International News Coverage and Foreign Image Building

– Agenda Setting, Persuasion, and Framing in the Formation of Public Image toward Foreign States in Japan, 1987-2015 –

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October 27, 2017

Abstract

Domestic citizens often have difficult time building images of foreign countries. Especially in a country like Japan, where foreigners consist less than two percent of the population, ordinary people rarely have a chance to interact with them. Nonetheless, people form images toward different countries, and those images influence their attitudes toward foreigners, from tourists to migrants. With lack of direct contact with foreigners, it is expected that Japanese people to rely on the signals from media to form foreign perceptions. Political communication studies identify three functions of media. Agenda-setting implies that more intense media coverage of an issue makes people more accessible to the issue. Persuasion suggests the direct impact of directional media coverage on opinions, and framing implies the indirect media influence on opinions by making people weight particular aspects of an issue when thinking about overall evaluations of an issue. Three media functions have been widely, but separately, studied in the past literature. The current project examines the effect of international newspaper coverage on the aggregated perceptions of foreign states in Japan from 1987 through 2015. The longitudinal analysis reveals the significant roles of all three media functions. The increase in the total coverage is followed by the rise in the perception of importance (agenda-setting), and the increase in the negative coverage is followed by the decrease in favorability perception (persuasion). Sub-issue frames partially condition both functions (framing). Also, systematic patterns are observed in the variation in effect sizes across states. This study gives the comprehensive understanding of when and how media influences foreign perceptions. Also, it makes methodological contributions by introducing machine-coding of texts and time-series analysis into the study of media effects.

*gento.badger@gmail.com. This paper is prepared for presentation at the Migration Research Cluster Workshop, University of California, Davis, November 2nd, 2017.

1 Introduction

Domestic citizens often have difficult time building images of foreign countries. Especially in a country like Japan, where foreigners consist only 1.6 percent of the population (as of 2013)[1], ordinary people rarely have a chance to encounter foreigners. Still, public foreign perceptions can play a significant role in influencing not only foreign policy but also attitudes and policies toward immigrants in the country. The good and important image of foreign countries may lead to the favorable attitudes and policies toward immigrants from those places, while the different images may lead to hostile attitudes and policies. But, if people rarely have "real experience" to update their foreign images, then what explains the change of it? This paper explores the role of one, potentially critical source of foreign perceptions: *media*.

Media can influence foreign perceptions in at least three ways. First, it can cue public about the importance of particular foreign states or regions. By simply increasing the coverage of particular foreign states or regions, media can signal domestic citizens which place in the world they should care and prioritize now. This function of media is called *agenda-setting effect* (McCombs and Shaw 1972). Second, media can directly alter the evaluation of foreign countries. By providing the positive and negative assessments, media can *persuade* domestic citizens to change their positive/negative evaluations toward foreign countries. Third, media can indirectly change the perception by *framing* the coverage with different tastes. In another word, the effectiveness of the agenda-setting and persuasion functions of the media can be conditioned by the frames used in the coverage. For example, the negative coverage of North Korea (for Japan) may be more persuasive if it is framed regarding national security than the economy.

In this study, I utilize the monthly longitudinal data of foreign perception and newspaper foreign coverage to explore the role of media in the formation of public foreign perception. The foreign perceptions are measured through the monthly public opinion polls in Japan that have been conducted for over twenty years period, and media coverage is collected through first-page headline coverage from two major daily newspapers in Japan: *Asahi Shimbun* and *Yomiuri Shimbun*. The coverage is quantified in three ways to capture three functions of media. First, agenda-setting

function is captured by the total quantity of relevant headlines (i.e., the ones that involve relevant texts to particular foreign state/region). Second, persuasion function is captured by the quantity of positive and negative tone of headlines towards relevant foreign state/region. This measure is constructed through the combination of human coding and machine learning of raw headline texts. Finally, framing function is captured by the coverages on sub-issue frames included in relevant headlines to each foreign state. Specifically, I focus on two significant frames that are prevalent in foreign media coverage: economy and defense.

The contribution of this study is threefold. First, the three media functions have been widely, but separately, studied in the past literature; few studies attempt to differentiate each type of effects in one study. This study integrates and tests three types of media effects into one research design. This design enables us to draw the comprehensive picture of media functions in the formation foreign perception. Second, the media texts data are under-utilized in the previous literature, partly due to the limitation in manually coding a lot of texts. For this point, this study shows the utility of semi-automated machine learning method to produce reliable coding of the media tones efficiently. Third, the past findings on media effects are based largely on individual-level and cross-sectional data. Here, individual-level nature limits the generalizability of findings to the societal level and cross-sectional nature prevents those studies from assessing the persistence/durability of media effects. The usage of aggregated and longitudinal data in this studies gives new insights to the media effect studies by providing the societal-level implications and the assessment of media effects durability.

