding, screening and brief intervention for alcohol problems, HPV vaccination, colon

cancer screening, contraception, smoking cessation, and tobacco quit; to manage obesity and chronic diseases (e.g. asthma, diabetes, and a number of major cardiovascular diseases such as hypertension and dyslipidaemia) and improve medication adherence in patients with chronic illnesses; and to prevent child abuse and/or neglect, intimate partner violence, etc. Some resources on the theme of, e.g. HIV testing, PrEP and PEP, are related to a key public health challenge in New York City – HIV prevention. Having been used by the various health campaigns since 2003, most of the posters and other materials in these action kits remain the same; while some have been updated and new ones have been added for newly-designed campaigns, initiatives, etc.

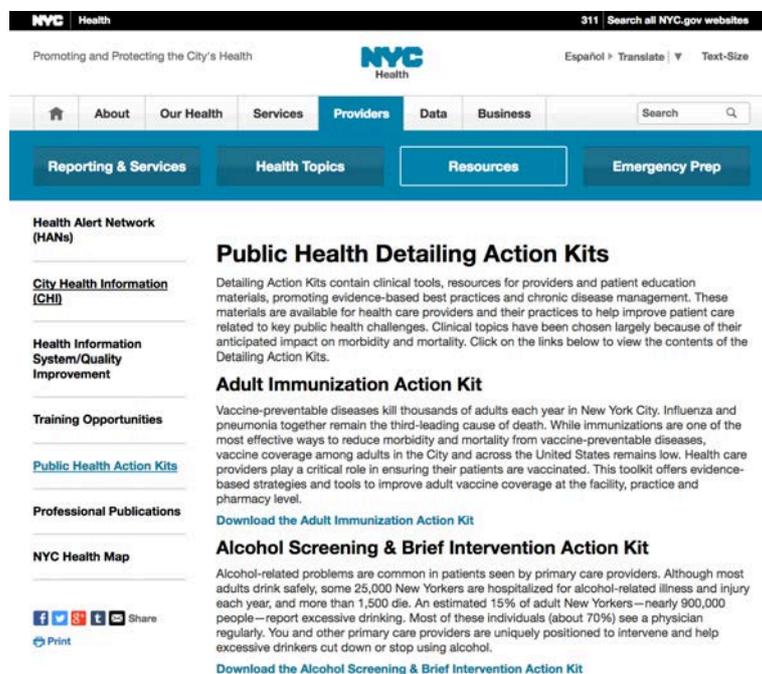
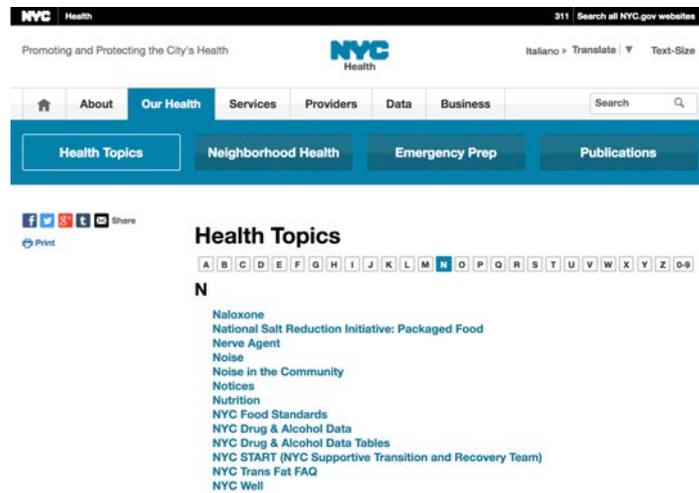


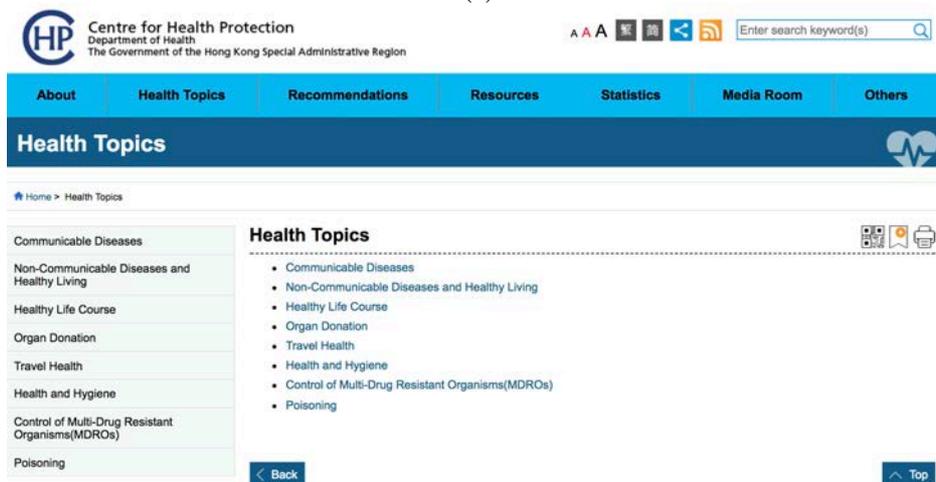
Figure 4.4 Screen shot of the DOHMH’s public health action kits web page (captured 7 October 2017)

Although the public health detailing program centres on various clinical topics, its focus is on managing chronic conditions (Dresser et al., 2012). In New York City, multiple programs spanning multiple sectors, with varied approaches and targets, are in fact supported to improve the lives of New Yorkers during the Bloomberg Administration (2002-2013) (Kelly, Davies, Greig and Lee, 2016). These health programs are designed with identified priorities and goals. For example, TCNY – the City’s four-year health agenda to help New Yorkers live longer and healthier lives, encourages health improvement in ten key areas to mainly promote healthy living (cf. Mettey et al., 2015; Summers, Cohen, Havusha, Sliger and Farley, 2009).

Initially launched in 2004, each new agenda of this city-wide health initiatives (e.g. TCNY 2008, TCNY 2012, TCNY 2016, TCNY 2020) takes the previous plans a step further, and looks at new health factors as well.



(a)



(b)

Figure 4.5 Screen shots of the DOHMH's and the CHP's health topics web pages (captured 9 December 2017)

In order to cover the health topics as comprehensively as possible and ensure the diversity of the possible public health posters contained in CPHP, I have run a thorough search. I have checked all the major public health agendas, programs, initiatives, campaigns, etc. launched in New York City and Hong Kong. In one of the locales – Hong Kong, the main service areas provided by the DH include the CHP, dental service, drug office, elderly health service, family health service, primary care office, student health service, etc. Hence, I searched these primary service areas that are delivered and overseen by the local health departments. I also clicked on a wide range of health topics in an A to Z list on the NYC DOHMH

website (Figure 4.5(a)) and all health topics on the Hong Kong's CHP website (Figure 4.5(b)) to collect available public health posters and track all the information relevant to the collected posters. In addition, in order to get the latest news, I have been staying connected with health agencies' official social media channels (e.g. Twitter, YouTube, Facebook, Instagram), and have been saving relevant information on a regular basis. Although vast and varied, rounds of comprehensive checks on all the health education programs and health topics, and news feeds of many social networks have provided me with an exhaustive data bank of public health posters used in the City of New York and Hong Kong.

4.1.3.2 Selecting Health Topics

After collecting hundreds of public health posters, I started to choose health topics that would be included in CPHP. The treemaps Figure 1.1 and Figure 1.2 (cf. Section 1.1.1.1) show that non-communicable diseases account for more than 70% of total global deaths in GBD 2016, and such diseases are also the causes of the increased total global DAYLs (i.e. health loss due to both fatal and non-fatal disease burden) from 1990 to 2016 (cf. also Hay et al., 2017; Naghavi et al., 2017). But according to GBD 2016 findings, what are the leading risk factors in terms of global deaths or DAYLs?

Using the GBD Compare tool (IHME, 2017), I can have arrow diagrams (e.g. Figure 4.6 and Figure 4.7) and other charts to display ranks of risks, explore the trends in risks for two different years, and visualise the changes in rankings between those years. Figure 4.6 and Figure 4.7 display the leading risk factors and the change in terms of deaths and attributable DALYs, respectively, between 1990 and 2016 at the global level for both sexes and all age groups combined (cf. Gakidou et al., 2017). Metabolic risk factors are shown in orange, environmental/occupational risks in green, and behavioural risks in purple. As shown in Figure 4.6 and 4.7, in 2016, 16 out of 26 risk factors responsible for global deaths and DALYs are in purple, hence, more than half of the major health risks have origins in behaviour of individuals and populations. In 2016, high systolic blood pressure, smoking, high fasting plasma glucose, and high body-mass index are on the very top of the two lists of leading risks responsible for deaths and DALYs worldwide.

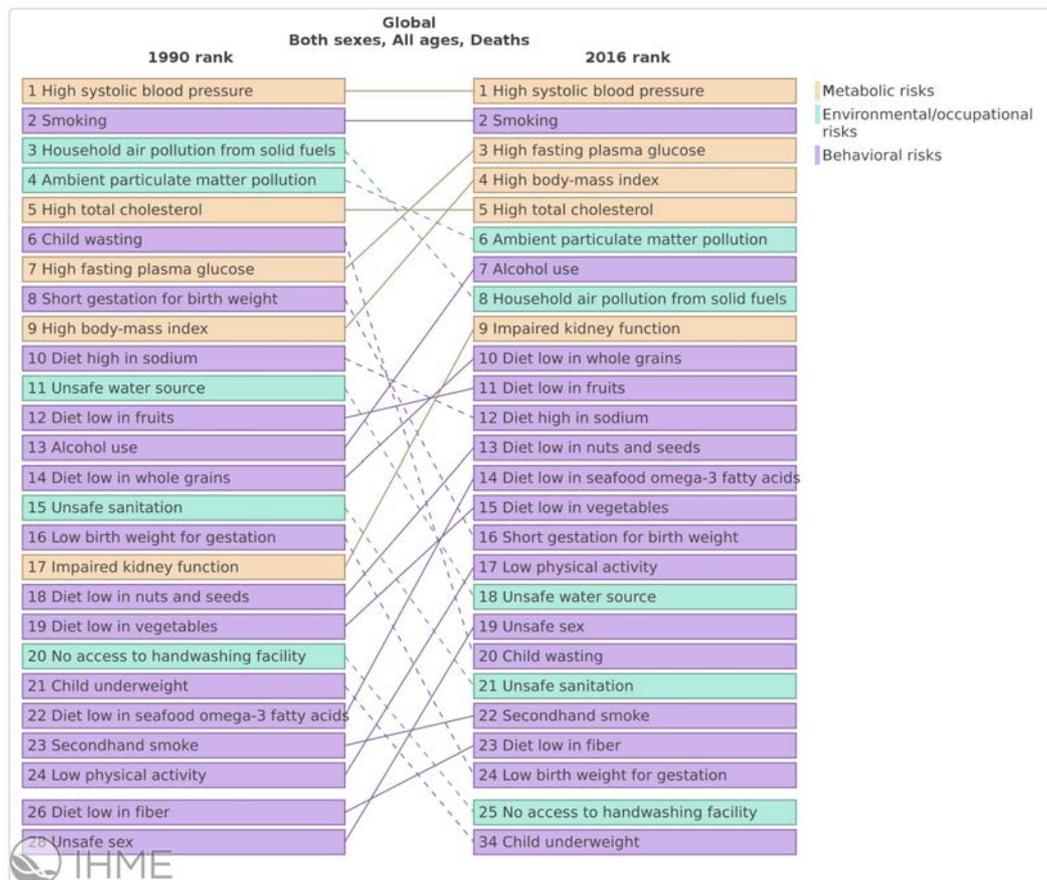


Figure 4.6 Ranks of leading risk factors by deaths at the global level, in 1990 and 2016, both sexes and all ages combined; and the changes in rankings between 1990 and 2016 (IHME, 2017)

In addition, the changes in rankings between 1990 and 2016 in both arrow diagrams are visualised with connecting lines. The online interactive version of Figure 4.6 and Figure 4.7 can also demonstrate the percentage change of deaths and DALYs between two different years. Over the time period of 1990 to 2016, the three most significant increases in global deaths and DALYs are the same list of risks: unsafe sex (percentage changes of deaths and DALYs: 145.84%, 164.91%), high body-mass index (96.57%, 102.93%), and high fasting plasma glucose (88.88%, 83.44%) (cf. also Gakidou et al., 2017). This trend actually coincides with the HIV/AIDS epidemic and the increases in obesity-related diseases including IHD, stroke, diabetes and some cancers which are shown in Figure 1.1 and Figure 1.2 (cf. also Hay et al., 2017; Naghavi et al., 2017). It is also worth noting the dietary risk factors as well. A group of dietary risks (e.g. low intakes of whole grains, fruits, and nuts and seeds.) have experienced large increases between 1990 and 2016, which is caused by unhealthy eating habits and patterns.

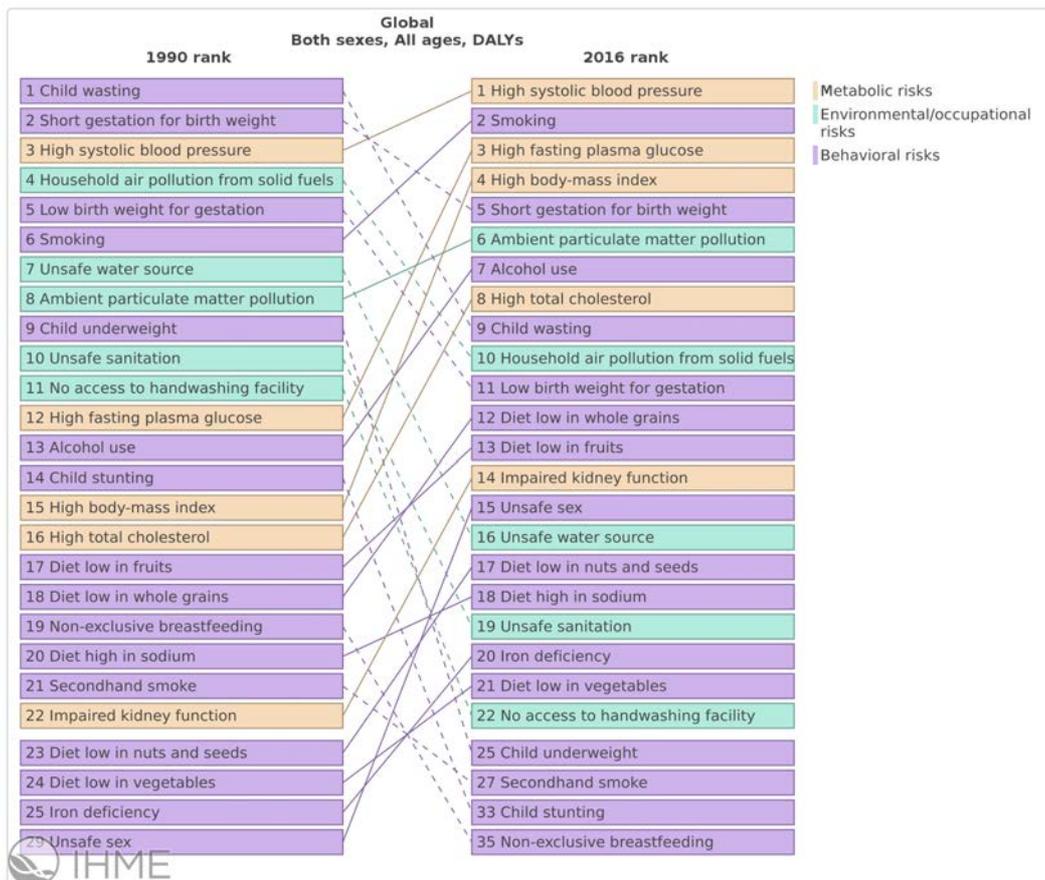


Figure 4.7 Ranks of leading risk factors by DALYs at the global level, in 1990 and 2016, both sexes and all ages combined; and the changes in rankings between 1990 and 2016 (IHME, 2017)

Although the GBD Compare tool (IHME, 2017) cannot be used to check the data at the city level to compare New York City and Hong Kong, this interactive tool is useful to help me extract a list of major health topics in CPHP (Table 4.5). I have made out this list by also considering the key health challenges and priority action areas for intervention and education in these two world cities (cf. Section 4.1.3.1). This list is by no means complete. But, as shown in Table 4.5, the data encompasses a wide coverage of major topics in public health including: healthy living (including eating healthy and physical activity), chronic diseases (including diabetes, obesity, and hypertension), influenza prevention, personal hygiene and cough manners, smoking and tobacco use, cancer prevention (including colorectal cancer, breast cancer, HPV-associated or cervical cancer, and skin cancer), oral health, breastfeeding, infectious diseases (including viral hepatitis and tuberculosis), alcohol and drug use, HIV prevention and testing, health insurance and health plan, organ donation, and mental health.

Table 4.5 Health topics included in CPHP and the sampled posters for each health topic

Health topic	CPHP-NYC		CPHP-HK	
	#	Poster (agency)	#	Poster (agency)
Healthy eating	1	<i>Portions Have Grown</i> (DOHMH)	1	<i>Smart Cooking Brings Healthier Diet</i> (FEHD)
	2	<i>2000 Calories a Day Is All Most Adults Should Eat</i> (DOHMH)	2	<i>321 Healthy Lunch Suitable for Everyone</i> (DH)
	3	<i>Are You Pouring on the Pounds?</i> (DOHMH)	3	<i>Calculate the Nutritional Intake</i> (FEHD)
	4	<i>No Time to Eat?</i> (DOHMH)	4	<i>2 Plus 3 a Day</i> (DH)
Physical activity	5	<i>Burn Calories, Not Electricity</i> (DOHMH)	5	<i>Healthy Eating, More Workout, You're So Smart!</i> (DH)
Diabetes, obesity, hypertension	6	<i>BEAT Diabetes</i> (DOHMH)	6	<i>Obesity... Kills</i> (DH)
	7	<i>Act Now! Control Your Blood Pressure.</i> (DOHMH)	7	<i>Is Your Blood Pressure Normal?</i> (DH)
Influenza prevention	8	<i>Prevent Influenza.</i> (DOHMH)	8	<i>Prevent Flu Get a Shot</i> (DH)
	9	<i>Wash Your Hands</i> (DOHMH)	9	<i>Add Soap Rub Hands for 20 Seconds</i> (DH)
	10	<i>Keep Clean to Stay Healthy</i> (DOHMH)	10	<i>Be Clean and Stay Healthy, Make School a Safer Place</i> (DH)
Smoking and tobacco use	11	<i>Cover Your Cough</i> (DOHMH)	11	<i>Maintain Cough Manners</i> (DH)
	12	<i>Still Smoking?</i> (DOHMH)	12	<i>Smoking = Diseases</i> (DH)
	13	<i>Dying from Smoking Is Rarely Quick ... and Never Painless.</i> (DOHMH)	13	<i>Smoking Causes Sexual Impotence</i> (DH)
Cancer prevention	14	<i>Approaching 50 Colonoscopy Ahead</i> (NYC Health + Hospitals)	14	<i>Bye-bye Polyps</i> (HKCF)
	15	<i>Breast Cancer Survivors Come in All Colors.</i> (NYSDOH)	15	<i>Check Check Check</i> (HKCF)
	16	<i>Today, You Could Save Your Child's Life.</i> (DOHMH)	16	<i>Relieved?</i> (DH)
	17	<i>A Base Tan Is Not a Safe Tan</i> (CDC)	17	<i>Be SunSmart.</i> (HKCF)
Oral health	18	<i>The Root of Tooth Decay May Be Time Spent with this Sippy Cup.</i> (DOHMH)	18	<i>Get a Check-up for Gum Disease</i> (DH)
Breastfeeding	19	<i>Breast Milk Is Best for Your Baby.</i> (DOHMH)	19	<i>Sustained Breastfeeding Paves the Way for Healthy Growth of Your Baby</i> (DH)
Anti-drug	20	<i>Drugs + Your Body It Isn't Pretty</i> (NIDA)	20	<i>Cocaine = Heroin Is Addictive!</i> (Security Bureau)
	21	<i>Life's Complicated Enough: Make Smart Decisions About Drugs</i> (NIDA)	21	<i>Friends?</i> (Security Bureau)
HIV/AIDS	22	<i>Be HIV Sure</i> (DOHMH)	22	<i>Face It! Test It!</i> (DH)
	23	<i>New York's Hottest New Wrapper</i> (DOHMH)	23	<i>To Protect</i> (DH)
Viral hepatitis	24	<i>I Promise, I Will Get a Hepatitis B Test.</i> (CDC)	24	<i>Protect Against Hepatitis B, 3 Jabs Work</i> (DH)
	25	<i>Born from 1945 to 1965?</i> (CDC)	25	<i>Prevent Hepatitis C Don't Share Needles or Works</i> (DH)
Tuberculosis	26	<i>You Can Help Stop TB in New York City!</i> (DOHMH)	26	<i>Know More About Tuberculosis</i> (DH)
Health insurance	27	<i>You'd Be Surprised...</i> (NYSDOH)	27	<i>Your Health, Your Life.</i> (FHB)
Organ donation	28	<i>It Kills New Yorkers to Wait in Line.</i> (LiveOnNY)	28	<i>Support Organ Donation Register Online!</i> (DH)
Alcohol use	29	<i>Just One More Drink Can Hurt.</i> (DOHMH)	29	<i>From Bear to Beer</i> (DH)
Depression	30	<i>Depression. It's Treatable. Talk to Your Doctor.</i> (DOHMH)	30	<i>Nobody Understands? Give Us a Call.</i> (The Samaritans)

4.1.3.3 Sampling Corpus Data

In order to get a representative sample, I have adopted two data selection methods – *systematic sampling* and *random sampling* (Bateman et al., 2017). Systematic sampling means that “one adopts some simple scheme for the selection of data”; and random sampling, as the term suggests, is the method where “instances are selected equally, i.e., without bias, from the entire set of potential candidates”

(Bateman et al., 2017: 142). Hence, I have developed some simple scheme to select the public health posters from the data bank – the posters in CPHP are randomly selected but systematically organised. Firstly, how many posters will be sampled for the same/similar health topic is based on the situation of poster collection. As shown in Table 4.5, the posters on the same/similar topic are labelled with the same Arabic numerals.

When searching for and collecting posters, I found that several campaigns or a variety of posters are designed for a major health issue (e.g. healthy eating, the prevention of influenza, cancer). Take the topic of influenza prevention as an example, its posters outnumber most other topics. There are many health campaigns designed for past and current flu seasons; there are free materials for different types of influenza (e.g. seasonal, avian, swine/variant, pandemic) and for different groups of population (e.g. general public, pregnant women, schools and child care, older adults); and there have been many facts and discussions about its sub-topics (e.g. types of flu vaccines, vaccine effectiveness and safety, flu and other diseases, symptoms and complications). Through these campaign materials, health agencies recommend flu vaccines for everyone as the first and most important step in protecting against flu (NYC-8 and HK-8). In addition to getting flu vaccines, one can also take everyday preventive actions such as washing your hands (NYC-9 and HK-9) and maintaining cough etiquette (NYC-11 and HK-11) to reduce the spread of germs at work, home and school (NYC-10 and HK-10).

And which poster(s) related to the same health topic or designed for the same campaign is/are chosen as the CPHP data is randomly selected. I am going to use some examples to clarify the random and systematic sampling next. I have adhered to this selection principle to also overcome the personal preference for more visually powerful posters or a particular type of posters (e.g. posters using a side by side comparison) and guarantee the uniform coverage of general health topics in CPHP-NYC and CPHP-HK. Secondly, English versions of the public health posters used in New York City and bilingual versions of the posters used in Hong Kong are the first choices. If there is no bilingual version of a Hong Kong public health poster, English version is chosen to be annotated. Versions in other languages (e.g. Español, Hindi) are not considered.

In many circumstances, a series of posters is designed for the same health campaign. Then only one of the whole set is sampled, the others and related materials are also saved for later use during corpus annotation and data analysis. 14 and 11 such cases are found in CPHP-NYC and CPHP-HK respectively; and these cases fall into three main categories. First, in 14 cases (10 in CPHP-NYC and 4 in CPHP-HK) where the design is of consistent style, each poster promotes the same campaign theme by presenting different examples or illustrates the theme by using different photographic subjects to target a variety of racial/ethnic groups. For example, the *Take Me with You* campaign provides a set of 5 posters and shows one example of snacks on the go in each of the posters. Take NYC-4, for example, fitting an apple into your day is featured.

Public health posters are usually designed for all individuals and groups, regardless of race, ethnicity, sex, age, or sexual orientation. One poster features various groups at the same time to appeal to the general population or specific racial/ethnic groups, such as NYC-7, NYC-8, NYC-15 and NYC-30 in CPHP-NYC. Nevertheless, in 4 cases of the CPHP-NYC, health campaigns provide more than one poster to target to a variety of groups. For instance, as shown in Figure 4.8, 5 posters including NYC-22 for the New York City’s *#BeHIVsure* media awareness campaign share the same template and wording to motivate the public to get tested for HIV and know their status. One of them features transgender model Carmen Carrera who is also an American reality television personality; while the photographic subjects are alternated to speak to different groups in four other iterations of the campaign poster by featuring two heterosexual and two homosexual couples.

Be HIV Sure (NYC DOHMH, 2014)



Figure 4.8 Example campaign creating a set of public health posters of the same design

Second, in 6 cases (2 in CPHP-NYC and 4 in CPHP-HK) where the design remains quite similar, but each poster delivers part of the messages or addresses the same

campaign theme from complementary points of view. Figure 4.9 displays four posters including HK-16, which are designed for cervical screening programme since its launch in March 2004 to enhance public awareness on cervical cancer prevention through featuring four faces of different age groups, depicting different stages of a smear test (e.g. before or after), and describing different results of having or not having regular screening tests. In such circumstances, a series of posters juxtaposes similar sets of text and images to revolve around the same campaign theme comprehensively. Another reason the fourth poster in Figure 4.9 is selected is that I'm informed that this one is currently available and other posters are obsolete.



Figure 4.9 Example programme creating a set of public health posters of the same style covering the programme theme from various points of view



Figure 4.10 Example campaign creating a set of 4-in-1 public health posters

Third, in 4 cases (2 in CPHP-NYC and 2 in CPHP-HK) where posters have different design styles, each poster has its own layout arrangement and juxtaposes different

sets of text and images to convey the campaign messages. In addition, there is an interesting case where a series of 4-in-1 *From Bear to Beer* posters including HK-29 (Figure 4.10) are designed and displayed in Hong Kong to raise public awareness of the fact that alcohol can cause cancer. The 4-in-1 posters urge parents and guardians to take action to protect children and young people from alcohol-related harm, and to get more information relating to the topic of alcohol and health by scanning the quick response (QR) code in the posters. Under the circumstances, I still sampled one from the whole series for corpus compilation but considered the others during analysis.

4.2 Describing a Holistic Structure

4.2.1 Why Bother?

In order to analyse different semiotic resource systems used in public health posters, I need to have an initial understanding of the public health poster structure involved as a generic template (e.g. what such posters are and what they typically look like, etc.) to justify how to determine the parts of language and images to be analysed in the current chapter, how to label (not identify) base units and layout units, and how to identify rhetorical segments for corpus annotation in the next chapter (cf. Section 5.3). Some lines in public health posters such as funding acknowledgements and copyright statement, are part of the holistic structure that will not be considered to be part of the analysis of meaning-making in such posters or the relational structure (cf. Mann et al., 1992: 55; see also Bateman and Delin, 2006: 594).

Regarding the studies within the genre of public health poster, this is a less defined genre area. After contacting the director of publications at NYC DOHMH, I was informed that the technical specifications on poster design were confidential and for internal use only. Unfortunately, responses I received from other agencies are same. Before reaching out to the Hong Kong Polytechnic University School of Design for any book recommendations dedicated to poster design, I ventured a guess that I would once again have a difficult time finding even broader answers on the style guidelines of posters. The reason is that posters are just one form of communication

materials and the core decision for any designer or marketer isn't in the end design, but rather the message from the start and how that will fit into the chosen format at any scale. The real magic happens when a designer transforms the message into various formats including posters.

As one of the simplest and bluntest formats in which to convey information, a poster addresses an issue or advertises a product in a direct and eye-catching manner. In addition, a poster most commonly functions as a kind of shorthand for complex topics and broad campaigns, and as a kind of 'freeze-frame' that can be expounded upon and extended to detailed explanations in a flyer, brochure, infographic, public service announcement and other materials. Be clear and concise as they may, posters still vary in different kinds that brim with designers' talent. Being constructed like, among others, official admonitions or gentle reminders, the public health posters are the art of persuasion with unrestrained style. And such posters can be created with either graphic software (e.g. Adobe Illustrator, Photoshop, LaTeX), or materials like a large sheet of paper, pencils, coloured pens, glue and art supplies. All these aspects, including design style, practices and tools, may be taken as potential contributions to genres in multimodal contexts (Bateman, 2008, 2014b).

However, designers' magic happens in relatively similar process if their work turns out to be socially (i.e. semantically and formally; cf. Stöckl, 2004: 19) recognisable as posters. There are some keys to poster design that the designers should keep in mind as far as the design process goes: What information is the most important, how to highlight it and how is other information further down the hierarchy? What images do you want to include, will it be a photograph or an illustration, and will it be one strong image or a collage of images? What text elements do you want to include? Will the poster be image heavy or text dominant? How text and images work together compositionally? What font and colour schemes are the most appropriate? And the solutions to some of these questions are certainly constrained by conventional properties of this particular genre.

The present study does not focus on the design transformation (e.g. basic techniques, ideas about creativity), does not cover old and emerging conventions of the verbal-visual component of the public health posters, but rather explores the ways of constructing health-related messages through the text-image combinations. Despite

this, it is essential to recognise the public health poster's holistic structure that derives from the properties of the genre or variety of text (Mann et al., 1992: 41). Suppose what would happen if you were assigned to design a series of public health posters for a campaign targeting at people in the City of New York, for instance, regarding the topic of 'living with HIV'. There are several aspects to consider before you start on the poster design.

First, what are issues or problems within this topic, and why do they need to be addressed? They could be the stigma and discrimination associated with this epidemic, which still are the barriers to preventing infections and providing care and treatment; could be the HIV treatment that helps the infected live longer and healthier lives; and could be prevention options especially for those who are at high risk of getting HIV; etc. While you determine these key issues, you can identify target viewers, and you also need to know their key characteristics to help tailor design, such as gender, age group, race/ethnicity, culture and beliefs, and their current level of the knowledge of the identified issues.

Second, how to capture the intended viewer's attention? Use an eye-catching image and/or a catchline? If there is any spokesperson to boost the campaign, an image of the celebrity or role model can make an enormous difference. You could otherwise invite infected patients and bring together their lobbying power to 'speak' honestly about this topic in posters. Then, you pick up the most important part from the full information and 'translate' them into messages in the public health posters. In most cases in poster design, simplicity is the key – the very nature of the poster determines any verbal and visual information conveyed by it should be concise. Therefore, you limit the number of messages and break them down into an arrangement that not only offers up at least all obligatory information, but also catches attention.

4.2.2 What to Describe?

Scholars (e.g. Barron, 2012; Degano, 2014) describe posters in terms of their rhetorical realisation of moves (for move structure, cf. e.g. Bhatia, 1993; Swales, 1981, 1990). In Degano's (2014) contrastive analysis of electoral posters and TV electoral debates in the UK, three core moves are listed to realise the communicative

purpose in electoral posters – inducing viewers to vote for their candidates: “(1) identifying the sender (candidate/party), (2) giving vote instruction, and (3) providing reasons (both issue- and character-related) why voters should follow such an instruction” (Degano, 2014: 334). Her analysis is genre-specific. The sender identity construction is also a necessary move in the public health poster, for example, by using logos to identify official agencies, but not to attract the blaze of publicity. Barron (2012) adopts a genre-analysis approach to investigate public information messages developed for social behaviour education campaigns and public service information campaigns in Germany and Ireland. The corpus under her analysis is a collection of spoken and written texts of print messages and posters, television/cinema and radio messages, but non-verbal features relevant to the analysis are also noted. In addition, roughly one-third of the corpus is discourse designed for public health campaigns. Thus, Barron’s (2012) empirical study of move structure is still of great value for me to determine the functional categories of expressions of the public health posters.

Barron’s (2012) investigation of the macro-textual structure of public information messages identifies seven moves that characterise the messages: (1) capture attention, (2) give audience details of recent/upcoming changes, (3) detail strategies for participation, (4) justify change, (5) incite audience participation, (6) solicit further action, and (7) establish credibility (cf. Barron, 2012: 109); and reveals the German and Irish corpus to have clearly identifiable conventions: move 1, 4, 6 and 7 have obligatory status while other moves are either optional (move 3) or appear to be unique to the context (move 2 and 5) (cf. Barron, 2012: 166). The order in which the seven moves are listed does not reflect any sequence of occurrence since the genre of public information messages does not reveal a well-defined sequence of moves (cf. Barron, 2012: 109, 281). This is particularly so given that one move may be combined with other moves and also given that a particular move may be realised at different points in a text (cf. Barron, 2012: 109).

And I refer back to the case of ‘living with HIV’ mentioned in Section 4.2.1. Based on Barron’s (2012) move structure of public information messages, the obligatory information employed in one poster designed around the topic of ‘living with HIV’ thus may include: a headline or an image to caption the eye (move 1), what issues are about (move 2), what actions to take (move 3 and 5), why these are important

(move 4), what services and support offered to the intended viewers (move 6), and which government ministry or agency initiates, endorses and/or sponsors the campaign (move 7). Following this train of thought, if I were the designer, in all likelihood I would produce a visually powerful poster to attract the attention by using an image (move 1). And a headline further draws the viewer into the poster and specifies the issue (move 1). Even in my simplest design of the poster body, there are verbal and/or visual display that helps the viewer get more information about the issue in question. So with the body part, I sketch the details of the recent problematic situation (move 2, 3, and 4), provide some concrete tips to implement the change and justify support for the change (move 5), and add response devices such as website and contact details to offer further information that is external to the text (move 6). Finally, I make a mention of the relevant health agency (move 7) and probably add the publication number at the bottom.

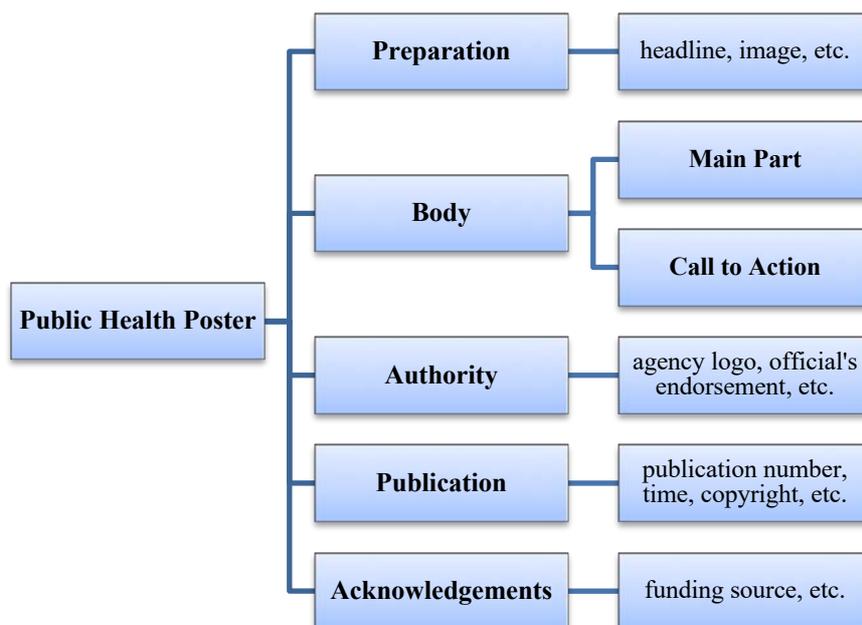


Figure 4.11 Holistic structure of public health poster

The findings of Barron's (2012) genre analysis are useful to me for identifying the categories of generic units in terms of their functional moves, and describe the rough holistic structure of the public health poster for the present study (Figure 4.11; cf. also Mann et al.'s, 1992: 53, description of the holistic structure sequence for the letter mailed by the grassroots population organization ZPG). Usually, the largest and most prominent verbal and/or visual elements are the leading **Preparation**. Some headlines and main images are preparatory – headline and image can function

alone or as a whole in the preparatory way and catch attention at the same time. Memorable campaign slogans, distinctive campaign's emblems or logos, etc. can also play a preparatory role.

Body includes **Main Part** that is where the details of the health topic and the concrete tips are developed, and **Call to Action** that is a command to provoke the viewer's immediate response and action. Various verbal elements (e.g. paragraph, sentence or sentence fragment, sequences, lists) and visual displays (e.g. diagrams, icons, symbols, illustrations) are usually used to construct the main part. The call to action also often lists contact and connect forms such as a call and visit invitation to encourage the viewer to get further information, and ways of connecting on social media (e.g. hashtags, QR codes linking to download websites of health smartphone applications). For example, each of the campaign materials published by DOHMH has a call to action, which is often to call 311, visit nyc.gov/health and to search for a keyword associated with a health campaign, or to opt-in to a texting service. We cannot draw a clear line of demarcation between preparation and body in most of the public health posters. As I have discussed earlier, preparation may be realised by headlines, images, or other units. However, for example, a headline can be preparatory, it can also be the nucleus of the whole poster. In addition, an image (e.g. a background photograph, an illustration) can function in a preparatory way, just as the headline of a poster does; but this visual display can also help to build the body.

Authority information often includes the name and/or logo of the responsible agency, mayor's and/or health commissioner's endorsement, etc. **Publication** information is about the time published or printed (6 cases in CPHP-NYC and 5 in CPHP-HK), publication number (5 cases in CPHP-NYC and 4 in CPHP-HK), the name of printing agency (3 cases in CPHP-HK), the printing paper (e.g. recyclable materials; 1 case in CPHP-NYC and 1 in CPHP-HK), may also contains a short line of copyright notice (5 cases in CPHP-NYC). An **Acknowledgement** statement is added to recognise funding sources (5 cases in CPHP-NYC), other agencies' and/or programmes' technical support and collaboration (3 cases in CPHP-NYC and 3 in CPHP-HK), etc. Publication and acknowledgement lines are case-specific elements and usually verbally displayed.

Here I use NYC-1, one of a set of three posters designed for a portion-size campaign – *Cut Your Portions. Cut Your Risk.* (Figure 4.12), as an example to show some generic units labelled in blue and red italics in Figure 4.13:

Portions Have Grown (NYC DOHMH, 2012)

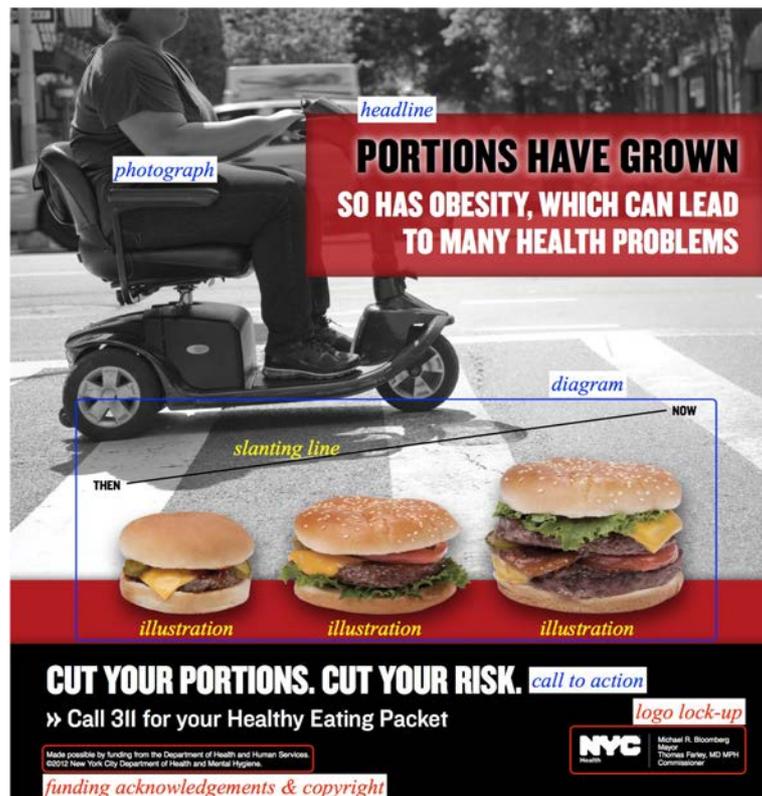


So has type 2 diabetes, which can lead to amputations

So has obesity, which can lead to many health problems (NYC-1)

So has obesity, which can lead to many health problems

Figure 4.12 Cut Your Portions. Cut Your Risk. campaign posters



NYC-1: *Portions Have Grown* (NYC DOHMH, 2012)

Figure 4.13 Example poster whose units labelled in terms of functions

The high contrast of red against black simply shows that there are an upper part and a lower/black part of the poster NYC-1. The upper part has its headline *PORTIONS HAVE GROWN*, one line underneath the headline *SO HAS OBESITY, WHICH CAN*

LEAD TO MANY HEALTH PROBLEMS, a photograph that features an overweight woman riding a mobility scooter, and a diagram that consists of illustrations of three different serving sizes for a cheeseburger being further indicated by a slanting line and interpreted by two words *THEN* and *NOW*. The lower part comprises a call to action *CUT YOUR PORTIONS. CUT YOUR RISK.* that is also the campaign name, plus a call invitation), a funding acknowledgment line, a copyright statement, and a lockup (the NYC DOHMH logo, plus the mayor's and commissioner's names).

