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Published: 01/06/1998

Document Version:
Peer reviewed version

[Link to publication](#)

Citation for published version (APA):

Chan, K. (1998). *Exploratory study on causal framing of environmental news in Hong Kong*. Paper presented at Journalism and social change in Asia conference, Hong Kong.

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**CAUSAL FRAMING OF ENVIRONMENTAL NEWS
IN HONG KONG**

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A paper presented at the conference

Journalism and social change in Asia

Hong Kong Baptist University

June 2-4, 1998

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Causal framing of environmental problems in Hong Kong

Abstract

This study explored the framing effect of mass media on the perceived causes and responsibilities of air pollution and solid waste disposal problems in Hong Kong. Content analysis of causal attribution in the print news was matched with public agenda on causal perception obtained from a telephone survey of 745 respondents. Results of the correlation analysis failed to support a linear relationship between the ranking of perceived causes and responsibilities of both problems reported in the press and that held by the public. This was probably due to the infrequent coverage and weak framing of the issues in the print news. Respondents who perceived the selected problems as obtrusive issues had similar causal perception with those who did not. Use of mass media for environmental news was positively related to the number of causes and treatments mentioned. Reading and viewing of environmental news may deepen respondents' cognitive dimension and enhance their ability to explain societal phenomena.

Introduction

Hong Kong, being the most densely populated cities in the world, suffers from many environmental problems. Industrial, commercial and domestic activities produce large amount of wastes. These activities lead to different environmental pollution problems such as water pollution, disposal of solid and chemical wastes, undesirable levels of air pollutants and noise. The environmental degradation has been on a scale that seriously threatens the remaining unspoilt areas of the territory and its surrounding waters and also the health and well-being of its people (Hills, 1988). While many of the pressures on the environment are very obvious and in qualitative terms are by no means unique to Hong Kong, what is different in Hong Kong's case is their intensity as a result of limited land supply, rapid population growth and large-scale industrialization (Hills, 1988).

The Hong Kong Government sets ten principles for protecting the environment and the 'polluter pays principle' are among one of them. It states that those who cause environmental damage should pay for the costs of the damage, with subsidy, and should seek to curtail such damage by internalising the costs of pollution. This principal is seen to be a matter of fairness and a way to encourage waste recycling and waste minimisation (Planning, Environment and Land Branch, 1993).

Asking why about the environmental problem is a natural process among the general public. The public's understanding of the cause of the pollution problem will guide their opinion about environmental policy making. One may wonder how the general public know about the causes of the environmental problems. Barton (1995) suggested that content analysis of mass media can provide information on the sources of public explanations of social problems.

The agenda-setting hypothesis, which has drawn increasing attention in mass communication research literature, posits a relationship between the relative emphasis given by the media to different issues and the degree of salience these issues have for the general public.

Several studies have investigated the agenda setting effect of mass media on the public salience of the environmental issue. However, there was little research about the agenda setting effect on the causes and responsibilities of environmental problems.

Past research results indicated that issue obtrusiveness, the degree that an issue forces itself into lives of individuals, had impact on the agenda setting effect. Although many researchers argued that the environment was an unobtrusive issue, this study proposed that the environment consisted of a number of sub-issues with different degree of obtrusiveness. By examining the media agenda and the public agenda of the causes and responsibilities of air pollution and solid waste disposal problems in Hong Kong, this study attempted to test the framing effect of mass media.

Literature review

Over seventy years ago, Lippmann (1922) noted the role of the news media in defining people's understanding of their environment. Lippmann (1922) described an important distinction between the world outside and the pictures in people's mind and argued that news media influenced in many ways the consumers' perception of the world around. As Cohen (1963) remarked 'the press may not be very successful in telling us what to think, but is stunningly successful in telling us what to think *about*'. Rogers and Dearing (1988) define agenda-setting as 'a process through which the mass media communicate the relative importance of various issues and effects to the public'. Over two hundred studies to date have examined an agenda composed of public issues. For these studies, the core hypothesis is that the degree of emphasis placed on issues in the news influences the priority accorded these issues by the public (McCombs, 1995).

Initial studies on the agenda setting function of mass media focused on the context of mass communication and voter behavior. The primary objective was to investigate how the news media play an important role in influencing voters' judgment of salience issues in voting decisions. The first empirical study to test the theory was done by McCombs and Shaw (1972) during the 1968 United States presidential election. Based on a random sample of 100 undecided voters in Chapel

Hill, North Carolina, they found a nearly perfect rank-order correlation (+0.97) between the issues considered most important by voters and the coverage of these issues in the news media used by the voters.