The following sections in this paper are structured as follows. The next section reviews previous media effect studies and derives hypotheses from theoretical expectations. Section 3,4 and 5 focus on the analysis of agenda-setting effect, persuasion effect, and framing effect. Each section starts with introducing the data to testing hypotheses and then shows the results of the time-series analysis. Section 6 concludes with implications and suggestions for future research.

2 Theory

Under the democratic society, opinions of the people inevitably affect public policies. Media, in this sense, is considered to be a critical source those opinions. People, with the limited ability and opportunity to directly experience outer-world, are expected to "rely on the media to explore the world around us and construct our 'reality' " (Lippmann 1922, 18). But how and in what extent media can influence public opinion? For "how" question, three major types of effect – agenda-setting effect, persuasion, and issue framing effect – have been suggested. For "what extent" question, studies have been utilizing two measures of the strength of media effect – size and durability. This section first overviews three types of media effects, then discusses the supposedly the central measure of effect strength: durability.

2.1 Three Functions of Media Effect: Agenda-setting, Persuasion, and Framing

Agenda-setting effect (first proposed by McCombs and Shaw 1972) is one of the most straightforward and powerful function of media. It suggests that "the more coverage an issue receives, the more important it is to people" (Coleman et al. 2009, 147). For example, it expects that when media starts to cover economy extensively, public salience towards economy goes up[2]. In line with this logic, previous studies find significant agenda-setting effects on election issues (e.g., McCombs and Shaw 1972, Kiousis 2011, Takeshita and Mikami 1995) and more general policy issues (e.g., Palmgreen and Clarke 1977, Behr and Iyengar 1985, Iyengar and Kinder 1987, Neuman 1990, Watt, Mazza and Snyder 1993, Brulle, Carmichael and Jenkins 2012). On foreign perceptions, using cross-sectional public opinion data and TV-news coverage in the United States, Wanta, Golan and Lee (2004) find the positive relationship between the quantity of coverage and perceived importance of foreign states for the American public. The first hypothesis for this study is therefore constructed as follows:

H1 (Agenda-setting): As a foreign state receives more news coverage, the more im-

portant the state is to be perceived by people.

In contrast to agenda-setting effect, which suggests the relationship between the simple quantity of media coverage and public salience, *persuasion* and *framing* effect implies that the content of media coverage can influence how people think about an issue. Persuasion suggests that media can directly guide people to think about an issue in a particular way. Relevant studies often measure the tone of media coverage by positive or negative and test if those tones directly influence the positive or negative public perceptions toward that issue. Therefore, the second hypothesis for this study is simply constructed as follows:

H2 (Persuasion): As the tone of foreign state coverage becomes more negative (positive), the more unfavorable (favorable) the state is to be perceived by people.

The logic of framing effect is more indirect than persuasion. It argues that the content of media coverage can influence opinions by changing the applicability of directional arguments (Scheufele and Tewksbury 2007, 15). For example, Baumgartner, Boef and Boydstun (2008) argues that, when arguing against the death penalty in the United States, innocence frame – focusing on the unfairness of criminal court system – is more powerful than other frames such as constitutionality frame – emphasizing the cruelty an immorality of death penalty – to move public opinions and policies toward the direction of anti-death penalty. Innocence frame is more convincing and applicable for the broader public than such frame as constitutionality frame. From the above illustration, framing effect can be conceptualized as the conditional factor to other media functions. The contents of a more applicable frame can influence people more strongly than those with a less applicable frame.

Given the above discussion, what kind of frame characteristics conditions the media effects? Here, the amount of available relevant information in memory can matter for the immediate *size* of media effects. First, if a large amount of relevant information is already available before the media exposure, new information provided by media makes little difference to the overall perception towards the object. This phenomenon is called inertial resistance (Zaller 1992). Second, if no information about the issue is accessible in the memory before the media exposure, media cover-

Table 1: **Theoretical Framework for the Conditionality of Media Effects**

		Availability of Relevant Information		
		Low	Medium	High
Familiarity	High	*Small;Short*	*Large;Short*	*Small;Short*
	Low	*Small;Long*	*Large;Long*	*Small;Long*

Created by the author based on the original discussion in Baden and Lecheler (2012).

age also cannot exercise the strong immediate influence. Here, individuals may not have enough information to form *any* perception. Following this logic, Iyengar and Kinder (1987) find that for unemployment issue, the agenda-setting effect is larger for those who are unemployed – who have problem-relevant information directly available – than for those who are employed (51). The above discussion implies the non-linear relationship between information availability and media effects. In the aggregated level, the strongest media effect should be observed when the frame is not available to everyone but available to the significant portion of the public.