In this campaign, illustrations of different sized drinks, cheeseburgers, and French fries, and fear-appealing photographs of an amputee and overweight ladies (having difficulties with physical functioning) are spotlighted in these three posters to raise awareness about increasing portion sizes and the severe health consequences. My first impression of these posters is that the diagram in each poster functions in a preparatory way and is also a part of the body. And the portion explosion that is illustrated in the sequence among the three serving sizes and the severity of the health threat, plus all the wording in and underneath the headline, are combined to directly elicit the viewer's action to call 311 for further information.



NYC-28: *It Kills New Yorkers to Wait in Line.* (LiveOnNY, 2013)

Figure 4.14 Example of a public health poster that concisely imparts its messages

Sometimes, by its very brevity, a public health poster may only contain a headline and/or call to action, an image, plus an information specifying the responsible authority. I don't have such kind of example on hand, but an organ donation poster in CPHP-NYC (Figure 4.14; cf. also Appendix A for more information about NYC-28) imparts its messages with an image and a minimal number of words. The main visual display shows people stand in line with a corpse wearing a toe tag leaning up against a wall, and the whole poster taps into this compassion to inspire the unregistered to register to save lives. This poster comprises the chilling image, a headline plus a line underneath it, a call to action, and the agency's internet address which mentions the responsible organisation indirectly. Thus, I shall focus on the language and images in the preparation and body of each public health poster in the analysis sections that follow.

4.3 Analysing Language

4.3.1 The Clause as an Experiential Construct

Here, the clause is a quantum of change in our experience of a flow of events, which is modelled as a figure consisting of a process, participants being directly involved in this process in some way and circumstances of time, space, cause, manner or one of a few other types (cf. Halliday and Matthiessen, 2014: 213). As expressed in Section 3.1.2.3, in English, six types of process (i.e. material, behavioural, mental, verbal, relational and existential) construe different domains of experience, and represent semiotic space of doing, being and sensing.

Following the criteria discussed in Halliday and Matthiessen (1999/2006, 2014), I distinguish the process types contributed to the construction of experience in the public health posters in CPHP (Table 4.6). A majority of fragments of experience (98.5% (398)) in such posters are construed by 274 material clauses and 124 relational clauses; only a very few experience fragments (1.5% (6)) are construed by 2 mental clauses, 1 verbal clause, and 3 existential clauses. Behavioural clause is not found in CPHP. For 69.7% (191: 129 clauses in CPHP-NYC and 62 in CPHP-HK) of material clauses, they have Process (realised by verbal group) only in

experiential structures, as in *Get vaccinated...* (NYC-8); or their first experiential element is the process rather than the participant, for example *Take the stairs!* (NYC-5). Similar to the language in recipes and instructions, no overt Actor is constellated in this type of ‘goings-on’.

Table 4.6 Transitivity processes in CPHP

<i>Process type</i>	material	behav.	mental	verbal	relational		existential
					attributive	identifying	
<i>meaning</i>	<i>doing</i>	<i>behaving</i>	<i>sensing</i>	<i>saying</i>	<i>being (attribute)</i>	<i>being (identity)</i>	<i>being (existence)</i>
CPHP-NYC	184	0	1	1	55	21	3
CPHP-HK	90	0	1	0	28	20	0
CPHP	274	0	2	1	124		3

More examples include (process and participants are underlined):

Call 311 for more information! Get locations and hours for NYC Health Department Chest Centers! Make an appointment! Locate free or low-cost community clinics! (NYC-26)

Take note of reference amount being used in the nutrition label, compare to individual consumption amount so as to calculate the energy and nutrient intake on each eating occasion. (HK-3)

Cover mouth and nose with tissue paper or handkerchief when sneezing or coughing. (HK-26)

The experiential analysis shows that the addresser of each of these clauses construes the given phenomenon of experience as a semiotic figure comprising an implicit Agent – the addressee, who is “selected (by the addresser) as the one who is required to carry out the action desired by the addresser” (Thibault, 2004: 269). On the one hand, these clauses construe the behaviour changes (e.g. NYC-5, HK-3, HK-26), information and assistance that a call centre could provide (e.g. NYC-26), preventive action (e.g. NYC-5, NYC-8, HK-26), etc.; on the other hand, these processes need to be taken as directed by the addressee. The triumphs of these experiential constructions are thus measured in terms of, for example, the health-related behaviour adoption they will entrain.

In order to help the viewer carry out the health-related action proposed by some of the public health posters, knowledge, attitudes, and skills (cf. Section 1.1.1.1) necessary to adopt and maintain the proposed behaviours need to be developed. Together with a high percentage of material clauses (67.8% (274)), a high percentage of relational clauses (30.7% (124)) are used to construe health-related messages. Examples of material and relational clauses (material clauses in continuous underlines; relational clauses in dotted underlines and verbal group in bold) include:

*You're drinking 85 packets of sugar in just 4 sugary drinks a day. All those extra calories **can bring on** obesity, type 2 diabetes and heart disease.*
(NYC-3)

*Still **smoking**? Cigarettes are eating you alive. Quitting smoking **is** the single most important thing you can do for your health.* (NYC-12)

*Dying from smoking **is** rarely quick... and never painless. When smoking leads to stroke, you can suffer every minute of every day.* (NYC-13)

*Asian Americans **have** very high rates of Hepatitis B. Without timely and needed treatment or monitoring, about 25% of people with chronic Hepatitis B **develop** serious liver problems, including liver cancer. Talk to your doctor about getting tested for Hepatitis B so you can take care of yourself and protect your family.* (NYC-24)

High blood pressure kills but it's preventable and treatable (HK-7)

*When hands **are** not visibly soiled, you may clean them with alcohol-based handrub* (HK-9)

*One person dies by suicide every 10 hours in Hong Kong. One in four secondary school students **has** suicidal thoughts.* (HK-30)

The first experiential elements in these examples are either the viewer 'you' or topic-related participants. And the present in present and simple present tense are very much likely to occur in these and other material and relational clauses in CPHP. Material clauses serve to construe some concrete changes (e.g. NYC-3, NYC-12, HK-9, HK-30), general truths (e.g. NYC-13, HK-7, HK-30) and proposed action or

habits (e.g. NYC-24, HK-9); whereas relational clauses serve to characterise (e.g. NYC-13, NYC-24, HK-7, HK-9, HK-30) and to identify (e.g. NYC-3, NYC-12). For relational clauses, the English system operates with three principal types – intensive (‘*x is a*’), possessive (‘*x has a*’) and circumstantial (‘*x is at a*’); and each of these comes in two distinct modes of being – attributive (‘*a is an attribute of x*’) and identifying (‘*a is the identity of x*’) (cf. Halliday and Matthiessen, 2014: 263-267). These six categories of relational clause are identified and listed in Table 4.7.

Table 4.7 Relational clauses and verbs serving as Process in the different categories of relational clauses in CPHP

Relational:	Attributive		Identifying		
	CPHP-NYC	CPHP-HK	CPHP-NYC	CPHP-HK	CPHP
intensive	46	26	8	15	95
	be, feel become, get, go, develop keep seem help, apply	be become, turn into stay, keep help	be act as show	be, = count as provide	
possessive	6	2	4	1	13
	have	have	offer, provide	offer	
circumstantial	2	0	10	4	16
	be, take	-	bring on, cause, lead to	bring, cause =	
CPHP	82		42		124

72 intensive attributive clauses (46 clauses in CPHP-NYC and 26 in CPHP-HK) are used in CPHP. In an example such as *Packing convenient fruits like apples is an easy way to add heart healthy fruits & vegetables to your day.* (NYC-4), the Attribute ‘*an easy way*’ is added to the topic-related Carrier ‘*Packing convenient fruits*’. So, choosing fruits and veggies that are convenient to pack is qualified as an easy move to fit more healthy eating into your day, and eating them as snacks on the go can lower your risk of heart disease and improve your health. The Carrier is thus specified “by naming a criterion for class-membership by reference to a quality or qualities of the entity that constitutes the class” (Halliday and Matthiessen, 2014: 268). The qualitative attribution is also attached by involving comparison, for example, *Whole fruit is better than fruit juice in providing the daily requirement of dietary fibre!* (HK-4).

A small number of qualities is construed as a qualitative Process (e.g. help ['be good'], apply ['be relevant']) rather than as a qualitative Attribute. Examples include:

*Walking up the stairs just 2 minutes a day **helps** prevent weight gain. It also **helps** the environment.* (NYC-5)

*Having at least 2 servings of fruit and 3 servings of vegetables every day as part of a balanced diet **helps** promote health!* (HK-4)

*If you **have** health insurance, your plan will be billed and **co-payments** **may** **apply**.* (NYC-14)

The verb help in the above first two examples means 'be good for something (e.g. a situation or problem) to develop or be improved', whereas the same verb in a material clause such as *Help your child drink from a regular cup by age one* (NYC-18) means 'make possible or easier for someone to do something by giving them something they need or by doing part of their work'. In addition, as shown in Table 4.7, other verbs are found to construe qualitative characterisation in CPHP, for example:

***Keep** clean to stay healthy During the day when you play or pet your cat or dog or fall or go to the toilet you **can get** dirty hands* (NYC-10)

***Felt** sad for no reason. ... Things **seemed** hopeless. ... Things **went** downhill fast at home.* (NYC-21)

***Be** clean and **stay** healthy* (HK-10)

***Polyyps** in your colon **can turn into** cancer.* (HK-14)

23 intensive identifying clauses (8 clauses in CPHP-NYC and 15 in CPHP-HK) are identified. For example, in *Breast milk is best for your baby.* (NYC-19) and *It's the best way to find and remove colon polyyps* (NYC-14), 'being better than any other' is the quality ascribed to breast milk and colonoscopy, not formula or other screening tests. These kinds of relational clauses are not about membership of a class, they narrow down the class in question to a class of one (cf. Halliday and Matthiessen, 2014: 277). Therefore, in the following examples of this type, what

the common tanning myth is and why tanned skin is not healthy skin are clearly stated through three identifying clauses in NYC-17; the amount of fruit juice (a different form of fruits) counting as one serving of whole fruits is expressed through the equation in HK-4. In this way, the base tan and the healthy consumption of fruit juice are represented as definite pieces of information for the viewer.

There is a common misconception that a tan acts as the body's natural protection against sunburn. A tan is the body's response to injury from UV rays, showing that damage has been done. (NYC-17)

1 serving = 180 ml of pure fruit juice ... Consuming pure fruit juice in excess to 180ml would still be counted as taking one serving of fruit only (HK-4)

The other two types of being, possessive and circumstantial clauses also come in these two distinct modes of being, attributive and identifying. As shown in Table 4.7, less than one-fourth of the relational clauses (23.4% (29)) construe the relationship between two terms as one of ownership (13) and one of time and cause (16). In CPHP, most of the possession is construed not in the usual sense of 'owning', but in a broader, more generalised sense – possession of invisible entities (e.g. germs), abstractions (e.g. signs, worry, suicidal thoughts, rates of Hepatitis, health insurance, sun protection factor) and health-related services (e.g. cancer screening and vaccination). For example, in this possessive identifying clauses *Baby boomers have the highest rates of Hepatitis C. (NYC-25)*, the Carrier baby boomers are the real carriers of the Hepatitis C virus, and they are much more likely than other adults to be infected.

Circumstantial identifying clauses are the major type found in CPHP; and the Process itself is the expression of circumstantial features of cause. Examples of this type include:

So has obesity, which can lead to many health problems (NYC-1)

Smoking = Diseases (HK-12)

Smoking causes sexual impotence (HK-13)

In CPHP, material and relational clauses are the principal types of process used in such posters to construe health-related knowledge, attitudes and skills; other process

types are seldom used in the public health posters (cf. Table 4.6). In some cases, it is hard to distinguish the types of process since there seems to be a fuzzy borderline between material and relational clauses, or existential and relational clauses. For instance, *Breast cancer survivors **come** in all colors.* (NYC-15) and ***Maintain** cough manners* (HK-11) are identified as the existential clause and the material clause respectively; both of these two resemble relational clauses in some respects – quality and duration. However, the process verb ‘come’ means ‘exist/happen’ rather than ‘be available’; the verb ‘maintain’ means ‘properly follow and practice’ good hygiene etiquette when coughing.

The discussion above mainly focuses on the process of material and relational clauses. In addition to the process, the participant and circumstance elements typically realised by nominal group and adverbial group or prepositional phrase construe complementary facets of a quantum of change. When I come to look below the clause, the modifiers in the nominal groups add not only extra, but also specific value to the heads, as in:

1 in 17 women are at risk of breast cancer (HK-15)

More than 90% of the people in Hong Kong suffer from varying severity of gum disease (HK-18)

Actually, the heads (i.e. 1 in 17, 90%, severity) in these nominal groups dissociate from things (i.e. women, people, severity) and conflate with some of the premodifiers (the other modifiers: more than, varying, in Hong Kong). Pointing to these two clauses, I want to show that individual elements in the participant such as the modification of the nominal group make contributions to the modelling of the change. And so does every individual circumstance element that construes features of the process, as in:

Be safe, be sure, and get tested frequently (NYC-22)

Use condom properly to reduce the risk of HIV infection. (HK-23)

It can reduce your son or daughter’s risk of certain HPV-related cancers by up to 99% (NYC-16)

4.3.2 The Clause as an Interpersonal Construct

4.3.2.1 Speech Functions

Looking downwards to the clause choices that realise four primary speech functions, I have summed the numbers of different grammatical categories found in the language in CPHP. As shown in Table 4.8, we see a high rate of employment of both proposals (255 items) and propositions (264 items) among the public health posters sampled in CPHP. 264 indicative items are used with the aim of equipping the target public with health-related information by either stating facts (251 items in CPHP) or asking questions of facts (13 items in CPHP). 132 imperative clauses issue commands or give directives, warning, advice to the general public which guide the proposed action and behaviour; and 123 items offer health-related services, assistance and advice to the public which enable them to carry out the specific action of the command and achieve these proposed goals. Most of the Subjects in the declarative and interrogative clauses are related to health-related elements, involving no interactants.

Table 4.8 Grammatical realisations of the four primary speech functions in CPHP

Role in exchange	Commodity exchanged	SPEECH FUNCTION realisation	CPHP- NYC	CPHP- HK	CPHP
<i>giving</i>	goods-&- services	offer	65	58	123
		imperative clause	42	4	
		declarative clause	11	3	
		nominal group	12	50	
		exclamative clause	0	1	
<i>demanding</i>		command	66	66	132
		imperative clause	63	65	
		elliptical imperative clause	1	0	
		imperative + declarative	0	1	
		declarative + imperative	2	0	
<i>giving</i>	information	statement	141	110	251
		declarative clause	75	49	
		elliptical declarative clause	33	1	
		nominal group	30	59	
		verbal group	2	0	
		exclamative clause	1	1	
<i>demanding</i>		question	7	6	13
		yes/no interrogative clause	6	6	
		WH-interrogative clause	1	0	

The use of imperative mood is the standard form for commands in CPHP. 96.97% of the commands (128: 63 clauses in CPHP-NYC and 65 in CPHP-HK) are realised by imperative clauses to encourage the target population to take action; and only a minority of them (4) are realised by elliptical imperative clause and certain mood combinations. In written English, punctuation is essential to disambiguate the meaning of sentences (e.g. creating sense, clarity and stress) and to organise the structures of our writing. However, poster designers treat punctuation in a contrastingly careless way. In most of these public health posters, for example, no period is used to note the end of a declarative sentence, no colon is found before a list. Some of the command lines end with no punctuation marks. Most of the imperative sentences end with periods such as *Cut your portions. Cut your risk.* (NYC-1) and *Get checked.* (HK-14). 16 imperative sentences end with exclamation marks (8 cases in CPHP-NYC and 8 in CPHP-HK), such as *Get your healthy eating packet!* (NYC-4), *Get a free TB test!* (NYC-26), *Be SunSmart!* (HK-17) and *Face it! Test it!* (HK-22).

Commands vary from the aforementioned no-Mood forms (the verb form is Predicator only, with no Finite in it) to the other forms with Mood elements. *Don't get burned by tanning myths* (NYC-17) and *Don't share needles or works* (HK-25) have Finite (don't); while *Let's know more about tuberculosis* (HK-26) has an anomalous Subject (Let's). *Let's*, the 'you-&-me' type, "realises a suggestion, something that is at the same time both command and offer" (Halliday and Matthiessen, 2014: 166). Commands also vary from direct forms to less direct, more polite forms. For instance, instead of saying "Steam or parboil me before we go for a fry!", HK-1 makes a different choice of how to express this command: *Before frying... try steaming or parboiling ingredient first.* In addition, politeness markers (e.g. please) are worded to mitigate commands in a couple of posters: *Please go for regular cervical smears* (HK-16) and *Please send us your views and join the discussion on Healthcare Reform.* (HK-27). The addition of the word *Please* at the beginning of these imperatives softens the commands or requests by inviting the viewer to do the proposed action.

Motivated commands and advice are evolved from certain mood combinations. In some case, declarative clause and imperative clause related as interdependent in a

complex can involve a command with a motive for doing the proposed action (cf. Halliday and Matthiessen, 2014: 438-439), for example:

It's your right to feed your baby only breast milk and get the support you need. (NYC-19)

Life's complicated enough: Make smart decisions about drugs (NYC-21)

Protect against Hepatitis B, 3 jabs work (HK-24)

There is one poster – NYC-14 designed for colon cancer awareness month in 2016, using warning sign language to provide the directive and urge all adults age 50 or over to get screened (cf. Appendix A). NYC Health + Hospitals used a unit of guide and warning signs as the campaign emblem for three years straight from 2014 to 2016 (Figure 4.15):



Figure 4.15 Example of a public health campaign emblem that employs road signs

The emblem consists of three signs: a white square guide sign with ‘approach 50’, an orange/yellow diamond-shaped warning sign with a black symbol of colon-shaped turns, and a purple/green rectangle guide sign with ‘colonoscopy ahead’. The wording in road signs is brief but clear, mighty and connoting the highest level of urgency. *Approaching 50 Colonoscopy Ahead* is not a typical imperative, but here, it is used with road signs to indicate that “50 or older? Make a colonoscopy your next stop!” or “If you are approaching the age of 50, make a colonoscopy your next stop.”. Therefore, this elliptical line with no superfluous words is considered as an instruction or a warning.

In order to aid the viewer in carrying out the commands to achieve health-related goals, a range of services, information and support is usually offered. In most of the health posters used in the City of New York, commands are packaged with offers of related details in the part of call to action in a fixed pattern: imperative mood plus resources that connect the viewer with the source of further information and services (e.g. call center, hotline, text service, website or URL), for example:

Call 311 for your healthy eating packet (NYC-1)

Search “SoGood” on nyc.gov or call 311. (NYC-4)

To find out more, visit nychealthandhospitals.org today! (NYC-14)

To learn more about the Human Papillomavirus (HPV) vaccine, talk to your pre-teen’s doctor, call 311 or search “HPV” on nyc.gov (NYC-16)

For more information, talk to your healthcare provider or call 311. (NYC-7)

For free testing Call 311, text “TESTNYC” to 877877 or search “HIV” on nyc.gov (NYC-22)

From the above examples, we can see that these lines provide the general public with easy access to services, more information and professional resources, and the offers in CPHP-NYC are usually started with “*To (learn/find more details)*” and “*For (more details)*”. Therefore, the details are brought to the forefront of most of these imperative offers. As indicated in Table 4.8, offers of further information and services are realised in totally different trends in the public health posters used in New York City and Hong Kong. Only 4 imperative clauses are found in all the Hong Kong public health posters to offer further information and services:

For details, please visit the above website. www.change4health.gov.hk (HK-5)

For enquiry, please contact nearby Maternal and Child Health Centre or call the Department of Health’s breastfeeding hotline 2961 8868 (HK-19)

Please consult your family doctor for details (HK-24)

Rather than commanding the viewer to call or visit online, the majority of posters in CPHP-HK just list the contact information in the same form as a name card does. In all, 50 nominal groups function as indirect offers in such posters, for example:

www.chp.gov.hk (HK-8, 10, 11)

Centre for Health Protection website www.chp.gov.hk (HK-9)

24-hour health education hotline 2833 0111 (HK-2, 9)

Help/Report: 186 186 (HK-20, 21)

In addition, offers can be indirectly delivered by declarative clauses, for example:

NYC Health + Hospitals offers colonoscopies at little or no cost. (NYC-14)

You'll find many quality health plans, help paying for the plan you pick, and our new Essential Plan for lower-income New Yorkers. (NYC-27)

The Maternal & Child Health Centres, Department of Health offer free hepatitis B vaccination to children under age of six. (HK-24)

BCG (Bacille Calmette Guerin) vaccination is given to all newborn babies to protect them from contracting tuberculosis. (HK-26)

The Subjects in these declarative clauses usually are the agency that offers the further information and services, the information/service itself, or the viewer ('you'). In fact, the grammatical category that is characteristically used to exchange information is the indicative: declarative (non-exclamative and exclamative) and interrogative (yes/no and WH-). So, the directive force of such offers of further information and services in the declarative clauses – one of mood structures to exchange information, is “masked” (cf. Barron, 2012: 151).

As counted above and listed in Table 4.8, full and elliptical declaratives, and nominal groups are the major realisations of statements; yes/no interrogatives are the major realisations of questions. However, one poster in CPHP – NYC-21, displays a whole page of a teen girl's monologue over her face (cf. Appendix A). Using 32 elliptical declarative clauses and 3 declarative clauses, the teen speaks about how she became involved in consuming and selling drugs, the dangers of drug

addiction, and her journey to recovery. The nominal groups are usually used together with images, to interpret a sequence or to elaborate a diagram. If these facts are considered, then the full declarative clauses are the principal structures used to realise statements.

As the sub-type of declarative, a couple of exclamative clauses are found: *How easy it is to get a good, low-cost health plan.* (NYC-27) and *bye-bye polyps* (HK-14); and another one (*Welcome to the website http://www.info.gov.hk/tb_chest*) is used in HK-26 to invite the viewer to search more information about tuberculosis. There are 13 questions in all (12 yes/no interrogatives and 1 WH-interrogative) in CPHP. The function of the WH-interrogative *How long should I wash?* (NYC-9) is to specify a circumstantial feature related to the process. This poster does not leave it unanswered, but rather supplies the missing information in *As long as it takes to sing your ABC's!* (NYC-9) in the meanwhile. Therefore, the target viewer is recommended to hum the ABC song to make sure wash hands for at least 20 seconds.

The 12 yes/no interrogative clauses asked in the public health posters are:

If this is lunch, is there room for dinner? (NYC-2)

Are you pouring on the pounds? You're drinking 85 packets of sugar in just 4 sugary drinks a day. (NYC-3)

No time to eat? "Take me with you" (NYC-4)

Still smoking? Cigarettes are eating you alive. (NYC-12)

Born from 1945 to 1965? Baby boomers have the highest rates of Hepatitis C. (NYC-25)

Have you asked your doctor about a simple test for depression? (NYC-30)

Is your blood pressure normal? (HK-7)

Over 50? Get checked. (HK-14)

Relieved? I'm so relieved as I went for regular health check. (HK-16)

Friends? Drug friends are not real friends! (HK-21)

Today, he doesn't have a worry in the world... Do you want your healthcare needs to worry him tomorrow? (HK-27)

Nobody understands? Give us a call. (HK-30)

The interrogative used in NYC-30 is presented after the poster lists common symptoms of depression; and the one in HK-7 is followed by the normal blood pressure levels. So, each of these 12 yes/no interrogatives is asked not to evoke a literal reply, but to make a point. As a request for polarity (yes or no), this interrogative type is employed to cause upset and imply guilt (e.g. NYC-2, NYC-3, NYC-12, HK-21, HK-27), to expect the exact 'response' what the poster is after (e.g. NYC-4, HK-30), to enthrall and call for the viewer in a particular group (e.g. NYC-25, HK-14), to cast doubt and advise the viewer what to do (e.g. NYC-30, HK-7, HK-16), etc. Together with a gross and disgusting image, the interrogative used in NYC-3 can even shake the viewer up (cf. Appendix A). Therefore, the yes/no interrogative clauses are used to end the discussions by making the propositions non-negotiable. In order to ward off the negative health consequences, it would seem that the target viewer has no other choices but to obey the authorities by following their recommendations.

4.3.2.2 Modality

The intermediate degrees between yes and no, collectively known as Modality, will be discussed here. According to Halliday and Matthiessen (2014), the system of types of modality includes modalisation – scales of probability and usuality, and modulation – scales of obligation and inclination. In a proposition, probability and usuality can be expressed by a finite modal operator in the verbal group (e.g. must, will, may), by a modal Adjunct (e.g. probably, usually), or by both together; in a proposal, obligation and inclination can be expressed by a finite modal operator (e.g. should, will), by an expansion of the Predicator through verbal group complexing (e.g. supposed, anxious) (cf. Halliday and Matthiessen, 2014: 177-178).

As shown in Table 4.9, the public health posters in CPHP favour three types of modality – modalisation: probability (27 items in CPHP-NYC and 4 in CPHP-HK), modulation: obligation (3 items in CPHP-NYC and 3 in CPHP-HK) and modulation: inclination (1 item in CPHP-NYC). Some of the examples are also listed in Table

4.9. Most of the modal items are used to express probability, for instance, high value is attached to *can't* and *couldn't* to indicate the impossible; *will* and *can* are used to show what is possible or something is typically the case; *would* is used to make the poster designer's opinion less definite; and *may* is added in the above two examples to imply that there is a possibility that it will happen but this is not certain. Among them, the probability operator *can* is nested in the verbal group with the highest frequency (17 times in all). It is not hard to identify the trend in showing what sometimes happens – *can* is combined with verbs serving as Process in 2 intensive clauses or circumstantial verbs in 7 relational clauses; and is used with Process verbs in 8 material clauses.

Table 4.9 Modal items of different modality types in CPHP

Modality	Degree	Modal item	CPHP-NYC	CPHP-HK	Example
Modalisation: probability	high	can't couldn't	3	0	NYC-30 (2): <i>can't concentrate; can't cope</i> NYC-21: <i>Couldn't seem to shake the blues.</i>
	medium	will	5	0	NYC-10 (3): e.g. <i>Washing your hands will get rid of the germs</i> NYC-14: <i>your plan will be billed</i> NYC-27: <i>You'll find many quality health plans,</i>
		would	1	1	NYC-27: <i>You'd be surprised...</i>
		can	15	2	NYC-1: <i>can lead to many health problems</i> NYC-03: <i>extra calories can bring on obesity</i> NYC-10 (3): e.g. <i>you can get dirty hands.</i> NYC-13: <i>you can suffer every minute</i> NYC-18: <i>... can cause tooth decay.</i> NYC-20 (6): e.g. <i>can get/cause/lead to/damage/slow</i> NYC-22: <i>One night can change your HIV status</i> NYC-29: <i>Just one more drink can hurt.</i> HK-14: <i>Polyps ... can turn into cancer.</i> HK-29: <i>... alcohol can cause cancer</i>
low	may	3	1	NYC-11: <i>You may be asked to wear a surgical mask in public.</i> NYC-14: <i>and co-payments may apply.</i>	
Modulation: obligation	medium	should	3	3	NYC-2: <i>2000 calories a day is all most adults should eat</i> NYC-9: <i>How long should I wash?</i> HK-26: <i>Patients with tuberculosis should receive drug treatment under DOT</i>
Modulation: inclination	high	will	1	0	NYC-24: <i>I promise, I will get a Hepatitis B blood test.</i>

Modulation represents the degrees of obligation in a command and the degrees of inclination in an offer. The modal verb *should* is used to show that something is the best thing to do because it is good for your health. Modal items indicating

inclination are sparingly used, only one case is found in NYC-24 (cf. Appendix A). Building on the strong family ties in many Asian American communities, a series of campaign posters depicts hepatitis B testing as a way for individuals to take care of themselves and protect family members. This poster features an image of pinky promise between two family members pledging to get tested for hepatitis B with the promise – *I will get a Hepatitis B blood test.*

There is one further category – that of ability/potentiality (e.g. *can*, *could*), which is “on the fringe of the modality system” (Halliday and Matthiessen, 2014: 696). 9 examples of this category (6 items in CPHP-NYC and 3 in CPHP-HK) are identified in CPHP:

Today, you could save your child’s life. ... It can reduce your son or daughter’s risk of certain HPV-related cancers by up to 99% (NYC-16)

Talk to your doctor about getting tested for Hepatitis B so you can take care of yourself and protect your family. (NYC-24)

Early detection can save lives. (NYC-25)

you can help stop TB in New York City! Tuberculosis (TB) is a serious disease, but it can be prevented and cured! (NYC-26)

I can work out my nutritional intake. (HK-3)

The infectiousness can be reduced quickly, and the disease can be cured completely. (HK-26)

The modal items *can* and *could* are used in the clauses above to indicate that the viewer has the ability to do something (e.g. saving your child’s life in NYC-16, taking care of yourself and protecting your family in NYC-24, TB prevention in NYC-26, improving dietary quality and achieving caloric balance in HK-3), or show the potentiality that something has a particular effect (e.g. HPV vaccine in NYC-16, Hepatitis C detection in NYC-25, TB treatment in NYC-26 and HK-26). The meaning of *can* is *to have to do* the only one possible thing in a particular situation, as in *Quitting smoking is the single most important thing you can do for your health.* (NYC-12). In this case, *can* functions as a high-value variant of *must* (obligation).

4.4 Analysing Image

4.4.1 The Image as an Ideational Construct

As introduced in Section 3.3.1, the visual structures of ideational meaning can either be narrative presentations or conceptual patterns. The main distinction between these two categories is whether the represented participants are linked by the presence of vectors. Narrative processes present actions and events by means of vectors (e.g. action lines, eyelines, thought bubbles, dialogue balloons); while conceptual processes lack vectors, and they represent different relations between each of the participants (e.g. taxonomy, part-whole, symbolic attribute/suggestive). According to the results from the analysis of the ideational aspects shown in Figure 4.16, more conceptual processes are identified in the public health posters used in both New York City and Hong Kong.

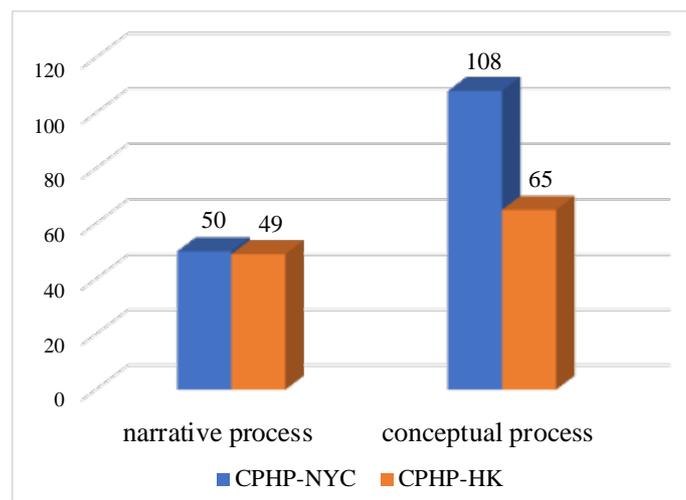


Figure 4.16 Narrative and conceptual processes in CPHP

The first category – narrative patterns can be sub-divided into action, reactionary, speech, mental, conversion, geometrical symbolism types in terms of the kinds of vector and the number and kind of participants involved (cf. Kress and van Leeuwen, 2006: 63-71); and the latter category – conceptual patterns can be further distinguished on the basis of different types of relations that a conceptual process related participants to each other, including classificational, analytical, and symbolic processes (cf. Kress and van Leeuwen, 2006: 79-107). Only action, reactionary, speech, classificational, analytical, and symbolic processes are found in CPHP (Table 4.10).

Table 4.10 Types of narrative and conceptual processes in CPHP

	Narrative			Conceptual			
	action	reactional	speech	classificati onal	analytical	symbolic attributive	symbolic suggestive
CPHP- NYC	26	21	3	12	85	8	3
CPHP- HK	28	13	8	4	41	17	3

In both CPHP-NYC and CPHP-HK, the situation that only one single process is realised in an image seldom exists. Embedding occurs and the categories of visual process do not have “clear-cut edges” (Kress and van Leeuwen, 2006: 95), therefore one image can merge two or more structures. When several types of processes are embedded with each other, the image forms a multidimensional structure (for the complexities of embedding in images, cf. Kress and van Leeuwen’s example, 2006: 107). In CPHP, some common situations of merging or co-presence within images can be summarised:

- 1) Minor narrative processes are embedded in major analytical processes. Action and reactional processes are the most common occurrences to help shape more powerful analytical structures (e.g. NYC-6, NYC-8, HK-19, HK-27). In NYC-6, for example, two New Yorkers – carriers in relation to a number of possessive attributes (e.g. African American, senior, jogging clothing) are featured to imply that the health burden of diabetes and its complications in the New York City falls disproportionately on minority communities of colour. As also captured in NYC-6, the scene contains their motion (brisk walking, race walking, or jogging) and smiling glances that are formed by the eye lines emanated from and directed at each other. Therefore, these two represented New Yorkers are also engaging in the action process of walking and the reactional process of looking. However, because certain races and ethnicities like African Americans are at higher risk of developing diabetes and diabetic complications, so these narrative processes can be considered as minor processes. The characteristics of the two represented participants are the key information, and the analytical process is the major one in this photograph. In other public health posters in CPHP, although physical contact such as a represented participant putting arms round and cosying up to the other participant (e.g. NYC-8) and a kid

sitting on her/his father's back (e.g. HK-27) is often used to display vectors relating participants and realise narrative representations, the analytical structures in these posters play more considerable roles and should be interpreted as major processes.

- 2) A series of narrative processes featured in various images is used to realise 'kind of' and 'part of' relations to form larger classificational and analytical structures. More specifically, action processes in different images are labelled as steps that follow each other in an ordered sequence to represent a whole analytical process, such as the handwashing steps displayed in NYC-9 and HK-9 to demonstrate how you should wash your hand. Or action and/or reactional processes in some images play the role of subordinates with respect to each other to form a covert or overt taxonomy (e.g. NYC-7, NYC-8, NYC-30, HK-10). If the structure is an overt taxonomy, the element playing the role of superordinate is realised verbally. Such set of action and/or reactional processes is employed to indicate some kinds of people are at high risk from certain diseases (e.g. NYC-8) or provide suggested healthy tips for the viewer (e.g. HK-10). How to determine whether the larger structure is classificational or analytical, may depend on the rhetorical relations among these images and verbal elements around them.
- 3) Two or three different types of conceptual processes co-present to form complex and multidimensional structures. Classificational process and analytical process co-present in the same image, especially in CPHP-NYC. Each of the presented participants in a classificational process is the carrier in relation to a number of possessive attributes (e.g. NYC-7, NYC-15, NYC-20, NYC-30). For instance, ten breast cancer survivors wearing the same turtleneck sweaters stand in one line, as shown in the photograph in NYC-15. Each woman – the carrier of a number of possessive attributes (e.g. skin colour, colour and kind of hair, age group, etc.), creates visual concepts of their different ethnicities and age groups. Therefore, this image helps indicate that cancer survivors come in all colours, a mammogram made the difference for them. In addition, analytical process and symbolic process co-present. Each of the presented participants in a symbolic process is the

carrier in relation to a number of possessive attributes (e.g. NYC-3, NYC-24, HK-6). For instance, the close-up of two hands, one of an adult, the other of a child, with pinky fingers locked depicted in NYC-24 symbolises a promise has been made between these two represented participants. The yellow skin colour signifies that the hepatitis B campaign poster is designed for Asian Americans since this viral infection disproportionately affects Asian Americans.

In some cases of CPHP, physical contact as a kind of vector connection is represented, however, this cannot be interpreted as action structure. For example, a man coozing up to his partner in NYC-22 can be understood as the intimation of intimacy and sex, a smiling mother holding her baby in HK-19 can imply family values such as maternal-infant bonding. Therefore, these processes are considered as conceptual structures such as symbolic and analytical processes. For symbolic process in CPHP, its occurring numbers in CPHP-HK (20) is almost twice the numbers in CPHP-NYC (11). According to Kress and van Leeuwen (2006: 105):

Either there are two participants – the participant whose meaning or identity is established in the relation, the *Carrier*, and the participant which represents the meaning or identity itself, *the Symbolic Attribute* – or there is only one participant, the *Carrier*, and in that case the symbolic meaning is established in another way, to be described below. The former type of process we will call *Symbolic Attributive*; the latter, *Symbolic Suggestive*.

When parts of visual images are made salient, or seem out of place, or they have any conventional associations, they are symbolic attributes in visual structures (cf. Kress and van Leeuwen, 2006: 105). For instance, a blob of fat marbled with blood vessels is a symbol of obesity (NYC-3); the colour changing from yellow to red in a tape measure signifies that the bigger the potbelly, the higher the risk of obesity-related diseases (HK-6). Different from symbolic attributive process, symbolic suggestive process creates a mood or atmosphere. For instance, the darkness and black tones can suggest frightening mood (e.g. HK-12), dark ambience (e.g. NYC-21, HK-30), or cause distress (e.g. NYC-28); the soft pink glow on a woman's face can be rendered as a healthy status and a feeling of relaxation (HK-16). Viewing the public health posters is about more than just reading the verbal elements, it is about reading both the verbal and visual elements in such posters. Understanding the symbolic visual structures, however, requires the target population's higher-level

visual competence. Whether there are verbal elements to help explain these symbolic attributive and suggestive images, will be discussed in Section 7.1.2.1.

4.4.2 The Image as an Interpersonal Construct

Whenever human or quasi-human participants are depicted, image producers must choose to make them look at the viewer or not. The image acts constituted by gaze do not work in the same way as speech functions: when an image creates a visual form of direct address, it demands the goods-&-services that realise a particular social relation; when an image addresses the viewer indirectly, no contact is made, it primarily offers information, and images which do not contain any people or quasi-human participants looking directly at the viewer are of this type (Kress and van Leeuwen, 2006: 119, 123). Figure 4.17 shows that a large number of the visual items in the public health posters are offer images that do not make the viewer engage with them.

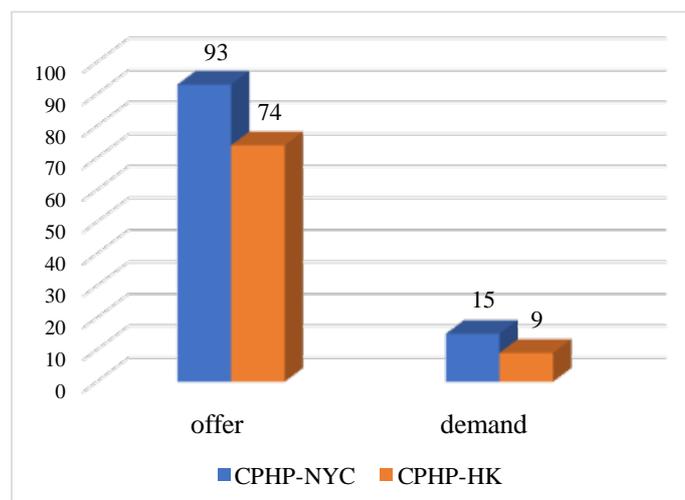


Figure 4.17 Image acts in CPHP

The image producers make the choice between offer and demand to suggest different relations between the represented participants and the viewer. Meanwhile, they must choose different angle-shots: the choice between horizontal angle and vertical angle, and the choice between close-up, close shot, medium shot, long shot, etc. In CPHP, all of the human represented participants have been photographed from a frontal and eye-level angle, which means that these represented participants are part of the viewer's world and the relation between them and the viewer is one

of equality, neither the represented participants nor the viewer is deemed to be in a powerful position.

Another dimension to the interpersonal meaning of images is related to the size of frame – the choice of shots, i.e. the distance choice from which to shoot or depict the objects, which can suggest social relations (e.g. impersonal, social, personal, intimate) between the represented participants and the viewer. Portraying in a long shot indicates public, largely impersonal social distance; a medium shot indicates social distance; a close shot shows friendly or personal distance, and a close-up means intimacy. Typically, in the long shot, the human or quasi-human represented participant fills about half the height of the frame or even more space around the figure; the medium shot shows the full figure or cuts off the subject approximately at the waist or the knee level; the close shot shows head and shoulders of the subject, and the close-up portrays anything less than that (cf. Kress and van Leeuwen, 2006: 124).

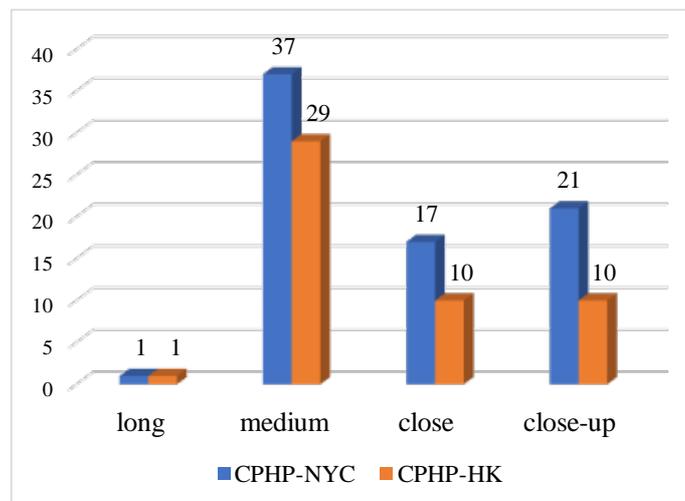


Figure 4.18 Sizes of frame in CPHP

The use of varying sizes of frame is shown in Figure 4.18. First of all, I need to clarify that, the majority of close-up shots in CPHP are actually the shots of particular parts, for example, the mouth or eye to show the invisible coatings of germs in NYC-10 and to provide detailed descriptions of the dramatic impacts of drug use in NYC-20. Therefore, these close-ups are not for the building up of personal or intimate relations but are the pure and direct offering information. More examples of this type include NYC-9 and HK-9 using lots of hand close-ups to

demonstrate the handwashing steps. Similarly, the close shots are preferred in CPHP to describe the signs and symptoms of some diseases (e.g. symptoms of TB disease in HK-26, symptoms of expression in NYC-30). Some of the close shots are employed, so the viewer can clearly see the represented participant's facial expressions, for instance, the horror of suffering on a smoker's face in NYC-13. Only few close shots are used to create a friendly social relation (e.g. NYC-16, HK-3). Second, both sub-corpora favour portraying people or quasi-human represented participants in the medium shot, which create a comfortable and appropriate distance for the viewer to see what is happening or being as a whole in the public health posters. In this way, the represented participants are depicted as 'one of us' existing in the same community with the viewer.