Four years later during the 1972 United States presidential election, the findings of this study were replicated in a middle-sized city, Charlotte, North Carolina. The study used a three-wave panel design to measure the public agenda and a content analysis of two local newspapers and two national TV networks to measure the media agenda (Shaw and McCombs, 1977). Results also indicated that the media agenda at previous time points had a strong correlation with the current public agenda, while the public agenda at previous time point demonstrated a weak correlation with the current media agenda. The findings did not support the argument that the media responded to salience issues perceived by the public.

One may argue that correlation alone fails to establish the causal relationship that the news media influences the public agenda. There could be a common source that influenced both the news coverage and people's perception towards the issues. Funkhouser (1973) tackled this problem by introducing statistical indicators of 'reality' which serves as an objective measurement of actual salience of the issue. Funkhouser's (1973) secondary analysis simultaneously compared time series data of public opinion survey findings, content analysis of news coverage and real indicators of events about Vietnam, campus unrest and urban riots during the entire decade of 1960s. He found substantial correspondence between public opinion and news coverage. But most important, he found little correspondence between either of these and the objective indicators of reality.

Brosius and Kepplinger (1990) replicated the design of the original McCombs and Shaw study by comparing a content analysis of the major West German television news programs for one year with 53 weekly national opinion polls on the issues considered most important by West Germans. Strong agenda-setting effects were found for five issues: energy supply, East-West relations, defense, the environment, and European Community politics. For other issues, news

coverage trailed public opinion, or there was no correlation between the two. Results also indicated that an influence of television coverage on problem awareness was likely to occur when coverage of an issue was intense and when relative variation was large.

Several studies focused on the agenda setting of the environmental problem. Atwater, Salwen and Anderson (1985) applied the agenda setting theory to the study of six environmental sub-issues including disposal of water, quality of waters, hazardous substances, quality of land, quality of air and wildlife conservation. A content analysis of reporting of these sub-issues in three selected newspapers formed the mass media agenda. Moderate correlation was found between the frequency of occurrence of articles about the sub-issues and the perceived salience of the sub-issues among the public.

Salwen (1985) analyzed media coverage of seven sub-environmental issues in three Michigan newspapers for 33 weeks and compared with the public agenda measured by about 300 telephone interviews conducted in three waves. The peak relationship of the media agenda to the public agenda occurred after eight to ten weeks of media coverage. Salwen (1985) remarked that 'by simply keeping an issue alive by reporting about it for some duration, the media may transmit to the public more than just information, but also a subtle message concerning the legitimacy of such an issue'.

The agenda setting hypothesis was again supported for the issue of environmental pollution in Ader's (1995) longitudinal study of media content, survey on salience of environmental issues and real-world environmental quality conditions from 1970 to 1990. Results indicated that there was a positive correlation between the amount of media attention devoted to pollution and the degree of public salience for the issue. The negative correlation between the media agenda and the total pollution index, air pollution and water pollution indicated that despite the overall reduction in pollution, there was an increase in media coverage. However, the positive correlation found between the media agenda and real-world conditions for waste pollution suggested that waste pollution was an obtrusive issue that directly affect the public.

Recently, the agenda-setting role of the news media has been established in laboratory settings. In a series of controlled experiments conducted by Iyengar and Kinder (1987), participants viewed television news programs that had been edited to reflect importance of certain issues, such as environmental pollution or national defense. Results indicated that the issues emphasized in the experimental versions of the newscasts were perceived as more important.

Scholars have not been convinced that the news media influenced the salience of all issues for all people. Some have sought to identify audience characteristics including need for orientation, audience sensitivity and attentiveness limited or enhanced their influence (e.g. Weaver, 1977; Erbring, Goldenberg and Miller, 1980; MacKuen and Coombs, 1981). Some have attempted to explore issue characteristics as contingent conditions for the agenda setting function.

Several researches discussed the obtrusiveness or unobtrusiveness of the issue as an important contingent conditions. Obtrusiveness refers to the degree to which an individual is affected by an issue, or the degree to which the issue forces itself into lives of individuals (Yagade and Dozier, 1990). Other scholar conceptualize obtrusiveness in terms of whether people can have personal experience with an issue independent of media exposure (Zucker, 1978; Winter, 1981).

Zucker (1978) argued that the environmental problem can be an unobtrusive issue because pollution builds up gradually in most instances. So, most people either do not realize it is there, or do not consider it other than natural, unless it is talked about as a problem in the media. In a study using factor analysis to distinguish obtrusive issues from unobtrusive issues, Eyal (1979) found that the issue of the environment loaded strongest on the unobtrusive factor.

Demers, Craff, Choi and Pessin (1989) pointed out that obtrusiveness should be considered a continuous rather than a discrete variable. They also suggested that the identification of issue obtrusiveness should be measured by respondent's rating at individual level rather than a priori definition at an aggregate level.