Also, it is discussed that the familiarity of the frame is connected to *duration* of media effects. Studies often operationalize familiarity as "obtrusiveness" of an issue (Zucker 1978, Watt, Mazza and Snyder 1993, Coleman et al. 2009); if an issue is obtrusive, people have "information sources other than media that influence the level of salience" (Coleman et al. 2009, 412). For the highly familiar issue, media effects may have a substantial immediate effect, but it disappears (or be updated) shortly after and does not last long. Since the issue is familiar, people have extra opportunities to update their perception outside of media exposure (Baden and Lecheler 2012, 371). When the frame is not familiar, the persistent effect will occur. In this case, since the frame is not familiar, the information provided by the media will be less likely to be updated by non-media source. This conception of familiarity does not require a highly familiar frame to have a large amount of immediately available information. For example, local issues are more familiar (obtrusive) than national issues, but it does not imply that local issues are more salient among public than national issues.

The implications from the above discussions are summarized in Table 1. In the table, effect

types are described by the size (small or large) and duration (short or long). Here, information availability first functions as to define the immediate size of effects, and familiarity functions as to define the duration of effects.

Based on the logic presented in Table 1, I argue that framing effect functions as to interact with agenda-setting and persuasion effects. Here, the size and duration of agenda-setting effect and persuasion are expected to be dependent upon how each country is framed in the coverage. In particular, I focus on two major frames in foreign states coverage: economy and defense. First, economic interdependence is one of the most important factors to explain the bilateral relationship between two countries. On the other hand, national security concerns are not always present. Especially for Japan, the country has not been involved in armed conflict for long years. Therefore, we expect, for most of the foreign countries, economy frames are socially more salient (i.e., more information are immediately available) than defense/security frames. But, given the nature of foreign countries, not everyone has the information. Therefore, the first framing hypothesis is constructed as follows:

> *H3a (Issue Framing: Economy): The immediate media effect of economy framed coverage is larger than the media effect of defense framed coverage.*

On the other hand, defense frame often have a low familiarity among public. In everyday life, individuals may encounter a situation to update their evaluation within the economic frame (e.g., by consuming/selling products from/to foreign countries), but they rarely encounter an opportunity to update defense-related beliefs outside of media exposure. This nature of the defense frame leads to the second hypothesis regarding framing:

> *H3b (Issue Framing: Defense): The media effect of defense framed coverage lasts longer than the media effect of economy framed coverage.*

Lastly, the framework of media effects conditionality can also be applied to the characteristics of foreign states. Information availability is expected to be captured by the average level of media

coverage over the years; even when the media provides intensive short-term coverage on foreign regions or states that are rarely (or almost never) covered in the long-run, people have no prior-information available to comprehend short-run new information. Next, high familiarity implies the high frequency of direct contacts between domestic people and foreigners; by that, people can form foreign image by direct interactions independent of indirect information from media. For example, tourism can be one of the major sources of direct interaction with people in foreign countries; thus, in case of Japan, familiarity increases as more Japanese tourists visit foreign states or regions and more tourists from those places come to Japan. From the above illustrations, conditional hypotheses for media effects base on foreign state characteristics are constructed as follows.

H4 (States: Information Availability): The size of media effect for foreign states is small for those states receiving the high or low level of long-run coverage, and large for those states receiving the medium level of coverage.

H5 (States: Familiarity): The duration of media effect for foreign states becomes shorter as the direct interaction with those foreign states increases.

3 Analysis 1: Agenda-Setting Effect

3.1 Data

To assess the agenda-setting function of media on foreign perception of Japanese people, this study focus on twelve different states and regions in the world: United States, China, South Korea, North Korea, Russia, Europe, Middle/Near East, Taiwan, South East Asia, Middle/South America, Oceania, and Africa. Each variable in the analysis is collected or constructed for every month between April 1995 and March 2015. The following paragraphs explain the detailed structure of the variables of interest in this study. It also shows the distributions of the dependent variable – foreign perceptions – and independent variables – foreign news coverage – to make sense of the characteristics of the data.