The final aspect in the discussion of interpersonal meaning in images is that of visual modality – the reliability and credibility of visual messages. The modality is a complex of several values such as colour, background setting, pictorial detail of the represented participants, etc. (cf. Table 3.9; cf. also Kress and van Leeuwen, 2006: 160-163). Four different kinds of coding orientations are distinguished in Kress and van Leeuwen (1996/2006), including (1) scientific or technological coding orientation, (2) sensory coding orientation, (3) abstract coding orientation, and (4) naturalistic coding orientation; and these four sets of abstract principles “inform the way in which texts are coded by specific social groups, or within specific institutional contexts” (Kress and van Leeuwen, 2006: 165). According to the scales for modality markers and the criteria for differentiating the four coding orientations (cf. Kress and van Leeuwen, 2006: 160-166), there are clear variations in modality in CPHP.

For actual photographs used in both CPHP-NYC and CPHP-HK, almost all of them are high modality from the common sense naturalistic coding orientation. Interestingly, there are great disparity in the number of the actual photographs with high modality used in CPHP-NYC (34 items) and CPHP-HK (7 items). For non-photographs (e.g. illustrations, diagrams) in CPHP, their visual modality becomes particularly complex because of the design features. As shown in Table 4.3, 54 posters in CPHP collection cover the period from 2005 to 2016, and for some reason, the year of publication for 6 posters cannot be determined. The design technologies

cannot remain unchanged for more than ten years, which also presents a challenge to the judgement of visual modality. In CPHP, non-photographs are seldom black and white. Being decontextualized, most of the illustrations, cartoons, etc. are photoshopped visuals used to be typical examples, to simplify complexities, to exaggerate the importance or highlight the key components of certain health-related messages, etc. The viewer may judge these non-photographs 'less than real', so a somewhat artificial impression may result. Therefore, they are low modality within naturalism. However, if the viewer is familiar with the characteristics of works of popular science and medicine (e.g. field guides), the viewer knows that simple illustrations or drawings (e.g. stick figures) may work best in some public health posters. Thus, for those with such knowledge, the non-photographs will never have low modality and always remain 'real'.

Designed for the health education targeting at the general public, the images employed in the public health posters in CPHP are primarily the offer of information. The angle-shots of most of the images require the viewer to look at these images from the frontal angle and in the same level position. In sum, the choice between offer and demand, the selection of angle-shots, the modality realisation of visual images, and the coding orientation form which the images have been derived, etc. all work together to depict the presented participants as one of ourselves. Building up a social relation between the public health posters and the viewer, such posters remain detached to offer health messages (knowledge, attitudes, and skills), meanwhile, make the viewer engage with the presented participants. After analysing the individual labour of each of the semiotic systems, I shall move on to examine how verbal and visual resources work together to construct health-related information.

Chapter 5 Building the Multimodal Corpus

This chapter focuses on a brief overview of the GeM framework and takes you through the steps to compile a multimodal corpus using the GeM model. For the introduction of the GeM model, the nature of the model and the methodological steps in applying the model are discussed first, followed by a detailed description of its analytical layers. For the corpus building, the basic principles of the GeM annotation schema (Henschel, 2003) is presented and discussed, the technology (i.e. markup language XML for annotating, gem-tools (Hiippala, 2015a) for visualising, etc.) that is of importance to compile the data into GeM-annotated corpora (e.g. CPHP) and to work with such multimodal corpora, is also shown with examples.

Although the chapter describes how to build a GeM-annotated corpus for analysis, it is not a manual to be used by analysts in the annotation, creation, and visualisation of such corpus. This chapter is a demonstration of how to apply the GeM framework to a whole new genre of multimodal artefacts – the public health posters, in order to help unravel the mechanisms of multimodal multiplication in such posters. In the following sections, I will first introduce the motivation for developing the GeM framework and several key concepts within the model. I then will describe briefly the GeM annotation schema for encoding the multimodal documents and the set of computational tools for visualising the XML data. Finally, I will guide you through the steps and procedures to actually put the annotation schema to use, and present how the GeM-annotated corpus can be visualised and verified.

5.1 The GeM Model

5.1.1 An Overview of the GeM Model

The GeM model (cf. Bateman, 2008, 2014a; Bateman et al., 2004, 2007; Delin and Bateman, 2002; Delin et al., 2002; for its application to non-static multimodal artefacts, cf. Bateman, 2013b) is the result of the GeM project (<http://www.purl.org/net/gem>) ran from 1999 until 2002 at the University of Stirling

(Judy Delin, Renate Henschel) and the University of Bremen (John Bateman). The GeM project synthesised ideas from a variety of fields including linguistics, graphic and information design (e.g. Schriver, 1997), typography (e.g. Waller, 1987), and computer science, to arrive at a framework that allows researchers to “account for consistencies in visual style (including layout and typographical decisions) in terms of an extended notion of multimodal genre” (Bateman, 2014a: 32) and eventually to “attack any example of a multimodal document with a single set of tools that can provide reproducible, and therefore evaluable, analyses of what is involved in the multiplication of meanings discovered” (Bateman, 2008: 2).

First of all, the GeM project proposed the multimodal account of genre which brings “constraints on selections within layout structures, on their typographical and spatial realisation, and on the transformation processes between layout structure and rhetorical organisations” (Bateman, 2014a: 32; cf. also 2014b). Secondly, the GeM project also developed the first XML annotation schema (cf. Henschel, 2003) for multilayered description of multimodal documents with complex layout in several primary layers – content, language, rhetorical structure, layout structure and navigation structure – that forms the basis of the GeM model (Table 5.1). Each of the primary layers may play an independent role in satisfying communicative goals and conceptualising the notion of multimodal genre.

Table 5.1 The primary layers of the GeM framework (Bateman, 2008: 19)

<i>Content structure</i>	the content-related structure of the information to be communicated – including propositional content
<i>Genre structure</i>	the individual stages or phases defined for a given genre: i.e., how the delivery of the content proceeds through particular stages of activity
<i>Rhetorical structure</i>	the rhetorical relationships between content elements: i.e., how the content is ‘argued’, divided into main material and supporting material, and structured rhetorically
<i>Linguistic structure</i>	the linguistic details of any verbal elements that are used to realize the layout elements of the page/document
<i>Layout structure</i>	the nature, appearance and position of communicative elements on the page, and their hierarchical interrelationships
<i>Navigation structure</i>	the ways in which the intended mode(s) of consumption of the document is/are supported: this includes all elements on a page that serve to direct or assist the reader’s consumption of the document

In addition to genre, there are a couple more core concepts within the GeM framework: mode and medium (cf. Bateman, 2008, 2016a; Hiippala, 2017). A semiotic mode is a way of making meaning, is semiotically stratified across material,

‘lexicogrammar’ and discourse. A medium is a historically conditioned ‘site’ for the mobilisation of semiotic modes, is labelled usually according to the material, the mode of transmission, the style of performance, etc. The GeM project selected print and online newspapers, illustrated bird guides and instruction manuals as the data in their analysis. For all these four types of multimodal artefacts, language, photographs, illustrations, diagrams, tables, icons, symbols, maps, page layout, etc. are employed to make meaning on the pages/screens. Although sharing common substrates, i.e. the visually perceived two-dimensional page/screen, a full, definitive list of semiotic resources used in these data is difficult to set out. One of the reasons is that scholars from a range of backgrounds may have their own understanding of the semiotic modes. Bateman (2008: 175-176; see also Hiippala, 2015b; Bateman, 2009, 2011, 2016a, 2017b) then suggests a more discriminating, more empirically anchored notion of semiotic mode and hypothesised three distinct semiotic modes: text-flow, page-flow, and image-flow:

In essence, text-flow supports a linear unfolding of logical text organization and includes motivation for basic text-formatting options; page-flow draws in the two-dimensional possibilities of the page for expressing rhetorical relationships via spatial proximity and grouping; and image-flow uses the space of the page or a presentation in time for carrying an unfolding conjunctively-related discourse.

Consider the definitions of text-flow, page-flow, and image-flow (Bateman, 2009: 55) offered above, the key terms from these definitions are textual organisation, rhetorical structure and conjunctive relations respectively. Hence, we are in a much better position to compare and contrast distinct semiotic modes and to relate them. In order to achieve an empirically effective understanding of how various semiotic modes relate and how multimodal documents function, the GeM project combined distinct layers of analysis within a single framework – the GeM model, and provided an annotation schema with four principal analytical layers: base layer, layout layer, rhetorical layer, and navigation layer. Hiippala (2017) provides a brief overview of the annotation layers and visualises the entire analytical process (Figure 5.1).

Between the analytical layers, Bateman (2008: 108) has not theoretically assumed any relations, which are “left open to empirical investigation”. And the analytical layers are not limited to the aforementioned four, analysts can model more independent layers if necessary. For the present study, navigation devices are

seldom used in the public health posters, for instance, a double arrowheads icon (») is found in NYC-1 before the line of call to action, and some lines are used to connect parts of a diagram and textual labels (e.g. NYC-19). So, I will focus on just the base, layout, and rhetorical analytical levels within the GeM model, which I will introduce in detail in the section following.

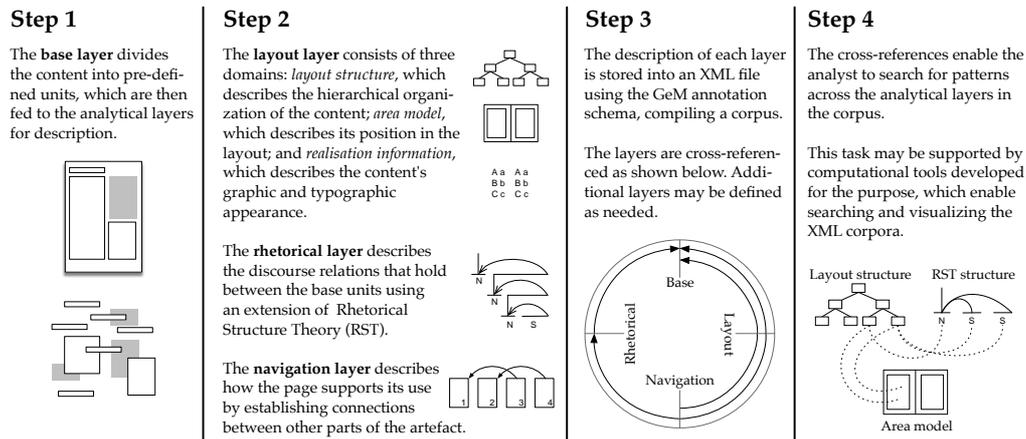


Figure 5.1 Methodological steps in applying the GeM model (Hiippala, 2017: 278)

5.1.2 Multiple Analytical Layers of the GeM Model

5.1.2.1 The Base Layer

The first step towards building a GeM-based corpus (cf. Figure 5.1) and achieving total coverage of an analysed page or document is to identify atomic base units. First of all, everything which can be seen on each page of what is being analysed “should be assigned to some base unit”; any analysts cannot “leave components of the page out of consideration because they do not intuitively appear central or relevant” (Bateman, 2008: 110). Anything which is differentiated from its environment should be identified as a base unit. Second, units described within the other layers (e.g. layout units, RST segments) should not be smaller than base units. This could be handled ‘simply’ by breaking up the material on each page into the most minimal units, for instance, by marking every single word or even character in an orthographic sentence and allowing other layers to do the grouping, however, this would lead to an explosion of base units (Bateman, 2008: 113). Therefore, we mark minimal elements which “serve as the common denominator for interpretative and textual elements as well as for layout elements” (Bateman, 2008: 110).

Third, there is no fixed list of base units. Table 5.2 shows page elements identified during analysis in the GeM project. These base unit candidates are sufficient for the research purposes in GeM, but “more extensive empirical work may require the addition of new types or further subdivisions” (Bateman, 2008: 110). For instance, Thomas (2009) and Hiippala (2015b) add ‘map’ to the list of recognised base units in their studies and change a few values. Fourth, most base units in Table 5.2 are labelled in terms of their genre-specific functions, which is to help the analyst locate them and nothing more. In sum, the base layer provides the other analytical layers with a comprehensive set of fine-grained segmentation of both verbal and visual content. And it is better to be over-cautious with the identification of base units: (1) never leave any units but include all of them, (2) never mark them but only label them in terms of their functions, and (3) never group them at this stage.

Table 5.2 Recognised base units in GeM project (Bateman, 2008: 111)

sentences	headings	titles	headlines
icons	table cells	list items	list labels
footnote label	items in a menu	page numbers	running heads
emphasized text	floating text		
<ul style="list-style-type: none"> • sentence fragments initiating a list • footnotes (<i>without footnote label</i>) • photos, drawings, diagrams, figures (<i>without caption</i>) • captions of photos, drawings, diagrams, tables • text in photos, drawings, diagrams • horizontal or vertical lines which function as delimiter between columns or rows • lines, arrows, polylines which connect other units 			

Among the base units listed above, for example, an emphasised/highlighted text portion in a sentence should be marked as base unit as well because “it is likely that this will need to be picked up as a layout or navigation element”; thus, the GeM model allows “base units inside other base units” (Bateman, 2008: 113). This type of elements can be treated as base units embedded within the base unit not merely to preserve the unity of a unit as a whole, but also to mark their differences; although some of them can also be marked as base units and can be grouped in layout and other layers. The embedded base units proposed in GeM include (Bateman, 2008: 113):

- emphasized text portions in a sentence/heading
- icons or similar pictorial signs within a sentence
- text pieces in a diagram or picture
- multimodally supported parts of a diagram or picture

- arrows and other graphical signs in a diagram or picture
- explicit references to other parts of a document occurring within a sentence
- menu items in an interactive pop up menu
- dynamically appearing pop up ‘labels’ provided by mouse-over behaviours on web-pages

5.1.2.2 The Layout Layer

For this analytical layer, we characterise layout properties and structure (cf. Figure 5.1). To capture “the layout grouping and spatial proximity, their mutual spatial relationship and their particular layout and formatting properties”, Bateman (2008: 115) defines the layout base as consisting of three major components: “(a) layout segmentation – identification of the minimal layout units, (b) realisation information – typographical and other layout properties of the basic layout units, and (c) layout structure information – the grouping of the layout units into more complex layout entities and determination of spatial relationships”. Generally, the GeM model assumes that the layout structure of a page or document is tree-like, with the entire artefact (e.g. a single page, pages, an entire book) being the root. For each node in the tree, it features a layout chunk; the terminal nodes are the minimal layout units which are grouped in the layout chunk.

First, the graphic and typographic elements are identified as layout units. In GeM, the typographical and formatting effects are handled “at a more global level for a page” (Bateman, 2008: 116), so paragraphs, rather than glyph (in text) are recognised as individual layout elements in typography. Thus, a sentence is marked as one layout unit if it appears alone; a sequence of sentences that makes up one paragraph is also marked as one layout unit. Take the base units listed in Table 5.2 for example, all graphical elements, the highlighted text portions in a sentence, textual labels in graphics, etc. can be identified as layout units. Second, each layout unit identified in the layout segmentation has a visual realisation. Broadly speaking, they are either textual elements or graphical elements; and there are different sets of attributes that describe their layout properties (cf. Bateman, 2008: 117-121). For instance, the textual elements are realised with a range of features and values: font-family, font-size, font-style, font-weight, case, colour, justification, etc.; the visual elements can also be marked with various attributes such as type (e.g. photograph, illustration, diagram) and colours.

Third, some of the layout units identified in the segmentation part of the layout base can be grouped into larger elements that collectively make up the tree-like composition of the page. For instance, an image and all text labels within the image can be grouped into a layout chunk – a diagram, and this layout chunk of the diagram and its belonging text can form a larger layout chunk. We can also label these layout chunks in terms of their functions such as title and table. In addition, area model is introduced in the GeM model “to determine the position of each layout element in a way that abstracts beyond the specifics of individual documents” (Bateman, 2008: 124). In this way, the entire page or document is considered as the area root, which can be divided into a variety of smaller sub-areas. If a page exhibits grid-like arrangement, it is often the row-column design. We can partition the whole area (area-root), mark smaller areas (sub-areas), and add attributes (e.g. cols, rows, location, hspacing, vspacing) to “specify where particular layout elements or groups of layout elements are positioned on the page” (Bateman, 2008: 125). The two spacing attributes – hspacing and vspacing – specify the size of each sub-area as a percentage of the whole area: “hspacing gives the partition of the width of the parent area into the widths of its constituting columns”, while “vspacing gives the partition of the height of the parent area into the heights of its constituting rows” (Henschel, 2003: 11). All of these attributes determine the precise positioning of the layout units identified in the layout base.

5.1.2.3 The Rhetorical Layer

The GeM rhetorical layer is the extension of classical RST to multimodal documents (cf. Figure 5.1; cf. also Section 3.2.1 and Section 2.3.2). Language and image are two very different modes of representation (Kress, 2003), but the combination of text and images within single page layout is subject to a distinct semiotic mode – page-flow which “relies upon the complete two-dimensional space of the ‘canvas’ provided by the physical substrate and uses proximity, grouping of elements, framing and other visual perceptual resources in order to construct patterns of connections, similarity and difference” (Bateman, 2011: 26; cf. also Bateman, 2008: 156-157). In addition to their respective semantics, the discourse semantics – rhetorical relations – realised in the combination of text and images may be in operation across the layout space. According to Matthiessen (2007b),

rhetorical relations are intra-semiotically used to link passages of text, to link images, and inter-semiotically used to link text to image. RST “looks at the text as a ‘finished product’ – it considers all the parts of a text as if they were simultaneously available for inspection” (Bateman, 2008: 157), which makes it an ideal basis for considering the multimodal presentation.

The rhetorical layer aims to identify the functional contributions made by various semiotic elements of a document to the intended communicative goals of the document as a whole. When applied multimodally, four problematic areas with classical RST exist and warrant our attention: (1) the sequentiality assumption, (2) nuclearity assignments, (3) multiple purposes served by one segment, and (4) criteria for decomposing minimal units of analysis (cf. Bateman, 2008: 158-159). The first problem area comes from the spatial logic of simultaneity between/among the segments in multimodal documents, rather than the sequentiality of text segments or spans. To resolve this, the GeM model restricts rhetorical relations to “pairs (sets) of document parts (segments/spans) which are adjacent in any direction”, which can be expressed with respect to the area model (Bateman, 2008: 158).

The second difficulty lies in the text-image nuclearity assignments. For instance, when a graphical illustration is used to rephrase a headline, and when a text line is projected by a presented figure who is the carrier of a number of possessive attributes, how to decide which one is the nuclear in each of the two cases becomes a problem. Under circumstances like these, the GeM model allows “both assignments of nuclearity as necessary” (Bateman, 2008: 158). In the two just-mentioned examples, the multinuclear restatement relation and the multinuclear projection relation (cf. Table 3.6) can be used respectively to “avoid forcing arbitrary nuclearity assignments” (Bateman, 2008: 159). Third, there are the cases where one and the same segment/span serves more than one purpose in one document and may therefore stand in several places in a single rhetorical structure. However, re-using a segment/span is not permitted in conventional RST, so the GeM model prefers to “maintain a strict tree notion for the rhetorical structure of a document in order to maintain tighter criteria for evaluating whether an analysis may hold or not” (Bateman, 2008: 159). The fourth problematic aspect concerns

how to decompose and identify segment. In the GeM model, the following base units are segments (Henschel, 2003: 17):

- orthographic sentences
- headings, titles, headlines
- photos, drawings, diagrams, figures (without caption), if they are not part of an identification relation
- captions of photos, drawings, diagrams, tables, if they are not part of an identification relation
- list items, if they are clauses
- footnote without footnote label

More difficult cases occur when there are callouts in a diagram, when there are labels in a map or a design drawing, when there are items listed in a table, etc. In order to provide a means of accounting for these relations that would have been expressed as, e.g. *is/are*-clauses and *has/have*-clauses, the GeM model adds the following five ‘intra-clausal’ relations (cf. Halliday and Matthiessen, 2014) which “do not hold between a nucleus and a satellite, but between two relation dependent semantic roles” (Bateman, 2008: 161-162; Henschel, 2003: 16-17):

<i>Identification</i>	assertion of identity
<i>Class-ascription</i>	relation between an object and its superclass
<i>Property-ascription</i>	relation between an object and something predicated of that object
<i>Possession</i>	relation between possessor and possessed
<i>Location</i>	relation between an object and its spatial or temporal location

These five intra-clausal relations are similar to the rhetorical relation ELABORATION (cf. Table 3.4), but are “distinct by virtue of their application to fragments, individual entities and incomplete propositions” (Bateman, 2008: 162). In the following section, I shall proceed to introduce the GeM annotation schema and visualisation tools.

5.2 GeM Annotation and Visualisation

5.2.1 The GeM Annotation Schema

The GeM model applies XML to multimodal corpus design. XML is a markup language that uses tags for annotation. In GeM, different XML tags are used to annotate each of the layers. In this subsection, I will briefly describe the XML-based GeM annotation schema, which is developed to identify textual, visual (e.g. graphics, diagrams), layout and navigational elements in a multi-layered annotation, and eventually, to support and extend analysis of interactions among text, graphics, layout, etc. in multimodal artefacts. The following description will focus on the annotation of three layers: base, layout and RST.

According to Henschel's (2003) GeM annotation manual, the tags employed to mark base units, layout units and basic RST units are `<unit>`, `<layout-unit>` and `<segment>`, respectively. Each element marked as base unit, layout unit and each RST unit has the attribute `id`, which carries an identifying symbol. The attribute `xref` points to the base units which belong to a layout unit or an RST unit. If all these units consist of text, the start and end of this text is marked by the `<unit>`, `<layout-unit>` and `<segment>` tags. If all these units are visual elements (e.g. photographs, illustrations, diagrams), base units which represent the visual elements are actually empty XML-elements since we cannot copy the visual ones into the annotation. The value `alt` is added to remind analysts of its content. Examples include:

```
<unit id="u-04.01">No time to eat?</unit>
<layout-unit id="lay-04.01" xref="u-04.01">No time to eat?</layout-unit>
<segment id="s-04.01" xref="u-04.01">No time to eat?</segment>

<unit id="u-01.05" alt="Illustration: Small cheeseburger"/>
<layout-unit id="lay-01.05" xref="u-01.05" alt="Illustration: Small cheeseburger"/>
<segment id="s-01.05" xref="u-01.05" alt="Illustration: Small cheeseburger"/>
```

When some base units are grouped as one layout unit, it is “possible, but not necessary to store the corresponding text portions of the original text file between the start and end tag of a layout-unit” (Henschel, 2003: 6). Thus, we can simplify the annotation in certain cases, for example, in which the layout unit is a paragraph (e.g. `<layout-unit id="lay-24.03" xref="u-24.03 u-24.04 u-24.05"/>`). In the following example, *KILLS* and *NEW YORKERS* are in uppercase as opposed to

other words in that sentence. These two text portions should be marked as embedded units. For these embedded base units that are in some ways typographically different from their environment, their properties (e.g. bold, italic, colour, size, highlight) will also be noted and annotated with particular values (i.e. realisation information attributes) in layout layer to reflect their distinctions (cf. Bateman, 2008: 120; Henschel, 2003: 8). The annotation of embedded elements in base and layout layers are as follows:

Text: **Heart disease KILLS more NEW YORKERS than anything else.**

```
<unit id="u-07.01">Heart disease <unit id="u-07.01.1">KILLS</unit> more <unit id="u-07.01.2">NEW YORKERS</unit> than anything else.</unit>
```

```
<layout-unit id="lay-07.01" xref="u-07.01">Heart disease <layout-unit id="lay-07.01.1" xref="u-07.01.1">KILLS</layout-unit> more <layout-unit id="lay-07.01.2" xref="u-07.01.2">NEW YORKERS</layout-unit> than anything else.</layout-unit>
```

```
<hi-text id="lay-07.01.1" xref="u-07.01.1" context="lay-07.01" font-family="inherit" font-size="inherit" font-style="inherit" font-weight="extra-bold" case="caps" colour="white">KILLS</hi-text>
```

The annotation of layout base consists of three parts – layout segmentation, realisation information and layout structure (cf. Section 5.1.2), and the above examples show the identification of the layout units and realisation information. The following will explain how to annotate the layout structure in detail. First, if a page or document adopts a grid structure, in general, the page or document as the area root can be divided into smaller rectangular sub-areas in which elements can be nested in an abstract way. The tags used to represent the area root and sub-areas are `<area-root>` and `<sub-area>` respectively. The `<area-root>` has several obligatory attributes: `cols`, `rows`, `hspacing`, `vspacing`; and `<sub-area>` has the same attributes plus a location attribute. Thus, in the page or document arranged in the grid structure, how the area model specifies sub-areas can be annotated as:

```
<area-model>
  <area-root id="poster-frame" cols="1" rows="3" hspacing="100" vspacing="19 71 10"
  height="60cm" width="42cm">
    <sub-area id="text-part" location="row-2" cols="1" rows="3" hspacing="100"
    vspacing="flexible"/>
  </area-root>
</area-model>
```

Second, once we've done the area model, we can move on to allocate location values to each layout-chunk/leaf of the hierarchical layout structure. The location

attribute of a layout-chunk or layout-leaf consists of **location** and **area-ref**, the first is one of the values defined in area model, and the latter refers to “the **id** of a particular area of the area model with respect to which the location value has been chosen” (Henschel, 2003: 12). Therefore, based on the specification of the area root (**poster-frame**) and one sub-area (**text-part**) in the above example, the layout structure can be annotated as follows:

```
<layout-structure>
  <layout-root id="NYC-10-poster">
    <layout-chunk id="headline" location="row-1" area-ref="poster-frame">
      <layout-leaf xref="lay-10.01" location="row-1" area-ref="poster-frame"/>
    </layout-chunk>
    <layout-chunk id="main-text" location="row-2" area-ref="poster-frame">
      <layout-leaf xref="lay-10.02" location="cell-11" area-ref="text-part"/>
      <layout-leaf xref="lay-10.03" location="cell-21" area-ref="text-part"/>
      <layout-leaf xref="lay-10.04" location="cell-31" area-ref="text-part"/>
    </layout-chunk>
  </layout-root>
</layout-structure>
```

Carrying out the analysis of rhetorical relations holding among segments and spans is the prerequisite for XML annotation of rhetorical structure. The ‘intra-clausal’ relations (cf. Section 5.1.3), multinuclear relations and nucleus-satellite relations (cf. Section 3.2) are labelled as mini-span, multi-span and span respectively. Examples are shown in the following, and note the differences among these three general categories of rhetorical relations:

```
<mini-span id="span-23.01" attribuend="s-23.03" attribute="s-23.04" relation="property-
ascription"/>
<mini-span id="span-23.02" attribuend="s-23.02" attribute="span-23.01"
relation="identification"/>

<multi-span id="span-23.03" nuclei="s-23.01 span-23.02" relation="restatement"/>

<span id="span-23.04" nucleus="s-23.05" satellites="s-23.06" relation="elaboration"/>
<span id="span-23.05" nucleus="span-23.04" satellites="s-23.07" relation="justify"/>
```

5.2.2 The gem-tools

After annotating all analytical layers and storing the description into XML files, we use a set of computational tools – the gem-tools developed by Hiippala (2015a) to display the XML data (cf. Figure 5.1). The gem-tools are written in Python – a programming language created by Guido van Rossum, at National Research Institute for Mathematics and Computer Science in the Netherlands in the late 1980s.

As a high-level scripting language based on ABC, Python supports structured programming and object-oriented programming, so it is easy to extend. The gem-tools are provided as Jupyter notebooks produced by the web application Jupyter Notebook for sharing documents that include programming code etc., use the software GraphViz for visualisations and work with multimodal corpora annotated using the GeM model (Hiippala, 2015a).

The current version of the gem-tools consists of five Jupyter notebooks intended to (1) visualise rhetorical structures, (2) visualise layout structures, (3) visualise rhetorical and layout structures, (4) describe the content and layout of multimodal documents according to the schema defined in the GeM framework, and (5) extract basic statistics from GeM-annotated corpora. In order to create hierarchical organisations suitable for representing rhetorical structures and layout structures of multimodal documents, the first three Jupyter notebooks in the gem-tools kit parse and transform data from the XML files into a programming language for creating plots, i.e. IPython. The first Jupyter notebook can also highlight a specific rhetorical relation in the visualisation, which facilitates focusing on certain types of such relations in some studies.

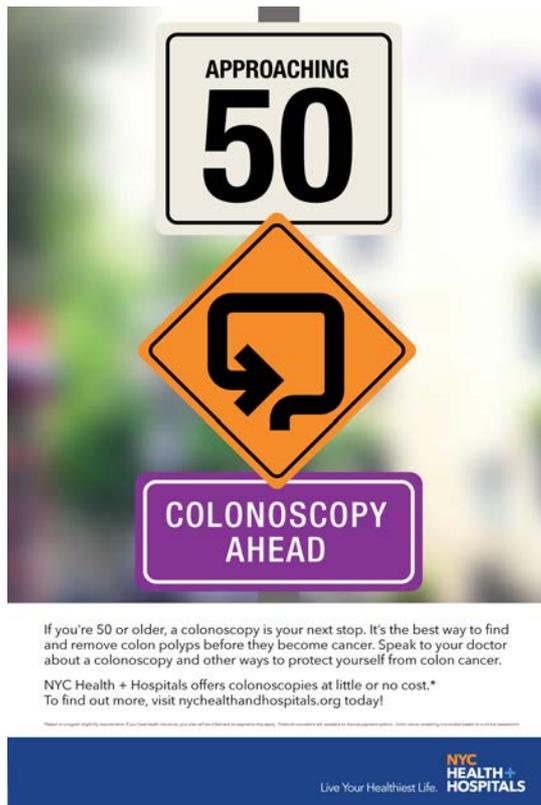
For visualising multimodal corpora, all XML files must be valid and well-formed. We need XML files for both base and RST layers to get the graph of the rhetorical structure in the first Jupyter notebook; we need an XML file for the layout layer for visualising the layout structure; and we need XML files for base, RST and layout layers in the third notebook. My work of corpus building helped Hiippala to test and revise some of the scripts. Hiippala fixed a couple of minor bugs that was preventing the gem-tools from handling embedded visual base units and drawing multi-spans and mini-spans, and improved the resolution of resulting graphs. The updated tools can support more genres of multimodal artefacts and have higher reliability. Plots created by the gem-tools, if necessary, can be refined by other software application, for instance, OmniGraffle, to produce more precise and beautiful graphs. In addition, Hiippala (2015a) has developed a Jupyter notebook (first version) to describe GeM-annotated corpora (cf. Appendix B). With all valid XML files put in one directory, this notebook can extract basic statistics including the numbers of base units, visual base units, embedded base units, layout units, embedded layout units, RST segments, visual RST segments, unique RST relations and RST structures.

In sum, the whole package of the gem-tools enables immediate visualisation of XML data and statistics extraction, which supports both qualitative and quantitative analysis of multimodal artefacts. In the present study, for example, the graphic descriptions of rhetorical structures and layout structures, the basic statistics extracted from the GeM-annotated corpus of the public health posters, and much more information pulled out by searching specific scope of the multimodal corpus, provide a basis for in-depth analysis to see how an ensemble of various semiotic resources interact with each other in such posters. Up till now in this chapter, we have described the GeM framework, its annotation schema and visualisation tools. Because of limited space, I cannot discuss all related issues, cannot elaborate every aspect with examples. Analysts will face many problems and challenges when they annotate different types of multimodal documents. In the section following, I will share my experiences gained by manually annotating all 60 public health posters to build my own multimodal corpus.

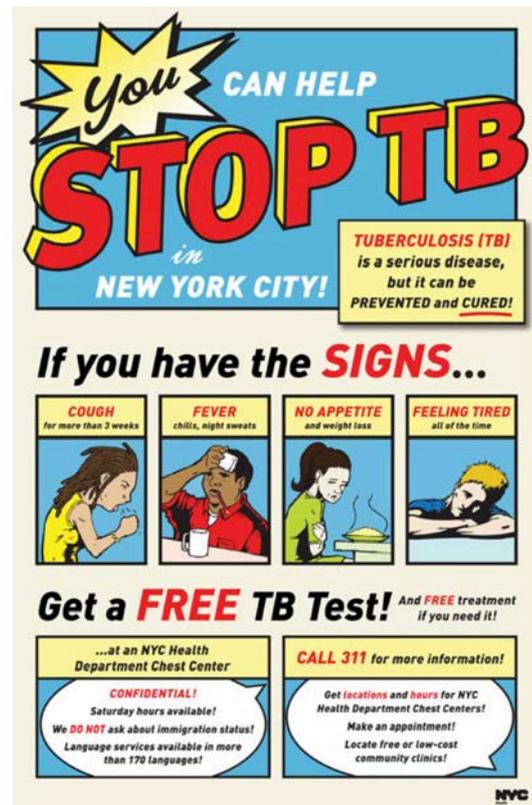
5.3 Annotating the Multimodal Corpus

5.3.1 Identifying Base Units

When considering building a GeM corpus of the public health posters, the first step, the demarcation of poster units and the correct identification of base units, is crucial. The holistic structure of the public health posters described in Section 4.2.2 can help label base units in terms of their functions, but it seems not enough since the public health posters are a very much mixed genre that draws on visual-verbal components with design elements from various genres in all major parts of the holistic structure, i.e. preparation, body and authority. Taking the headline – the largest and visually most prominent text in some of the posters as an example, in addition to employing suitable typeface and choosing among different variations of the typefaces, designers also use other design principles (e.g. adding contrast) to make its appearance sharp and clean; however, the headline can also have a visually appealing and impactful design realised by, for example, elements from other genres. Here, two public health posters have been chosen from CPHP-NYC (Figure 5.2) to exemplify.



NYC-14: *Approaching 50 Colonoscopy Ahead* (NYC Health + Hospitals, 2016)



NYC-26: *You Can Help Stop TB in New York City!* (NYC DOHMH, 2009)

Figure 5.2 Examples of public health posters whose headlines have design details

In the first case, the Colorectal Cancer Awareness Month 2016 poster (NYC-14) uses the campaign emblem as its headline, which is a unit of road signs: a white square guide sign with black wording ‘APPROACHING 50’, an orange diamond-shaped warning sign with a black symbol meaning colon-shaped turns ahead, plus a purple rectangle guide sign with white wording ‘COLONOSCOPY AHEAD’. The purpose of the road or traffic signs is to give instructions or provide information to road users, therefore, the headline here definitely hijacks such generic function by grouping these guide and warning signs to urge New Yorkers 50 and older to get a colorectal cancer screening. In the second case, the whole poster (NYC-26) is comic-strip style, and its headline also uses an explosion *carrier* (cf. Cohn, 2013b: 35-37) to encapsulate ‘you’ in order to call (i.e. say loudly) all community leaders and residents to help to stop TB by encouraging people with symptoms to get tested.

Actually, 35 headlines in the public health posters (17 cases in CPHP-NYC and 18 in CPHP-HK) have been designed more or less, for example, by adding contrast with colour, shape, visual weight, etc. to emphasise part of the headlines, let alone the body of the public health posters in which different semiotic resources with

features of various genres merge. All of these elements that are distinct from their environment are base units, although most of them will be annotated as embedded base units. Since there are no design guidelines for the public health posters, I referred to the holistic structure of the public health posters (cf. Section 4.2.2), some generic analysis of posters (e.g. Barron, 2012; Degano, 2014), studies on other related genres such as comics (e.g. Cohn, 2013a, 2013b; Forceville, Veale and Feyaerts, 2010) to know how to label the base components of the public health posters in terms of their functions.

Table 5.3 Basic components to be identified as base units during corpus annotation

Recognised base units of the public health posters in CPHP		
sentences	headlines	images
logos/emblems	icons	signs/symbols (visual)
list/sequence items	list/sequence labels	emphasised text
QR codes	hashtags	footnote label
publication/code numbers	publication/printing time	
<ul style="list-style-type: none"> • images in different kinds: photographs, illustrations, diagrams, etc. (<i>without caption</i>) • captions of images • carriers: speech balloon, explosion, tailed line, soap bubble, callout, text label (e.g. flag label), search bars, coloured circles, etc. • text in images and carriers • sentence fragments initiating a list/sequence • list/sequence labels: bullets, picture bullets, etc. • footnotes (<i>without footnote label</i>) • horizontal or vertical lines, centred points, asterisks which function as delimiter between items • lines which emphasise text (e.g. underline) • lines which connect other units • equals signs, plus signs in headlines • some punctuation marks such as colons in bilingual posters • copyright symbols, registered trademark symbols • highlighted markers, arrows, etc. 		

A full list of the page elements identified as the base units of the public health posters is given in Table 5.3. But before I proceed to present corpus annotation of two public health posters, let me clarify three issues concerned with the base units of the public health posters and the identification in the course of practical analysis. First, the list of base unit candidates provided in Table 5.3 is by no means canonical or exhaustive. It is not a general list of basic components for all kinds of public health posters, but rather is sufficient for my collection of 60 public health posters – it is applicable to the cases in the present corpus annotation only. Take the responsive device for example, many posters in my collection list the phone number, text telephone (TTY) number, website or at least the hostname of the website’s

uniform resource locator, QR code that give the viewer a way to contact the agency or to log on to the website for more information. However, direct-response device is also seen as tear-off tabs at the bottom of some campus and community public health posters. Thus, the categories may have small variations if you collect public health posters from different contexts or different areas of the same context.

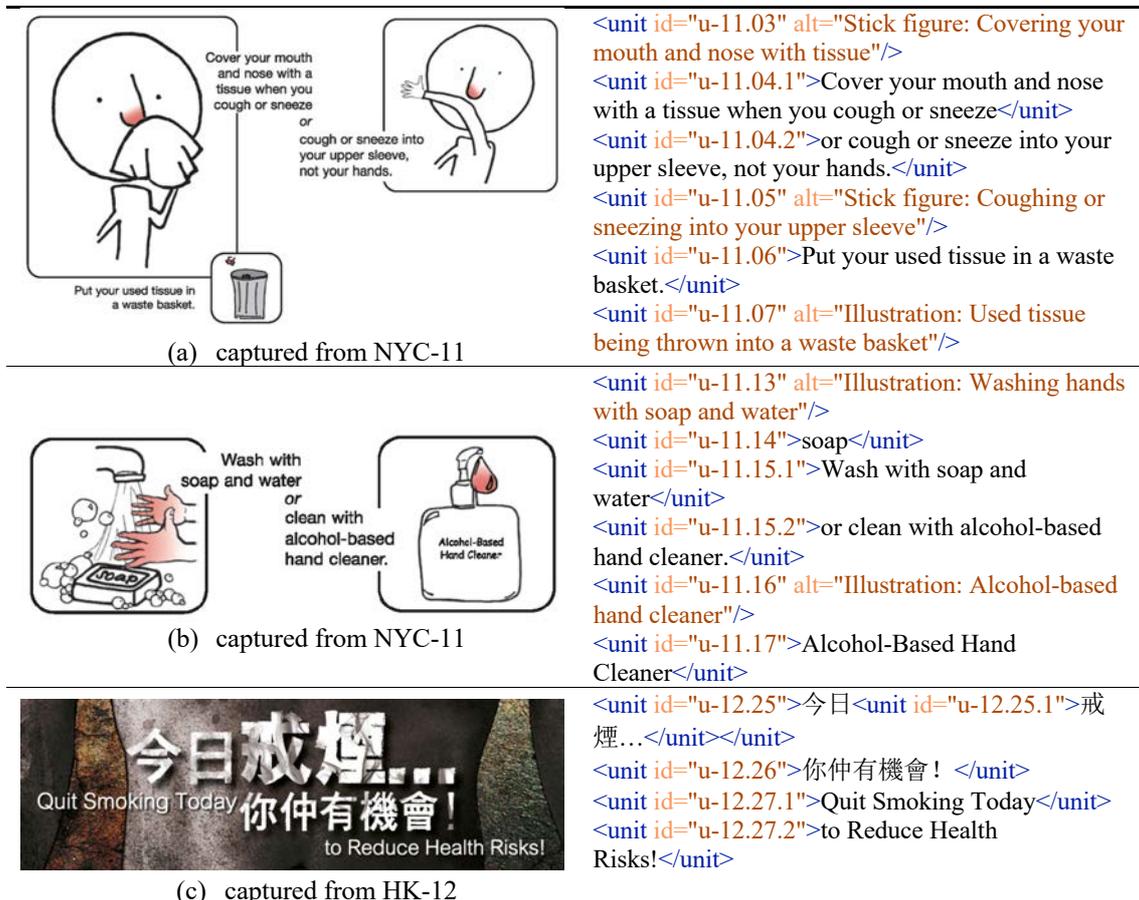


Figure 5.3 Examples of annotating an orthographic sentence as one more base units

Second, the GeM model states orthographic sentence as the minimal linguistic unit of analysis. In the base layer annotation, however, I break up one orthographic sentence into more than one base units in two cases (NYC-11, HK-12) and allow the layout layer to do the grouping. Two sentences in NYC-11 (Figure 5.3(a) and Figure 5.3(b)) are divided by ‘or’ as two major chunks (e.g. (a) Cover your mouth and nose with a tissue when you cough or sneeze or cough or sneeze into your upper sleeve, not your hands.). And there is a distinct cut-off between ‘Quit Smoking Today’ and ‘to Reduce Health Risks!’ (Figure 5.3(c)). Take the poster extract Figure 5.3(a) as an example, these sentence fragments are marked under the same base unite attribute id <unit id="u-11.04">, and as <unit id="u-11.04.1"> and <unit

id="u-11.04.2">. Note that here the situation is different from annotating embedded base units. I label them as <unit id="u-11.04.1"> and <unit id="u-11.04.2">, rather than <unit id="u-11.04"> and <unit id="u-11.05"> to indicate that they belong to the same sentence. Doing so would violate the GeM model, but I handle them in such a way in order to further annotate defined rhetorical relations for doing multimodal analysis.