Van Liere and Dunlop (1980) gave support to the unobtrusive nature of the environment issue. They reviewed 50 environmental studies and concluded that standard demographic information such as age, income and education were better predictors of environmental concern than direct experience with the issue. Murch (1971) found that people who viewed the environment issue as important saw it as a serious matter facing other people's lives rather than their own.

However, in the Hong Kong experience, the environmental issues should not be considered as unobtrusive as many pollution problems are highly visible and have direct impact of people's daily life. Being one of the most densely populated cities in the world, serious environmental pollution is an unfortunate by-product of Hong Kong's economic success and population growth. According to official statistics, some 1.5 to 2 million people are exposed to unacceptable levels of sulphur dioxide and nitrogen dioxide and the most common adverse health effects take the form of increased incidence of respiratory illness. More than one million people are exposed daily to unacceptably high levels of noise from road traffic, nearly half a million people are exposed to aircraft noise and about two million people are exposed to excessive noise from construction, industrial, commercial or domestic activities. The harbor and many rivers are polluted by untreated industrial wastes and sewage (Hong Kong Government, 1989). It will be more appropriate to conceptualize the environment issue as having many sub-issues that differ in their degree of obtrusiveness. For example, air pollution and noise pollution are relatively obtrusive while global warming and waste disposal problems are relatively unobtrusive. People can experience directly the air quality and the noise level of the environment and their health will be greatly affected. People have little experience about global warming nor how their garbage have been treated. The shortage of landfill have virtually no impact on people's daily life.

Scholars have different views on whether agenda setting effects will be stronger for obtrusive or unobtrusive issues. Prior research results have observed that unobtrusive issues demonstrate stronger agenda-setting effect than obtrusive issues (Eyal, Winter, and DeGeorge,

1981; Zucker, 1978; Behr and Iyengar, 1985). However, there are also evidence that the opposite theory, that agenda setting effects increases as obtrusiveness increases. Personal experience with an issue sensitizes the individual's attention to the issue and therefore enhances rather than assuages media effects (Erbring, Golderberg and Miller, 1980; Demers, Craff, Choi and Pessin, 1989).

To summarize, agenda setting theory posits a positive relationship between the relative importance given by the media to various topics and the degree of salience these topics have for the general public. Perceived issue salience of individuals are influenced by the relative issue salience reported by the mass media. Empirical supports of the agenda-setting role of news media for a variety of issues have been obtained through field studies employing survey research and content analysis to investigate the degree of correspondence between the news agenda and the public agenda as well as through laboratory experiments. Empirical evidence pertaining to agenda-setting effects of obtrusive and unobtrusive issues is mixed. Environmental issues were identified by most researchers as an unobtrusive issues using a priori definition as well as audience-based measurement. In view of the poor environmental conditions in Hong Kong, it is expected that some environmental issues such as air pollution are likely to be perceived as obtrusive ones.

Extension of agenda setting theory: Framing

In recent years, communication scholars have attempted to explore the framing effect of mass media as extension of agenda setting function. Tankard, Hendrickson, Silberman, Bliss and Ghanem (1991) describe a media frame as the central organizing idea for news content that supplies a context and suggests what the issue is through the use of selection, emphasis, exclusion and elaboration. Entman (1993) argued that framing essentially involved selection and salience. To frame is to *select some aspects of a perceived reality and make them more salient in a communicating text, in such way as to promote a particular problem definition, causal*

interpretation, moral evaluation and/or treatment recommendation for the item described

(Entman, 1993).

The idea of framing was conceptualized as an extension of agenda setting and addressed the impact of news coverage on the public's perception about who should be responsible for a particular issue or an event (Iyengar, 1991; Iyengar and Simon, 1993). Research on framing has studied the effects of alternative news frames on the public's attributions of responsibility for issues and events.

Attributions of responsibility are of interest for a variety of reasons as the concept of responsibility embodies an especially powerful psychological cue. Social psychologists have demonstrated that attitudes and actions within a wide variety of areas are altered by the manner in which individuals attribute responsibility (Iyengar, 1991).

Iyengar (1991) argued that television news frames issues in either episodic or thematic terms. The episodic frame depicts public issues in terms of concrete instances or specific events. In contrast, the thematic news frame places public issues in some general or abstract context. For example, the episodic frame will report environmental issues in terms of an oil spill, a factory accused of polluting the river, an environmental campaign provoking paper recycling and so on. On the contrary, the thematic frame will report increase in government expenditure on environment, changes in environmental legislation, the social grievances of people affected by the airport noise, or the backlog in the environmental complaint process. Visually, episodic reports make for "good pictures" while the thematic reports typically takes the form of a "backgrounder" directed at general outcomes or conditions and frequently shows "talking heads on television screen". Episodic framing is visually appealing and consists of on-the-scene, live coverage. Thematic coverage, which requires interpretive analyses, is normally overshadowed by other news items (Iyengar, 1991). Given the stringent time limit and heavy commercial influences, the television news coverage of issues like poverty, terrorism, election campaigns and the Gulf Crisis were episodic framing (Iyengar, 1991; Iyengar and Simon, 1993).