Importance of the Foreign States and Regions. As the dependent variable of a foreign perception, this study uses monthly public opinion poll conducted by *Jiji Press*[3]. This poll asks a question on the perception of the importance of the relationship with each state or region. The question is asked from April 1995 through March 2015, so the analysis with this variable is limited this period.

Specifically, the question asked respondents to list up to three countries or regions that they think the relationships with them are important, by offering 15 categories (See Appendix A for the wording detail). Figure 1 shows the distribution of importance perception for each state and region[4]. From the boxplots, the United States and China are two states that are perceived to be most important for Japanese people. While China has more variances in the importance, over 60 percent of respondents list those two countries as one of the most important countries for Japan. Next, South East Asia, South Korea, Europe, Russia, and North Korea are perceived moderately important: about 10 to 20 percent of respondents list those countries and regions as important for Japan. Then, Middle, Near East and Taiwan often scores 10 percent or less, and Central, South America, Africa and Oceania are one of the least important regions.

Total Foreign News Coverage (TC). As the independent variable of media coverage, this study utilizes headlines from first pages of daily morning newspapers in Japan. There are three rationales for this operationalization. First, I select newspaper as the target media. Some studies conducted in the US claim the merits of using TV news coverage, based on its popularity and accessibility for general public (Behr and Iyengar 1985, Watt, Mazza and Snyder 1993). Nevertheless, Japanese newspapers have the world's largest circulation of the newspaper by far, and more than 70% of adult Japanese read newspapers[5]: Japanese newspapers are one of the most popular domestic media in the world. Also, major national TV stations in Japan have close financial and information ties with major national newspaper companies (Freeman 2000, 13-21), thus the newspaper coverage is expected to coincide with TV news coverage[6].

Second, I select first pages of daily morning newspapers as the sub-target of the analysis.