The third point concerns the identification of visual units, including images, logos and emblems, signs and symbols, icons, and different graphic design or forms (e.g. carriers, lines) that are being displayed either within an image or independently, etc. Poster designers everywhere create unique visual elements in different kinds, they could also search and manage (e.g. hybridise) millions of stock images (i.e. royalty-free and high-quality photographs, illustrations, vector graphics, etc.) due to graphic design software, apps and service (e.g. Adobe Creative Cloud). Consequently, a miscellaneous array of visual elements is found on the pages of the public health poster, whether a photograph, an illustration, a comics panel, a stick figure, a guide sign, a collage of signs, or even a Chinese calligraphy. As shown in Table 5.4, photographs (43 items in 24 posters), illustrations (142 items in 40 posters) and logos (111 items in 58 posters) are common visual forms employed in the public health posters, among which the most prevalent image and graphic elements are illustrations and logos.

Table 5.4 Breakdown of visual design and forms employed in CPHP

Visual form		Corpus		CPHP		CPHP-NYC		CPHP-HK	
		item	poster	item	poster	item	poster	item	poster
Image	Photograph	43	24	35	17	8	7		
	Illustration	142	40	68*	14	74	26		
	- <i>cartoon-like</i>	23	6	8	3	15	3		
	- <i>collage</i>	2	2	1	1	1	1		
	Diagram	5	5	2	2	3	3		
	Sign, symbol	17	5	11	3	6	2		
	Icon	15	10	5	3	10	7		
	Logo (agency, campaign etc.)	111	58	48	28	63	30		

(* NYC-10 employs 32 illustrations embedded within text-flow as replacements for lexical words, and hence 36 items of illustrations are used in the other 39 posters.)

As with all of these different kinds of images, designers capture moments from the real world, and then choose compelling photographs to show events, people, and emotions in real life. In most cases of the corpus, however, designers illustrate

photographs and drawings in the best way possible and take them to the next level. Illustrations of various kinds may work best in many instances – visual embellishments are added to explain an invisible event (e.g. HK-26: airborne transmission of tuberculosis – tubercle bacillus is transmitted by tiny droplets in the air); photoshopped images can either euphemistically depict culturally sensitive issues (e.g. HK-13: sexual impotence) or exaggeratedly gross people out (e.g. NYC-3: sugary drinks that are covered with a blob of fat marbled with blood vessels), etc.

Among different kinds of illustrations, stick figures and simple drawings can highlight the key components of a procedure (e.g. NYC-9 and HK-9: hand washing steps); and multiple signs can be combined to a collage in any shape emphasizing the theme on the one hand, but avoiding too many details vying for attention on the other hand (e.g. NYC-27, HK-5). Several of the public health posters in the corpus are importing a considerable amount from comics and cartoons. Some designers adopt the comic strip style (NYC-26); some depict well-known cartoon characters in the target locale (HK-10, HK-11); and some turn an image into a comic-like panel by simply inserting a tailed balloon that is “one of the most defining visual conventions of the comics medium” (Forceville et al., 2010: 56).

The visuals of speech balloons are variable in the corpus of the present study, including circle/oval or rectangular rounded balloon-with-tail (NYC-4, NYC-26, HK-3), cloud-form balloon (HK-1), jagged contour explosion (NYC-26), soap bubble (NYC-9), and tailed line (HK-28). Encapsulating text, these balloon variables function to verbalise the speech generally. The jagged borders on the balloon in NYC-26 also “depict sound effects” – loud sounds or shouts (cf. Cohn, 2013a: 39). Other text containers like callouts (HK-2), text labels (e.g. a triangle flag label in NYC-2) in images, and text boxes such as search bars (HK-1 and HK-28) and coloured circles (NYC-16), could be expressed visually in many ways with or without a tail, a pin or a line by which these graphic forms and other verbal/visual elements are united. Here, all of these elements including balloon variables, callouts, text labels, etc. are collectively called as ‘carriers’ (cf. Cohn, 2007, 2013a, 2013b: 35-37 for the detailed remarks on different types of carriers).

Other visual design and forms are identified as base units, including logos of agencies and health campaigns; icons representing social media, apps, and depicting

telephone handset, mouse cursor; bullet characters (e.g. NYC-19 and HK-26) using picture bullets rather than dashes or centred points to set items; etc. The logos, among other graphics, can be further divided in many cases. For example, the logo of TCNY (Figure 5.4) is a combination of a symbol, the name of this health initiative, and/or the slogan of one of these health initiatives. Poster designers may change part of the logo design to match the background colour (e.g. NYC-11, NYC-30), or add lines of slogan of one of these health initiatives (e.g. NYC-7, NYC-30).

The logo/lock-up of <i>Take Care New York</i> (TCNY)			
			
NYC-6, 12	NYC-11	NYC-7 (theme: heart health)	NYC-30 (theme: depression)
e.g. <unit id="u-06.18" alt="Logo: TCNY">TAKE CARE NEW YORK</unit>		e.g. <unit id="u-07.23" alt="Logo: TCNY">TAKE CARE NEW YORK <unit id="u-07.23.1">KEEP YOUR HEART HEALTHY:</unit> <unit id="u-07.23.2">A Key Step to a Healthier New York</unit></unit>	

Figure 5.4 Example of annotating a health agenda’s logo/lock-up of various design

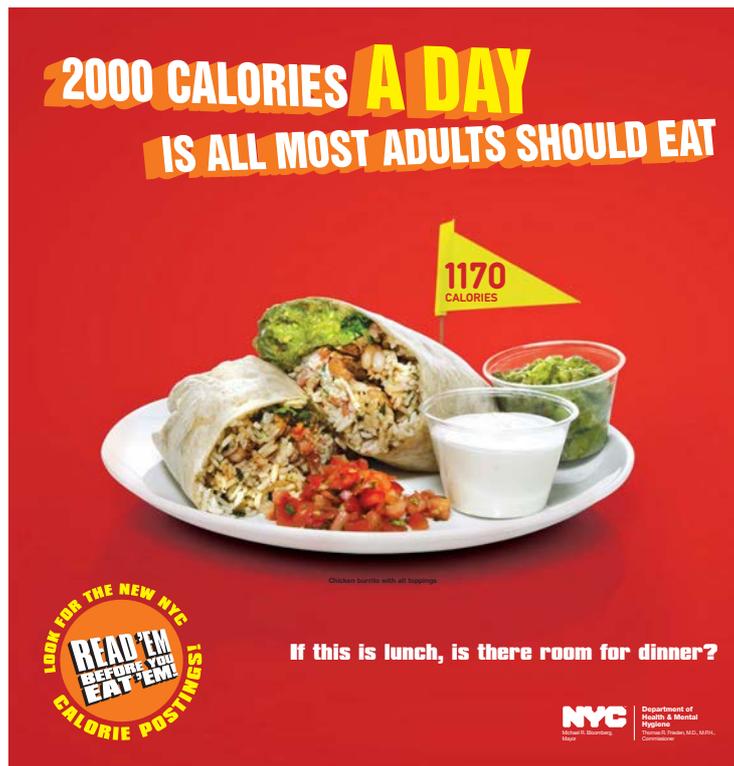
Although both the verbal and non-verbal elements create the logo together in all of these cases, I still consider the integrated package as one base unit. And I annotate other logos of agencies, campaigns, etc. in the same way. However, as with the lockup of the NYC DOHMH employed in 14 public health posters – one NYC DOHMH logo plus officials’ names with one vertical line between them (see examples shown in Figure 5.5). You can tell whose term of office from the lockup, and you can find some posters with simpler or different design (e.g. NYC-4, NYC-5), so I annotate the lockup as separate base units.

The logo/lock-up of NYC DOHMH			
			
e.g. NYC-1, 3, 11	NYC-22, 29	NYC-5	e.g. NYC-4
6 base units: 1) Logo: NYC DOHMH 2) Line 3) Michael R. Bloomberg 4) Mayor 5) Thomas Farley, MD MPH 6) Commissioner	6 base units: 1) Logo: NYC DOHMH 2) Line 3) Bill de Blasio 4) Mayor 5) Mary T. Bassett, MD, MPH 6) Commissioner	3 base units: 1) Bill de Blasio 2) Mayor 3) Logo: NYC DOHMH	1 base unit: Logo: NYC DOHMH

Figure 5.5 Example of annotating a health agency’s logo/lock-up of various design

5.3.2 Introducing Examples

After setting out the list of base units, here I present the complete XML annotation of two public health posters of healthy eating (i.e. NYC-2 and HK-2; cf. Appendix A for detailed introduction) following the GeM annotation schema. Before showing the intensive annotation process, let me briefly introduce these two posters and explain why they are chosen as the examples of corpus annotation.



NYC-2: *2000 Calories a Day Is All Most Adults Should Eat* (NYC DOHMH, 2008)

Figure 5.6 A starting point for annotation presentation: NYC-2

NYC-2 (Figure 5.6) is one of a series of posters designed for a public education campaign *Read 'em Before You Eat 'em* (Figure 5.7). In 2008, shortly after New York City became the first jurisdiction in the United States to require restaurant chains to post calorie information conspicuously on menus and menu boards, the campaign was unveiled to encourage New Yorkers to pay attention to calorie postings and promote awareness of an appropriate daily calorie intake of no more than 2000 calories for most adults (Dumanovsky and Huang, 2009: 62-62; Dumanovsky, Huang, Bassett and Silver, 2010: 2520). NYC-2 with simple design, is a good starting point for me to show GeM annotation. Complementarily, HK-2 (Figure 5.8) is used as an example to show more complicated annotation process.

2000 Calories a Day Is All Most Adults Should Eat (NYC DOHMH, 2008)



Figure 5.7 Read 'em Before You Eat 'em campaign posters



HK-2: 321 Healthy Lunch Suitable for Everyone (DH, HKSAR, 2011)

Figure 5.8 A complex poster for annotation presentation: HK-2

HK-2 is designed to promote healthy, balanced eating habits for both children and adults. The poster employs a diagram to clearly display a well-portioned lunch and encourages the viewer to get recommendations for healthy meals in terms of quantity and quality by following two campaigns - *Change for Health* and

EatSmart@school.hk. I then in the subsections following turn to the complete XML annotation of NYC-2 and use HK-2 to show some different and confusing aspects in annotation. Space constraints make it impossible to fully present all of the annotation situations with complex design, so I discuss several examples of posters or extracts crucial for complete annotation of the public health posters.

5.3.3 The GeM Base

Breaking out the basic constitutes of NYC-2 gives me altogether 14 base units (Table 5.5). These are the headline (u-02.01) at the top, a visual display (a photograph and its caption, and a flag label: u-02.02 – u-02.05) occupied its central position, a sentence (u-02.06), the campaign logo (u-02.07), and the lockup (the logo of New York City, mayor’s name, a vertical line, the name of DOHMH, and health commissioner’s name: u-02.08 – u-02.14) at the bottom right.

Table 5.5 Labelling the base units of NYC-2

label	unit
u-02.01	2000 CALORIES A DAY IS ALL MOST ADULTS SHOULD EAT
u-02.02	Photograph: A plateful of burrito with toppings
u-02.03	Flag label: Calorie posting
u-02.04	1170 CALORIES
u-02.05	Chicken burrito with all toppings
u-02.06	If this is lunch, is there room for dinner?
u-02.07	Logo: Calorie Education Campaign
u-02.08	Logo: NYC
u-02.09	Michael R. Bloomberg,
u-02.10	Mayor
u-02.11	Line
u-02.12	Department of Health & Mental Hygiene
u-02.13	Thomas R. Farley, M.D., M.P.H.,
u-02.14	Commissioner

Therefore, the XML file of the base units of NYC-2 is:

```
<?xml version="1.0" encoding="UTF-8"?>
<gemBase>
  <unit id="u-02.01">2000 CALORIES <unit id="u-02.01.1">A DAY</unit> IS ALL MOST
  ADULTS SHOULD EAT</unit>
  <unit id="u-02.02" alt="Photograph: A plateful of burrito with toppings of guacamole, sour
  cream and tomatoes"/>
  <unit id="u-02.03" alt="Flag label: Calorie posting"/>
  <unit id="u-02.04">1170 CALORIES</unit>
  <unit id="u-02.05">Chicken burrito with all toppings</unit>
  <unit id="u-02.06">If this is lunch, is there room for dinner?</unit>
  <unit id="u-02.07" alt="Logo: Calorie Education Campaign">
    <unit id="u-02.07.1">READ 'EM BEFORE YOU EAT 'EM!</unit>
    <unit id="u-02.07.2">LOOK FOR THE NEW NYC CALORIE
```

```

POSTINGS!</unit></unit>
<unit id="u-02.08" alt="Logo: NYC">NYC™</unit>
<unit id="u-02.09">Michael R. Bloomberg,</unit>
<unit id="u-02.10">Mayor</unit>
<unit id="u-02.11" alt="Line"/>
<unit id="u-02.12">Department of Health & Mental Hygiene</unit>
<unit id="u-02.13">Thomas R. Farley, M.D., M.P.H.,</unit>
<unit id="u-02.14">Commissioner</unit>
</gemBase>

```

Similarly, I break out the base units of HK-2, label them and annotate the base layer. For the diagrammatic representations in HK-2 showing appropriate portions of the main staple, vegetables and some meat, I treat the whole diagram as a package of separate compartment images and then mark all diagrammatic components which are shown in Figure 5.9.



Figure 5.9 Example of labelling basic components in a diagram

The complete annotation of the base layer of HK-2 is therefore:

```

<?xml version="1.0" encoding="UTF-8"?>
<gemBase>
<unit id="u-02.01" alt="Logo: CHP">衛生防護中心 Centre for Health Protection</unit>
<unit id="u-02.02">321</unit>
<unit id="u-02.03">至醒午餐</unit>
<unit id="u-02.04">Healthy Lunch</unit>
<unit id="u-02.05" alt="Highlighted marker: Yellow"/>

```

<unit id="u-02.06">大人細路都啱</unit>
 <unit id="u-02.07">Suitable for Everyone</unit>
 <unit id="u-02.08" alt="Illustration: White and brown Rice is put in the largest compartment of a lunch box"/>
 <unit id="u-02.09" alt="Illustration: Vegetables take up the second largest portion size in a lunch box"/>
 <unit id="u-02.10" alt="Illustration: Meat takes up the smallest compartment of a lunch box"/>
 <unit id="u-02.11">3</unit>
 <unit id="u-02.12" alt="Carrier: Orange callout"/>
 <unit id="u-02.13">五穀類</unit>
 <unit id="u-02.14">Grains and Cereals</unit>
 <unit id="u-02.15">2</unit>
 <unit id="u-02.16" alt="Carrier: Green callout"/>
 <unit id="u-02.17">蔬菜類</unit>
 <unit id="u-02.18">Vegetables</unit>
 <unit id="u-02.19">1</unit>
 <unit id="u-02.20" alt="Carrier: Red callout"/>
 <unit id="u-02.21">肉類</unit>
 <unit id="u-02.22">Meat</unit>
 <unit id="u-02.23">五穀類（如飯麵）、蔬菜類和肉類（及其代替品）佔飯盒容量的比例應是 3 比 2 比 1。</unit>
 <unit id="u-02.24">Grains and Cereals (such as rice and pasta), vegetables and meat (and its substitutes) in lunch box should be provided in the ratio of 3:2:1 by volume.</unit>
 <unit id="u-02.25" alt="Logo: EatSmart@school.hk Campaign">健康飲食在校園 EatSmart@school.hk</unit>
 <unit id="u-02.26" alt="Logo: Change for Health">活出健康新方向 For health We change</unit>
 <unit id="u-02.27" alt="Logo: DH">衛生署 Department of Health</unit>
 <unit id="u-02.28">「健康飲食專題網站」</unit>
 <unit id="u-02.29">EatSmart Website</unit>
 <unit id="u-02.30">www.eatsmart.gov.hk</unit>
 <unit id="u-02.31">二十四小時健康教育熱線</unit>
 <unit id="u-02.32">24-hour Health Education Hotline</unit>
 <unit id="u-02.33">2833 0111</unit>
 <unit id="u-02.34">印製</unit>
 <unit id="u-02.35">Printed</unit>
 <unit id="u-02.36">2011</unit>
 </gemBase>

5.3.4 The Layout Structure

The layout base consists of three main parts: (1) layout segmentation, (2) realization information and (3) layout structure information. For the present research project, after determining (1) the layout units, for three reasons, I don't annotate (2) the realization part, and simplify the annotation of the area model which serves to determine the position of each layout-chunk or layout-leaf in (3) the layout structure. First, the focus of the present study is not on the structure of the public health posters. Hence, the examination of the layout structure is not the chief task during the corpus building. Second, the accurate height and width information is not available for most of the public health posters. It is thus impossible for me to determine precisely

the value of each sub-area, but I approximately estimate e.g. the distribution of the poster height to its different sub-areas.

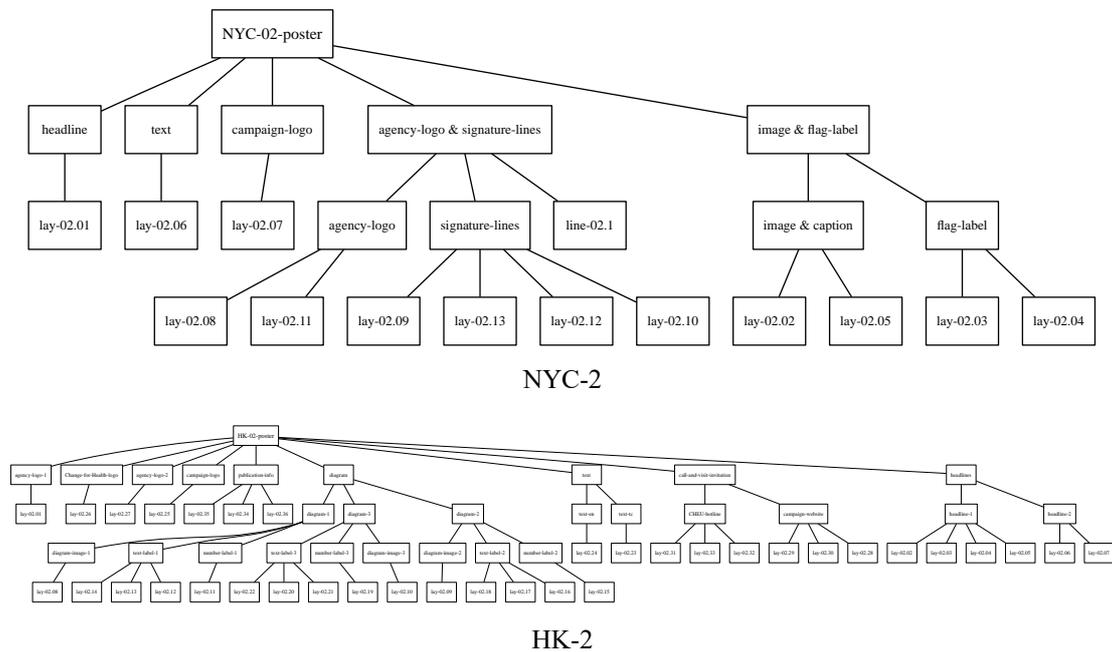


Figure 5.10 Graphs of the hierarchical organisation of the layout structures



NYC-16: *Today, You Could Save Your Child's Life.* (NYC DOHMH, 2014)

NYC-18: *The Root of Tooth Decay May Be Time Spent with this Sippy Cup.* (NYC DOHMH, 2013)

Figure 5.11 Examples of public health posters with touching and overlapped design

Third, most of the public health posters have no grid-based design. The current GeM annotation schema of layout base is not suitable for the public health posters. If I pull a grid over both NYC-2 and HK-2, indeed, I can have an estimated information of each layout-chunk, and I use the gem-tools (Hiippala, 2015a) to visualise the XML files of their layout structures (Figure 5.10). The complete XML files of the layout structures of NYC-2 and HK-2 is not possible here (the gemLayout XML files of NYC-2 and HK-2 have 62 lines and 141 lines respectively, and showing them here could occupy several pages). Owing to the focus and limited space, I mention a couple of other posters (Figure 5.11) here to further discuss the third reason.

Most of the public health posters in my corpus have no grid structures. Such posters cannot be partitioned into rectangular areas and sub-areas to locate their elements, cannot be ranged into columns and rows to define their locations. For instance, in NYC-16, an adolescent girl's photograph fits the whole poster frame. Its headline and the text in two coloured circles are wrapped around her face. The call and visit invitation, and the logo of NYC DOHMH at the bottom left are all arranged above her photograph. According to the current GeM annotation schema, text, photograph and graphic forms are in the same area-root. Dealing with all of the layout units in one cell, I have the following XML file of the layout structure:

```
<?xml version="1.0" encoding="UTF-8"?>
<gemLayout>
  <segmentation>
    <layout-unit id="lay-16.01" xref="u-16.01" alt="Photograph: An adolescent girl looks forward and smiles"/>
    <layout-unit id="lay-16.02" xref="u-16.02"><layout-unit id="lay-16.02.1" xref="u-16.02.1">TODAY,</layout-unit> you could save your child's life.</layout-unit>
    <layout-unit id="lay-16.03" xref="u-16.03" alt="Green circle"/>
    <layout-unit id="lay-16.04" xref="u-16.04">Talk to your pre-teen's doctor about <layout-unit id="lay-16.04.1" xref="u-16.04.1">THE HPV VACCINE</layout-unit></layout-unit>
    <layout-unit id="lay-16.05" xref="u-16.05" alt="Orange circle"/>
    <layout-unit id="lay-16.06" xref="u-16.06">It can reduce your son or daughter's risk of certain <layout-unit id="lay-16.06.1" xref="u-16.06.1">HPV-related cancers</layout-unit> by up to <layout-unit id="lay-16.06.2" xref="u-16.06.2">99%</layout-unit></layout-unit>
    <layout-unit id="lay-16.07" xref="u-16.07">To learn more about the <layout-unit id="lay-16.07.1" xref="u-16.07.1">Human Papillomavirus (HPV) vaccine,</layout-unit> talk to your pre-teen's doctor, call <layout-unit id="lay-16.07.2" xref="u-16.07.2">311</layout-unit> or search <layout-unit id="lay-16.07.3" xref="u-16.07.3">"HPV"</layout-unit> on <layout-unit id="lay-16.07.4" xref="u-16.07.4">nyc.gov</layout-unit></layout-unit>
    <layout-unit id="lay-16.08" xref="u-16.08" alt="Logo: NYC DOHMH">NYC™ Health</layout-unit>
  </segmentation>
  <area-model>
    <area-root id="NYC-16-poster-frame" cols="1" rows="1" hspacing="100" vspacing="100">
```

```

</area-root>
</area-model>
<layout-structure>
  <layout-root id="NYC-16-poster">
    <layout-chunk id="image" location="row-1" area-ref="NYC-16-poster-frame">
      <layout-leaf xref="lay-16.01" location="row-1" area-ref="NYC-16-poster-frame"
valign="center"/>
    </layout-chunk>
    <layout-chunk id="headline" location="row-1" area-ref="NYC-16-poster-frame">
      <layout-leaf xref="lay-16.02" location="row-1" area-ref="NYC-16-poster-frame"/>
    </layout-chunk>
    <layout-chunk id="text-in-circles" location="row-1" area-ref="NYC-16-poster-frame">
      <layout-leaf xref="lay-16.03" location="row-1" area-ref="NYC-16-poster-frame"/>
      <layout-leaf xref="lay-16.04" location="row-1" area-ref="NYC-16-poster-frame"/>
      <layout-leaf xref="lay-16.05" location="row-1" area-ref="NYC-16-poster-frame"/>
      <layout-leaf xref="lay-16.06" location="row-1" area-ref="NYC-16-poster-frame"/>
    </layout-chunk>
    <layout-chunk id="call-and-visit-invitation" location="row-1" area-ref="NYC-16-poster-
frame">
      <layout-leaf xref="lay-16.07" location="row-1" area-ref="NYC-16-poster-frame"/>
    </layout-chunk>
    <layout-chunk id="agency-logo" location="row-1" area-ref="NYC-16-poster-frame">
      <layout-leaf xref="lay-16.08" location="row-1" area-ref="NYC-16-poster-frame"/>
    </layout-chunk>
  </layout-root>
</layout-structure>
</gemLayout>

```

In NYC-18, the situation is not just the text-image touching. One photograph featuring a young boy drinking from a sippy cup is overlapped with another photograph showing tooth decay in baby teeth. Hence, we definitely need new annotation schema to deal with a wide of various layout structures of multimodal documents with different types of design. For the present, 3D automatic layouting software can solve all my problems. Here, I propose that the software should have several basic functions to automatically determine the value of each layout entity in three dimensions.

Firstly, the software can determine the basic geometric information for all layout units. If NYC-16 is on a $x/y/z$ axis, for example, it is easier to determine the geometric pixels of the photograph, the green and orange circles. For other verbal and graphic units, if the software could detect and crop units and objects (i.e. finding the location of a single verbal line or visual object inside the poster, and knowing where to crop them), assign regular bounding figures/boxes or draw irregular polygons automatically to all these verbal and visual elements, then the geometric information of the bounding figures and polygons could be achieved. In order to show my tentative assumption, by OmniGraffle – a diagramming and digital

illustration application, I manually label the geometric coordinates and the width and height of the layout units and the bounding figures (circles, rectangles and bevelled rectangles in white, yellow and blue) of NYC-16 in Figure 5.12 (and imagine the software could set more suitable bounding boxes and polygons and indicate the z-axis coordinates and alignment information, etc.).

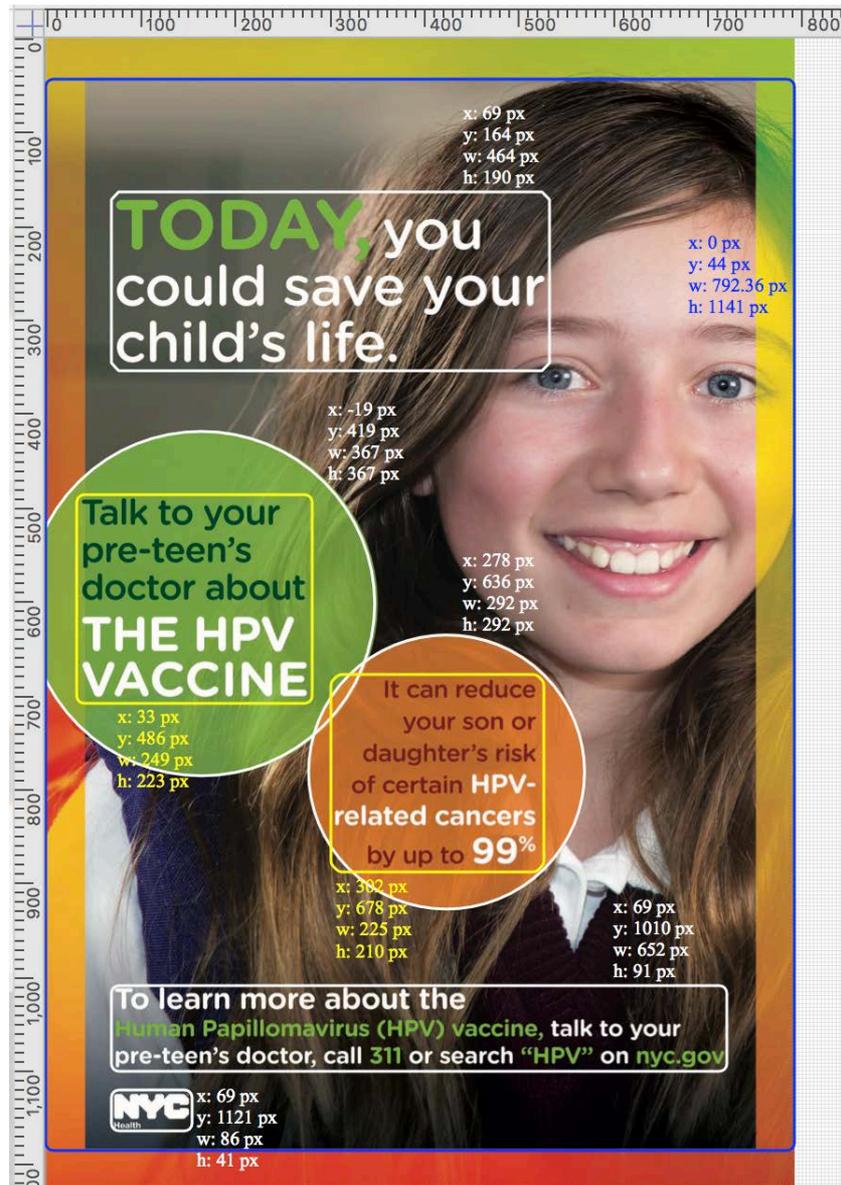


Figure 5.12 Example of imitating layouting software labelling geometric coordinates

Automatically setting the most suitable shapes of bounding figures or drawing polygons, and determining the geometric absolute coordinates is the lowest level of abstract. Secondly, moving up in levels of abstraction where the software should capture qualitative features (e.g. layer attributes such as front or back) which is more important than coordinate numbers. For NYC-16, the photograph, the coloured

frame, the colour-filled circles, the text, and the logo are located in different layers. And whether something it is touching or not, to the left or right, etc. is more salient than actual coordinates. This is what is perceived rather than the numbers. If the software could annotate qualitative attributes, which is similar to the reversed process of the poster design, then the XML presentation of one layout unit – the adolescent girl’s photograph would be modified e.g. as:

```
<?xml version="1.0" encoding="UTF-8"?>
<gemLayout>
  <segmentation>
    <layout-unit id="lay-16.01" xref="u-16.01" alt="Photograph: An adolescent girl looks forward and smiles"/>
  </segmentation>
  <area-model>
    <area-root id="NYC-16-poster-layer-1" width="792.36px" height="1141px">
    </area-root>
  </area-model>
  <layout-structure>
    <layout-root id="NYC-16-poster">
      <layout-chunk id="image" location="x:0 y:0 z:0" area-ref="NYC-16-poster-layer-1">
        <layout-leaf xref="lay-16.01" location=" x:0 y:0 z:0" area-ref="NYC-16-poster-layer-1" valign="center"/>
      </layout-chunk>
    </layout-structure>
  </gemLayout>
```

If the realisation information and area model is also well annotated, the layout conventions of the public health posters used in New York City and Hong Kong could be achieved. Layout is “an important aspect of visual organisation in its own right and its inter-relationship and influence on text is considerable”; and the explicit concern with layout “constitutes another component of text-image relations that is far too often ignored” (Bateman, 2014d: 134). For the present study, the primary aim of annotating the layout base is to see how the layout and rhetorical structures are intertwined – e.g. which layout chunk of the public health poster is the nucleus and which is the satellite.

For example, after annotating NYC-16’s base, layout and rhetorical layers, I visualise its discourse structure as described using RST and layout structures together (Figure 5.13) with gem-tools – the content is retrieved from the base layer, before drawing out the rhetorical relations between the content and organizing it into the hierarchy defined in the layout structure (Hiippala, 2015a). With valid XML files for base, layout and RST layers of 60 public health posters, each poster has

three graphs showing its rhetorical structure, layout structure, and rhetorical-layout structure in different Jupyter notebooks. Next I come to the annotation of rhetorical relations.

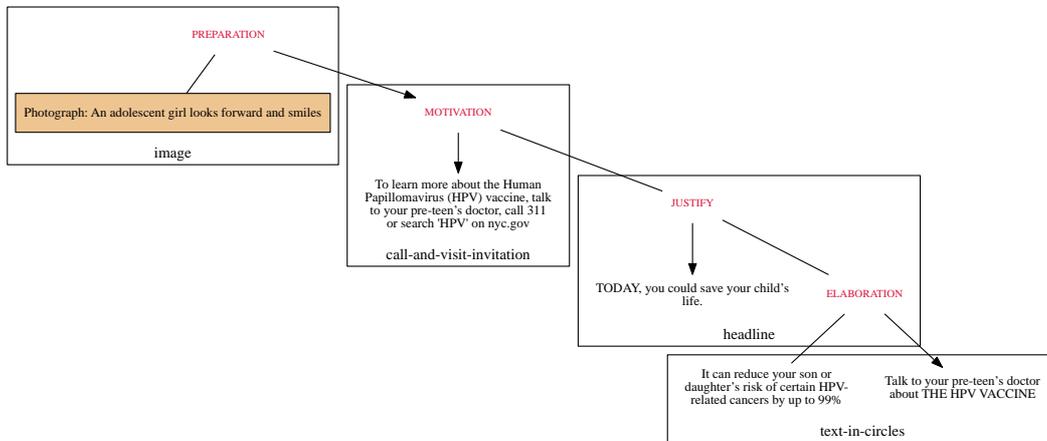


Figure 5.13 Graph of rhetorical-layout structure for NYC-16

5.3.5 The Rhetorical Structure

I return to NYC-2 and HK-2 as the examples. NYC-2 has 6 RST segments including the headline (s-02.01), the photograph (s-02.02) and the caption (s-02.04), calorie counts in the flag label (s-02.03), the sentence (s-02.05), and the campaign logo (s-02.06). Strictly speaking, NYC-2 has 5 RST segments and 1 mini-segments (s-02.04). But mini-segments are also marked as segments in the present study for the sake of visualisation only – the gem-tools works well if the tag used to mark all kinds of basic RST units is `<segment>` rather than `<mini-segment>`. But the multinuclear and intra-clausal relations are still marked as `<multi-span>` and `<mini-span>`. Hence, the XML representation for the segmentation and rhetorical relations of NYC-2 would then look as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<gemRst>
  <segmentation>
    <segment id="s-02.01" xref="u-02.01">2000 CALORIES A DAY IS ALL MOST ADULTS SHOULD EAT</segment>
    <segment id="s-02.02" xref="u-02.02" alt="Photograph: A plateful of burrito with toppings of guacamole, sour cream and tomatoes"/>
    <segment id="s-02.03" xref="u-02.04">1170 CALORIES</segment>
    <segment id="s-02.04" xref="u-02.05">Chicken burrito with all toppings</segment>
    <segment id="s-02.05" xref="u-02.06">If this is lunch, is there room for dinner?</segment>
    <segment id="s-02.06" xref="u-02.07" alt="Logo: Calorie Education Campaign"/>
  </segmentation>
  <rst-structure>
    <span id="span-02.01" nucleus="span-02.02" satellites="s-02.01" relation="preparation"/>
  </rst-structure>
</gemRst>
```

```

<span id="span-02.02" nucleus="s-02.06" satellites="span-02.03" relation="motivation"/>
<span id="span-02.03" nucleus="span-02.04" satellites="s-02.05" relation="elaboration"/>
<span id="span-02.04" nucleus="s-02.03" satellites="span-02.05" relation="elaboration"/>
<mini-span id="span-02.05" attribuend="s-02.02" attribute="s-02.04" relation="identification"/>
</rst-structure>
</gemRst>

```

With valid XML files for both base and rhetorical layers of NYC-2, the gem-tools (Hiippala, 2015a) is used to visualise its rhetorical structure of this multimodal poster (Figure 5.14(a)). The RST relations ('spans') are represented using DOT nodes – relations are drawn as edges from both nuclei and satellite nodes ('segments') towards the span, thus creating a hierarchical structure suitable for representing RST structures; and the nodes are organized into DOT subgraphs according to the hierarchical organization as represented using the GeM layout structure (Hiippala, 2015a).

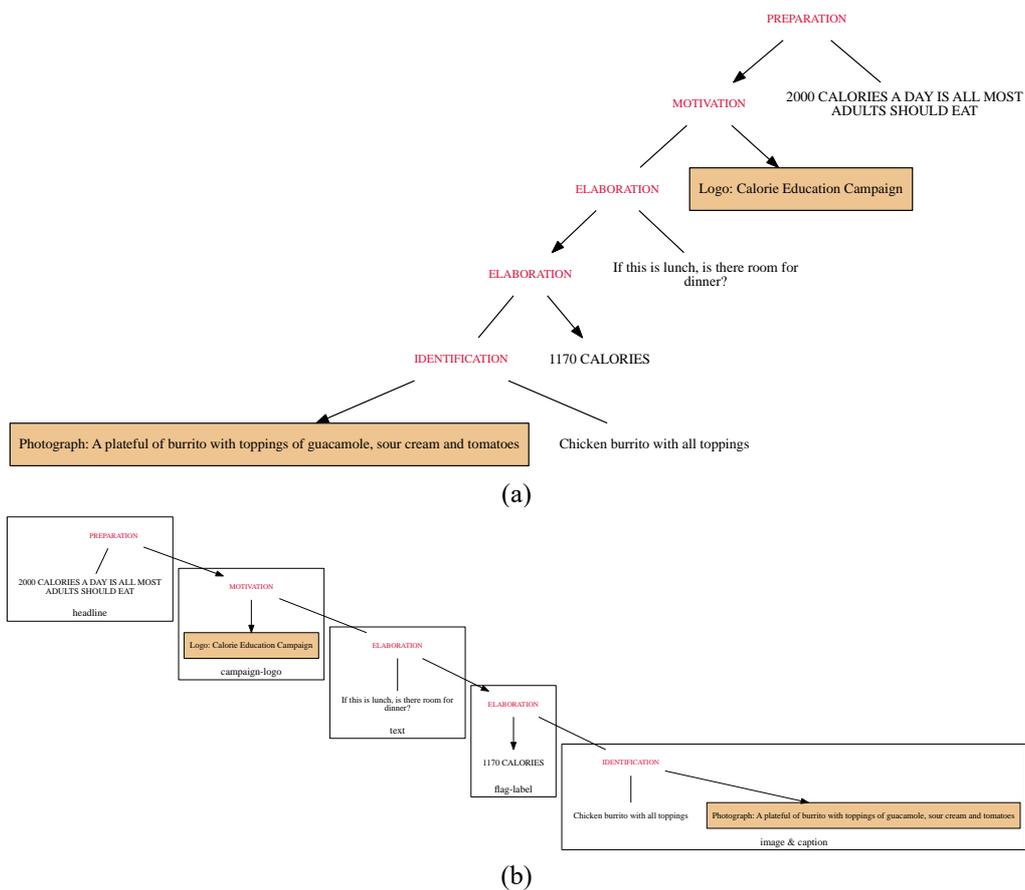


Figure 5.14 Graphs of rhetorical structure and rhetorical-layout structure for NYC-2

And let me use the rhetorical-layout graph of NYC-2 (Figure 5.14(b)) to explain why I analyse the semantic relations in such a way. The image is a plateful of ‘chicken burrito with all toppings’ (caption), so the relation between the image and

its caption is property-ascription. This Mexican dish is instanced as one of the common fast-food choices that have the energy value – 1170 calories (flag label). So the relation that holds between the dish and the calorie posting is elaboration, and the posting is the nucleus. If something that is equal to 1170 calories is consumed at lunchtime, then is there room for dinner? This question is elaborated on the choice of high-calorie foods to encourage the viewer to follow the New York City’s calorie education campaign *Read 'em Before You Eat 'em* (campaign logo), and check the caloric content of the foods at the point of purchase. And the headline recommending the 2000-calorie daily intake for most adults functions in a background-preparatory way, but more as a leading preparation.

For HK-2, from the determined 36 base units, the logo of CHP and the logo of the Hong Kong DH, the yellow heightened marker under the first line of its headline, three coloured callouts used in the diagram, and publication information at the bottom, in all 9 units are not marked as RST segments. So, I have altogether 27 RST segments. The hierarchical organisation of its rhetorical structure as a whole is given in Figure 5.15.

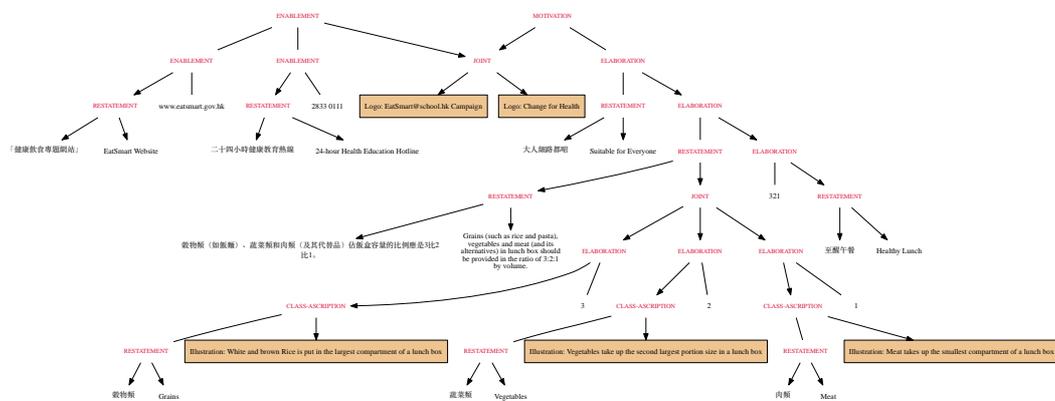


Figure 5.15 Hierarchical structure of rhetorical relations for HK-2

As introduced at the beginning of Section 5.3.2, HK-2 promotes the concept of healthy and balanced diets. The salient object in HK-2 is the diagram of a lunch box with appropriate portions of a variety of foods; and the following presentation focuses mainly on explaining how to annotate the diagram of the healthy lunch. The diagram shows that, if a lunch box is divided into six parts, the grains and cereals should take up three, and two of the rest should go to the vegetables and one should

be some meat. As such, the ratio among these three different classes of foods is 3:2:1. All of its 14 RST segments are labelled and shown in Figure 5.16.



Figure 5.16 Example of labelling RST segments in a diagram

The hierarchical structure of the rhetorical relations for the diagram is visualised graphically in Figure 5.17.

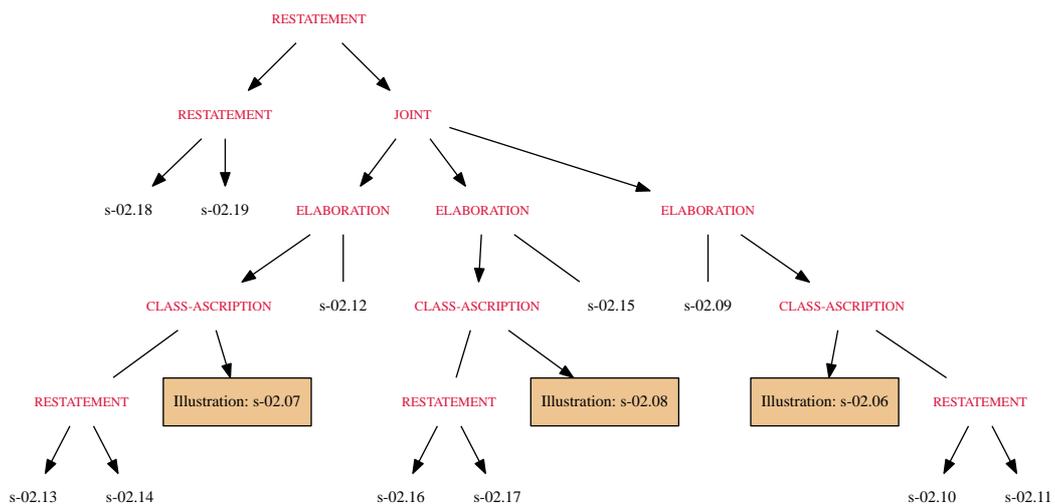


Figure 5.17 Hierarchical structure of rhetorical relations for the diagram in HK-2

All RST segments form 6 multi-spans, 3 mini-spans, and 3 spans, which have the following rhetorical structure in XML annotation:

```

<rst-structure>
...
  <multi-span id="span-02.03" nuclei="s-02.10 s-02.11" relation="restatement"/>
  <multi-span id="span-02.04" nuclei="s-02.13 s-02.14" relation="restatement"/>
  <multi-span id="span-02.05" nuclei="s-02.16 s-02.17" relation="restatement"/>
  <multi-span id="span-02.06" nuclei="s-02.18 s-02.19" relation="restatement"/>
  <mini-span id="span-02.08" attribuend="s-02.06" attribute="span-02.03" relation="class-
ascription"/>
  <mini-span id="span-02.09" attribuend="s-02.07" attribute="span-02.04" relation="class-
ascription"/>
  <mini-span id="span-02.10" attribuend="s-02.08" attribute="span-02.05" relation="class-
ascription"/>
  <span id="span-02.11" nucleus="span-02.08" satellites="s-02.09" relation="elaboration"/>
  <span id="span-02.12" nucleus="span-02.09" satellites="s-02.12" relation="elaboration"/>
  <span id="span-02.13" nucleus="span-02.10" satellites="s-02.15" relation="elaboration"/>
  <multi-span id="span-02.14" nuclei="span-02.11 span-02.12 span-02.13" relation="joint"/>
  <multi-span id="span-02.15" nuclei="span-02.14 span-02.06" relation="restatement"/>
...
</rst-structure>

```

24 public health posters in CPHP-HK are produced in two languages, the relation between the Chinese texts and the translation of them into English is multinuclear restatement. Therefore, the relation between bilingual labels is restatement-relation (e.g. [span-02.03](#)), the relation between two sentences accompanying the image ([span-02.06](#)) is treated in the same way. The bilingual texts in orange, green and red callouts then identify the illustrations drawn in the three compartments of the lunch box. For example, everything belongs to the grains and cereals including brown rice, rice with added corn kernels, and wholemeal bread can be chosen as the main staple. Adding the labels of food categories is not only to identify the specific parts of the whole lunch box, but also reminds the viewer to use a great diversity of fresh foods in these three general categories. Therefore, the relations between the texts in each callout and the identified illustration is a kind of the be-relation, more specifically, class-ascription (e.g. [span-02.08](#)). The biggest numbers ‘3’, ‘2’, ‘1’ put in illustrations show the portion size to elaborate the ratio among different food categories (e.g. [span-02.08](#)), not eating steps. The whole diagram composed of three parts ([span-02.14](#)) is primarily a re-expression of the sentences appearing just below it ([span-02.15](#)).

It is not possible with the current annotation schema to handle one situation where the nucleus covers a scope or domain consisting of more than one smaller span. A

headline, for example, can function as the preparation for the remaining spans; or several spans work as the solution to an overarching problem. As one example of this kind of annotation situation, HK-22 (cf. Appendix A) is an AIDS poster where a test chart designed after the Snellen eye chart functions as a leading preparation, and the rest of segments combine orientation to action (motivation: [span-22.10](#)) with orientation to providing information of hotline and related websites (enablement: [span-22.11](#)). The enablement relation is often used along with a motivation relation in the public health posters, and this pair is the only one where RST allow different relations to bear on the same nucleus. Hence, when the central image ([s-22.01](#)) printed with 11 lines of letters from words ‘HIV’ and ‘AIDS’ functions in a preparatory way (preparation: [span-22.12](#)), I annotate this kind of situation by targeting all of the spans and this is the only exception I made for RST annotation schema:

```
<rst-structure>
...
  <span id="span-22.10" nucleus="span-22.03" satellites="span-22.09"
  relation="motivation"/>
  <span id="span-22.11" nucleus="span-22.03" satellites="span-22.05 span-22.07"
  relation="enablement"/>
  <span id="span-22.12" nucleus="span-22.10 span-22.11" satellites="s-22.01"
  relation="preparation"/>
</rst-structure>
```

5.4 Verifying the Multimodal Corpus

The manual annotation of corpora is prone to human errors. For each XML file, I select ‘Check Spelling’ option that is available in oXygen XML Editor to find any misspelled words, and validate it with a GeM-RelaxNG schema. However, this does not guarantee that the annotation is accurate even though the validation is successful. For GeM-annotated corpora, the risk of human error “does not refer to analytical errors in applying the GeM model, but mainly to errors in the identifiers responsible for cross-referencing and identifying the analytical units” (Hiippala, 2015b: 105). This type of human errors is actually clear at a glance when analysts visualise the XML files in the gem-tools. Let me demonstrate how these human errors look like using the XML files of the example NYC-2 again.

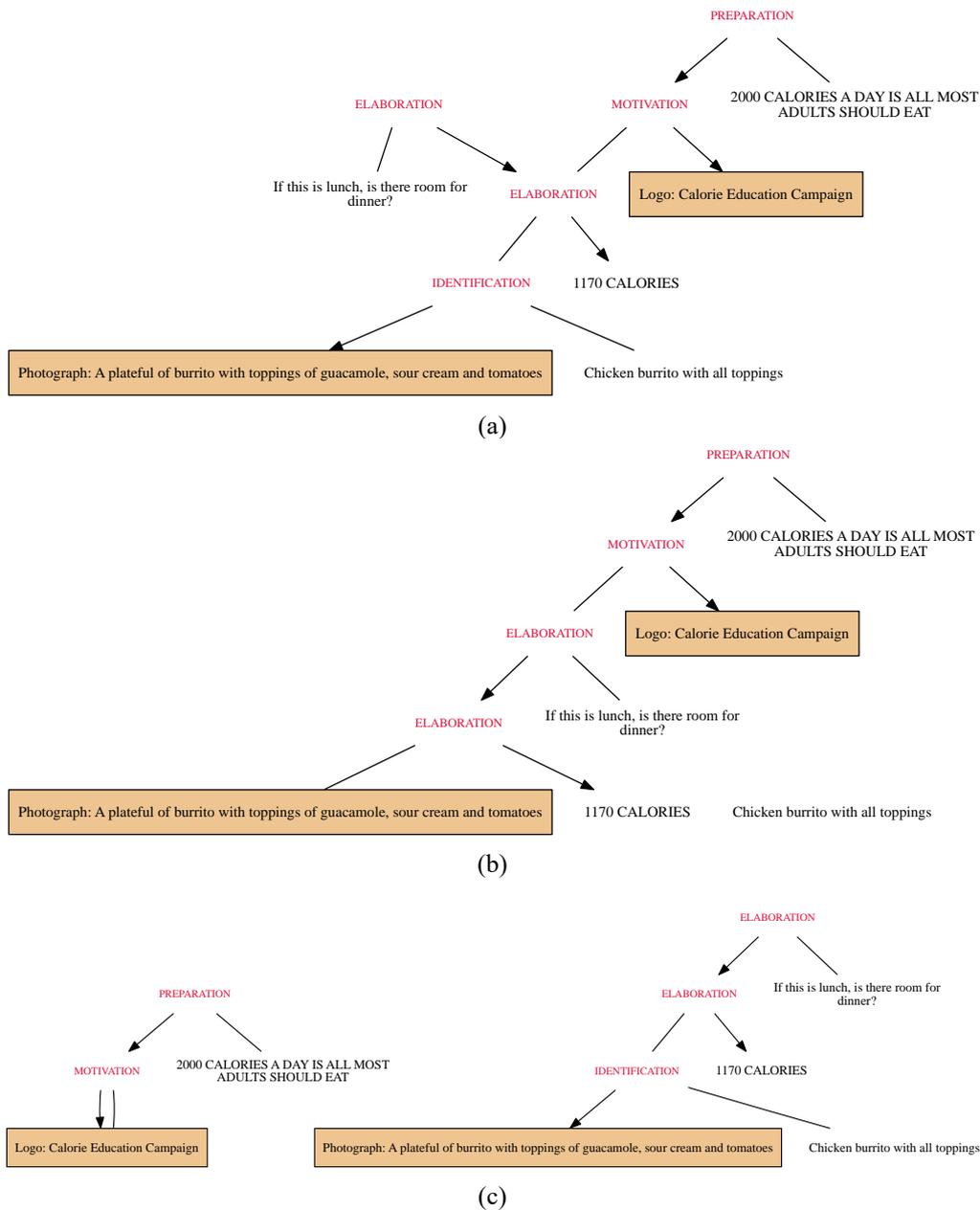


Figure 5.18 Incorrect graphs of the rhetorical structure for NYC-2

The graphs shown in Figure 5.18 are the resulting images in the Jupyter notebook after valid XML files for both base and RST layers are imported. Compared to the correct graph (Figure 5.14(a)) of the rhetorical structure of poster NYC-2 (Figure 5.6), it is all too easy to notice all the human errors. The graph in Figure 5.18(a), shows that the annotator annotates the wrong RST span id the satellite of the motivation relation. Since there are two elaboration relations (but in different span ids) in its rhetorical structure, the annotator mixes the satellite up with another text span. In the graph in Figure 5.18(b), there is an ‘orphan segment’ *Chicken burrito with all toppings*, which results from the failure of the annotation to link all

segments. There are an ‘orphan span’ and a ‘looping relation’ in Figure 5.18(c): the first error results from “the failure of the annotation to link one or more RST spans together”, and the latter occurs “when the annotator inputs the wrong identifier, causing the RST span to refer to itself” (Hiippala, 2015b: 105). In fact, all these annotation errors are not easy to locate in valid XML files. Therefore, the gen-tools can facilitate verifying the GeM-annotated corpora.

Chapter 6 Working with the Multimodal Corpus

Due to the limited space of the thesis, the last chapter has not described in detail all of the vital but tiny things to consider in each of the annotation layers and for each of the 60 public health posters, it has not documented all difficulties that I encountered during the course of the laborious annotation process. However, Chapter 5 presents the principal steps of GeM-annotated corpus building, by presenting how to identify base units of the particular genre of multimodal documents and how to annotate each layer of the GeM model in terms of XML descriptions. In addition, Section 3.2 in Chapter 3 has introduced the revised version of classical RST – system of rhetorical relations, which is systemicised by Matthiessen (cf. e.g. 1995b, 2002, 2015c, in prep.). So, in this chapter I will be considering all the results obtained from CPHP, in order to explore the general architecture (i.e. the discourse organisation) of the public health posters and discuss the interactions between different semiotic resources on the pages of the public health posters.

This chapter begins with the presentation of basic statistics extracted from the annotated corpus, and discusses some most common rhetorical relations identified in the discourse organisations. Furthermore, the chapter goes beyond the quantitative patterns to discuss the intersemiotic meaning-making between language and other semiotic resources with examples from the present corpus. Finally, Chapter 6 points out the correlation between annotating the layout structure and analysing the rhetorical structure in the present study.

6.1 Statistical Analysis

6.1.1 Basic Statistics

Some basic statistical information about the numbers of base units, layout units, RST segments, unique and all rhetorical relations, etc. is presented in Table B.1 and Table B.2 respectively in Appendix B. Generally, there are more textual base units

than visual base units in the public health posters. For each of the case, the number of base units is always bigger than the number of layout units – that is to say, no layout units are smaller than base units, which is another aspect to verify the corpus. There are also more textual segments than visual segments in each of the 60 public health posters; and each of these posters has only one rhetorical structure. The ‘unique/all RST relations’ column in Table B.1 and Table B.2 shows the number of unique rhetorical relations and the overall number of rhetorical relations used in each poster.

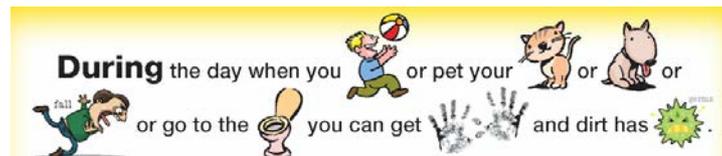
Compared the ‘base unit’ column in Table B.1 with the same one in Table B.2, the public health posters sampled in Hong Kong usually employ much more basic page elements than such posters used in the City of New York. This is because that 80% (24) of the public health posters sampled in Hong Kong are Chinese – English bilingual version (cf. Table 4.2). This can also explain why there are much more rhetorical relations found in these bilingual version posters sampled in CPHP-HK, since there are lots of multinuclear restatement relations between bilingual segments and some repetitions of the other rhetorical relations caused by the bilingual situation (cf. Section 6.1.2).

In addition, more than 80% (49) of public health posters have the situations in which I mark some parts as embedded base units. NYC-10 is an unusual case (cf. Figure 6.1(a); cf. also Table A.1 in Appendix A), it has in all 45 embedded base units. Similar to emoji images, 32 of them are illustrations used as replacements for lexical words in sentences. All these tiny illustrations are thus marked embedded base units, and the captured sentence of NYC-10 in Figure 6.1(a) is described by the XML annotation below:

```
<unit id="u-10.02">
  <unit id="u-10.02.1">During</unit> the day when you <unit id="u-10.02.2"
  alt="Illustration: Play"/> or pet your <unit id="u-10.02.3" alt="Illustration: Cat"/> or <unit
  id="u-10.02.4" alt="Illustration: Dog"/> or <unit id="u-10.02.5" alt="Illustration: Fall"/> <unit
  id="u-10.02.6">fall</unit> or go to the <unit id="u-10.02.7" alt="Illustration: Toilet"/> you can
  get <unit id="u-10.02.8" alt="Illustration: Dirty hands"/> and dirt has <unit id="u-10.02.9"
  alt="Illustration: Cartoon germ/microbe"/> <unit id="u-10.02.10">germs</unit>.
</unit>
```

Note that the first word **During**, identified as the embedded base unit as well, is bold and has different font size. As in almost all other cases in CPHP, embedded base units are the text portions which have distinct differences in typographic

preferences, such as highlighted words and capitalised words, which makes them more salient than the other information in their environment. In this case, the word **During** is made bold and larger to serve as a navigation element, it is a formatting mark for a new paragraph. However, most of these emphasized text portions (e.g. two examples shown in Figure 6.1(b) and Figure 6.1(c)) are designed to make these key information eye-catching, etc.



(a) captured from NYC-10



(b) captured from NYC-3



(c) captured from HK-25

Figure 6.1 Examples of embedded base units in CPHP

Both the sentence captured from NYC-3 (Figure 6.1(b)) and the bilingual headlines from HK-25 (Figure 6.1(c)) have several embedded base units within the other base units to emphasise the key words. The annotation of these two parts is as follows:

Figure 6.1(b):

```
<unit id="u-03.05">You're drinking <unit id="u-03.05.1">85</unit> <unit id="u-03.05.2">PACKETS OF</unit> <unit id="u-03.05.3">SUGAR</unit> in just 4 sugary drinks a day.</unit>
```

Figure 6.1(c):