Research using laboratory studies have investigated the effects of the episodic and thematic news frames on viewers' attributions of responsibility for various political and social issues including poverty, unemployment, crime, terrorism and racial inequality. Under thematic framing, viewers tended to assign responsibility for national problems to general societal factors, including cultural norms, economic conditions, and the actions or inaction of government officials. Under episodic framing, however, viewers attributed responsibility to the actions of particular individuals or groups (Iyenger, 1991). However, the experimental manipulation involved only television news and it was expected that the nature of the print media would facilitate more thematic framing. It appears that there has been no study on the presentation of episodic or thematic framing of environmental news and their possible effects on attribution of responsibility.

Attributions of responsibility are generally divided into causal and treatment dimensions. Causal responsibility focuses on the origin of the issue or problem (Fincham and Jaspars, 1980), whereas treatment responsibility focuses on who or what has the power either to alleviate or to forestall alleviation of the issue (Brickman, Karuza, Coates, Cohn and Kidder, 1982). Therefore, if the problem of environmental pollution is assessed in terms of causal responsibility, the relevant questions concern the processes by which pollution problems arise and which persons or organizations that pollute the environment. Treatment responsibility, on the other hand, focuses on who has the power and interest to reduce pollution or to handle the environmental problems.

In examining the framing of causal responsibility of Barton Spring, a local environmental problem in Texas, Austin, Maher (1995) found that the local newspaper most frequently identified developers, new housing and shopping malls as the key causes, while the city population growth was seldom mentioned. A survey on residents supported a nearly perfect match between the media agenda and the public agenda about the causes of pollution.

For the study of the media agenda in terms of casual models, Barton (1995) proposed that content analysis of the mass media, by coding the causal models directly expressed, or those implied by the media 'framing' of events, can provide information on the sources of public

explanations of social problems. Price and Tewksbury (1995) also proposed that the media framing effects can be tested by examining the frequency of constructs in media coverage of particular issues over time, and relating the results to the frequency of constructs appearing in audience cognitive responses to these issues.

Attribution of responsibility for environmental issues are of particular interest since the Hong Kong government advocates the 'polluter pays principle' as one of the basic principles for protecting the local environment. It states that those who cause environmental damage should pay for the costs of that damage, without subsidy, and should seek to curtail such damage by internalizing the costs of pollution. For example, the factory owner who pours chemical waste down the drain should pay the costs required to clean up the pollution. As a result, the responsibility for payment incurred passes from the public through indirect tax payment to the polluters (Planning, Environment and Lands Branch, 1993). Based on the polluter pays principle, the government introduced new environmental policies. These include introduction of various a charging scheme for treatment of chemical wastes, disposal of construction, commercial and industrial waste at landfills and recovery of sewage treatment costs in public's water bill. After a series of publicity campaigns carried out by the government, the 'polluter pays principle' was widely accepted among the public (Lai, 1992).

For the reporting of environmental news in Hong Kong, it is not uncommon to find that the content explicitly mentions who caused the problem or who should be responsible for doing something about it. For example, newspaper reported a government official said that motor vehicles were the major cause of air pollution in Hong Kong (*Sing Tao Jih Pao*, 4 January, 1996). In this way, attribution of responsibility by the press was evident through the use of direct quotation of selective new sources.

To conclude, this critical review has shown that mass media has potential influence on the perceived salience of environment as a problem among audience. Research on priming and framing represents the second wave of the agenda setting theory. One of the issues emerging

from this review involves the attribution of causes and responsibilities of environmental problems. Content analysis of the mass media, coding the causal models directly expressed, or those implied by the media 'framing' of events, will provide information on the sources of public explanations of social problems.

Research method

The environment is selected as the issue of this study. Environmental issues were defined as "news items relating to humanity's unintentional disruption of the ecological system" (Atwater, Salwen and Anderson, 1984, p.4).

This study involved a matching of the public agenda and the media agenda on causes and responsibilities of two selected local environmental problems. It investigated the relative frequency of attribution of causes and responsibilities in the media and its implication on the audiences' perception about responsibility of environmental problems. The two environmental problems selected were air pollution and domestic waste disposal problem. Air pollution was expected to be an obtrusive problem as air quality has direct implication on health consequence. Domestic waste disposal was expected to be an unobtrusive problem as the shortage of landfill had no direct implication on health. Most of the people care very little about where and how their domestic wastes are treated as long as these waste are cleared.