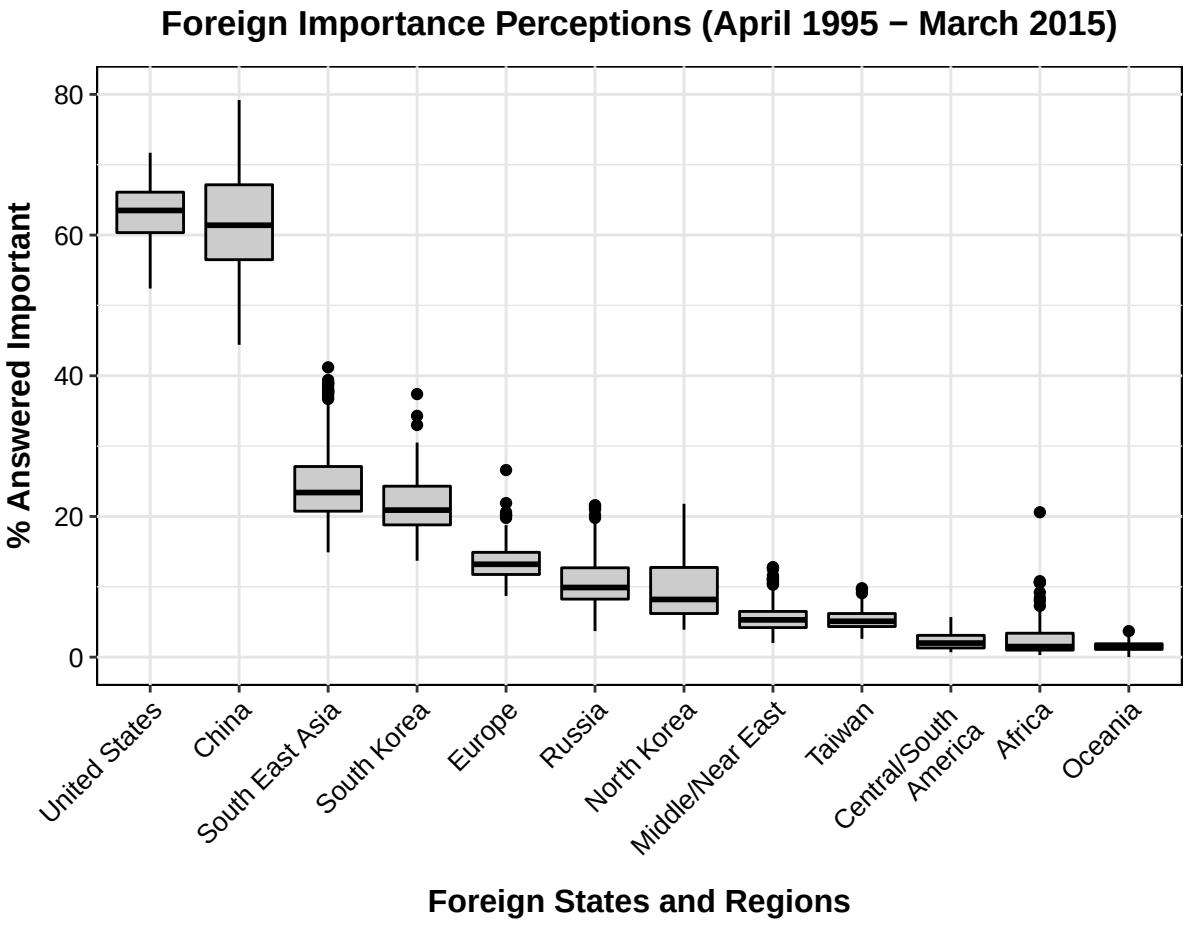

Figure 1: Boxplots on Distribution of Foreign Importance Perceptions

Here, people should have various preferences of articles to read the newspaper, while the first page is what is expected to be checked by every reader. The dependent variable in this study is an aggregated (or averaged) impression towards foreign states. Considering every article may confuse the distribution of the variable by including articles that are read by only a small group of readers. Thus, by only using what every reader is expected to read, it is logical to limit the scope of the newspaper coverage to the first page.

Third, I select headlines as the target of content analysis (Also used by Blood and Phillips 1995, 1997). This is valid from the similar reason as limiting the target to first pages. Previous studies show that headlines are quite influential in shaping public opinion (Geer and Kahn 1993, Pfau 1995), while contents of headlines are not perfectly consistent with the contents of main texts

(Althaus, Edy and Phalen 2001, Andrew 2007). Thus, if an average person grows the impression out of an article by only reading a headline and does not bother to read detailed texts, including texts in the analysis may confuse the measurement; the headline is the adequate and appropriate target of the agenda-setting analysis.

Then, the raw data of all first page newspaper headlines of November 1987 through March 2015 are collected from the two most circulated national newspapers in Japan – *Yomiuri Shimbun* and *Asahi Shimbun*[7] (This follows the selection by Ito and Zhu 2008). Then, it extracts the relevant headlines for twelve object states and regions by searching for relevant words such as the name of states and political leaders[8](see Appendix B for the detailed procedure.).