```
<unit id="u-25.02">預防感染<unit id="u-25.02.1">丙</unit><unit id="u-25.02.2">型</unit><unit id="u-25.02.3">肝炎</unit></unit>
<unit id="u-25.03">切勿共用<unit id="u-25.03.1">針咀</unit><unit id="u-25.03.2">針具</unit></unit>
<unit id="u-25.04">Prevent <unit id="u-25.04.1">Hepatitis</unit> <unit id="u-25.04.2">C</unit></unit>
<unit id="u-25.05">
  <unit id="u-25.05.1">Don't share</unit> <unit id="u-25.05.2">needles</unit> <unit id="u-25.05.3">or</unit> <unit id="u-25.05.4">works</unit>
</unit>
```

6.1.2 Statistics – Relations in CPHP

After reading the basic statistics extracted from two sub-corpora of the public health posters in the subsection above, here, I focus on the rhetorical relations used in the 60 public health posters and display detailed statistical information behind the numbers in ‘unique/all RST relations’ column in Table B.1 and Table B.2 in Appendix B. All types and numbers of nucleus-satellite relations, multinuclear relations and intra-clausal relations used in CPHP are shown, respectively, in Table 6.1, Table 6.2 and Table 6.3. Each of the italic numbers in brackets in these three tables means that there are some more occurrences of the particular rhetorical relation because of the translation-equivalent repetitions in the bilingual public health posters used in Hong Kong. For instance, 61 (*4*) in the first row of Table 6.3, means that there are in all 65 occurrences of the relation of elaboration in CPHP-HK, but 4 of them is caused by the reiterations in several posters where textual elements are bilingual; hence, 61 is the real occurring number of the rhetorical relation of elaboration holding between different segments.

Table 6.1 Nucleus-satellite relations in CPHP

Nucleus-satellite relations	CPHP-NYC	CPHP-HK	CPHP
Elaboration	47	60 (<i>5</i>)	107
Enablement	18	42 (<i>21</i>)	60
Motivation	26	24 (<i>1</i>)	50
Preparation	17	10	27
Solutionhood	7	3 (<i>1</i>)	10
Background	7	5 (<i>1</i>)	12
Evidence	3	4	7
Justify	5	0	5
Interpretation	3	2	5
Evaluation	1	1	2
Condition	3	3	6
Otherwise	1	0	1
Restatement	11	2	13
Summary	2	0	2
Cause	4	2	6
Result	2	2	4
Purpose	0	2	2
Antithesis	1	0	1
Circumstance	1	1	2
Means	0	1	1
Projection	2	2	4

Table 6.1 provides a summary of 21 mononuclear relations found in the present corpus of the public health posters and the numbers of their occurrences. Rhetorical

relations of elaboration, enablement, motivation and preparation appear very frequently in both sub-corpora. The statistical data in Table 6.2 shows 8 multinuclear relations found in CPHP, and the most frequently occurring type of this broad category is multinuclear restatement (46). In addition, for posters in CPHP-HK, 132 occurrences of bilingual-related relation of multinuclear restatement hold between pairs of text portions in translations between Chinese and English. Several other types of rhetorical relations such as joint, list and addition have numerous occurrences as well.

Table 6.2 Multinuclear relations in CPHP

Multinuclear relations	CPHP-NYC	CPHP-HK	CPHP
Restatement	28	18 (132)	46
List	12	8	20
Addition	8	8 (2)	16
Joint	6	9 (1)	15
Disjunction	2	2 (3)	4
Sequence	6	6 (2)	12
Contrast	2	4 (1)	6
Projection	2	6	8

Information about the intra-clausal relations holding between two relation dependent items are summarised in Table 6.3. There are 3 intra-clausal relations found within the present corpus CPHP. Among them, relations of identification and property-ascription occur most frequently, and are used in fixed patterns.

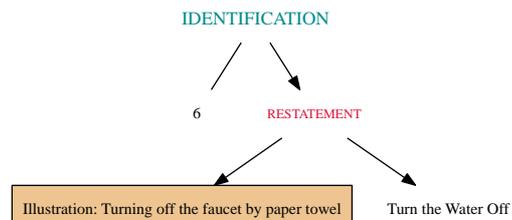
Table 6.3 Intra-clausal relations in CPHP

Intra-clausal relations	CPHP-NYC	CPHP-HK	CPHP
Identification	15	32	47
Class-ascription	0	3	3
Property-ascription	1	2 (1)	3

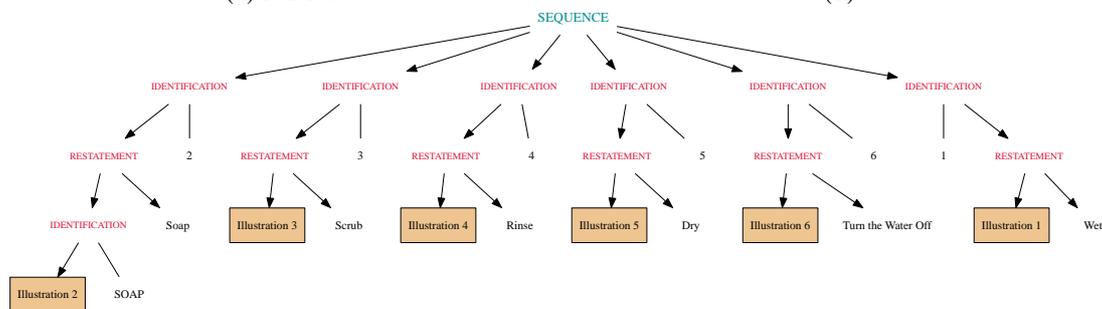
For the relation of identification, 13 of them are used to label step-by-step instructions for handwashing in NYC-9 and HK-9. As shown in all six illustrations captured from NYC-9 (Figure 6.2(a)), Arabic numbers (i.e. 1, 2, ... 6) are added to indicate six different steps in the sequence of washing hands, thus, the relation between the identified image and the identifier number is identification (Figure 6.2(b)). Meanwhile, all these six labelled illustrations form a relation of sequence (Figure 6.2(c)).



(a) NYC-9



(b)



(c)

Figure 6.2 Example of intra-clausal relation – identification

In addition, another fixed pattern of the sub-nuclear relation identification can be found, for example, between a telephone icon and a sequence of several digits. Here, the icon tells the viewer that the sequence is a phone number. The relation of property-ascription often holds between an attribuend image and its attribute caption in CPHP, for example, between the central photograph in NYC-2 (cf. Figure 5.6) and its caption ‘Chicken burrito with all toppings’ (cf. Section 5.3.5, for its annotation and the graph of its rhetorical structure).

Table 6.1 and Table 6.2 indicate the diversity of rhetorical relations used in the public health posters. Looking at all these 29 rhetorical relations and their 454 occurrences in Figure 6.3, it is obvious that elaboration is the most frequently occurring rhetorical relation, followed by enablement, motivation, multinuclear restatement, etc. In next section, I shall focus on some of the mononuclear and

multinuclear rhetorical relations for an in-depth analysis to understand the semantics behind the statistical numbers listed in this section.

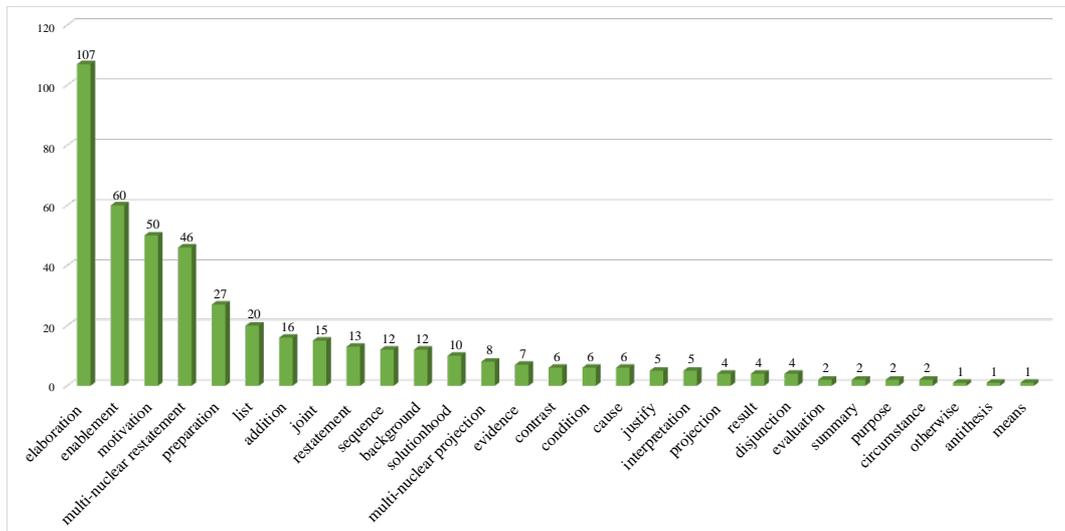


Figure 6.3 Nucleus-satellite and multinuclear relations in CPHP

6.2 Corpus-Based Analysis

6.2.1 An Overview of Rhetorical Relations

Here I shall give a general discussion of rhetorical relations with high occurrences in the corpus, rather than analysing all types of rhetorical relation. As shown in Table 6.4, 12 rhetorical relations have at least ten occurrences in the sub-corpora CPHP-NYC and CPHP-HK: elaboration, enablement, motivation, multinuclear restatement, preparation, list, addition, joint, restatement, sequence, background, and solutionhood. Among them, all relations of multinuclear restatement and mononuclear restatement in CPHP hold between one linguistic segment and one visual segment, so they will be discussed in next subsection. All other rhetorical relations that occur fewer than ten times will not be considered here.

The public health posters are rich in ELABORATION – there are 107 occurrences (47 in CPHP-NYC and 60 in CPHP-HK), which account for 23.6% of the total rhetorical relations in the corpus. Elaboration is also the most frequent relation in other corpora of different documents, for example, Taboada and Habel’s (2013) collection of scientific articles and Hiipala’s (2015b) corpus of tourist brochures

(Hiippala, 2015b). Why elaboration occurs so often in different genres? It would be more convenient to lay the blame for the frequent presence of this relation on its definition. According to Stede (2008: 318), “the definition of elaboration, background and circumstance are so imprecise that they are simultaneously applicable in a great many cases”, as a result, “many annotators seem to resort to elaboration as a ‘default’”. Concerning the criticism of Stede (2008), Hiippala (2015b: 137) points out that any judgement regarding any rhetorical relation “must be sufficiently informed by the context in which the relation is considered to hold”. Only in this way, a reliable result of rhetorical analysis can be achieved.

Table 6.4 The most common rhetorical relations (both mononuclear and multinuclear) in CPHP (*N* = 454; % of the entire corpus)

Rhetorical relations	CPHP-NYC	CPHP-HK	CPHP	
			N	%
Elaboration	47	60	107	23.6%
Enablement	18	42	60	13.2%
Motivation	26	24	50	11.0%
Multinuclear restatement	28	18	46	10.1%
Preparation	17	10	27	5.9%
List	12	8	20	4.4%
Addition	8	8	16	3.5%
Joint	6	9	15	3.3%
Restatement	11	2	13	2.9%
Sequence	6	6	12	2.6%
Background	7	5	12	2.6%
Solutionhood	7	3	10	2.2%

In CPHP, relations of elaboration hold between textual segments or between segments from various semiotic systems. As shown in Table 6.5, the satellite consists of one segment, several segments, or one span in the large majority of the elaboration spans. Most of them are used to present additional detail, to add specific information, to show an example about the nuclei. As indicated in the ‘unique/all RST relations’ columns of Table B.1 and Table B.2 in Appendix B, the rhetorical structures of most of the public health posters are not very deep, which is conditioned by the features of this particular genre – because posters of all kinds present messages in concise (cf. Section 4.2).

According to Mann and Thompson (1987: 54), the relations ENABLEMENT and MOTIVATION “form a subgroup, since both evoke a reader action”. In the public health posters, relations of motivation can be commonly located in the call to action

part to exhort the viewer to act by presenting commands, requests, suggestions, invitations, etc.; in the meanwhile, relations of enablement are often found in the same part to provide the viewer with information or related resources to increase his/her ability to perform the action (cf. Table 3.5). Furthermore, these two relations are often used along with each other in the part of call to action which is one of the compulsory moves in most of the posters. Therefore, both motivation and enablement have high occurrences in the public health posters. Notice that the relation of enablement contributes 42 occurrences in CPHP-HK, which is more than twice its occurrences in CPHP-NYC. This makes sense because there are lots of nominal groups listed as implicit offers in the public health posters used in Hong Kong (cf. Table 4.8).

Table 6.5 The satellites in elaboration spans in CPHP

	one segment	more than one segment	one span	one segment + one span	more than one span
CPHP- NYC	27	7	10	1	2
CPHP- HK	45	3	10	0	2

In the 60 public health posters, there are 27 occurrences (17 in CPHP-NYC and 10 in CPHP-HK) of PREPARATION relation, which account for 5.9% of the total rhetorical relations in the corpus. Retrieving the satellites participating in the relations of preparation from my corpus, I characterise them and find three general categories (Table 6.6): (1) the satellites consist solely of textual segments, for example, a headline (NYC-2, NYC-5, NYC-8, NYC-10, NYC-30), bilingual headlines (HK-10, HK-11), a section heading (NYC-17), or one headline and a line of text that is just below the headline (NYC-26); (2) the satellites consist solely of visual segments, for example, a central image (NYC-6, HK-15, HK-19, HK-22, HK-30), a set of images (NYC-7, NYC-20), a whole background image (NYC-16), or a collage of medical, hospital and piggy bank icons in the shape of New York State in NYC-27; (3) the satellites consist of a package of both verbal and visual element, for instance, a headline/bilingual headlines and a central image (NYC-23, HK-14), an image and texts/headlines projected by the participant(s) represented in the image (HK-3, HK-8), the campaign emblem that employs road signs in NYC-14 (cf. Figure 4.15), etc.

Table 6.6 The satellites in preparation spans in CPHP

	verbal	visual	verbal & visual
CPHP- NYC	8 headline, section heading, etc.	5 image(s), collage, background image	4 headline and image, campaign emblem, image and campaign logo, etc.
CPHP- HK	2 bilingual headlines	4 image	4 bilingual headlines plus image

There is thus a pattern that all of these aforementioned verbal and visual resources can be used separately as well as together in the public health posters as leading preparation, meanwhile, to facilitate understanding and remembering. However, this pattern is not likely to cause a trend in the corpus, it is certainly not for every instance – not all of the headlines and central images are preparatory, for example, a headline can be the nucleus of a whole poster (e.g. NYC-9), a background image that applies to the whole page of a poster can be the satellite of other relations such as projection if the image is the profile of a represented participant who speaks out textual messages (e.g. NYC-21).

The total occurrence numbers of LIST and SEQUENCE are 20 and 12 respectively in CPHP. Almost all of the list relations hold between segments that are items arranged in a list style with or without bullets (e.g. NYC-18, HK-17), while only a few hold between lines of monologue passages by a teen girl in NYC-21. The list items usually form a homogeneous collection of both the verbal and visual elements, for example, ways of beating diabetes listed in NYC-6, and obesity-related diseases exemplified in HK-6. In addition, visual or multimodal items can constitute a classificational process in which elements can be recognised as subordinates with attributes or properties inherited from a more general one, for example, 5 simple ways to prevent skin cancer represented with textual items and signs in HK-17.

In general, a sequence is a list of items arranged in a definite order. Items in the relation of sequence can be called steps, stages, terms, phases, etc. A series of handwashing steps shown in NYC-9 and HK-9 is the most obvious example of sequence in CPHP. Here I also introduce a more complicated example of sequence relation – the ‘history’ of portion sizes shown in NYC-1 (cf. Appendix A, cf. also Figure 4.13). In the diagram in NYC-1, three different-size portions of cheeseburgers are illustrated in a sequential order, which shows that the serving

sizes of cheeseburgers have almost tripled over time. Each of these three illustrations in the diagram represents the quantity of food that a restaurant serves or we prefer to order in different periods. Therefore, the rhetorical relations holding between these illustrations in the diagram can be identified as sequence (Figure 6.4).

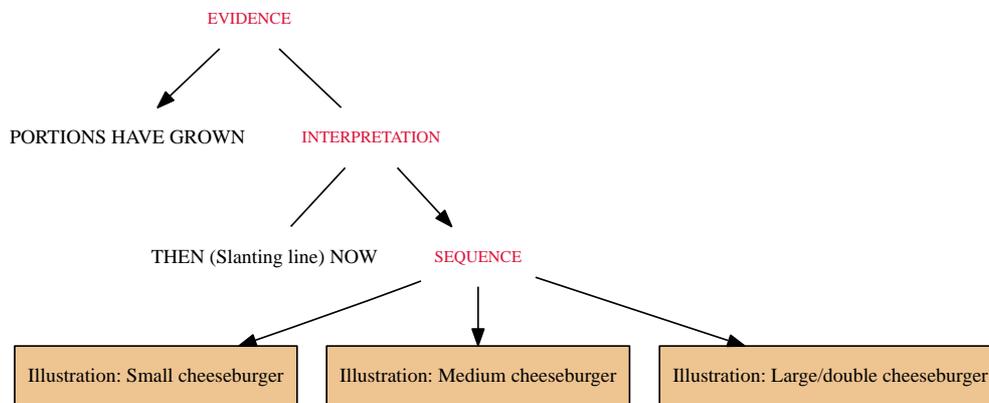


Figure 6.4 Example of rhetorical relation sequence

Addition, disjunction, contrast, joint and antithesis all belong to the extending type of rhetorical relations. Addition, disjunction, contrast and joint are multinuclear relations; whereas antithesis is a nucleus-satellite relation. Put simply, nuclei in the relations of addition, disjunction and contrast are comparable: ADDITION holds between segments to form an additive combination, disjunction marks an alternative relationship, contrast expresses the meaning of adversative; while antithesis has the meaning of replacive and incomparable (cf. Matthiessen, in prep.). For JOINT, none of other rhetorical relations is claimed to hold between nuclei. In the corpus, the relation of addition occurs 16 times. These relations of addition hold because segments share some similarities or one of the segment offers supplementary information about the other, so they are linked as a more complete representation. Among the 15 occurrences of joint in CPHP, there are cases, for example, where parts of a diagram together form a joint schema, they are simply linked as a whole (e.g. NYC-3).

As shown in Table 6.4, rhetorical relation BACKGROUND has 12 occurrences. This relation is used to express that the satellite segment contains background information for comprehending the nucleus segment. In CPHP, some of the satellites in background spans are also motivational, as in *One night can change your HIV status* (NYC-22) and *In Hong Kong, Hepatitis C is mainly spread by*

sharing needles and syringes (HK-25). For SOLUTIONHOOD, there are 10 instances of this relation in the corpus. In most of the cases, the satellites in the solutionhood spans are questions (e.g. NYC-4, NYC-9, NYC-12, HK-7, HK-18, HK-30). In the other cases, the satellites are about unhealthy living conditions or behaviours, such as the viewer's risk of health problems caused by the super-size portions (NYC-1). The first part of this section has been included to discuss some rhetorical relations with high occurrences in my corpus, in the next part of this section I shall move on to the discussion of the rhetorical relations that involve various semiotic systems.

6.2.2 Rhetorical Relations Involving Semiotic Systems Other Than Language

6.2.2.1 Restatement and Elaboration

As a type of expanding relations, elaborating relations include elaboration, restatement and summary (cf. the system of logico-semantic type of Figure 3.2 in Section 3.2.2). In terms of intersemiotic relations between text and image, the default type can be said to be “elaborating expansion – prominently the range of relationships covered under the label of ‘elaboration’ in RST (e.g. exemplification, classification, further detail), but also e.g. ‘restatement’ and ‘summary’” (Matthiessen, in prep.). In the present corpus of the public health posters, the default intersemiotic relations holding between text and image are restatement and elaboration. It is obvious from Figure 6.5 that restatement is the most frequently used intersemiotic relation which occurs 59 times in the two sub-corpora, as compared to the less frequent elaboration which occurs 41 times in all.

As shown in Figure 6.5 (cf. also Table 6.4), 46 occurrences (28 in CPHP-NYC and 18 in CPHP-HK) of multinuclear restatement, and 13 occurrences (11 in CPHP-NYC and 2 in CPHP-HK) of mononuclear restatement are located in the corpus. When only textual segments are involved, restatement holds when “the bulk of a satellite is roughly the same as that of the nucleus” (Mann and Thompson, 1987: 70). Similarly, in the multimodal context, mononuclear restatement holds when one segment re-expresses the other; whereas multinuclear restatement holds between two segments when these two segments form “a paratactic combination of two

segments of meaning being given equal semiotic status or weight” (Matthiessen, in prep.). Thus, whether the relation of restatement between text and image is asymmetric or symmetric, creates a nuclearity cline of restatement.

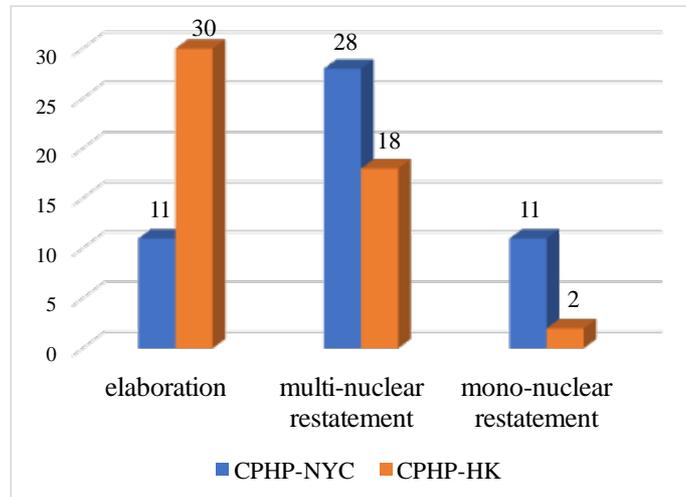


Figure 6.5 Occurrences of elaboration and restatement between text and image



NYC-5: *Burn Calories, Not Electricity*
(NYC DOHMH, 2008)



NYC-23: *New York's Hottest New Wrapper*
(NYC DOHMH, 2007)

Figure 6.6 Examples of multinuclear restatement in CPHP

Almost 78% of the restatement in the corpus of the public health posters is multinuclear type. For instance, in HK-2 (cf. Appendix A; cf. also Figure 5.17 in Section 5.3.5), the rhetorical relation holding between its diagram and the passages of text under the diagram is a multinuclear restatement. Figure 6.6 shows a couple

more examples. In NYC-5, the stick figure of a person climbing stair restate the call to action line *Take the Stair!*; and in NYC-23, the headline *New York's Hottest New Wrapper* and the product shot of a NYC condom with the distinctly 'Gotham' wrapper is also a restatement. Thus, the text and the image in relations of multinuclear restatement have roughly the same meaning, and they are coordinate with each other in these two public health posters. In some cases, multinuclear restatement is assigned to “avoid forcing unwarranted nuclearity choices” (Bateman, 2008: 169) when analysing multimodal documents.

In CPHP, all instances of nucleus-satellite restatement are relations in which the textual segments are the nuclei. More specifically, if an image presents essentially the same messages but it is a little incomprehensible without the nuclear claim in the passages of text, then the image is a mononuclear restatement satellite. There is a fuzzy line between nucleus-satellite restatement and elaboration when the two relations hold between text and image in an illustration style. The only way to determine the difference is to stick by their definitions (cf. Table 3.4 for the six subtypes of elaboration). Figure 6.7 shows two examples, and I shall explain why they are mononuclear restatement rather than multinuclear restatement or elaboration.



(a) captured from NYC-7



(b) captured from HK-24

Figure 6.7 Examples of mononuclear restatement in CPHP

First, the relations holding between signs and texts in Figure 6.7(a) are nucleus-satellite restatement. This case is different from the road signs used in NYC-14 (cf. Appendix A; cf. also Figure 4.15) or many other public signs such as No Smoking and Smoke-Free signs. Text and image in most of the public signs (e.g. traffic or road signs, warning signs, exit signs) are juxtaposed with each other and form multinuclear relations such as restatement and addition (cf. Matthiessen, in prep.).

Here, the NYC-7 poster designer imitates public signs but the three signs may create ambiguity independent of the textual segments. For example, the first sign in Figure 6.7(a) means No Salt rather than *Eat less salt*; the second is similar to Pedestrian Crossing or Crosswalk sign instead of a sign for exercise; and the third medicine bottle sign is not the conventional way of expressing *Take your medicine*, perhaps it might suggest visiting your pharmacist.

However, in public signs, ambiguity is unacceptable, and the messages in multimodal signs are realised linguistically and pictorially in either expository (i.e. multinuclear restatement) or additive (i.e. addition) way. Therefore, the rhetorical relation holding between the sign and the text in Figure 6.7(a) is more like nucleus-satellite restatement or elaboration. But the verbal and visual segments are displayed vertically in the design, which is remarkably similar to public signs. I identify them as restatement rather than elaboration, and assign the nuclearity to the textual segments. For the second example – the central image and the bilingual headlines shown in Figure 6.7(b), mononuclear restatement is also assigned here. The poster HK-24 features three syringe signs making a diagonal line in a tic-tac-toe game on a 3x3 grid. Drawn in the right lobe of a liver, the tic-tac-toe board joints the human liver as a single segment, which indicates that three-injection vaccination wins the ‘game’ – fighting off the infection.

Restatement is also the most common intersemiotic relation in CPHP-NYC (i.e. 39 occurrences); while elaboration is the most common intersemiotic relation in CPHP-HK (i.e. 30 occurrences). In the public health posters, elaboration holds between verbal and visual segments often to present additional details. For example, photographs are used to provide examples such as one particular health problem caused by obesity in NYC-1, and various kinds of illustrations are used to exaggerate the immense scale of health consequences associated with tobacco, drugs, etc. (e.g. NYC-12, HK-20). In addition, texts can serve as satellites to add specific details to images, such as the calorie posting in NYC-2 and smoking-related diseases labelled in HK-12.

6.2.2.2 Projection

Within SFL, relation of projection corresponds to verbal and mental clauses – it sets up one clause as the representation of the linguistic content of another either as “locutions in a verbal clause of saying” or as “ideas in a mental clause of sensing” (Matthiessen et al., 2010: 165; cf. Halliday and Matthiessen, 2014: 432-435, 508-549; cf. also Halliday and Matthiessen, 1999/2006, 2014; Matthiessen, 1995b). In the multimodal context, projection holds between sayers/sensors that are represented pictorially and verbal/visual information that is represented within or without carriers (e.g. speech balloons, thought clouds). More specifically, carriers are not necessarily a holder of passages of text only, “but can hold visual matter as well” (Cohn, 2013a: 48). In certain cases, projection can be formed without any explicit carriers. I shall describe relations of projection in detail using examples from the public health posters in my corpus.

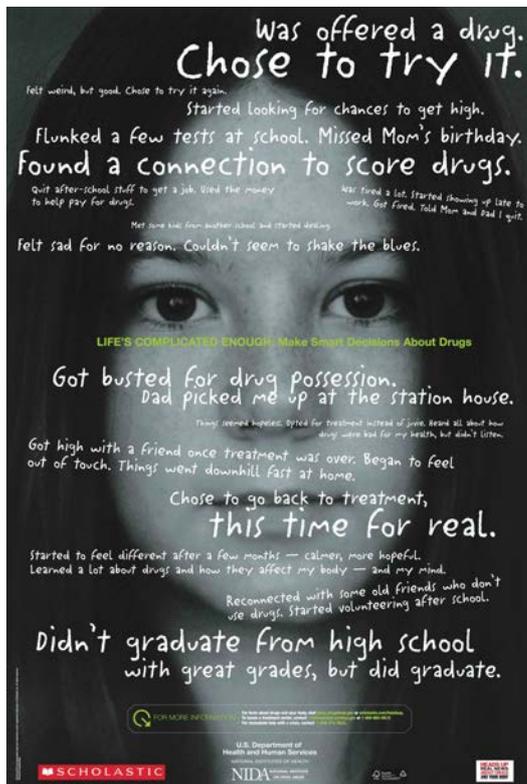
As introduced in Section 3.2.2, relations of projection can be either nucleus-satellite (either projecting or projected as the nucleus) or multinuclear (cf. Figure 3.3). Table 6.7 provides a summary of the occurrences of two types of projection relation identified in my corpus of the public health posters: 8 occurrences of multinuclear projection, and 4 occurrences of nucleus-satellite projection with the projected segments as the nuclei. Among the 12 occurrences of projection, 11 of them are intersemiotic relations between text and image, 1 holds between two visual elements.

Table 6.7 Intersemiotic projection relation in CPHP

PROJECTION	CPHP-NYC	CPHP-HK	CPHP
multinuclear projection	2 (NYC-4, NYC-15)	6 (HK-1, HK-3, HK-8)	8
mononuclear projection (Nucleus: the projected segment)	2 (NYC-21, NYC-24)	2 (HK-28)	4

Under normal circumstances, projection is easy to locate if there is any overt or covert carrier or tail, for instance, speech balloons depicted in NYC-4 (Figure 6.9), HK-1, HK-3, HK-8, a tailed line and an imaginary vector line in HK-28 (Figure 6.8). The vector line formed by the celebrity’s pointer finger is called null carrier by Cohn (2013a: 53). In some cases, projection is formed without any carrier or other devices, as in NYC-15 (Figure 6.9), NYC-21 (Figure 6.8) and NYC-24. However, we can

tell it by the first-person subjects in the passages of text. For instance, the first-person plural pronoun *us* in their rallying cry *Breast cancer survivors come in all colors*. *A mammogram made the difference for us* in NYC-15; and the *I* used by the speaker to refer to himself or herself in *I PROMISE, I will get a Hepatitis B blood test*. In NYC-24 (cf. Appendix A).



NYC-21: *Life's Complicated Enough: Make Smart Decisions About Drugs* (NIDA, 2008)



HK-28: *Support Organ Donation Register Online!* (DH, HKSAR, 2006)

Figure 6.8 Examples of mononuclear projection with the projected segments as nuclei in CPHP

Figure 6.8 provides two examples of mononuclear projecting relation holding between the represented participants and textual information or a visual logo, in which the projected messages are the nuclei. NYC-21 features a close-up of a teen girl and presents a detailed portrayal of how she became involved in consuming and selling drugs and the subsequent road to recovery. This young lady in this poster is an actress, is not a drug user in real life; however, the monologue about drug abuse projected by her is not unrepresentative of what can happen among teens. She speaks about her personal story and hopes others can learn from her mistake and make smart decisions about drugs. HK-28 depicts two celebrities – one of them pointing to the viewer and projecting “*Family support is important!*”, the other

pointing to the organ donation campaign logo. The butterfly logo has brightly coloured wings made of four fingerprints and has the word ‘love’ as its antennae, which symbolises the loving act of helping others by signing up to donate organ after death. All the three participants represented in both NYC-21 and HK-28 serve as the satellites qualifying the epistemic status of the messages given in the nuclei.

In contrast, the relations of projection shown in Figure 6.9 are multinuclear – both the projected textual messages and the represented participants are nuclei. The projecting participant in NYC-4 is a fresh green apple looking delicious, with water droplets. It is not only the sayer, but also an example of heart healthy fruits which the viewer should pack as a snack to eat on the go. In poster NYC-15, ten breast cancer survivors standing in row are shown against a pink background which symbolises their fight against breast cancer. In addition, as the carriers in relation to various possessive attributes (cf. Section 4.4.1), they are grouped here to create the visual concepts of racial and ethnic diversity and age differences. If the textual lines were *Breast cancer survivors come in all colors. A mammogram made the difference for THEM*, a relation of multinuclear restatement can hold between them. Therefore, all the participants in these two public health posters exemplified in Figure 6.9 are represented as figures playing more than one role.



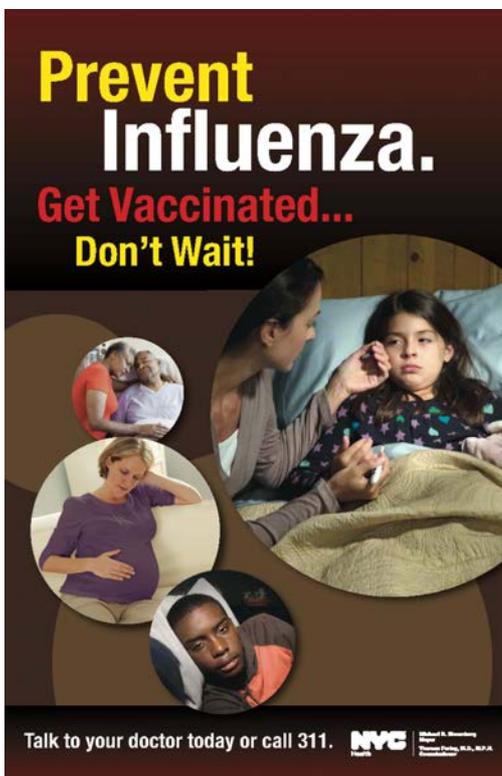
NYC-4: *No Time to Eat?*
(NYC DOHMH, 2014)

NYC-15: *Breast Cancer Survivors Come in All Colours.*
(NYSDOH, 2010)

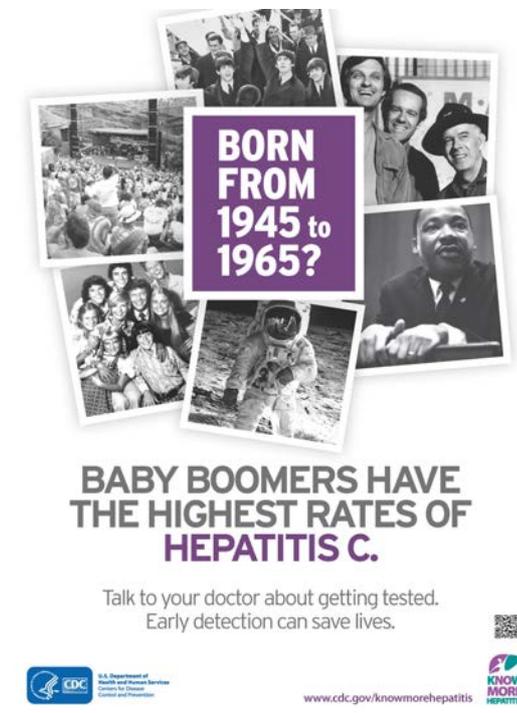
Figure 6.9 Examples of multinuclear projection in CPHP

6.2.2.3 Other Intersemiotic Relations

In the present corpus of the 60 public health posters, the intersemiotic relations involve preparation (cf. Table 6.6), motivation (e.g. NYC-2, NYC-12), enablement (e.g. NYC-19, NYC-24, HK-9, HK-30), interpretation (NYC-1, cf. Figure 6.4), otherwise (NYC-8), solutionhood (HK-7), result (HK-10), circumstance (NYC-25), addition (HK-6), etc. Almost all the motivation and enablement relations occur between different semiotic resources if campaign logos, QR codes, etc. are involved. Most of the other types are just individual cases, occurring only once in CPHP. Here, I shall focus on two examples shown in Figure 6.10: otherwise and circumstance.



NYC-8: *Prevent Influenza.*
(NYC DOHMH, 2009)



NYC-25: *Born from 1945 to 1965?*
(CDC, 2012)

Figure 6.10 Examples of intersemiotic relations: Otherwise and circumstance

In the first example – NYC-8, four photographs cropped in circles feature sick people with influenza in different groups: children, senior citizens, pregnant women, and teens. These four images indicate how pandemic flu may affect the New Yorkers, and imply that health conditions such as pregnancy can make the flu more dangerous. Therefore, anyone who wants to avoid flu and flu complications should be vaccinated, otherwise you and your family members might be one of the represented participants depicted in NYC-8. According to Mann and Thompson

(1987: 66), the effect of otherwise is the viewer “recognises the dependency relation of prevention between the realisation of the situation present in nucleus and the realisation of the situation presented in satellite”. Thus, the rhetorical relation between the four photographs and other parts of the poster is otherwise, and Figure 6.11 shows the rhetorical structure of this poster.

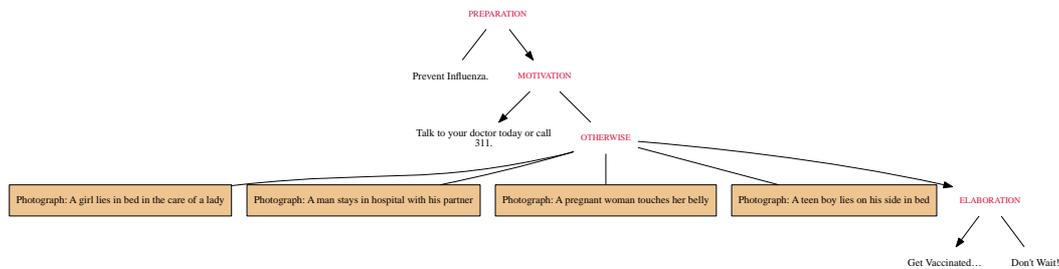
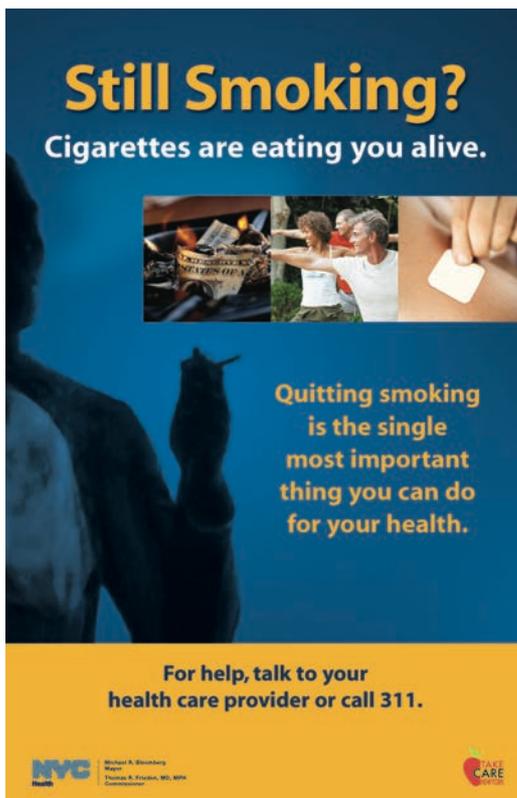


Figure 6.11 Rhetorical structure of NYC-8: Otherwise as the intersemiotic relation

The second example, public health poster NYC-25 utilises six iconic photographs with universal appeal specific to baby boomers. My initial impression of the rhetorical relation between the headline *Born from 1945 to 1965?* and the photographs that feature a circular layout is elaboration – the headline sets up a temporal circumstance and this is elaborated by the photographs. However, in a clockwise direction, these photographs are about (1) the Beatles band landed at JFK airport in New York City in 1964, (2) cast of *M*A*S*H*, American television series from 1972 to 1983 on CBS, (3) Martin Luther King (1929 – 1968), who spearheaded the 1960s civil rights movement from 1954 until his death in 1968 in the US, (4) Neil Armstrong took the first walk on the moon in 1969, (5) cast of the *Brady Bunch*, American sitcom aired from 1969 to 1974 on ABC, and (6) Woodstock Music and Art Fair (1969) at Yasgur’s farm in New York State. Four of these events did not occur or exist within the range of birth years of the baby boomers. Therefore, all these six photographs are the visual circumstances of the early lives of the baby boomers, they are provided to engage with the target viewer and promote self-identification. So it’s quite clear that the relation holding between these six photographs and the headline *Born from 1945 to 1965?* is circumstance.

6.3 The Rhetoric-Layout Interface

As clarified in Section 5.3.4, I haven't fully annotated the layout layer – only the layout structure of each public health poster is annotated in the present corpus. So, is there any correlation between the layout structure and the rhetorical layer? Hiippala (2013: 461, 469; cf. also 2015b) suggests that the relationship between the rhetorical and the layout structure may be characterised as “reciprocal” – “adopting a particular configuration in the rhetorical structure also affects the range of choices available in the layout structure and vice versa”; and the “rhetoric-layout interface” shapes the structure of multimodal documents. Although the multimodal structure is not the core focus of the present study, it is useful and helpful to notice the rhetoric-layout interface during the visualisation of CPHP. I shall use two examples (Figure 6.12) from CPHP to elaborate.



NYC-12: *Still Smoking?*
(NYC DOHMH, 2008)



HK-24: *Protect Against Hepatitis B, 3 Jabs Work*
(DH, HKSAR, 2014)

Figure 6.12 Examples of the public health posters with matching/mismatching layout and rhetorical structures

NYC-12 is divided into two parts: the blue upper part and the orange lower part. The upper part includes an X-ray photograph of a person smoking a cigarette,

headline part (*Still Smoking? Cigarettes are eating you alive.*), three images and a sentence (*Quitting smoking is the single most important thing you can do for your health.*); the lower part offers information and help to quit, and shows the lockup (the NYC Health logo, plus the mayor’s and commissioner’s names) and the logo of the health agenda TCNY. The difficulty I was facing when I analysed the rhetorical relations is that how to determine the relation between the three images and the other part of the poster since they convey messages about quitting smoking from different points of view. The first small image is about the financial effects of smoking, so quitting smoking can save you bucks. The second small image features a few people being physically active, which is great for their health and can help curb the urge to smoke. The third small image depicts a person using a nicotine patch, which implies that using quit-smoking medications can reduce cravings and double your chance of success. The first image is about the reason to quit, and the other two can be considered as the ways that make the quitting easier. However, since the three images are arranged like a triptych art, they should be treated as a broader category – motivation tips.

Thus, the rhetorical structure of NYC-12 can be:

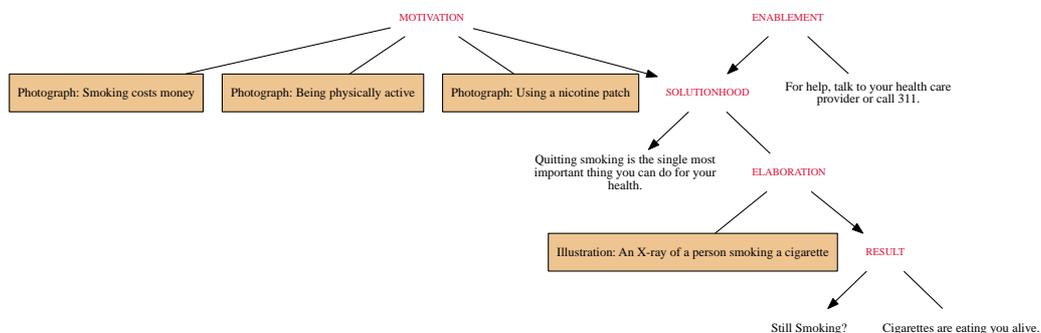


Figure 6.13 Rhetorical structure of NYC-12: A set of small images as visual motivation

HK-24 has a similar layout structure, including two sub-areas. For the relation between the bilingual headlines and the signature illustration, I have discussed in Section 6.2.2.1 (cf. Figure 6.7(b)). Below the headlines and the image, the poster presents the following three parts:

詳情請諮詢家庭醫生

Please consult your family doctor for details

衛生署母嬰健康院為六歲以下兒童免費接種乙型肝炎疫苗。

The Maternal & Child Health Centres, Department of Health offer free hepatitis B vaccination to children under age of six.

衛生署 特別預防計劃 病毒性肝炎預防服務

Viral Hepatitis Preventive Service, Special Preventive Programme, Department of Health

肝炎熱線 Hepatitis Hotline: **2112 9911**

肝炎網址 Hepatitis Website: **<http://www.hepatitis.gov.hk>**

They have different font colours and font sizes. It seems that part one and part two hold a multinuclear relation of disjunction – for arrangement of hepatitis B vaccination of ‘adults in the general population’ or ‘children under age of six’, please ‘consult your family doctor’ or ‘the Maternal & Child Health Centres’. However, the passages of text in part one are presented very close to the image and in a bold orange font, which causes the unequal semiotic weight between these two layout chunks. In addition, part one and part three are about where the viewer can get more information; while part two is about where children can get the vaccine. Thus, it is hard to determine the rhetorical relations among them, since the layout structure has no hint and they are not displayed as a list. I simply treat them as individual enablement resources, with no corresponding relation between/among each other.

The interface between rhetoric and layout in multimodal artefacts can be used to help re-determining rhetorical relations to achieve more reliable analysis results, can be used to describe multimodal genres. Furthermore, it can be used to explore design critique, according to Bateman (2017a: 232):

It was hypothesized that ‘good’ design might be partially characterised according to the extent to which visual page organization could be said to ‘support’, or be consonant with, communicative intent. This was explored with respect to the data analysed and cases where lack of support was found were discussed with designers. Where divergences were found between the visual layout organization and the rhetorical intent, it was suggested that design problems might result and consumers of such documents could be expected to face interpretation difficulties.

Checking all graphs of rhetorical-layout structures (cf. e.g. Figure 5.13, Figure 5.14(b)) and examining features for cross-referencing the rhetorical and layout structures, I find that the public health posters in CPHP-NYC have higher consistency rate in layout style than the posters in CPHP-HK. Most importantly, for most of the public health posters in CPHP-NYC, the deployment of layout and

spatial resources is highly consistent with the rhetorical weights. For instance, the enabling resources (i.e. the satellite segment in the enablement relations) are located closely with the call to action (i.e. the nucleus segment in the motivation relations). 25 public health posters in CPHP-NYC (83.3%) belong to this type, and the enabling information is listed at the bottom of these posters. It's obvious that such posters trace a template – first luring the viewers into the ‘trap’ of call to action and then offering related information in the same line of call to action or right below the line to enable the target masses themselves to get fully hooked. However, 17 public health posters in CPHP-HK (56.7%) have this kind of design. Although the design is different, the other 5 posters (i.e. NYC-9, NYC-10, NYC-11, NYC-20, NYC-21; cf. Table A.1 in Appendix A) in CPHP-NYC designed for children (NYC-9, NYC-10), hospital patients and visitors (NYC-11), and teen students (NYC-20, NYC-21) present information clearly by utilising graphics (e.g. diagrams) or text-flow (e.g. paragraphs) to enhance the target viewers, for example, to see six simple and effective handwashing steps in NYC-9, and to read an accurate portrayal of the path that teens often take when they are abusing drugs and their subsequent road to recovery in NYC-21. To some extent, these 5 posters are similar to infographics or even diaries, used to show sequence (cf. Figure 6.2(c)), etc. or to integrate a variety of information.

6.4 Generic Structure and Socio-Semiotic Processes

First, regarding the studies within the genre of public health poster, this is a less defined area. Hasan (1978: 229) defines genre as “type of discourse, a generalized structural formula, which permits an array of actual structures”, and introduces the concept of contextual configuration which is related to Halliday’s (1978) register variables of field, tenor and mode. Hasan’s (1978, 1984/1996; see also Part B in Halliday and Hasan, 1985/1989; Ventola, 1984: 104) views on genre can be summarised as: the values within the contextual configuration of a particular social context predict the structural formula (SP) which includes functional elements (obligatory and optional) and the sequence of elements. So, a genre is represented by the generic structure potential (GSP) which specifies what and where of invariant and variant elements that any texts may have in order to be belonged to a genre. The

GSP for a particular genre is then the linear representation of these elements in a permitted order.

Hasan's work on genre and the formulation of GSP are of great significance in genre analysis, it not only provides an astute explanation of the uniformity and diversity among all the texts of a genre, but also clarifies the relationship between texts and contexts in that Hasan (1978: 231) mentions that "context is a determinant of the structural formula". But Hasan's GSP is formally similar to the notion of rhetorical schema (Matthiessen and Bateman, 1991: 299) or rhetorical formation sequences (Lemke, 1999). In Halliday's (cf. e.g. 1991/2007, 2005a) model of context, genre is close to situation type based on the intersection of the hierarchy of stratification and the cline of instantiation – genre simply corresponds to text type or register (Matthiessen et al., 2010: 106-107; cf. also Lukin, Moore, Herke, Wegener and Wu, 2008; Matthiessen, 1993: 233). Drawing on Hasan's (1984/1996) work on the semantic realisation of elements of generic structure, Matthiessen (2015c) explores how situation types (genres) are realised semantically by suggesting that patterns of semantic realisation can be characterised in terms of logico-semantic complexes with the help of RST.

Hasan's GSP and some other genre studies within SFL such as Ventola's (1984, 1987) flowchart notation and Martin's (1992) genre model, and notions of genre defined within other traditions (e.g. the New Rhetoric genre theorist Miller, 1984; English for Specific Purpose scholar Swales, 1990) cannot be readily applied to the study of multimodal genres since they define the structure of genre as *linear* and *phased* and adopt largely *typological* perspective into genre deconstruction. Indeed, when these notions of genre meet multimodality, for example, the linearity sequencing – the *one-dimensional* unfolding of a communicative event either in space (artefact: written) or time (performance: spoken), is one of the first intrinsic properties to disappear (Bateman, 2014b: 243).

Despite this, the view of genre as staged, goal-oriented social processes in most of these early work, has "subsequently become a cornerstone of approaches to genre in general" (Bateman, 2008: 186-187). Thus, in a top-down manner, Bateman (2014b: 258) defines a multimodal genre as "a temporarily stabilised, conventionalised and structured bundle of planning results for communication

among a community of users” (cf. also Tseng, 2013; van Leeuwen, 2005). Since discourses are means to achieve communicative goals in a certain social/cultural context, multimodal discourses belong to the same genre if they are constructed to achieve similar communicative functions. This perspective from the above (i.e. semantics and context) avoids the problem of applying linguistic forms to non-linguistic modes (cf. Bateman and Schmidt, 2012; Matthiessen and Halliday, 2009).

In Bateman’s definition of multimodal genre, the link between mode and genre is crucial (cf. Bateman, 2008, 2014b: 251-258, 2016a, 2017b; Hiippala, 2014; cf. also Bateman’s, 2011, definition of semiotic mode: a semiotic mode is a tri-stratal organisation – “(1) a *material substrate*, which carries (2) the *semiotic resources*, whose interpretation is guided by (3) their *discourse semantics*” (summarised in Hiippala, 2014: 115)). Bateman (2008) emphasizes that we cannot really say what a genre is involved before we know what semiotic modes are being deployed. A multimodal genre is, according to Bateman (2014b: 258), “constituted by a collection of rhetorical strategies deploying the semiotic modes provided by the medium within which the communication is being enacted”. From this perspective, multimodal genres are complex syntheses produced by *multi-dimensional* meaning-making practices which are repeated and recognizable across different semiotic artefacts in our culture (cf. e.g. Bateman, 2008: 217-219, 2014b; Tseng, 2013: 36-38).

One direct consequence of the multi-dimensional view is that we can compare different genres along a number of dimensions from a *topological* perspective (cf. Bateman, 2008: 223-225; Halliday and Matthiessen, 1999/2006: 68-71; Lemke, 1999; Martin and Matthiessen, 1991; Matthiessen, 1995a). Lemke (1999) introduces the topological notion of specifying genres, suggesting that genre patterns characterised by semantic features (e.g. rhetorical strategies) can be used as criteria or parameters to describe similarities and differences among genres; and Lemke (2005) later suggests that a multimodal notion of genre has to be *multi-linear* (e.g. functional meaning relations among text and related image may constrain the sequence, but not in a strict way) and characterised by the probabilities of occurrence of verbal and visual forms as well as the sequential development. In Bateman’s (2008: 223) words: “A topological space of genres is ... one in which

each genre is characterised as being either nearer or more distant from other genres along a number of dimensions of comparison”.

In the current stage, therefore, I cannot characterise the genre of public health poster without a comprehensive empirical analysis focusing on features and patterns realised through language, image, layout, typography, colour, etc. All these different meaning-making and expressive resources work together in different discourse dimensions and are attributable to its genre considerations. However, after examining the public health posters from below (cf. Section 4.3 and Section 4.4) and from roundabout (cf. Section 6.2), I can discuss the generic structure and the nature of the socio-semiotic activity that constitutes a situation on the page of each public health poster. As shown in Figure 4.11, the holistic structure of the public health poster includes several main parts. For generic structure, it includes:

Attract and focus attention ^ Identify health-related phenomenon ^ Describe and explain phenomenon ^ Offer/ignite call to action ^ enable call to action and/or further action ^ Establish credibility/expertise

More specifically, the public health poster uses verbal and/or visual elements to draw and focus the viewer’s attention. Capturing the viewer’s attention can be achieved by employing headlines with typographic design and/or appealing images (e.g. a delicious green apple with water droplets in NYC-4, stomach-churning semi-congealed fat in NYC-3, a happy family in HK-8, a zombie man in HK-12). The headlines and/or images directly identify the health-related phenomena (i.e. health issues and problems), and also prepare the public for more details. The public health posters usually continue to describe and explain the identified phenomena by offering background and supporting information (e.g. causes, effects, risk factors) that creates awareness in order to justify a call to action, then follow up the call to action with more details (e.g. tips for what to do, relevant resources for the intended viewer) to enable the public to change their own health status. Finally, the poster designer stamps agency logos, lockups to create a high level of credibility and expertise for the conveyed messages.

For the socio-semiotic processes, Matthiessen (cf. 2006a, 2015b, 2015c, 2016; cf. also Matthiessen and Teruya, 2015, 2016; Matthiessen et al., 2010) classifies texts

according to eight primary fields of activity: expounding, reporting, recreating, sharing, doing, enabling, recommending, and exploring (Figure 6.14).

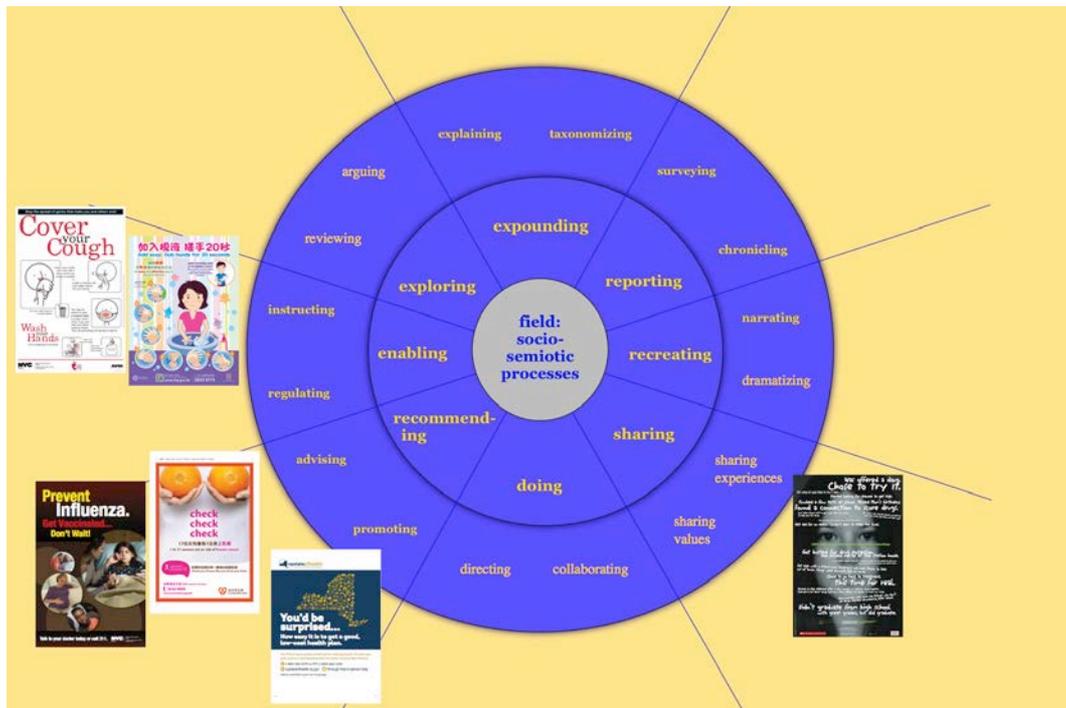


Figure 6.14 The eight primary fields of activity and their subtypes (Matthiessen, 2015b, 2015c), and some poster representatives located into several fields of activity