The media agenda was obtained through content analysis of print news about these two problems from 1st May, 1995 to 8th April, 1996 which was about twelve months before the public agenda data are collected. Two major Chinese daily newspapers, the *Sing Tao Jih Pao* and the *Ming Pao Daily News*, and one major English daily paper, the *South China Morning Post* were selected for analysis. These papers have both high circulation and an elite image. The three newspapers selected have a gross total readership of 986,000 in 1995 (Survey Research Hong Kong, 1995).

All news articles carried by the three selected newspapers about air pollution and solid waste disposal under the topic 'environment' in the Hong Kong Newspaper Clippings Index are

examined. The coding unit was the individual news article. For each article, individuals or groups being accused of causing the problem or having the responsibility to solve the air pollution and the solid waste disposal problems are coded. A maximum of three causes and responsibility individuals or groups were coded. The number of causes and responsible groups in *Ming Pao Daily*, *Sing Tao Daily News* and the *South China Morning Post* will be weighted in the ratio of 2:1:1 to roughly reflect their relative readership sizes (Survey Research Hong Kong, 1995).

The public agenda was obtained from a telephone survey. The target population of the study was all Hong Kong residents aged 18 and above. Telephone numbers were first drawn randomly from the residential telephone directories as 'seed numbers', from which another set of numbers were generated using the 'plus/minus digit' method, in order to capture the unlisted numbers. All numbers were then mixed in random order to produce the final telephone sample. When telephone contact was successfully established with a target household, one person aged 18 or above was selected from all those present using the 'next birthday' rule (i.e. the household member whose birthday is the closest to the survey date). The telephone interview was conducted by the Social Science Research Center of the University of Hong Kong during the period from April 9 to 12, 1996. The sample size was 745 and the overall response rate was 57.4%. A demographic profile of the sample is summarized in Table 1.

[TABLE 1 ABOUT HERE]

Perceived obtrusiveness of pollution problems Respondents were asked to rate the extent that the air pollution in Hong Kong was affecting their health and the solid waste disposal problems in Hong Kong was bothering them personally on a four point scale (1=not at all, 4=very much). Those who perceived the selected problem is not affecting him or her or affecting a little is classified as having an unobtrusive perception, and those who perceived the selected problem is affecting him or her to some or to very much extend is classified as having an obtrusive perception.

Causal and treatment responsibility of pollution problems Respondents were asked about their perception on which persons or organizations cause and have the power to solve the air pollution and the waste disposal problems in Hong Kong. The questions were in open-ended form and up to three answers were recorded for each problem.

Use of mass media for environmental news Respondents were asked on four questions about how frequently they viewed television and read print news about Hong Kong's and the world's environmental on a four point scale (1=never read, 2=read occasionally, 3=read very often, 4=read every time). The sum of the four questions formed the measure of use of mass media for environmental news.

Results

Media agenda During the content analysis period, there were twenty-one articles about air pollution. Most of the articles discussed about the compilation of an air quality index launched by the Environmental Protection Department and the government's proposed legislation of requiring light vans to switch from the use of diesel oil to petrol. Altogether twenty causes and twenty responsible groups were mentioned in the press. The causes and responsible groups reported in the surveyed articles are summarized in Table 2. Vehicles were most often blamed for the cause and other reasons such as the climate and the geographic environment was blamed for poor air quality.

During the content analysis period, there were only seven articles about solid waste disposal. Most of the articles were about the government's ten-year plan to reduce solid waste. Altogether nine causes and twelve responsible groups were mentioned in the press. The causes and responsible groups reported in the surveyed articles are summarized in Table 2.

[TABLE 2 ABOUT HERE]

Public agenda Survey results indicated that 72.2 percent and 41.1 percent of the respondents reported air pollution problem and solid waste disposal problem was affecting or bothering them very much or to some extent respectively. The mean scores for perceived

obtrusiveness of the air pollution and solid waste disposal problem were 2.94 and 2.15 on a four-point scale respectively. Results of t-test indicated that there was significant difference in mean scores of perceived obtrusiveness among these two problems. The perceived obtrusiveness of the selected problem is conceptualized to be low for respondents who perceived that the selected problem is not affecting him or her, or is affecting him or her to a little extent. The perceived obtrusiveness of the selected problem is conceptualized to be high for respondents who perceived that the selected problem is affecting him or her to some little extent or very much.

The perceived causes and responsible persons or organizations of air pollution are summarized in Table 3. Altogether 1,048 causes were mentioned and the four most frequently mentioned causes were factory and electrical plants, vehicles, Hong Kong people and Hong Kong Government. These four causes contributed to over eighty percent of total number of causes mentioned. A total of 1,018 persons and organizations were mentioned to be responsible. The four most frequently mentioned were Hong Kong Government, Hong Kong people, factories and electrical plants and the Environmental Protection Department.