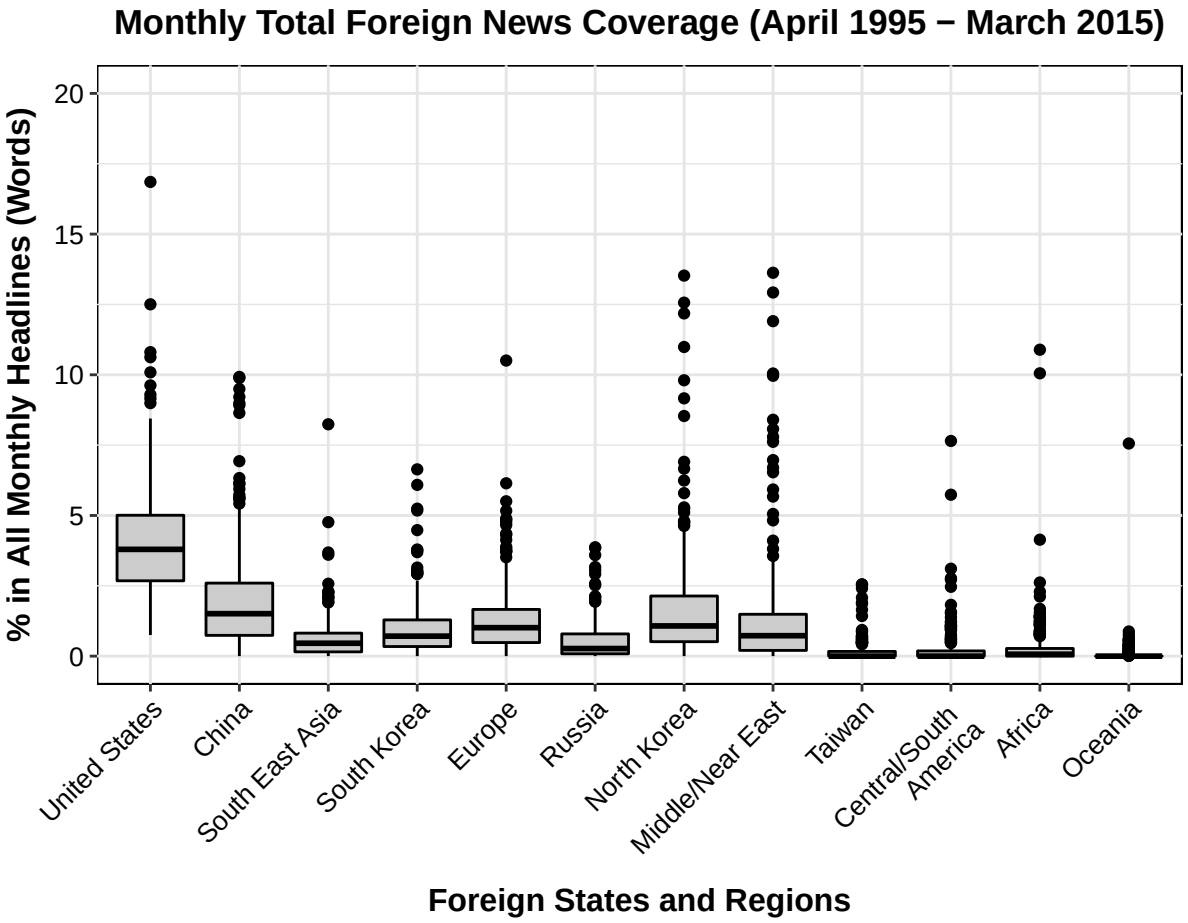

Figure 2: Boxplots of Total Foreign News Coverage (TC)

Using extracted headlines; I calculated total monthly coverage (TC) by adding up headlines

(HL) with the weight of prominence, operationalized as the word count (W) of each article. Specifically, the monthly coverage is calculated by following equation[9]:

$$TC = \left(\frac{\Sigma(Asahi.Relevant.HL * W)}{\Sigma(Asahi.All.HL * W)} * \frac{4}{9} + \frac{\Sigma(Yomiuri.Relevant.HL * W)}{\Sigma(Yomiuri.All.HL * W)} * \frac{5}{9} \right) * 100$$

To represent the relative power of *Asahi Shimbun* and *Yomiuri Shimbun* to influence public, the coverage is weighted by the ratio of the circulations of two newspapers, which is roughly 4 to 5 from *Asahi Shimbun*[10].

The distributions of total foreign news coverage are shown in Figure 2. It shows relatively heavy coverage of US, which consists around 3-5 percent of all news coverage every month. China and North Korea have the second most coverage, and other states and regions often receive less than one percent of coverage every month. On the other hand, all the regions have some months that have a particularly high level of coverage.

Trade Quantity. As control variables for the analysis, it includes *trade volume*.This variable is expected to capture strength and characteristics of the economic tie between Japan and an object state, which can become a different route to influence perception. The increase in the bilateral trade volume would raise people's salience toward an object state since the interactions with the object state likely increase in the business and consumption. Also, increasing economic dependency on the object state should heighten the perception of importance towards it. To construct the variable, the monthly data of exports and imports with the object country are obtained from the website of Trade Statistics of Japan[11]. Trade volume is calculated as the sum of exports and imports. To control for the economy size of Japan at each period, the variable is divided by the gross GDP of Japan of the month[12].

3.2 Model

Given the longitudinal structure of the data, this study utilizes time-series auto-regression models to estimate the size and duration of media effect. The following part briefly explains the structure

and rationales behind the model used in the analysis.

When analyzing the data with multiple time-series variables, one of the most frequently used methods is called vector autoregressions (VAR). In VAR modeling, the current values of the dependent time series are regressed on the past values of the same series. By filtering away the effect from the past values, it can analyze the pure relationships among variables of interests (For more analytical details of VAR modeling, see Okimoto 2010, 74-103). Vector error correction model (VECM) is an extension of VAR, which copes with the non-stationarity and co-integration in the entered variables in the model (Pfaff 2008). SVECM allows one to estimate coefficients for both short-run and long-run impacts. The VAR/SVECM modeling does not specify dependent variables, because all the variables included in the model can become independent and dependent variable at the same time, considering their dynamic relationships. However, for this study, I treat foreign perception as a dependent variable and news coverage as an independent variable in my interpretations.