These primary fields of activity are distinguished and grouped into three superordinate categories based on “whether the activity is primarily a process of meaning (semiotic activity), a process of behaving (or doing; social activity) or a process of meaning likely to lead to a process of behaving” (Matthiessen and Teruya, 2015: 252-253; 2016: 207-209; cf. also Halliday and Matthiessen, 2014: 35-36):

- **semiotic processes** (i.e. processes of meaning):
 - **expounding** knowledge about the world – about general classes of phenomena, categorizing them or explaining them
 - **reporting** particular phenomena, chronicling the flow of events, surveying places or inventorying entities
 - **recreating** any aspect of prototypically human life imaginatively by dramatizing or narrating events
 - **sharing** personal experiences and values, prototypically in private
 - **exploring** societal values and positions, prototypically in the public arena
- **semiotic processes** potentially leading to **social processes** (i.e. meaning leading to doing):

- **recommending** some course of activity, either for the sake of the speaker through promotion of some commodity or for the sake of addressee through advice
 - **enabling** some course of activity, either enabling the activity by instructing people in how to undertake it or regulating the activity by controlling people's actions
- **social processes** (i.e. processes of doing):
- **doing** – the situation is constituted in some form of social behaviour, involving one or more persons. Language or other semiotic systems such as gesture, gaze and facial expression may be engaged to facilitate the performance of the activity, as when language is used to coordinate a team.

The majority of the public health posters in CPHP belong to the socio-semiotic process of recommending, advising the general public to undertake the health-related messages for their own good (e.g. NYC-8, HK-15) or promoting health plans that work for the target viewer (e.g. NYC-27, HK-27). Some posters of this kind are inserted in Figure 6.14. A few public health posters in CPHP include the socio-semiotic process of enabling, instructing the public in some type of procedure (e.g. handwashing steps in NYC-9 and HK-9) or constraining them by regulating their health-related behaviours (e.g. covering your cough in NYC-11 and HK-11). In addition, there are also public health posters sharing personal experiences and stories (e.g. NYC-21, HK-29). HK-29 (cf. Appendix A), one of the 4-in-1 posters (cf. Figure 4.10), is a very special example. Four sequential posters are linked together to disseminate the message of no alcohol among young people. All the 4-in-1 posters are put together in the correct order and then the viewer reads the shared story as a whole, using the timeline as a cue. Life events displayed in the first three 4-in-1 posters in the development of the whole story don't foreshadow the tragic cause & effect event in HK-29. However, the contrast between responsible and irresponsible parenting (i.e. fostering good rather than bad life habits) cannot be emphasised when HK-29 is used alone.

Chapter 7 Discussion and Conclusion

Up till now, I have analysed the experiential meaning and interpersonal meaning made by individual semiotic systems, i.e. language and image, in 60 public health posters in Chapter 4; I have described the use of rhetorical relations used in such posters with the results obtained from the GeM-annotated corpus CPHP in Chapter 6. In this chapter, I shall summarise the analysis results to answer all the research questions listed in Section 1.2.1. So, this chapter will sum up how the public health posters in my corpus employ different semiotic resources to represent health-related information and educate the public; to discuss the contribution the present study can make and also the limitations.

7.1 Answering Research Questions

7.1.1 Meaning-Making and Text-Image Relations in the Public Health Posters

7.1.1.1 How Do Language and Images Work Individually?

Different semiotic systems (i.e. language and images) used in the public health posters in CPHP, differ in meaning-making. In this section, I shall summarise the major meaning-making features within the two different semiotic systems and elaborate the differences. For the public health posters in CPHP, in order to ensure the general public receive the educational messages through such posters appropriately, language is the principal semiotic resources used to identify the poster topic (i.e. a key health problem, health issue, or health interest) clearly and precisely, and to present the health-related information about the identified topic accurately and concisely.

For the majority of the public health posters in CPHP, language is made use of a lot of material and relational types of process (cf. Table 4.6 and Table 4.7) to construct easy-to-read health-related messages, easy-to-understand beliefs, and easy-to-use

life skills. As is shown in Table 4.8, in order to help the intended viewer understand, remember, and act on the health-related information through the public health posters, declarative clauses and nominal groups are often used to present factual and neutral information (i.e. the plain statement of facts, beliefs and values, and skills) and explain why such information is important to the public. For instance, a sequence of instructions (e.g. handwashing steps in HK-9) can even be realised by short nominal groups in the public health posters. Meanwhile, imperative clauses are used to make a specific call to action (i.e. command), to recommend healthy lifestyles and urge the viewer to practice them. And nominal groups and imperative clauses are often used to provide more details and further resources (e.g. call and visit invitation) that support and enable the viewer to take the call to action or to learn more about the health-related topics.

As one type of the public health education materials, the public health posters in CPHP prefer simple present tense to develop and deliver health-related information as plain facts. Nothing could be crassly misleading, and the members of the general public have no choice but to believe these facts. For example:

2000 CALORIES A DAY IS ALL MOST ADULTS SHOULD EAT (NYC-2)

IT KILLS NEW YORKERS TO WAIT IN LINE. EVERY 15 HOURS A NEW YORKER DIES WAITING FOR AN ORGAN. (NYC-28)

Seasonal influenza vaccination is an effective way to prevent seasonal influenza and its complications. (HK-8)

Sustained Breastfeeding paves the way for healthy growth of your baby (HK-19)

As mentioned above, the posters in CPHP prefer imperative clauses to issue commands, give advice, and request action, and prefer imperatives and nominal groups to enable the suggested choices or changes. In order to make the commands and advice clear and direct, such posters highlight the positive, tell the viewer what you should do (e.g. Do ..., Please do ...) rather than what you should not do (e.g. Don't do...). Hence, a plurality of the public health posters in CPHP educates the public by telling them how to improve their current behaviour and situation, not by

negating their current lifestyles. This can also avoid preaching at the public too much. So, *Don't* is seldom found in CPHP:

Get Vaccinated... Don't Wait! (NYC-8)

DON'T GET BURNED BY TANNING MYTHS (NYC-17)

Don't share needles or works (HK-25)

In addition, as one type of the public-facing communication materials, the public health posters prefer declarative mood with sparingly-used modal assessment (cf. Table 4.9), compared to advertisements in our daily lives that use declarative mood with high modality to be very certain in the claims they make about their products. Even in the cases where modal items are located, most of these cases express a medium value probability (e.g. will, can) to claim objective certainty, use a medium value obligation (e.g. should) to give clear advice with politeness, or employ *can* and *could* to make positive assessment of the viewer's ability or health-related product's potentiality.

Language and images differ in the ways of meaning-making in the public health posters in CPHP. There are much more offer images than demand images used in my collection of the public health posters (cf. Figure 4.17). The represented participants are usually depicted as not looking at the viewer, rather than aligning themselves with the viewer by eye contact. Thus, images are not the principal resources used to direct the viewer to the action that the public health posters want. The systems of non-verbal images (e.g. images, layout and graphic design aspects) have their natural advantages over abstract language. Images tend to be more appealing and compelling to the viewer than words in most of the public health posters sampled in CPHP. Various kinds of images and visual design elements enhance the visibility of the posters and, most importantly, make and contain meanings. Sometimes, an image is worth more than a thousand words.

First of all, images, especially the large images as photographs (cf. Table 5.4), work well for showing real-life situations or events (e.g. NYC-1, NYC-6, NYC-29, HK-10), people (e.g. NYC-7, NYC-15, NYC-30, HK-8, HK-18, HK-28), and emotions (e.g. NYC-13, NYC-28, HK-16, HK-27). For instance, NYC-1 describes an event in actual life – an overweight woman riding a mobility scooter. This lady has had

trouble walking long distances because of her obesity. NYC-7 features real New Yorkers – 4 elderly African Americans. Because they are more likely than other groups (e.g. Caucasians) to have high blood pressure. HK-16 expresses a positive emotion – a huge sense of relief on a woman’s face after her cervical smear test. In CPHP, most of the vividly captured reality is realised by action, reactional and analytical processes in images (cf. Table 4.10). And similar to the occurrence of relational processes in language (cf. Table 4.6 and Table 4.7), lots of conceptual images are identified in the public health posters in CPHP (cf. Figure 4.16) to “represent the world in terms of more or less permanent states of affairs or general truths” (Kress and van Leeuwen, 2006: 109). For the public health posters in CPHP, a plenty of analytical images are found to relate the represented participants to a number of possessive attributes.

Second, various types of illustrations (e.g. cartoon stick figure poses and actions; cf. also Table 5.4) are great at dividing a sequence (e.g. handwashing steps in NYC-9 and HK-9), explaining hard-to-see or invisible situations (e.g. colonoscopy screening in HK-14, tubercle bacilli in HK-26), simplifying complexities (e.g. addiction, a brain disorder in NYC-20 and HK-20), highlighting a key idea or key points of an idea (e.g. the idea of ‘don’t drink yourself fat and sick with sugary drinks’ in NYC-3), and depicting culturally-sensitive or sad issues (e.g. sexual impotence in HK-13, woman’s breasts in HK-15, people dying because of a shortage of donor organs in NYC-28). To elaborate one of the just mentioned instances, HK-26 employs simple illustrations to educate the public on the basic TB facts, for example, tubercle bacillus is transmitted by tiny droplets in the air. When a TB patient coughs or sneezes, small droplets containing the tubercle bacilli are generated and spread in the air. These invisible tubercle bacilli are visualised as baleful bacillus characters in HK-26.

Third, the diagrammatic representation is used to show a key idea or key components of an idea at a glance. In CPHP, a few diagrams (cf. Table 5.4) are employed to graph the essence of health-related or medical phenomena (e.g. benefits of breastfeeding in NYC-19, health risks of tobacco use in HK-12), to display how individual components make up a whole (e.g. steps (i.e. smart food choices and perfect portions) to a balanced lunch in HK-2), to expose connections or relationships between multiple entities (e.g. growing portion sizes of food offered

in restaurants and fast-food establishments over the past few decades in NYC-1). In order to emphasise the key points in an explicit manner, these diagrams remove all confusing and unnecessary information. Compared to the diagrammatic and infographic representation in scientific textbooks, the diagrams used in the public health posters are less complex, very clear and easy-to-follow.

Fourth, signs and symbols (cf. Table 5.4) are used in the public health posters in CPHP (e.g. signs of being physically active, etc. in NYC-6 and NYC-7, guide and warning signs in NYC-14, signs of tips to be SunSmart in HK-17, red ribbon – the universally-recognised symbol of HIV/AIDS awareness in HK-23). Familiar signs and symbols have always been among the most effective elements of public communication, since they have specific and precise meanings and can be used to convey a lot of information very easily and quickly. For instance, NYC-14 coins a route marker as the campaign emblem and poster theme to direct New Yorkers 50 and older the ‘road’ they should take – get a colonoscopy to prevent colon cancer. The whole route marker (cf. Figure 4.15) consists of three signs: a white square sign with ‘APPROACHING 50’, an orange diamond-shaped sign with a symbol of colon-shaped turns, and a purple rectangle sign with ‘COLONOSCOPY AHEAD’. The coined signs and symbols in this route marker not only formulate the colorectal cancer awareness themed messages easily, but also help the target viewers remember the idea.

7.1.1.2 How Do Language and Images Work Together?

The above section summarises generally the meaning-making features of the individual systems of language and images, and recaps briefly how the meaning-making is realised separately in the choices of the different semiotic systems. For the public health posters in CPHP, language plays a crucial role in creating and conveying accurate, clear and concise health-related messages, and images have their natural advantages in meaning-making. Different semiotic resources (e.g. language, images, layout), as a matter of fact, work together to weave the educational goals through the public health posters. In the following, we shall see how language and images work together to make health-related meanings in the public health posters used in New York City and Hong Kong.

Generally speaking, verbal and visual semiotic resources work together to develop and consolidate the health-related concepts and ideas (i.e. knowledge and life skills), and to adjust our thinking (i.e. beliefs and values) to enable healthier living in various ways to shape the public health messages. For the public health posters sampled in CPHP, the most occurring rhetorical relations holding between language and image are elaborating types: restatement and elaboration (cf. Section 6.2.2.1), although many different types of relation are identified (cf. Section 6.2.2.2 and Section 6.2.2.3). And for intra-clausal relations (cf. Table 6.3) holding between verbal and visual elements (e.g. images, icons, logos/logos; cf. Table 5.4), identification has the highest occurrences. Thus, oftentimes, verbal and visual resources work together to reinforce the overarching messages in the public health posters in CPHP.

More specifically, first of all, for the public health posters in CPHP, images are often used to restate the key messages developed by language (cf. Figure 6.5). A visual image can illustrate or rephrase a text line or passage placed near the image, or the text line or passage can be considered as a brief caption to interpret exactly what the visual image is trying to convey. Therefore, the verbal and visual elements are both nuclei, they are restating the same messages. For instance, the visual image in NYC-28 (cf. Figure 4.14) gives the viewer the creeps – waiting in a queue (for donated organs) kills New Yorkers. This image distresses New Yorkers together with the line *IT KILLS NEW YORKERS TO WAIT IN LINE*. In HK-5, a Cantonese character ‘叻’ (smart) is made up of ‘口’ (mouth) and ‘力’ (effort), which is also a collage of icons signifying healthy eating and physical activity. This piece of collage art echoes the health message spelt out by the headline ‘食得健康，出力運動你好叻!’ (healthy eating, more workout, you’re so smart!). Hence, the collage art of the Cantonese character and the headline in HK-5 state the same message to make the general public in Hong Kong to follow and make changes in their lifestyles.

Second, images elaborate and exemplify the information made by language to help the public better understand it. For instance, the *Portions Have Grown* campaign (cf. Figure 4.12) reaches out to New Yorkers through a series of three posters, and NYC-1 is one of them. To make obesity-related condition and problem a reality, each poster designed for this campaign uses a real-life photograph to give a specific,

concrete example (e.g. an overweight man with an amputated leg, an overweight woman on a mobility scooter), helping the viewer remember the health effects of overweight and obesity much better than words alone. These background photographs used in this campaign posters not only seize the viewer’s attention, but also elaborate the key messages conveyed by text. Therefore, in order to strive for simplicity and clarity in meaning-making, connecting verbal and visual segments with rhetorical relations such as restatement and elaboration is an effective choice.

In addition, as summarised in the above section, the individual systems of language and images have their own capacities to make meaning. For the public health posters in CPHP, language and images are connected in different ways to achieve the educational and communicative goals. Besides being organised via restatement and elaboration, the rhetorical relations holding between verbal and visual segments are various: projection, preparation, motivation, enablement, interpretation, otherwise, solutionhood, result, circumstance, addition, identification, etc. (cf. Section 6.2.2.2 and Section 6.2.2.3). If we come back to NYC-1 again (cf. Figure 4.13), the three visual images of the growing portions of cheeseburgers vividly depict how serving sizes have dramatically increased. Relations of multinuclear sequence hold between these three images of cheeseburgers, and *THEN – (a slanting line) NOW* interprets that these images are organised in time. The verbal and visual elements in this diagram, as a whole, serve as an evidence for the headline *PORTIONS HAVE GROWN*. With this steady increase in portion sizes comes New Yorkers’ expanding waistlines and an increase in the risk of developing obesity-related chronic diseases and conditions. Hence, the whole organisation of this poster in terms of rhetorical relations holding between verbal and visual segments is shown in Figure 7.1.

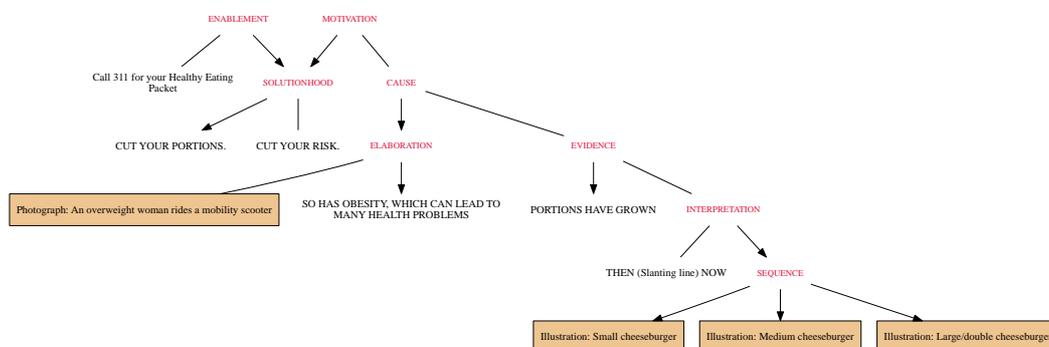


Figure 7.1 Hierarchical structure of rhetorical relations for NYC-1

How different semiotic resources work together to achieve the overarching educational goals is not the same for all the public health posters in CPHP. However, the health-related messages conveyed in such posters are expanded by means of a key information (i.e. the dominant nucleus) and various support relations. This key information usually is the call to action – the nucleus of rhetorical relations such as motivation, enablement, and solutionhood; it is actually also the nucleus of the whole poster. All the supporting verbal and visual segments work together to develop the key information logically to make the whole messages stronger and clearer. To close this section, I present yet one more example to show how different semiotic resources work together to create clearer messages. When showing a sequence such as a series of handwashing steps in NYC-9 and HK-9, each step is represented by a package of one simple illustration and one caption. To avoid any confusion, each step is also numbered via a rhetorical relation of identification holding between an Arabic numeral and the package of illustration and caption (cf. Figure 6.2(b)).

7.1.1.3 How Do the Public Health Posters Educate?

Public health education aims primarily at “learning experiences and the voluntary actions people can take, individually or collectively, for their own health, the health of others, or the common good of the community” (Breslow, 2002: 541). In the present and the near future, public health education and promotion must be concerned with non-communicable, communicable, maternal, neonatal and nutritional disease control issues (cf. Section 1.1.1.1 and Section 4.1.3.2). These include the promotion of healthy eating and physical activity (cf. Figure 4.6 and Figure 4.7), the prospect of expanding immunisation programs against influenza and hepatitis, using screening programmes and socio-behavioural approaches to curtail the major deaths and DALYs (cf. Figure 1.1 and Figure 1.2) caused by heart diseases and cancers. To deal with all these complex phenomena and educate the general public about different health topics and problems, the public health posters can set the ball rolling by clearly identifying the issue first and then quickly engaging the viewer in the educational process.

The above summaries give the basic information about how language and images make meaning alone and together. In order to better recommend and enable some

courses of health-related activities (cf. Figure 6.14), the public health posters in CPHP follow a general strategy to make and convey clear and understandable messages – the messages are easy-to-understand and the format is easy-to-follow. The public health posters in CPHP identify one major health-related phenomenon, and limit the numbers of key messages relevant to the identified phenomenon to fill a certain education gap. When offering calls to action or tips, such posters tell the public what to do instead of what not to do. It's always a right or wrong decision-making progress for better health status, and the posters always show the right side. Most of the public health posters in CPHP use short words, brief sentences and paragraphs, and avoid the use of jargon terms and technical language. For example, NYC-7 and HK-7 choose high blood pressure instead of hypertension, NYC-18 uses tooth decay instead of cavities. In addition, most of the visual images used in the public health posters are easy to follow and understand, and these visual images help create the clearer messages by restating, elaborating, emphasising, or explaining the text.

For the layout and design of the public health posters in CPHP, most posters use sub-headlines (e.g. NYC-17) or lists (e.g. NYC-18) to chunk and arrange information. And most of the posters in CPHP follow a predesigned template to lay out all the content in a logical order. This template includes core parts of the holistic structure (cf. Figure 4.11) such as headline, image, supporting information, call to action and agency logo. These core parts are optimally laid out from the top to bottom. Most importantly, the layout and the other graphic design aspects are consistent with the rhetorical structure, which can be very helpful to make the whole poster much more understandable.

The public health posters are often part of the whole package of educational materials. By drawing the viewer's attention and giving the most important information first, such posters tell the viewer what actions to take and explain why they are important to the viewer. This usually leads the viewer to a long-term educational process. I use the topic of hepatitis C (cf. NYC-25, HK-25) from the CPHP to illustrate. As indicated in NYC-25 (cf. Figure 6.10), CDC recommends hepatitis C testing for baby boomers – everyone born from 1945 to 1965. However, why baby boomers have the highest rates of hepatitis C, what the testing and screening are, whether this virus infection damages liver severely, etc. are not

explained in NYC-25. But the bottom of this poster shows the campaign information (campaign name and URL) and have a QR code that can send the viewer to the campaign website. Therefore, for undiagnosed baby boomers, they may continue to check the information on testing; for those previously diagnosed, they may follow up the campaign to receive the latest information about new drugs and primary care involvement; and for other interested individuals, they may scan the QR code to fill in existing knowledge gaps in hepatitis C for prevention. This poster is then a piece of easy-to-access knowledge not only tailored to the needs of priority populations – baby boomers, but also designed for the whole populations.

7.1.2 Comparative Studies of the Public Health Posters

7.1.2.1 Meaning-Making Differences

For the differences that distinguish the meaning-making in CPHP-NYC and CPHP-HK, the major ones include: (1) grammatical realisations of the offer for further information and service (cf. Table 4.8), (2) the occurrence of symbolic images (cf. Table 4.10), (3) the occurrence of intersemiotic rhetorical relations (cf. Figure 6.5), and (4) layout and design (cf. Section 6.3). Based on the analysis in Chapter 4 and the corpus-based search, I shall illustrate these summarised differences with some examples.

First of all, to offer further information and relevant service to the viewer, the public health posters used in New York City prefer imperative clauses, whereas the posters targeting the public in Hong Kong prefer nominal groups. The public health posters in CPHP-NYC choose imperatives as the first and standard choice. This makes the health agencies have higher degree of power than the general public – they are the health authorities who command and offer. However, further information and service are as something offered as resources or devices which the general public in Hong Kong are welcomed, invited or advised to use. Searching for the patterns in GeM-annotated corpus, I find that the segments of further information and service are usually the satellites in enablement spans. Although they are not the nuclei, this indirect way of offering may suggest that the health agencies are “not completely confident that such extra information will be welcomed by the addressee” (Barron, 2012: 152).

Second, high modality from a naturalistic coding orientation with actual photographs is found more frequently in CPHP-NYC. Hence, photographs are chosen as the best type of images to show real-life people, events and emotions to the viewer in New York City. Real-life photographs are also the best way to embrace people of different races, ethnicities, sexes, age groups, or sexual orientations (e.g. NYC-7, NYC-8, NYC-15, NYC-22, NYC-30). Since New York City is an ethnically more diverse metropolis than Hong Kong, actual photographs work better in CPHP-NYC to clearly target different groups of people. In addition, more symbolic visual images (e.g. HK-6, HK-12, HK-13, HK-20, HK-22, HK-24, HK-25) are identified in CPHP-HK. More specifically, colour (e.g. HK-6, HK-16), visual metaphor and visual stand-ins for sensitive health problems and body parts (e.g. HK-13, HK-15, HK-20), clever and unique design (e.g. HK-5, HK-22, HK-23, HK-29) are all used to make meanings. For instance, HK-6 (cf. Figure 4.2) features a composite visual image of a potbellied being of half man half woman, holding a time bomb. This poster is designed to inform people that obesity is associated with increased risk of a number of serious health conditions including diabetes, heart disease, several kinds of cancers. At the bottom of this poster, the colour changing from yellow to red in a tape measure implies the larger the waistline, the higher the risk of obesity-related diseases. However, the symbolic meaning of this ‘yellow-to-red’ colour ramp is not very clearly conveyed.

As shown in Figure 7.2, HK-22 is a poster intended to raise awareness to HIV testing. This poster features the Snellen eye chart that is used to measure visual acuity, but all rows of capital letters are replaced with letters from HIV and AIDS. This design signifies that HIV testing is a normal part of life, just like the common eye examination. The symbolic meaning made by this visual image actually echoes the literal meaning made in *Lay your prejudice aside and get an HIV Antibody Test without delay*. Another example in Figure 7.2 is HK-13, a poster intends to raise awareness of risks associated with smoking such as impotence. This poster shows anthurium plants (cf. Table A.2 in Appendix A). In Hong Kong’s Chinese New Year flower market, the anthurium plant is one of the popular choices because it means happiness, abundance, hospitality and passion. First, the droopy spadices displayed in HK-13 is a visual metaphor for erectile dysfunction. Second, the image also

implies that this smoking-attributable disease also affect the quality of life of smokers and their partners.



HK-22: *Face It! Test It!*
(DH, HKSAR, 2006)

HK-13: *Smoking Causes Sexual Impotence*
(DH, HKSAR, n.d.)

Figure 7.2 Examples of the public health posters with symbolic visual elements

Third, restatement is the most frequently used rhetorical relation between language and images in CPHP-NYC, while elaboration is the most common intersemiotic relation in CPHP-HK. Since the public health posters used in New York City prefer using images to restate the passages of text, rather than elaborate them, the images in these posters must express the same or similar set of meaning-content as the text. This also explains why there are more analytical images and less symbolic images in CPHP-NYC (Table 4.10). Fourth, a clear and consistent layout template is followed in most of the public health posters in CPHP-NYC. Generally speaking, the main message of the poster is often conveyed by the headline, then the following chunk supports the main message by more information. And these messages lead to the next chunk of call to action and other relevant resources that enable the viewer to take the action.

The fourth major difference also refers to the layout conventions and the rhetoric-layout interface. Layout is positioned by Waller (2017: 177) as “a less peripheral

feature of text than it has often been considered – as an important infrastructure for reading and writing in an age when few make time to engage with long linear texts”. Applied to the presentation of health-related messages on the pages of the public health posters in CPHP-NYC, the conventional layout structure conveys rhetorical functions. After comparing the public health posters (non-real-time data) with television public service announcements (real-time data) designed for the same health campaign, I find that the public health posters in CPHP-NYC select the ‘essence’ of the messages and show them from top to bottom in order to overcome the non-real-time characteristics of the print posters. The majority of the public health posters in CPHP-NYC seems to be designed by following the same set of style guidelines, which is also a strategy that the similar template can guarantee that the public could follow the health-related information more clearly and easily.

7.1.2.2 Public Health Education: Self, Family, Society Levels

Very interestingly, health is not so much a public-thing as a self-thing for New Yorkers if you search ‘YOU’ words in CPHP, as shown in Table 7.1.

Table 7.1 ‘YOU’, ‘FAMILY’, and ‘SOECITY’ words/images in CPHP

	CPHP-NYC item (poster)	CPHP-HK	
		<i>English</i> item (poster)	<i>Chinese</i> item (poster)
‘YOU’ <i>(e.g. you, your, yourself)</i>	102* (28)	22 (13)	9 (6)
‘FAMILY’ <i>(e.g. family, parents, partner, baby, children, pre-teen, etc.)</i>	13 (5)	10 (8)	8 (6)
‘FAMILY’ image	5 (4)		3 (3)
‘SOECITY’ <i>(e.g. community, school, people, us, everyone, Hong Kong, New York City, New Yorkers, Asian Americans, baby boomers, etc.)</i>	10 (7)	10 (6)	10 (6)
‘I’ <i>(e.g. I, my, me)</i>	8 (3)	7 (3)	2 (1)

(* NYC-10 employs 24 ‘YOU’ words in its text-flows, and hence 78 items of ‘YOU’ words are used in the other 27 posters)

There is a slight difference between the English language and Chinese language for the bilingual posters in CPHP-HK, but still, a huge gap is found between the occurrences of the ‘YOU’ words in two sub-corpora: 28 public health posters in CPHP-NYC employ in all 102 ‘YOU’ words, but only 13 posters in CPHP-HK use

22 ‘YOU’ words (or 6 posters use 9 ‘你’ words). As mentioned in Section 4.3.2.1, most of the Subjects within the Mood, in declarative and interrogative clauses, are the health-related elements. But there are some clauses, where the Subjects are the personal pronoun *you* (29 second person pronouns *you* as the Subjects in 15 posters in CPHP-NYC and 5 *you* in 4 posters in CPHP-HK). In these clauses, the Subjects *you* carry the modal responsibilities for the validities of what are being predicated (stated, questioned, commanded or offered) (Halliday and Matthiessen, 2014: 148). Hence, these clauses clearly state that *you* are responsible for understanding and following the public health posters. And much more such cases are found in CPHP-NYC than CPHP-HK. In addition, the health-related messages are also constructed at the family and society levels; but are seldom represented in the first person pronouns.

By just leafing through the first four public health posters (NYC-1, 2, 3, 4) in CPHP-NYC, I can find:

CUT YOUR PORTIONS. CUT YOUR RISK. » Call 311 for your Healthy Eating Packet. (NYC-1)

READ 'EM BEFORE YOU EAT 'EM! (NYC-2)

ARE YOU POURING ON THE POUNDS? You're drinking 85 PACKETS OF SUGAR in just 4 sugary drinks a day. (NYC-3)

“Take me with you” PACKING CONVENIENT FRUITS LIKE APPLES is an easy way to add heart healthy fruits & vegetables to your day. GET YOUR HEALTHY EATING PACKET! To find a Farmers’ Market near you, text “SoGood” to 877877. (NYC-4)

For the general public in New York City, public health messages are constructed as knowledge, skills, and beliefs (cf. Section 1.1.1.1) in self-initiated, self-organised, and self-determined work. Without self-responsibility for your own health behaviour, the success of setting and attaining health goals is impossible. Health is a ‘YOURSELF’ thing. As a New Yorker, you have the responsibilities to develop good hygiene habits (e.g. proper hand washing, cough and sneeze manner) which are essential in eliminating the potential of contracting hygiene-related diseases and infection control; to choose your own healthy eating and workout plans which help

you improve dietary quality and reduce chronic diseases; to monitor your health-related readings and indices (e.g. calorie intake, blood pressure, body mass index), to control tobacco and alcohol use before they control you, to discipline yourself to knock illegal drugs out, etc. And if you have questions about how to care for yourself or if you get sick, talk to your doctor and take your medicine when recommended to do so by your doctor.

Usually, designers delete unnecessary words and keep sentences short when they do poster design. However, most of the public health posters in CPHP-NYC do include the pronoun *you* and the specific determiner *your* (for the nominal group system network of determination, cf. Halliday and Matthiessen, 2014: 366). Highlighting motivation relation in the visualisation and checking its nuclear segment, I can see that the nucleus of motivation relation is the ‘YOU’-word line in 10 public health posters in CPHP-NYC, but only in 4 posters in CPHP-HK. These call to action lines explicitly and directly address the viewer ‘YOU’ to provoke an immediate response. Hence, according to the public health posters in CPHP-NYC, how well every New Yorker (i.e. yourself) engages in self-control and self-regulation in life is of great importance to stay healthy. The members of general public in New York City are compelled to take responsibility for their health and well-being trajectories. For the public health posters in CPHP-HK, however, the sense of ‘your health is your responsibility’ – a focus on self-responsibility for achieving and maintaining your health and well-being is not that strong.

In fact, particularly in the context of health and well-being, the success of self-control and self-regulation in life “may depend on a variety of cultural, social, and biological factors” (de Ridder, Adriaanse and Fujita, 2018: 3). Health is also a family thing, and more of a family thing – a society thing, which is constructed by some of the public health posters in both CPHP-NYC and CPHP-HK. First, health, illness, and well-being “have a great impact on families, and family has a powerful effect on health” (Kirch, 2008: 430). On the one hand, diseases and public health problems can affect the health of family members and partners, especially infectious diseases (e.g. influenza, hepatitis, TB, HIV/AIDS) and violence (e.g. intimate partner violence, suicide, child abuse and neglect). For some other diseases and public health problems (e.g. dental caries or cavities, HPV vaccination, breastfeeding), primary responsibility vests in parents. On the other hand, family

support, “e.g. through communication and cooperation, is health promoting” (Kirch, 2008: 430). The self-management of chronic diseases (e.g. diabetes) and stigmatising diseases (e.g. HIV/AIDS) also needs the support from family members to incorporate daily activities to help improve mental health and emotional well-being, etc. Hence, the public health posters in CPHP designed to prevent these diseases and public health problems tend to use ‘FAMILY’ words and images.

Second, we live as individuals, in families, and also in communities and societies. So, the public health posters in both CPHP-NYC and CPHP-HK give us updates on health-related information of the whole society:

Heart disease KILLS more NEW YORKERS than anything else. (NYC-7)

Asian Americans have very high rates of Hepatitis B. (NYC-24)

IT KILLS NEW YORKERS TO WAIT IN LINE. EVERY 15 HOURS A NEW YORKER DIES WAITING FOR AN ORGAN. (NYC-28)

More than 90% of the people in Hong Kong suffer from varying severity of gum disease (HK-18)

In Hong Kong, Hepatitis C is mainly spread by sharing needles and syringes (HK-25)

One person dies by suicide every 10 hours in Hong Kong. One in four secondary school students has suicidal thoughts. (HK-30)

These background information helps the general public in New York City and Hong Kong have a clear purpose in preventing and fighting certain diseases and public health problems. In addition, the sense of ‘SOCIETY’ helps us maintain and improve the health of all the people in our schools, communities, and the whole metropolitan areas through collective or social actions:

you CAN HELP STOP TB in NEW YORK CITY! (NYC-26)

Be clean and stay healthy, make school a safer place (HK-10)

Creating caring and supportive environments in our societies for any diverse group of people, such as employed breastfeeding mothers, HIV-positive people, cancer

survivors, and people with Alzheimer's disease, is fundamental to public health. For instance, the whole society can help support breastfeeding, not only mothers and families, but also communities (e.g. child care centres, community-based programs such as mother-to-mother support and peer counselling) and employment (e.g. flexible work schedules and breaks, support for lactation and direct breastfeeding in the workplace). Or, to give one more instance, the whole society can help minimize and eventually eliminate the HIV/AIDS stigma and discrimination which is an impediment to public health. Some people avoid testing because of the HIV-related stigma, but not knowing your current HIV status cannot help you take steps to keep you and your partner healthy. Examples in CPHP include: *Go to nyc.gov and search BREASTFEEDING or call 311 for help and support.* (NYC-19) and *Lay your prejudice aside and get an HIV Antibody Test without delay.* (HK-22).

To sum up this part of the comparative studies, the difference in two sub-corpora CPHP-NYC and CPHP-HK is at the 'SELF' level. It is critical that we take action across the whole society at all different levels (i.e. individuals, families, peers, schools, groups, and communities), but the public health posters in CPHP-NYC have almost universally devolved the responsibility for achieving and maintaining health and well-being to the individual. Therefore, in New York City, the public health posters designed for public health education not only deal with mediating health-related information that influences social-related factors of healthy lifestyles and health promoting behaviour, but also plant the sense of self-responsibility in every New Yorker's mind. With dramatic increases in diabetes and other lifestyle-related chronic diseases (cf. Figure 1.1 and Figure 1.2), such sense of self-responsibility is needed to help people improve the way they eat, move, and think. In Hong Kong, however, the public health posters are not very explicit that self-responsibility is of importance in your own avenue to health and well-being.

7.1.3 Implications for Multimodality and Public Health Education

7.1.3.1 Multimodality: Corpus-Based Approach

In the present study, the GeM-annotated corpus of 60 public health posters is built to examine how various semiotic resources work together to achieve the educational goals. Thus, the most important implication of this study is the need for more

empirical studies on multimodality, especially the research methodology, i.e., the corpus-based approach (cf. Chapter 5). The corpus-based approach has been actually employed across studies in the field of multimodality to examine various kinds of multimodal artefacts; and this study uses this approach to enhance our understandings of public health posters.

In order to conduct the empirical study of the public health posters, the GeM model is applied to annotate such posters and set up the XML-annotated multimodal corpus. In addition, the computational gem-tools are also used to visualise the annotated corpus and enable the analyst to search for patterns across the different analytical layers in the multimodal corpus. CPHP makes it possible to explore detailed aspects of the public health posters, because the corpus-based investigations can examine the structures, i.e., rhetorical structure and layout structure, more comprehensively, and find the layout and other differences that qualified analysis alone cannot notice. Therefore, this empirical corpus-based method can be applied to more types of multimodal documents, which can also help describe and define the multimodal genres.

7.1.3.2 Public Health Education: Material Design

For the design of public health education materials, the results of the present study hope to help the designers structure the overall design. A good design could not only help convey the health-related information persuasively and efficiently, but also enable the target public to sort the multimodally-represented information at a glance. The genre of public health poster is not like the genres of fine art poster, etc. The health-related messages must be delivered accurately, so language should play the leading role among various semiotic resources. Considered as ‘rules for choose’, some options of language and other semiotic resources should be thought of as the most suitable and reliable choices and structures for the public health posters and relevant materials for public health education.

After analysing the primary semiotic systems (i.e. language, image) employed on the page of the print posters, and comparing the rhetorical structure and the layout structure of each poster, I propose that there are several factors that the designers of public health posters and relevant education materials must consider, even though

the designers may have design systems (e.g. templates, style guidelines) to follow: (1) the different roles of principal semiotic resources (e.g. language, images) used on the pages of print public health education materials, (2) the preferred choices of various semiotic systems for different types of meaning-making (e.g. health-related information offering, call to action, call and visit invitation), (3) the influence of socio-cultural factors on the selection and design of visual images (e.g. visual conventions), and (4) the interface between the meaning construction of health-related messages and the design of the print page (e.g. an easy-to-follow layout, a poster template that helps communicate the whole messages).

7.2 Further Development

The present study has examined the meaning-making in the public health posters from the vantage points of below, roundabout, and above. Different semiotic resources work together to construct the health-related messages and persuade the target population to take action by learning the health-related knowledge and needed skills, by changing the attitude, beliefs, and behaviours, and by following the call to action. Designers in the field of public health education transform and present the intended messages to realise the educational and communicative purposes, to suit generic features, and to meet the average literacy competence of the target population. When achieving all these goals, both mode of meaning and mode of expression are of great importance. However, the present study hasn't fully considered the expressive resources. Hence, first of all, I will continue to examine the meaning-making on the expression plane of the public health posters in the immediate future, including a thorough understanding of the choices of page layout, typeface, etc.

The GeM model is designed for non-real-time multimodal artefacts and its XML-based annotation schema works well in the creation of multimodal corpora. However, in order to facilitate and accelerate the process of manual annotation, to improve its applicability to many and various kinds of multimodal artefacts, and to overcome further difficulties, the current annotation schema needs to be improved and web-based annotation tools need to be developed. Therefore, second, making

appropriate changes in the annotation schema provided by the GeM model is one direction for further, urgent development. Since the current schema for annotating the layout layer is limited to the grid-based design, so we need to develop a new plan (e.g. drawing polygons and 3D layering) that can handle the layout layer of different types of design in multimodal documents. To achieve this goal, working with research scientists from non-linguistics fields such as machine learning (e.g. vision research (computer vision and human vision)) and data visualisation may broaden our horizons. Finding a universal annotation schema for multimodal artefacts (both real-time and non-real-time) seems impossible, since there are so many different kinds of semiotic systems and resources. However, we can always add different layers to the current GeM framework since it is open and extensible and use the GeM model as a foundation for treating various types of multimodal artefacts (e.g. Bateman, 2013b).