[TABLE 3 ABOUT HERE]

In view of the large difference in the orders of magnitude of the number of causes and responsible groups mentioned in the survey and reported in the press, rank order correlation coefficients were compiled to match the media agenda and the public agenda. The mean of the tied ranks is assigned to each of the tied scores. Due to the large number of tied ranks, the Pearson rank correlation coefficient is preferred to Spearman r coefficient. The Pearson rank correlation coefficient between the causes perceived by the respondents and that reported in the press for air pollution problem was 0.56 and was not significant at 0.05 level. Similarly, the Pearson rank correlation coefficient for the treatment responsibility was 0.21 and was not significant at 0.05 level. Results indicated that there was no evidence for a positive relationship between the public agenda and the media agenda on the cause and responsibility of air pollution problem.

The Pearson rank correlation coefficient between the causes and treatment responsibilities perceived by the respondents for air pollution problem was 0.53 and was not significant at 0.05 level. Results indicated that there was no evidence for a linear relationship between the ranking of perceived causes and responsibility group of air pollution problem.

The perceived causes and responsible persons or organizations of solid waste disposal are summarized in Table 4. Altogether 847 causes were mentioned and the four most frequently mentioned causes were Hong Kong Government, Hong Kong people, Urban Council/Regional Council and factories. These four causes contributed to over eighty percent of total number of causes mentioned. A total of 962 persons and organizations were mentioned to be responsible. The four most frequently mentioned were Hong Kong Government, Hong Kong people, Urban Council/Regional Council and environmental protection groups.

[TABLE 4 ABOUT HERE]

The Pearson rank correlation coefficient between the causes perceived by the respondents and that reported in the press for solid waste disposal problem was 0.50 and was not significant at 0.05 level. Similarly, the Pearson rank correlation coefficient for the treatment responsibility was 0.45 and was not significant at 0.05 level. Again, results indicated that there was no evidence for a positive relationship between the public agenda and the media agenda on the cause and responsibility of solid waste disposal problem.

The Pearson rank correlation coefficient between the causes and treatment responsibilities for solid waste disposal problem perceived by the respondents was 0.60 and was significant at 0.05 level. Ranking of perceived causes of the solid waste disposal problem for positively related to the ranking of who should do something about it.

Chi-square tests are conducted to test whether the perception of cause and treatment responsibility is related with respondents' use of mass media. Use of mass media for environmental news was obtained by summing the scores for consumption of environmental news about the Hong Kong and the world's environment in the press as well as on the television. The

alpha coefficient was 0.82. Use of mass media for environmental news is grouped into two levels of high and low, using the mean score of nine as a dividing line. Chi-square values for perception of cause and treatment responsibility of air pollution were 0.67 and 1.10 respectively and were not significant at 0.05 level. Chi-square values for perception of cause and treatment responsibility of solid waste disposal problem were 0.45 and 1.23 respectively and were not significant at 0.05 level. Results indicated that respondents who use more mass media for environmental news had a similar perception of cause and treatment responsibility with those who use less mass media for environmental news.

Chi-square tests are also conducted to test whether the perception of cause and treatment responsibility is related with respondents' perceived obtrusiveness of the problem. Chi-square values for perception of cause and treatment responsibility of air pollution were 0.88 and 1.97 respectively and were not significant at 0.05 level. Chi-square values for perception of cause and treatment responsibility of solid waste disposal problem were 0.88 and 1.97 respectively and were not significant at 0.05 level. Results indicated that respondents who perceived the selected problem as an obtrusive issue had a similar perception of cause and treatment responsibility with those who did not perceived the selected problem as an obtrusive issue.

The hypothesis that the relative frequency of reporting of causal and treatment responsibility of specific pollution problems will correlate with the perceived causal and treatment responsibility of the problem among the audience was not supported in this study. Those who use more mass media for environmental news were not more likely to attribute the causal and treatment responsibilities of environmental problems to those reported in the mass media than those who use less mass media for environmental news. The correlation between media agenda and public agenda was not higher for an unobtrusive problem than an obtrusive problem. Results indicated that there was a lack of direct link between the public agenda and the media agenda on cause and treatment responsibility.

An interesting observation about the causal and treatment attribution was that there was positive correlation between the number of causes and treatment responsibility groups mentioned and the use of mass media. The correlation coefficient between the number of causes and responsible groups and the use of mass media for the air pollution problem was 0.24 and 0.15 respectively. The correlation coefficient between the number of causes and responsible groups and the use of mass media for the solid waste disposal problem was 0.15 and 0.17 respectively. All these coefficients were significant at 0.0001 level. This indicated that respondents who used more media for environmental news were able to give more causes and responsible groups for the selected problems.