For each country, three variables – foreign importance perceptions, total foreign news coverage (TC), and trade volume – are entered into the initial model. The final model is specified using following steps. First, Augmented Dickey-Fuller (ADF) test is conducted on all time-series variables in the model to detect non-stationary variables[13]. Blood and Phillips (1995) discusses that non-stationarity is an individual characteristic of a time-series that " there is no tendency for them to fluctuate around a constant (mean) values as there is when a series is stationary" (10). The stationarity of the data that there is a consistent mean value over time. However, if a series is non-stationary, it becomes harder to make predictions of its movement, since it has "random tendency to drift away from any given value over time" (10). It is found that at least one variable in each model is non-stationary[14], Thus it is not appropriate to apply VAR model directly. Second, the optimal lag for the VAR model is determined based on AIC statistics[15]. Third, the quantity of co-integration is determined by the trace test[16]. At least one co-integration is found in all models. Given the existence of both non-stationarity and co-integration, VECM is the appropriate model.

One issue with the VECM is that it is constructed only from lagged variables and does not

incorporate the contemporaneous impact at (t). Structural vector error correction model (SVECM) copes with this issue by entering variables at (t) into the model. Given all the above procedures, the final model of SVECM is estimated using `SVEC` function in the package `vars` in R for each country[17]. In what follows, impulse response function (IRF) analysis is used to visualize the result of SVECM. IRF captures the size of impact by showing the Standard Deviation (SD) change in the dependent variable given the unexpected SD increase in the independent variable, controlled for other variables.

3.3 Result

Figure 3 shows the result of IRF analysis. Vertical axis for each country shows the increase in the percentage of people choosing particular foreign states or region as one of the most important ones for Japan, given that the TC of that state increase by 1 SD, controlling for trade volume. Horizontal axes indicate the months from 1 SD increase shock in TC, show how long agenda-setting effects persist. Shaded area indicates the 95% confidence interval, bootstrapped for 1000 times.

Generally, increase in TC is post-seeded by the increase in importance perception. In most of the countries, importance perceptions increase a month later the shock in TC and eventually decays back to the former level in the long run. Comparing the size of the effect, South Korea and Russia have particularly large effects that importance perception increase by more than one percent a month after the one percent increase in TC. Smaller but statistically significant ($p<.05$) agenda-setting effect can be observed in North Korea, Europe, Middle Near East, Middle South America, and Africa. The effect is in the theoretically expected direction and marginally significant for US, South-East Asia, and Taiwan, while no movement could be observed for Oceania. In China, however, the importance significantly decrease by 0.5 SD three months after the shock in TC, and this is statistically significant ($p < .05$). In sum, H1 is supported except in China.

Comparing durations of effects, even when the immediate effect is statistically significant, it disappears after 3 to 4 months in most of the countries[18]. Here, the effect for North Korea persists to be statistically significant until 12 months after the shock. Especially, in North Korea, the effect

size continues to grow even after a year from shock. For North Korea, the agenda-setting effect does not go away; it stays to increase the public salience toward the country in the long run.

In summary, the analysis in this section confirms the general function of agenda-setting effect (H1) except for China, but the relative size and duration vary across countries. Comparing the size of effects, the large effect for South Korea and Russia is consistent with the expectation from H4, since Russia and South Korea are one of those countries receiving middle-level coverage in the long-run (see Figure 2). However, the null effect in South East Asia and Europe may go against the expectation from H4. I suspect this is because they are grouped as a region in *Jiji-Poll*, so people may have the hard time matching the media coverage of specific country and importance toward regions. For the duration, North Korea having the persistent effect is consistent with the expectation from H5, because Japan has no official relationship with North Korea and Japanese almost never have the opportunities to contact with the people in North Korea directly.

4 Analysis 2: Persuasion

4.1 Data

Upon the selection of target samples (i.e., foreign states and regions), for the persuasion and framing effect, it is argued that "[a]ttention to messages may be more necessary for a framing effect to occur than an agenda-setting effect" (Scheufele and Tewksbury 2007, 14). Thus this study limits the persuasion and framing effect analysis to United States, China, South Korea and North Korea. Due to geographical closeness and historical tie, the relationships with four countries are often considered to be important in Japan[19]. Each variable in the analysis is collected or constructed for every month between November 1987 and March 2015. The following paragraphs explain the detailed structure of the variables of interest in this study.