Third, as summarised in Section 7.1.2.1, CPHP-NYC and CPHP-HK are different in the choices of images and the design of the poster layout. It seems that the visual images and the overall design in the public health posters used in Hong Kong require a higher level of visual competence for the general public to fully understand, which may need to be assessed further. I may also need to consider whether these differences are caused by the agencies' design or branding guidelines, or whether these differences are related to social and cultural aspects of visual conventions or other related issues (e.g. whether there are culturally-motivated layout and image choices), or whether these differences are subject to other reasons and influences. These questions should be examined further in empirical studies (e.g. interview, eye-tracking experiment, user testing of responses to different types of poster design and different patterns of intersemiotic interaction), and discussed further with principles and insights generated from other disciplines and fields such as communication studies, cultural studies, information design, and social psychology.

Fourth, educating about health through public health posters challenges professionals in many disciplines. In this current era of big data and we are entering the third wave of artificial intelligence, experiments to evaluate the educational effectiveness of such public health education materials should be better planned and executed. Besides the meaning-making effectiveness of such materials themselves (e.g. content, design), the educational effectiveness can be also affected by

population-based and service-based applications such as knowledge of the target population, appropriateness to the target audiences, accessibility of the print materials (e.g. posting location, time, frequency, manner), etc. Therefore, based on all kinds of health data (e.g. city health, global health), we can synthesise statistical models to make predictions in health trends and improve the accuracy and effectiveness of using public health education materials. For instance, having access to such materials in our communities not only implies that we can easily avail ourselves of these educational materials and health services that are recommended, but also these materials and services will be promoted and used appropriately. For print public health education materials designed for a certain health topic, with the help of accurate data and improved algorithm, we will have a clearer picture of how to offer and circulate timely and relevant information to ‘influence’ target people’s health, including when such educational materials should be posted or removed, how long and how often they should be posted, where the appropriate posting spots in communities and workplaces are, etc.

Finally, I plan to enlarge my multimodal corpus CPHP by adding and annotating more public health posters used in other world cities (e.g. London; cf. Section 1.1.1.3). In addition, I plan to continue my work in a broader scope in the next stage – the health-related meaning construction in more types of multimodal materials for public health education and promotion such as public service announcements and online news stories. Nowadays, there are daunting challenges for public health, especially in world cities, because of some special circumstances such as high levels of population density and mobility, and different cultural, religious, ethnic, and racial composition of the world city population. And social semiotics can provide accounts of meaning-making, of all kinds, in different environments. Thus, from the social semiotic perspective and based on the empirical corpus-based approach, studying the public health education through varied multimodal documents will be my long-running task.

7.3 Concluding Remarks

I will bring this thesis to a close by briefly summarising the key findings (cf. Section 7.1) from the present study. In order to make progress in understanding the multimodal public health posters around us, it needs to be able to interpret semiotic resources (i.e. language and images) that work together to construct key health-related messages and achieve intended educational outcomes. 60 public health posters covering a variety of public health topics (cf. Table 4.5 and Appendix A) were sampled to build the GeM-annotated CPHP (cf. Section 5.3) to study public health education through such posters in two world cities – the City of New York and Hong Kong. As I investigated in Chapter 4 and Chapter 6, first of all, individual systems of language and image have different semiotic labour to make meanings (cf. also Section 7.1.1.1); second, the whole poster organisation underlines how each piece of meaning fits together and gives meaning to the function and form of the poster structure (cf. also Section 7.1.1.2).

Language is the primary means of meaning-making on the pages of my collection of the public health posters. Language is employed to straight-forwardly state the topic of each poster in its headline, call to action, etc.; to expand on the health-related topic by elaborating or explaining why the topic is so important to the intended general public, by adding relevant information (e.g. what actions to take, what change to make) and/or listing further resources (e.g. call and visit invitation), etc.; to restate or identify/label the whole or part of the information featured in visuals (e.g. the diagram of a lunch box with appropriate portions of a variety of foods in HK-2 (Figure 5.8), cf. Figure 5.16 and Figure 5.17; simple and effective steps that you take to wash your hands in NYC-9 and HK-9, cf. Figure 6.2); etc. Different types of visual images (cf. Table 5.4) are designed to restate or elaborate the main messages (cf. Figure 6.5), to highlight part of the key messages, to show a procedure or create a sequence, to depict culturally sensitive issues, to explain invisible events, to set an emotional tone, etc. In sum, verbal texts and visual images used on the pages of the public health posters in CPHP support each other in different ways (cf. Section 6.2.2 and Section 7.1.1.3) to grab the viewer's attention and 'sell a story' (e.g. health-related knowledge, skills, and beliefs); in addition, hierarchical structures (i.e. rhetorical structure and layout structure) formed by the

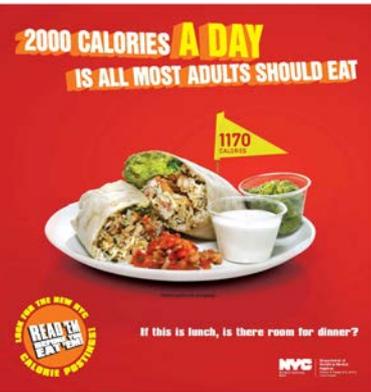
different semiotic resources match each other (cf. Section 6.3) to help the viewer easily and quickly ‘buy the story’. The educational purpose of these public health posters sampled in CPHP is to offer recommendations and enable solutions/choices to minimise the increased risks of adverse health outcomes (cf. Figure 4.6 and Figure 4.7).

These findings, along with insights from health practitioners and information designers, can help design effective public health education materials and develop evaluation tools that measure the effectiveness of these educational materials. The social semiotic view of multimodality and the empirical method (i.e. corpus-based approach) adopted in the present study can be used to describe more different types of multimodal documents with complex design and layout. These empirical investigations of multimodal artefacts will further develop the concept of multimodal genres. In addition, the discussion of Section 7.2 outlines five areas of particular concern that I will address in future research. In order to consolidate the significance of the present study, plan and enact the next cycle of investigation, I will work together with researchers from health-related fields (e.g. medicine, nursing, public health) and other different fields (e.g. information design, advertising communication, applied machine learning) to further examine the issues of public health education in world cities from the social semiotic perspective. In addition, if we can extend the theoretical frameworks to deal with more types of semiotic modes, figure out the instruction sets to annotate more complicated multimodal features, and develop semi-automatic or even automatic annotation tools, in the future work, we will be able to manipulate different semiotic resources in a targeted way to achieve intended educational outcomes and generate effective educational messages for public health.

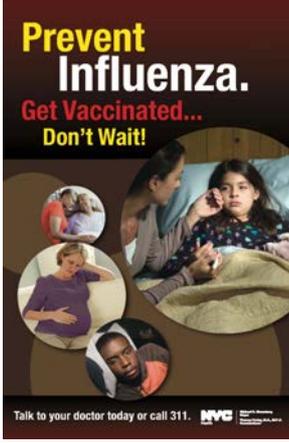
Appendix A Details of CPHP

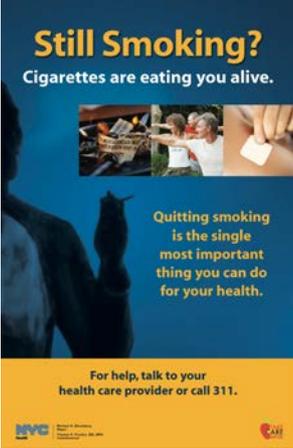
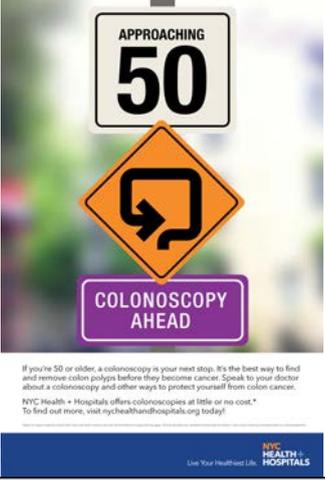
Table A.1 and Table A.2 present the public health posters under annotation and analysis in sub-corpora CPHP-NYC and CPHP-HK respectively. Each of the tables shows 30 posters in miniature and summarises details of all the selected posters.

Table A.1 30 public health posters in CPHP-NYC

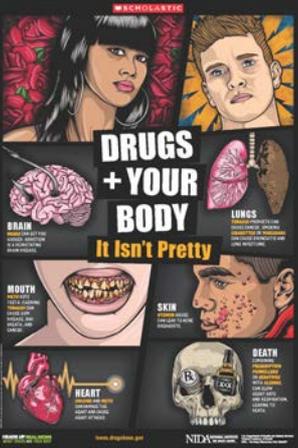
#	CPHP-NYC		
1		<i>Headline</i>	<i>Portions Have Grown</i>
		<i>Source</i>	NYC DOHMH
		<i>Campaign</i>	Cut Your Portions, Cut Your Risk (2012)
		<i>Description</i>	This poster spotlights how serving sizes of burgers have approximately tripled over the years. Different backdropping images in a series of three posters correlate oversized food and their devastating consequences (e.g. obesity, diabetes), urging viewers to be more aware of portion sizes when choosing what to eat or drink.
		<i>Versions</i>	Available in English and Spanish
2		<i>Headline</i>	<i>2000 Calories a Day Is All Most Adults Should Eat</i>
		<i>Source</i>	NYC DOHMH
		<i>Campaign</i>	Read 'em Before You Eat 'em (2008)
		<i>Description</i>	The central image shows a common fast-food choice – the burrito that looks harmless but how quickly calories add up. A series of five posters is designed for the calorie education campaign to help viewers make the most of the city's calorie-posting rules and choose healthy food alternatives.
		<i>Version</i>	Available in English
3		<i>Headline</i>	<i>Are You Pouring on the Pounds?</i>
		<i>Source</i>	NYC DOHMH
		<i>Campaign</i>	Pouring on the Pounds (2011)
		<i>Description</i>	The stomach-turning signature image depicts sugary beverages covered with blobs of fat, which is a stark reminder that how sugary drinks can lead to obesity and related health problems. A series of three posters highlights the dangers of sugar-sweetened drinks and suggests choosing beverages with less sugar.
		<i>Versions</i>	Available in English and Spanish

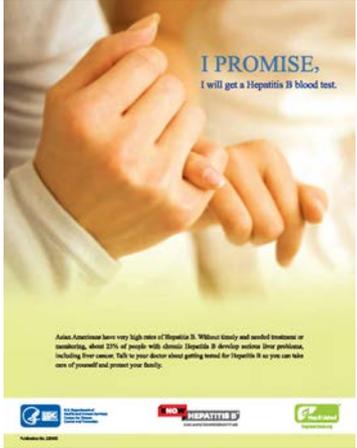
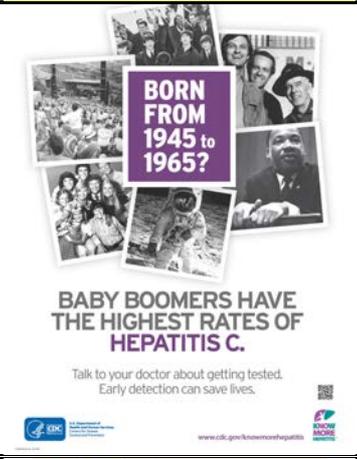
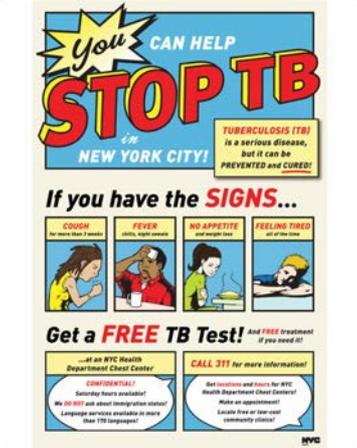
4		<i>Headline</i>	<i>No Time to Eat?</i>
		<i>Source</i>	NYC DOHMH
		<i>Campaign</i>	Take Me with You (2014)
		<i>Description</i>	This poster suggests that packing an apple is an easy way to add fruit into your diet. Other fruit and vegetables including bananas, carrot or celery sticks, and grape tomatoes are employed in four other posters. The whole series aims at encouraging viewers to get the healthy eating packet and make healthy choices when grabbing a snack to eat on the go.
		<i>Version</i>	Available in English
5		<i>Headline</i>	<i>Burn Calories, Not Electricity</i>
		<i>Source</i>	NYC DOHMH; AIANY; REBNY
		<i>Year</i>	First printed in 2008
		<i>Programme</i>	GreeNYC (2007-Ongoing)
		<i>Description</i>	Rendered on a bright green background, this poster depicts a stick figure climbing stairs. Not only does this stair prompt urge viewers to add physical activity to daily routine, it appeals for public action to help the environment as well. The stair prompts are posted on floors of health clinic, and at housing site, academic building, etc.
		<i>Versions</i>	Available in English and Spanish
6		<i>Headline</i>	<i>BEAT Diabetes</i>
		<i>Source</i>	NYC DOHMH
		<i>Year</i>	First printed in 2006
		<i>Health agenda</i>	Take Care New York
		<i>Description</i>	This poster informs the general population that they can prevent diabetes by getting regular physical activity and eating a healthy diet. Mainly targeted at African Americans and people with diabetes, this poster spells out tips on how to manage their illness and prevent complications.
		<i>Versions</i>	Available in English, Spanish, Traditional Chinese and Russian
7		<i>Headline</i>	<i>Act Now! Control Your Blood Pressure.</i>
		<i>Source</i>	NYC DOHMH
		<i>Year</i>	First printed in 2005
		<i>Health agenda</i>	Take Care New York
		<i>Description</i>	This poster shows four people looking happily into the camera. The poster points out that hypertension is the leading cause of heart disease, and encourages viewers to adopt healthy lifestyle changes, including a low-sodium diet, increased physical activity and taking prescribed medications, in order to control blood pressure.
		<i>Versions</i>	Available in English and Spanish

8		<p><i>Headline</i> Prevent Influenza.</p> <p><i>Source</i> NYC DOHMH</p> <p><i>Year</i> First printed in 2009</p>	<p><i>Description</i> This poster depicts images of sick people of various age, racial, and ethnic groups. Their expressions of pain encourage viewers to get vaccinated. One of the images features a mother-to-be, urging the pregnant to get the flu shots because the flu can cause serious illness during pregnancy.</p> <p><i>Versions</i> Available in English, Spanish, Traditional Chinese, Korean, Russian, Italian and Bengali</p>
9		<p><i>Headline</i> Wash Your Hands</p> <p><i>Source</i> NYC DOHMH</p>	<p><i>Description</i> Designed for both adults and kids, a series of posters presents how to wash hands and how long we should wash to reduce the spread of germs. This poster breaks up hand washing into six steps and tells kids to wash hands for a length of the ABC's song. The poster also uses soap bubbles as the text carriers to draw kids' attention.</p> <p><i>Versions</i> Available in English and Jewish, including Caucasian, African/Asian/Hispanic American and Jewish versions</p>
10		<p><i>Headline</i> Keep Clean to Stay Healthy</p> <p><i>Source</i> NYC DOHMH</p>	<p><i>Description</i> This poster employs lots of illustrative mini-images embedded within text-flow as the replacements for lexical words. Main text and the embedded illustrations in the poster go into detail about why, when, how to wash your hands, and the duration of the entire hand washing procedure. This educational poster also emphasizes the importance of washing away germs several times a day to keep clean and stay healthy.</p> <p><i>Version</i> Available in English</p>
11		<p><i>Headline</i> Cover Your Cough</p> <p><i>Source</i> NYC DOHMH; APIC</p> <p><i>Year</i> First printed in 2009</p> <p><i>Health agenda</i> Take Care New York</p>	<p><i>Description</i> This poster employs a rendering of a stick figure to articulate cough etiquette – cover your cough and clean your hands afterwards – to prevent the spread of germs that can make you and others sick.</p> <p><i>Versions</i> Available in 14 languages: Arabic, Bengali, Traditional Chinese, Creole, English, French, Hebrew, Hindi, Korean, Russian, Spanish, Urdu, Vietnamese and Yiddish</p>

12		<i>Headline</i>	<i>Still Smoking?</i>
		<i>Source</i>	NYC DOHMH
		<i>Health agenda</i>	Take Care New York
		<i>Campaign</i>	Cigarettes Are Eating You Alive (2008)
		<i>Description</i>	The silhouette of a smoker is shown in an x-ray picture, and the cloudy patch over the lung indicates the health effects of cigarette smoking. Other images indicate the reasons to quit and ways to make it earlier. The whole information reinforces viewers' knowledge about the harms of smoking and provides resources on quitting smoking.
		<i>Versions</i>	Available in English and Spanish
13		<i>Headline</i>	<i>Dying from Smoking Is Rarely Quick... and Never Painless.</i>
		<i>Source</i>	NYC DOHMH
		<i>Programme</i>	NYC Quits: Quit Smoking Today
		<i>Campaign</i>	Suffering Every Minute (2011)
		<i>Description</i>	This poster depicts a woman whose face is distorted by pain and has an oxygen tube attached to her nose to help her breathe. A pair of posters in this series urges smokers to quit before they suffer from smoking-related illnesses such as cardiovascular and respiratory diseases.
		<i>Versions</i>	Available in English, Traditional Chinese, Russian
14		<i>Headline</i>	<i>Approaching 50 Colonoscopy Ahead</i>
		<i>Source</i>	NYC Health + Hospitals
		<i>Campaign</i>	Colon Cancer Awareness (2016)
		<i>Description</i>	The emblem of the colon cancer awareness campaign plays with a unit of guide and warning signs, juxtaposing a symbol of colon-shaped turns and signs with key words to attract viewers' attention. This campaign emblem occupies most of the poster to lure people age 50 or older into making a colonoscopy your next step. The poster also provides additional information about colon cancer screening tests.
15		<i>Headline</i>	<i>Breast Cancer Survivors Come in All Colors.</i>
		<i>Source</i>	NYSDOH
		<i>Year</i>	First printed in 2010
		<i>Description</i>	This poster features a positive image of ten breast cancer survivors. Their rallying cry in the tagline indicates the fact that breast cancer can affect anyone regardless of race or ethnicity, which explains the importance of getting a mammogram.

16		<p><i>Headline</i> Today, You Could Save Your Child's Life.</p> <p><i>Source</i> NYC DOHMH</p> <p><i>Campaign</i> HPV Prevention (2014)</p> <p><i>Description</i> A series of four posters depicts smiling faces of African American, Hispanic, Caucasian and Asian youngsters to promote human papillomavirus (HPV) vaccine. This poster suggests that pre-teens and teens should get vaccinated to protect them from HPV-associated cancers (e.g. cervical cancer and cancer of the vulva, vagina, penis, or anus) later in life.</p> <p><i>Versions</i> Available in English and Spanish</p>	
17		<p><i>Headline</i> A Base Tan Is Not a Safe Tan</p> <p><i>Source</i> CDC</p> <p><i>Initiative</i> The Burning Truth (2014)</p> <p><i>Description</i> This initiative encourages people to keep your skin healthy to reduce the chance of getting skin cancer by avoiding indoor tanning and protecting yourself from too much exposure to ultraviolet rays from the sun when outdoors. This and two other posters dispel three common tanning myths and contain information for viewers to share with friends on social networks.</p> <p><i>Version</i> Available in English</p>	
18		<p><i>Headline</i> The Root of Tooth Decay May Be Time Spent with this Sippy Cup.</p> <p><i>Source</i> NYC DOHMH</p> <p><i>Campaign</i> Children's Oral Health (2013)</p> <p><i>Description</i> A series of five posters is designed to promote oral health for young children. This poster depicts a young child drinking from a sippy cup. It suggests that parents should not let children sip on non-water drinks in sippy cups or bottles, and provides some preventive measures that can help keep young children cavity-free.</p> <p><i>Versions</i> Available in English and Spanish</p>	
19		<p><i>Headline</i> Breast Milk Is Best for Your Baby.</p> <p><i>Source</i> NYC DOHMH</p> <p><i>Initiative</i> Latch on NYC (2012)</p> <p><i>Description</i> Four posters depicting babies of various racial and ethnic groups are designed to support mothers' decisions to breastfeed their infants. This series of posters drives home the message that breastfeeding is the healthiest choice for newborn babies by highlighting the unique benefits of breast milk, such as reducing the risk of ear infections, diarrhea and pneumonia.</p> <p><i>Versions</i> Available in English and Spanish</p>	

20			<p><i>Headline</i> Drugs + Your Body It Isn't Pretty</p> <p><i>Source</i> NIDA; Scholastic</p> <p><i>Education series</i> Heads Up: Real News About Drugs and Your Body (2012)</p> <p><i>Description</i> This poster is designed for students and teenagers, with the goal to inform them of how specific drugs of abuse affect the body, damage major organs, and cause death. Powerful and fearmongering images in this poster, especially the death image of skull, are used as the warning symbol to caution teens against abusing drugs.</p> <p><i>Version</i> Available in English</p>	
21			<p><i>Headline</i> Life's Complicated Enough: Make Smart Decisions About Drugs</p> <p><i>Source</i> NIDA; Scholastic</p> <p><i>Education series</i> Heads Up: Real News About Drugs and Your Body (2008)</p> <p><i>Description</i> A teen girl gives a description of how she became involved in consuming and selling drugs and her path to recovery. This poster is part of a skill-building programme to help teens understand the importance of informed decision-making, as well as the health risks associated with drug abuse.</p> <p><i>Version</i> Available in English</p>	
22			<p><i>Headline</i> Be HIV Sure</p> <p><i>Source</i> NYC DOHMH</p> <p><i>Campaign</i> #BeHIVSure (2014)</p> <p><i>Description</i> A series of five posters featuring different persons or couples encourages general HIV testing. This poster depicts an intimate image of a man nuzzling up to his partner. Using the image as an intimation of sex, together with the encouragement line below it, the poster urges viewers to take the HIV test to be sure of your status and help stem the spread of this epidemic.</p> <p><i>Version</i> Available in English</p>	
23			<p><i>Headline</i> New York's Hottest New Wrapper</p> <p><i>Source</i> NYC DOHMH</p> <p><i>Health agenda</i> Take Care New York</p> <p><i>Initiative</i> NYC Condom (2007)</p> <p><i>Description</i> This poster highlights the unique package of a NYC condom, the first official city brand in the United States. This aggressive promotion of the free condoms advocates safe sex to protect you and your partners from getting HIV and other sexually transmitted diseases, and to prevent unwanted or mistimed pregnancies.</p> <p><i>Versions</i> Available in English and Spanish</p>	

24		<p>Headline <i>I Promise, I Will Get a Hepatitis B Test.</i></p> <p>Source CDC; Hep B United</p> <p>Campaign Know Hepatitis B (2013-ongoing)</p> <p>Description A series of six posters is created to be targeted at Asian Americans and Pacific Islanders, and encourage them to get tested for hepatitis B. This poster shows a pinky promise between two people pledging to get tested for hepatitis B, calling for the intended viewers to follow the example.</p> <p>Versions Available in English, Traditional Chinese, Vietnamese, Korean and multilingual; 24" x 36" and 8½" x 11" in size</p>	
25		<p>Headline <i>Born from 1945 to 1965?</i></p> <p>Source CDC</p> <p>Campaign Know More Hepatitis (2012-ongoing)</p> <p>Description 16 posters are available to educate baby boomers about the importance of getting tested for hepatitis C. This poster employs pictures of iconic years to target at the baby boomers, highlights the unpleasant truth that baby boomers have the highest rates of hepatitis C and encourages talking to a doctor about getting tested.</p> <p>Versions Available in English; 24" x 36" and 8½" x 11" in size</p>	
26		<p>Headline <i>You Can Help Stop TB in New York City!</i></p> <p>Source NYC DOHMH</p> <p>Year First printed in 2009</p> <p>Description All community leaders are called to help increase awareness about tuberculosis (TB) and the free TB services. This comic-strip-style poster provides basic information about TB and emphasizes characteristic symptoms of TB, suggesting getting a free TB test if you have the signs of TB.</p> <p>Versions Available in English, Spanish, Traditional Chinese, Haitian Creole, French, Filipino, Hindi, Bengali, Urdu and Tibetan</p>	
27		<p>Headline <i>You'd Be Surprised...</i></p> <p>Source NYSDOH</p> <p>Health plan NY State of Health (2015)</p> <p>Description This poster promotes NY State of Health – an organized health insurance marketplace designed to help people in New York State shop for and enroll in health insurance coverage. The poster also introduces the new Essential Plan and encourages viewers to use the marketplace to get covered.</p> <p>Versions Available in English, Spanish, Simplified Chinese, Traditional Chinese, French, Haitian Creole, Italian, Korean and Russian</p>	

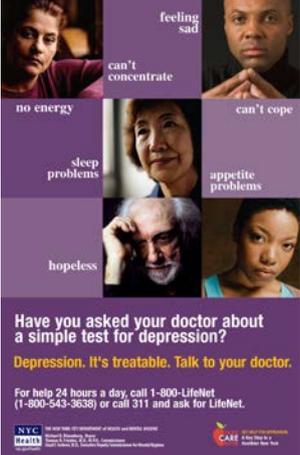
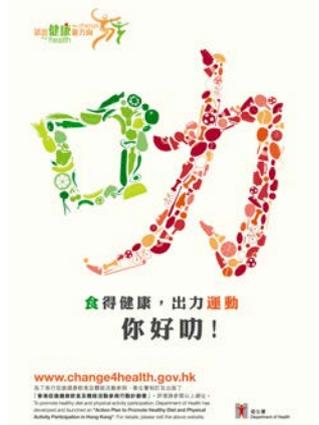
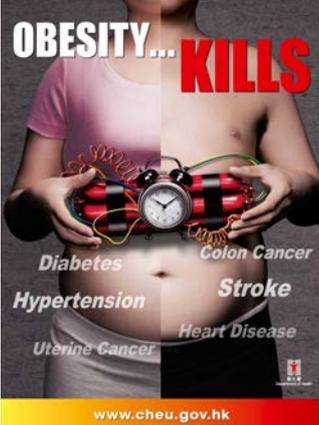
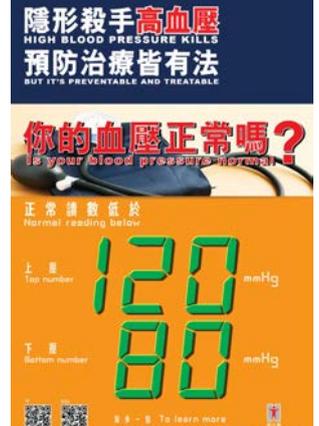
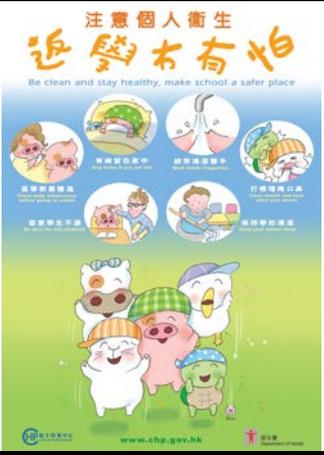
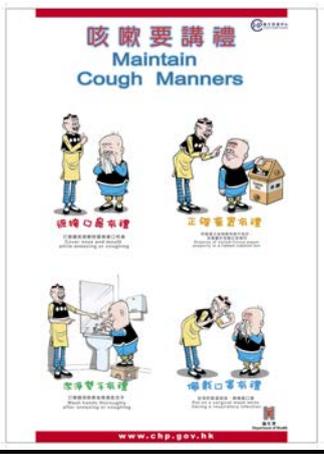
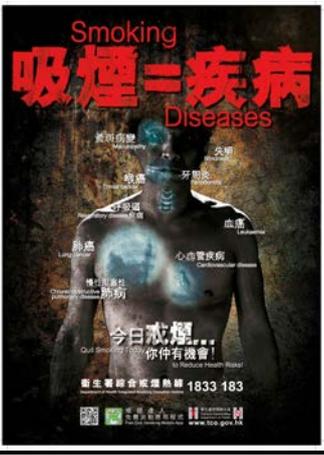
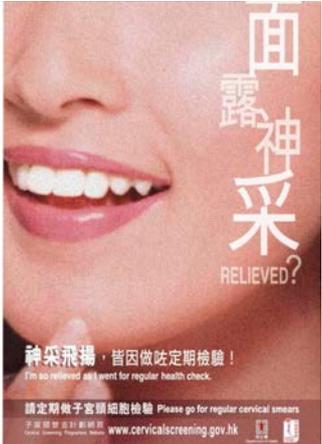
28	 <p>IT KILLS NEW YORKERS TO WAIT IN LINE. EVERY 15 HOURS A NEW YORKER DIES WAITING FOR AN ORGAN. BECOME AN ORGAN DONOR. SIGN UP AT THE DMV OR WHEN YOU REGISTER TO VOTE. SaveLivesNewYork.org</p>	<p><i>Headline</i> <i>It Kills New Yorkers to Wait in Line.</i></p> <p><i>Source</i> LiveOnNY</p> <p><i>Campaign</i> Hate the Wait (2013)</p> <p><i>Description</i> This poster depicts people waiting in line for donated organs but with a corpse wearing a toe tag leaning up against a wall. The chilling image indicates that people die waiting for a transplant. The poster employs this image to engulf viewers in shock and encourages New Yorkers to sign up to become organ donors to save lives.</p> <p><i>Version</i> Available in English</p>	
29	 <p>JUST ONE MORE DRINK CAN HURT</p> <p>Keep your friends from hurting themselves or others. Cut them off before they've had too much.</p> <p>NYC DOHMH</p>	<p><i>Headline</i> <i>Just One More Drink Can Hurt.</i></p> <p><i>Source</i> NYC DOHMH</p> <p><i>Campaign</i> Just One More Drink Can Hurt (2014)</p> <p><i>Description</i> This campaign seeks to sound the alarm about excessive consumption of alcohol. The central image shows that excessive drinking puts both the drinker and people around the drinker at risk. This poster from a series of two calls on New Yorkers to reduce binge drinking, and highly suggests that viewers step in when a friend has had too much to drink.</p> <p><i>Versions</i> Available in English and Spanish</p>	
30	 <p>feeling sad can't concentrate no energy sleep problems appetite problems can't cope hopeless</p> <p>Have you asked your doctor about a simple test for depression? Depression. It's treatable. Talk to your doctor.</p> <p>For help 24 hours a day, call 1-800-LifeNet (1-800-543-3638) or call 311 and ask for LifeNet.</p> <p>NYC HEALTH CAIE</p>	<p><i>Headline</i> <i>Depression. It's Treatable. Talk to Your Doctor.</i></p> <p><i>Source</i> NYC DOHMH</p> <p><i>Year</i> First printed in 2006</p> <p><i>Health agenda</i> Take Care New York</p> <p><i>Description</i> This poster describes common symptoms of depression, with a reminder that you should talk to a doctor about getting tested if you have often been bothered by these conditions. It also provides information to enable access to the counselling services.</p> <p><i>Versions</i> Available in English, Spanish, Traditional Chinese and Korean</p>	

Table A.2 30 public health posters in CPHP-HK

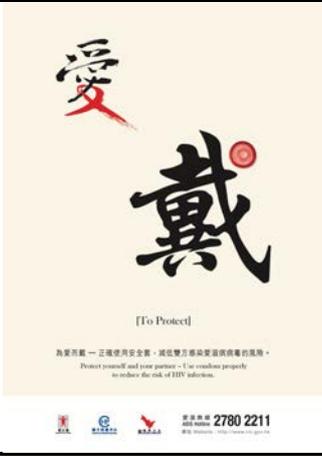
#	CPHP-HK		
1	 <p>The poster features anthropomorphic food items like a potato, eggplant, and meat. It includes tips such as 'Less by jing, grilling, roasting or boiling', 'More steaming or boiling', 'Before frying...', and '...try steaming or parboiling ingredient first'.</p>	Headline	Smart Cooking Brings Healthier Diet
		Source	CFS, FEHD, HKSAR
		Annual signature event	Food Safety Day (2014) – Safe and Smart Ways to Cook
		Description	Anthropomorphically depicted foodstuffs advise the public on cooking tips that can prevent or reduce the formation of harmful substances during cooking process. This poster also promotes a mobile application and other access to food safety information.
		Version	Available in bilingual (Traditional Chinese and English) and A2 size
2	 <p>The poster shows a plate of food divided into three sections labeled 1, 2, and 3. Section 1 is 'Meat', section 2 is 'Vegetables', and section 3 is 'Grains'. It includes the text '321 至醒午餐 Healthy Lunch Suitable for Everyone'.</p>	Headline	321 Healthy Lunch Suitable for Everyone
		Source	DH, HKSAR
		Year	First printed in 2011, revised in 2017
		Campaign	EatSmart@school.hk (2006-Ongoing)
		Description	This poster shows a diagram of a well-portioned lunch to urge viewers to follow this recommendation and make smart food choices. Besides being used for the annual EatSmart campaign in primary schools, the poster is also being employed to advocate healthy lifestyle in non-school occasions.
Version	Available in bilingual (Traditional Chinese and English) and A2 size		
3	 <p>The poster features a man holding a jar of food. It includes the text 'Turn and look at the nutrition label' and '計算營養標籤'.</p>	Headline	Calculate the Nutritional Intake
		Source	CFS, FEHD, HKSAR
		Campaign	Nutrition Labelling Publicity and Education (2009-2011)
		Description	A series of five posters featuring local people of different ages and genders is designed to encourage consumers to turn and look for the nutrition label information on pre-packaged food to make informed and healthier food choices.
Versions	Available in bilingual (Traditional Chinese and English) and A2, A3 sizes		
4	 <p>The poster shows hands holding various fruits and vegetables. It includes the text '2 plus 3 a Day' and '每日食兩餐食中, 食最少兩份水果及三份蔬菜'.</p>	Headline	2 Plus 3 a Day
		Source	CHEU, DH, HKSAR
		Campaigns	2 Plus 3 a Day (2005-Ongoing); Joyful Fruit Month (The project is launched as part of the EatSmart@school.hk and EatSmart@restaurant.hk campaigns from the 2006-07 school year onwards.)
		Description	This poster advises the public on the consumption of at least two servings of fruit and three servings of vegetables every day as part of a balanced diet.
Version	Available in bilingual (Traditional Chinese and English) and A2 size		

5	 <p>食得健康，出力運動 你好叻！</p> <p>www.change4health.gov.hk</p>	<p><i>Headline</i></p> <p><i>Source</i></p> <p><i>Year</i></p> <p><i>Description</i></p> <p><i>Version</i></p>	<p>食得健康，出力運動 你好叻！ (Healthy Eating, More Workout You're So Smart!)</p> <p>DH, HKSAR</p> <p>First printed in 2011</p> <p>This poster features a Cantonese word 叻 (smart) that is made up of 口 (mouth) and 力 (effort). It signifies that healthy eating and physical activity participation make a smart person. The poster also promotes 'Change for Health' website to disseminate knowledge for adopting healthy lifestyle.</p> <p>Available in bilingual (Traditional Chinese and English)</p>
6	 <p>OBESITY... KILLS</p> <p>Diabetes, Colon Cancer, Hypertension, Stroke, Uterine Cancer, Heart Disease</p> <p>www.cheu.gov.hk</p>	<p><i>Headline</i></p> <p><i>Source</i></p> <p><i>Description</i></p> <p><i>Versions</i></p>	<p>Obesity... Kills</p> <p>CHEU, DH, HKSAR</p> <p>This poster depicts a potbellied being of half man half woman, holding a time bomb. Likened to the ticking bomb, obesity put people who are overweight at increased risk because it predisposes many serious diseases. At the bottom of this poster, the 'yellow-to-red' colour ramp in a tape measure shows larger waistlines are linked to a higher risk of obesity-related diseases.</p> <p>Available in Traditional Chinese and English and A1, A2 sizes</p>
7	 <p>隱形殺手高血壓 HIGH BLOOD PRESSURE KILLS 預防治療皆有法 BUT IT'S PREVENTABLE AND TREATABLE</p> <p>你的血壓正常嗎？ Is your blood pressure normal?</p> <p>正常讀數低於 Normal reading below</p> <p>上量 Top number 120 mmHg</p> <p>下量 Bottom number 80 mmHg</p> <p>更多一查 To learn more 883 0111 www.chp.gov.hk</p>	<p><i>Headline</i></p> <p><i>Source</i></p> <p><i>Campaign</i></p> <p><i>Description</i></p> <p><i>Version</i></p>	<p>Is Your Blood Pressure Normal?</p> <p>DH, HKSAR</p> <p>World Health Day (2013) – High Blood Pressure (Hypertension)</p> <p>A public education campaign with the slogan “Is your blood pressure normal? – High blood pressure kills but it’s preventable and treatable” is launched from 2013 onwards to raise awareness of the hypertension, to motivate early detection, and to promote healthy behaviours.</p> <p>Available in bilingual (Traditional Chinese and English) and A3 size</p>
8	 <p>預防流感 快打針 Prevent Flu Get a shot</p> <p>每種季節性流感疫苗是預防季節性流感最特別有效方法， 確保你自己和家人的健康，立即接種疫苗！ Seasonal influenza vaccination is the most special and effective way to prevent seasonal influenza and to ensure the health of yourselves and your family.</p> <p>衛生署二十四小時健康教育熱線 24 Hour Health Education Hotline of the Department of Health 2833 0111</p> <p>www.chp.gov.hk</p>	<p><i>Headline</i></p> <p><i>Source</i></p> <p><i>Year</i></p> <p><i>Description</i></p> <p><i>Version</i></p>	<p>Prevent Flu Get a Shot</p> <p>CHP, DH, HKSAR</p> <p>First printed in 2016</p> <p>This poster features a happy family – mom who is heavily pregnant, dad, daughter, and grandpa. The central image also implies that young children, senior adults, and pregnant women are at high risk for developing flu-related complications. Viewers are strongly recommended to get flu vaccination for you and your family.</p> <p>Available in bilingual (Traditional Chinese and English)</p>

9		<i>Headline</i>	Add Soap Rub Hands for 20 Seconds
		<i>Source</i>	CHP, DH, HKSAR
		<i>Campaign</i>	Hand Hygiene Awareness Day (2011)
		<i>Description</i>	From 2010 onwards, Hand Hygiene Awareness Day is marked annually on 5 May in Hong Kong, and launches with different messages every year to raise the public awareness of good hand hygiene. This poster introduces steps for hand washing and alternative method without water – using alcohol-based hand sanitizer.
		<i>Version</i>	Available in bilingual (Traditional Chinese and English) and A2 size
10		<i>Headline</i>	Be Clean and Stay Healthy, Make School a Safer Place
		<i>Source</i>	CHP, DH, HKSAR
		<i>Year</i>	First printed in 2009
		<i>Description</i>	This poster is designed to connect with children and students by employing cartoon characters McDull and his friends who are extremely popular in Hong Kong. Six scenes, as shown in the oval-shaped pictures, teach the viewers how to stay healthy and make school a safer place.
		<i>Versions</i>	Available in bilingual (Traditional Chinese and English) and A2, A3 sizes
11		<i>Headline</i>	Maintain Cough Manners
		<i>Source</i>	CHP, DH, HKSAR
		<i>Campaign</i>	Maintain Cough Manners (2007)
		<i>Description</i>	Old Master Q and Big Potato are characters of a popular local cartoon, first appeared in 1962 and still in publication today. These widely recognisable figures are more likely to capture interest of several generations. This poster uses a set of four comics scenes to urge the public to observe hygiene etiquette when coughing.
		<i>Versions</i>	Available in bilingual (Traditional Chinese and English) and A2, A3 sizes
12		<i>Headline</i>	Smoking = Diseases
		<i>Source</i>	TCO, DH, HKSAR
		<i>Year</i>	First printed in 2014
		<i>Description</i>	This poster features a zombie man ‘dying’ from many smoking-related illnesses. The central diagram shows that cigarette smoking harms nearly every organ of the body. This poster highlights these hazards of smoking and urges smokers to quit to avoid these diseases. The poster also lists resources for support in quitting.
		<i>Version</i>	Available in bilingual (Traditional Chinese and English) and A2 size

13	 <p>Smoking Cessation Hotline Department of Health 1833 1833</p> <p>Smoking Causes Sexual Impotence</p> <p>www.tco.gov.hk</p>	<p>Headline <i>Smoking Causes Sexual Impotence</i></p> <p>Source TCO, DH, HKSAR</p> <p>Description To promote smoking cessation hotline, four kind of flowers – sunflower, lily, wilted rose, and anthurium – are employed respectively in a series of posters. This poster depicts droopy anthurium as a representation symbolic of impotence. The poster euphemistically addresses the erectile dysfunction caused by smoking and urges men to think about quitting.</p> <p>Versions Available in Traditional Chinese and English; 33cm x 60cm in size</p>	
14	 <p>小心! 「瘰肉」都市 bye-bye polyps</p> <p>健康飲食, 及早檢查, 擊退大腸癌。</p> <p>Over 50? Get checked. Polyps in your colon can turn into cancer.</p> <p>免費查詢熱線 FREE Hotline ☎ 3656 0800</p> <p>捐款熱線 Donation Hotline ☎ 3667 6332</p> <p>更多查詢請致電 For more details about colorectal cancer: www.cancer-fund.org/colorectal</p>	<p>Headline <i>Bye-bye Polyps</i></p> <p>Source HKCF</p> <p>Campaign Colorectal Cancer Awareness (2015)</p> <p>Description This poster zooms in on a man's abdomen, and depicts the man drawing a colonoscopy being performed to remove polyps even before they turn into cancer. His sketchy pencil drawing diagrams the simple and quick procedure of colorectal cancer screening, urging the target viewers – people over age 50, to get checked.</p> <p>Version Available in bilingual (Traditional Chinese and English)</p>	
15	 <p>check check check</p> <p>17位女性會有1位患上乳癌 1 in 17 women are at risk of breast cancer</p> <p>記得好似揀生果一樣細心檢查乳房 Check your breasts like you check your fruits</p> <p>免費癌症查詢 FREE cancer services ☎ 3656 0800 www.cancerfund.org/3656</p>	<p>Headline <i>Check Check Check</i></p> <p>Source HKCF</p> <p>Campaign Pink Revolution (2015)</p> <p>Description A series of posters depicts a lady's hands handling various types of fruit that are the visual stand-ins for breasts. The campaign aims to promote the awareness in viewers about the importance of self-checking your breasts in 3 steps (i.e. look, feel, compare) like checking the fruits, as the earlier breast cancer is detected the easier it is to treat.</p> <p>Version Available in bilingual (Traditional Chinese and English)</p>	
16	 <p>面露神采 RELIEVED?</p> <p>神采飛揚, 皆因做咗定期檢驗! I'm so relieved all want for regular health check.</p> <p>請定期做子宮頸細胞檢查 Please go for regular cervical smears 子宮頸癌早發現早治療 www.cervicalscreening.gov.hk</p>	<p>Headline <i>Relieved?</i></p> <p>Source DH, HKSAR</p> <p>Programme Cervical Screening (2004-Ongoing)</p> <p>Description This poster features a huge sense of relief the lady feels after her cervical smear test, encouraging women to get screened regularly. A series of four posters is created for the cervical screening programme to enhance public awareness on cervical cancer prevention and to increase the cervical screening participation rate.</p> <p>Version Available in bilingual (Traditional Chinese and English)</p>	

17		<p><i>Headline</i> Be SunSmart!</p> <p><i>Source</i> HKCF</p> <p><i>Campaign</i> SunSmart (2015)</p>	<p><i>Description</i> This poster indicates the importance of sun protection. To lower your risk of skin damage and skin cancer, the campaign poster recommends five easy options (i.e. slip, slop, slap, seek and slide): slip on a long-sleeved shirt, slop on some sunscreen, slap on a hat, seek shade under an umbrella or a pop-up tent, and slide on sunglasses.</p> <p><i>Version</i> Available in bilingual (Traditional Chinese and English) and A3 size</p>
18		<p><i>Headline</i> Get a Check-up for Gum Disease</p> <p><i>Source</i> Oral Health Education Unit, DH, HKSAR</p> <p><i>Campaign</i> Love Teeth (2011)</p>	<p><i>Description</i> A series of four posters depicts locals in two groups – one vastly outnumbering the other. This poster clearly articulates that the majority of community residents are suffering from gum disease. It encourages viewers to initiate a check-up of gum condition, and clean teeth thoroughly with daily flossing to prevent gum disease.</p> <p><i>Version</i> Available in bilingual (Traditional Chinese and English)</p>
19		<p><i>Headline</i> Sustained Breastfeeding Paves the Way for Healthy Growth of Your Baby</p> <p><i>Source</i> CHEU, DH, HKSAR</p>	<p><i>Description</i> This poster depicts a mother-infant bond, and features stages of a seedling growing up sturdily. It advocates breastfeeding by indicating that breast milk gives your baby a healthy start that would last a life time. The poster also offers breastfeeding hotline and related link for enquiry and resources.</p> <p><i>Version</i> Available in bilingual (Traditional Chinese and English)</p>
20		<p><i>Headline</i> Cocaine = Heroin Is Addictive</p> <p><i>Source</i> ND, Security Bureau, HKSAR; ACAN</p> <p><i>Campaign</i> Stand Firm! Knock Drugs Out (2012)</p>	<p><i>Description</i> The signature image features a drug user controlled from above strings by a skeleton hand. This marionette image and devilishly illustrated headline with horns and tail, symbolize addiction and death. This poster indicates the health effects and danger of cocaine use, and urges people to quit this powerfully addictive stimulant drug.</p> <p><i>Versions</i> Available in Traditional Chinese and English</p>

21		<p><i>Headline</i> <i>Friends?</i></p> <p><i>Source</i> ND, Security Bureau, HKSAR; ACAN</p> <p><i>Campaign</i> Stand Firm! Knock Drugs Out (2013)</p> <p><i>Description</i> This poster features a bloody handshake in which two people are passing a bag of drugs. The image and texts around it show that drugs kill you in the aftermath of this deal, and those who offer you drugs are not real friends. The poster also encourages viewers to contact with help line for their own or another person's drug use.</p> <p><i>Versions</i> Available in Traditional Chinese, English, Hindi, Nepali and Urdu</p>	
22		<p><i>Headline</i> <i>Face It! Test It!</i></p> <p><i>Source</i> RRC, CHP, DH, HKSAR</p> <p><i>Year</i> First printed in 2006</p> <p><i>Description</i> Designed after the Snellen eye chart, the central image is printed with 11 lines of block letters from words 'HIV' and 'AIDS'. It signifies that AIDS should be treated and tested like any health issues such as blurred vision. This poster aims to bring attention to the stigma of AIDS and urges the intended viewers to get tested.</p> <p><i>Version</i> Available in bilingual (Traditional Chinese and English); 21cm x 29.7cm in size</p>	
23		<p><i>Headline</i> <i>To Protect</i></p> <p><i>Source</i> RRC, CHP, DH, HKSAR</p> <p><i>Year</i> First printed in 2014</p> <p><i>Description</i> This poster features a loop of red ribbon and a condom as the substitutions for strokes in Chinese calligraphy 愛 and 戴, meaning love and wear respectively. Different from two other posters in this series, it accentuates the word 'wear' and urges the public to protect themselves and their loved ones by using condoms.</p> <p><i>Version</i> Available in bilingual (Traditional Chinese and English)</p>	
24		<p><i>Headline</i> <i>Protect Against Hepatitis B, 3 Jabs Work</i></p> <p><i>Source</i> CHP, DH, HKSAR</p> <p><i>Year</i> First printed in 2014</p> <p><i>Description</i> Syringe signs making a diagonal line in a tic-tac-toe game on a 3x3 'liver' board, indicates that we are on the winning side by receiving 3 jabs' hepatitis B vaccine. This poster also lists where children under age of six and adults in the general public can get vaccinated, and other channels to get information relevant to viral hepatitis.</p> <p><i>Version</i> Available in bilingual (Traditional Chinese and English)</p>	

25		Headline	<i>Prevent Hepatitis C Don't Share Needles or Works</i>
		Source	RRC, CHP, DH, HKSAR
		Year	First printed in 2006
		Description	A torn picture of syringe metaphorically illustrates the need to 'break the habit' of sharing needles or works, which is the main route of hepatitis C infection in Hong Kong. This poster emphasizes that single-use items must only be used once to prevent blood-borne hepatitis C infection.
		Version	Available in bilingual (Traditional Chinese and English); 21cm x 29.7cm in size
26		Headline	<i>Know More About Tuberculosis</i>
		Source	TB & Chest Service, DH, HKSAR
		Year	First printed in 2012
		Description	This poster provides basic tuberculosis (TB) facts including transmission of TB, infection control and prevention, BCG (bacille Calmette-Guerin) vaccine for TB, signs and symptoms, and treatment for TB disease. The poster aims to raise public awareness and promote understanding of this infectious disease.
		Versions	Available in Traditional Chinese and English
27		Headline	<i>Your Health, Your Life.</i>
		Source	FHB, HKSAR
		Programme	Public Consultation on Healthcare Reform (2008)
		Description	This poster depicts a father giving a piggyback ride to his baby and highlights strong family bonds. Four posters in this series appeal to the general population to support the reform of healthcare system by inviting all target groups to send views to healthcare reform opinion survey.
		Version	Available in bilingual (Traditional Chinese and English)
28		Headline	<i>Support Organ Donation Register Online!</i>
		Source	DH, HKSAR; HA; HKMA
		Campaign	Light up Lives (2006-Ongoing)
		Description	This poster features a large butterfly logo and two local artists – Yeung Chin-wah and Ku Kui-Kei. The wings of the butterfly are made of fingerprints, symbolising the loving acts of helping others by signing up to donate organs after death. The poster encourages viewers to get family support and register for organ donation.
		Version	Available in bilingual (Traditional Chinese and English) and A2 size

29			<i>Headline</i>	<i>(From Bear to Beer)</i>
			<i>Source</i>	CHP, DH, HKSAR
			<i>Year</i>	First printed in 2014
			<i>Description</i>	The 4-in-1 posters are designed to call on the public to stay alert to the underlying alcohol-related harm to health, especially for child and youth development. This poster urges parents to take action to not expose young people to alcohol, and to get more information relating to alcohol and health on the 'Change for Health' website.
			<i>Versions</i>	Available in Traditional Chinese and English
30			<i>Headline</i>	<i>Nobody Understands? Give Us a Call.</i>
			<i>Source</i>	The Samaritans Hong Kong
			<i>Year</i>	First printed in 2016
			<i>Description</i>	This image shows a student breaking down from the pile of school work. On themes of bereavement, isolated living space, school bullying, loneliness among senior citizens, gender identity/expression and study pressure, a series of 6 posters is designed to encourage the intended viewers to talk to the Samaritans, not to suffer in silence.
			<i>Version</i>	Available in bilingual (Traditional Chinese and English) and A3 size

Appendix B Statistics Obtained from CPHP

One Jupyter notebook in the gem-tools (Hiippala, 2015a) extracts basic statistics from GeM-annotated sub-corpora CPHP-NYC and CPHP-HK and stores the metadata in CSV files. Table B.1 and Table B.2 contain the statistical information.

Table B.1 Basic statistics obtained from CPHP-NYC

#	base unit	visual base unit	embedded base unit	layout unit	RST segment	visual RST segment	unique / all RST relations
1	20	9	2	20	10	4	8 8
2	14	5	3	14	6	2	4 5
3	14	4	4	13	7	2	6 6
4	10	3	3	10	7	1	6 6
5	13	5	0	12	6	1	5 5
6	18	7	6	18	12	5	6 9
7	23	11	4	23	15	7	8 10
8	14	6	2	14	8	4	4 4
9	31	10	1	31	22	6	6 16
10	11	35	45	6	9	0	6 6
11	30	11	7	28	19	6	9 18
12	15	7	0	15	8	4	5 5
13	13	3	0	13	5	1	4 4
14	18	7	3	16	12	1	8 9
15	7	1	1	7	4	1	3 3
16	8	4	8	8	5	1	4 4
17	17	7	4	16	13	3	7 9
18	17	7	1	17	9	2	7 7
19	29	12	2	29	14	5	5 10
20	33	12	17	30	27	9	7 19
21	50	9	7	36	38	2	8 12
22	14	5	4	14	7	2	4 5
23	10	3	2	10	9	1	8 8
24	9	4	4	7	6	2	4 4
25	15	9	4	15	13	8	5 6
26	29	9	16	29	26	4	8 18
27	14	5	0	14	12	5	7 10
28	7	2	0	7	6	1	4 4
29	10	3	2	10	4	1	3 3
30	23	7	2	23	17	5	5 10

Table B.2 Basic statistics obtained from CPHP-HK

#	base unit	visual base unit	embedded base unit	layout unit	RST segment	visual RST segment	unique / all RST relations
1	33	18	2	33	27	12	9 22
2	36	11	0	36	27	5	6 24
3	15	8	5	15	12	1	6 11
4	46	14	3	44	44	11	8 34
5	10	3	5	8	9	2	5 8
6	13	4	0	13	12	3	6 7
7	25	4	3	25	23	3	10 19
8	20	9	1	20	15	3	7 13
9	57	20	4	57	47	10	7 39
10	25	9	0	25	22	7	5 17
11	21	6	0	21	18	4	4 15
12	37	5	5	37	36	4	8 24
13	8	2	1	8	6	1	5 5
14	20	4	3	20	20	4	8 18
15	21	7	3	21	16	3	8 13
16	12	3	3	12	10	1	4 9
17	32	9	3	32	30	7	7 20
18	13	4	0	13	11	2	6 9
19	12	4	4	12	11	2	5 9
20	18	5	2	18	15	3	7 7
21	9	3	1	9	7	3	4 4
22	25	7	0	24	15	1	5 12
23	15	5	2	15	11	0	4 9
24	23	3	3	23	14	1	4 11
25	47	5	11	47	19	1	5 16
26	34	15	4	31	24	10	7 14
27	20	3	2	20	14	2	7 12
28	18	13	7	18	11	4	7 10
29	7	4	4	7	5	1	4 4
30	30	13	4	30	23	6	9 20

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