General linear models were used to predict the number of causes or responsible groups mentioned by the degree of mass media use and the perceived obtrusiveness of the issue for each of the selected problem. The results of the four general linear models are summarized in Table 6. All four models were significant at 0.001 level, indicating that use of mass media and perceived obtrusiveness contributed to the prediction of number of causes and responsible groups mentioned. Perceived obtrusiveness contributed to the number of causes mentioned but not the number of responsible groups for both problems. For every unit increase in use of mass media, the respondent would on average give 0.104 more causes of air pollution. Respondents who perceived air pollution problem as obtrusive would on average give 0.13 more causes than those who perceived it as unobtrusive when their use of mass media had been controlled. Similarly, for every unit increase in use of mass media, the respondents would on average give 0.051 more causes of solid waste disposal problem. Respondents who perceived solid waste as an obtrusive problem would on average give 0.32 more causes than those who perceived it as unobtrusive when their use of mass media had been controlled.

For every unit increase in use of mass media, the respondents would on average give 0.055 and 0.056 more responsible groups of air pollution and solid waste disposal problem respectively.

There was no difference in number of responsible groups mentioned for respondents with high and low perceived obtrusiveness when their use of mass media had been controlled.

[TABLE 6 ABOUT HERE]

Discussions

Results of rank order correlation indicate that there is no significant relationship between the public agenda and the media agenda on cause and treatment responsibility of the two selected environmental problems. This is probably because the infrequent occurrence of news articles about the specific problems and the lack of detailed analysis about the causes and solutions of the problems. In analyzing the change in public and media agenda of sixteen issues over one year, Brosius and Kepplinger (1990) found that agenda setting effect was found only for issues that were covered intensively and with large variance. In this study, the coverage and framing on causes and treatment responsibilities was very weak. On average, there were only seven and two articles a year in each sampled newspaper about air pollution and solid waste disposal problem respectively. It is unlikely that this weak frame of reference will guide the public opinion.

Respondents are more likely to refer to their own experience to account for causes of the problems. For example, smoke from factory chimneys and vehicles are highly visible and they are reported most frequently by respondents to be the causes of the air pollution problem. For the solid waste disposal problem, respondents can hardly see where the wastes come from. Instead, the government and the agent that collects waste are blamed. For the case of solid waste disposal, respondents' causal attribution was far from the real-world condition. Although construction waste contributed to over fifty percent of the total solid waste (Census and Statistics Department, 1995), it was greatly ignored by the respondents.

There was an overwhelming reliance on government to do something for both problems. Heider (1958) regarded the attribution of an event to personal or environmental factors determines the extent to which an individual is held responsible for that event. The high

percentage of respondents attributing treatment responsibility to the government may be an indication of their excuses to escape from their own duties to do something.

For both environmental problems, use of mass media were positively related to number of causes and treatment groups mentioned. Results suggest that use of mass media may deepen respondents' cognitive dimension and enhance their ability to explain social phenomena. Barton (1995) argued that asking why about social phenomena was very different from questioning individuals about the motives and influences which lead to their own action. People cannot answer simply from introspection, but have to use their information about the society around them. Mass media become a common and easily accessible source of information about the society. More frequent use of media for environmental news may trigger respondents' attention to the issue, be more observant about the causes and be more ready to form opinion about who should be responsible.

Respondents perceived of being affected by the problem mentioned more causes than those who perceived of not being affected. This suggests that people are more eager to explain or interpret causes of societal phenomena when they are being affected by the issues. Personal involvement increases the interest and the need to understand reasons causing the problem. Degree of obtrusiveness is positively related to number of causes perceived. Therefore, more causes have been identified for the obtrusive air pollution problem than the unobtrusive solid waste disposal problem.

Conclusion

In matching the cause and treatment attribution of air pollution and solid waste disposal problems in the print news contents and the surveyed respondents' perception, the framing effect of mass media was not supported. It is probably due to the infrequent and weak framing of the causes and treatment responsibilities in the print media. Respondents are more likely to refer to their own experience to explain causes of the problems. For the two selected problems tested, results indicate that use of mass media for environmental news was positively related to number of

causes and treatment groups mentioned. Reading and viewing of environmental news may deepen respondents' cognitive dimension and enhance their ability to explain societal phenomena and form opinion about the solutions. Perceived obtrusiveness of the issue appeared to be a moderating variable. Respondents perceived of being affected by the problem mentioned more causes than those of not being affected.

Table 1 Sample profile (N=745)

Demographic	No.	%
Sex		
Males	357	48.3
Females	382	51.7
Age		
15-19	63	8.9
20-29	167	23.5
30-39	218	30.7
40-49	139	19.5
50-59	42	5.9
60+	82	11.5
Education		
Primary	165	22.6
Secondary	389	53.2
Matriculated	55	7.5
Tertiary	27	3.7
Degree	95	13.0
Household type		
Public housing	281	38.6
Home Ownership Scheme housing	105	14.4
Private housing	293	40.2
Village	22	3.0
Others	27	3.7
Occupation		
Managers, executives	48	6.6
Professionals	59	8.1
Associate professionals	10	1.4
Clerks	97	13.4
Services, sales	113	15.6
Fishers	5	0.7
Artists	29	4.0
Machine operators	41	5.6
Unskilled workers	29	4.0
Students	87	12.0
Housewives	119	16.4
Retired, unemployed, others	81	11.2
Unidentified	8	1.1

Table 2 Causes and responsible persons or organizations of air pollution reported in the press

	Cause		Responsible persons or organization	
	No.	%	No.	%
Factories, electrical plants	1	5.0	0	0.0
Buses, vehicles, car-owners	13	65.0	7	35.0
HK people	0	0.0	0	0.0
HK Government	0	0.0	10	50.0
Smokers	0	0.0	0	0.0
Construction sites	2	10.0	1	5.0
Environmental Protection Department	0	0.0	0	0.0
Companies, offices	0	0.0	0	0.0
Investors	0	0.0	0	0.0
Railway, MTR, aeroplanes, vessels	0	0.0	0	0.0
Environmental protection groups	0	0.0	0	0.0
Schools (education)	0	0.0	0	0.0
Others	4	20.0	2	10.0
Total	20	100.0	20	100.0

Table 3 Causes and responsible persons or organizations of solid waste disposal problem reported in the press

	Cause		Responsible persons or organization	
	No.	No.	No.	No.
HK Government	1	4		
HK people	1	3		
Urban Council/Regional	0	0		
Factories	2	1		
Households	1	1		
Construction sites	0	2		
Restaurants	0	0		
Environmental Protection Department	0	0		
Companies, offices	1	0		
Environmental protection groups	0	0		
Schools (education)	0	0		
Others	1	1		
Total	9	12		

Note: Percentages are not compiled due to small N

Table 4 Perceived causes and responsible persons or organizations of air pollution in the survey

	Cause		Responsible persons or organization	
	No.	%	No.	%
Factories, electrical plants	286	27.3	81	8.0
Buses, vehicles, car-owners	249	23.8	47	4.6
HK people	206	19.7	259	25.4
HK Government	124	11.8	420	41.3
Smokers	37	3.5	9	0.9
Construction sites	28	2.7	6	0.6
Environmental Protection Department	24	2.3	57	5.6
Companies, offices	23	2.2	12	1.2
Investors	20	1.9	22	2.2
Railway, MTR, aeroplanes, vessels	11	1.0	8	0.8
Environmental protection groups	0	0.0	44	4.3
Schools (education)	0	0.0	25	2.5
Others	40	3.8	28	2.8
Total	1048	100.0	1018	100.0

Note: Respondents may give at most three possible answers

Table 5 Perceived causes and responsible persons or organizations of solid waste disposal problem in the survey

	Cause		Responsible persons or organization	
	No.	%	No.	%
HK Government	230	27.2	400	41.6
HK people	220	26.0	248	25.8
Urban Council/Regional Council	143	16.9	143	14.9
Factories	91	10.7	27	2.8
Households	47	5.5	16	1.7
Construction sites	34	4.0	16	1.7
Restaurants	27	3.2	9	0.9
Environmental Protection Department	12	1.4	29	3.0
Companies, offices	7	0.8	9	0.9
Environmental protection groups	0	0.0	30	3.1
Schools (education)	0	0.0	16	1.7
Others	36	4.3	19	2.0
Total	847	100.0	962	100.0

Note: Respondents may give at most three possible answers

Table 6 Summary of general linear model for predicting number of causes or responsible groups for air pollution and solid waste disposal problems by perceived obtrusiveness and use of mass media

Predicted variable	F-value of model	R-square	Model
no. of causes of air pollution (AC)	23.78***	0.063	AC=0.42+0.104*mass media for low perceived obtrusiveness AC=0.55+0.104*mass media for high perceived obtrusiveness
no. of treatment groups of air pollution (AT)	10.03***	0.027	AT=0.94+0.055*mass media no difference in intercepts for high and low perceived obtrusiveness
no. of causes of solid waste disposal problem (WC)	20.86***	0.060	WC=0.58+0.051*mass media for low perceived obtrusiveness WC=0.90+0.051*mass media for high perceived obtrusiveness
no. of treatment groups of solid waste disposal problem (WT)	11.39***	0.033	WT=0.89+0.056*mass media no difference in intercepts for high and low perceived obtrusiveness

*** F-value significant at 0.001 level

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Prof Lawrence R. Frey,
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Dear Professor Frey,

Submission of Article

Please find attached five copies of a manuscript on **Causal framing of environmental problems in Hong Kong** for your consideration to be presented at the Applied Communication Division of the SCA 1997 annual conference. Please do not hesitate to contact me if you have any inquiries. Thank you for your attention.

Yours sincerely,

Kara, K.W. Chan

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