Foreign Directional Perceptions. As the dependent variable of a foreign directional perception, this study uses two questions from the monthly public poll conducted by *Jiji Press*[20]. It asks two

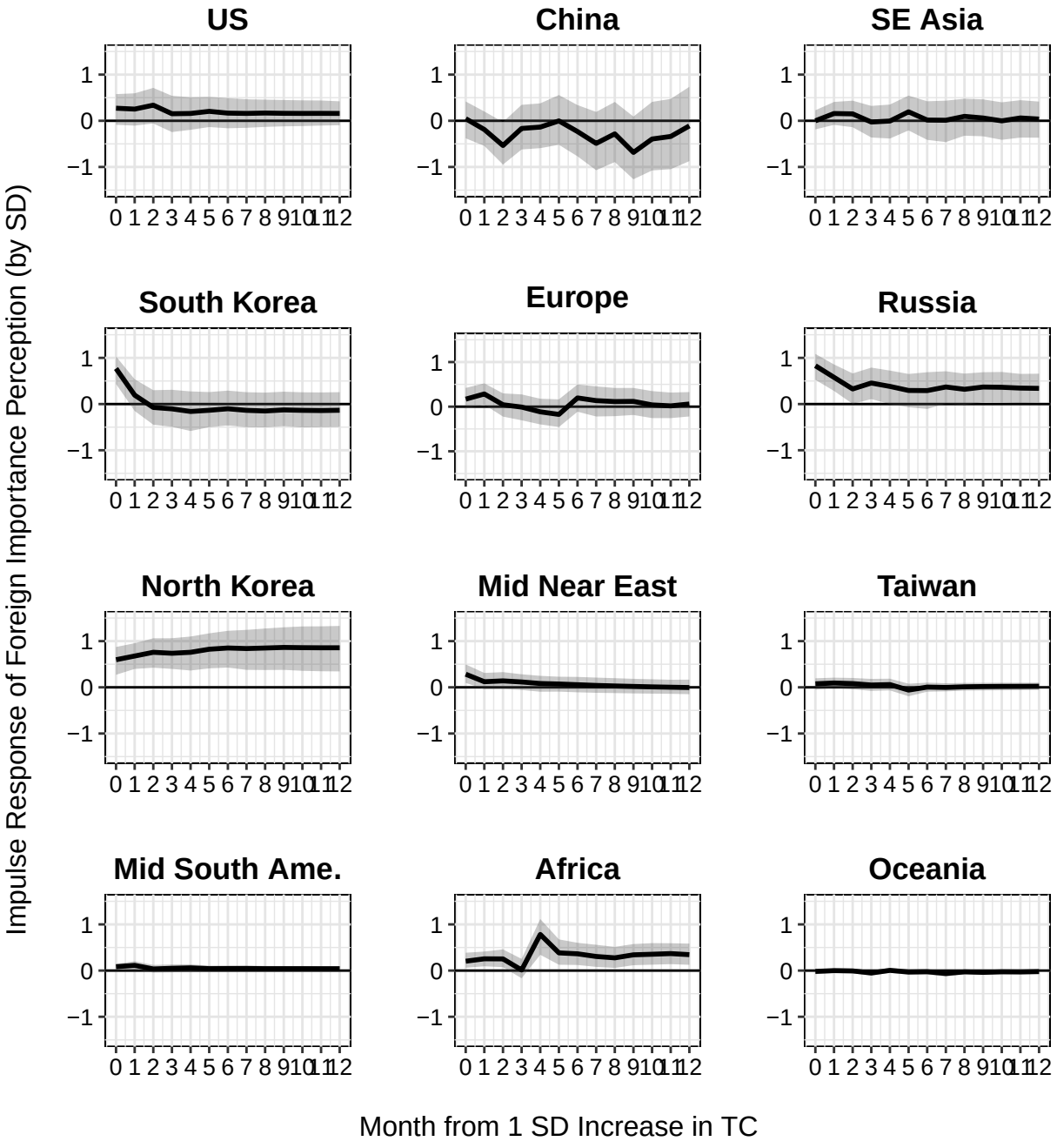

Figure 3: SD Increase in Foreign Importance in Response to SD Increase in TC (with 95 Percent Confidence Interval)

questions about the perceptions of favorability and unfavorability towards different foreign states, including United States, China, South Korea, and North Korea[21](See Appendix A for the wording detail).

In the analysis, the aggregated percentage of respondents who included the object state as one

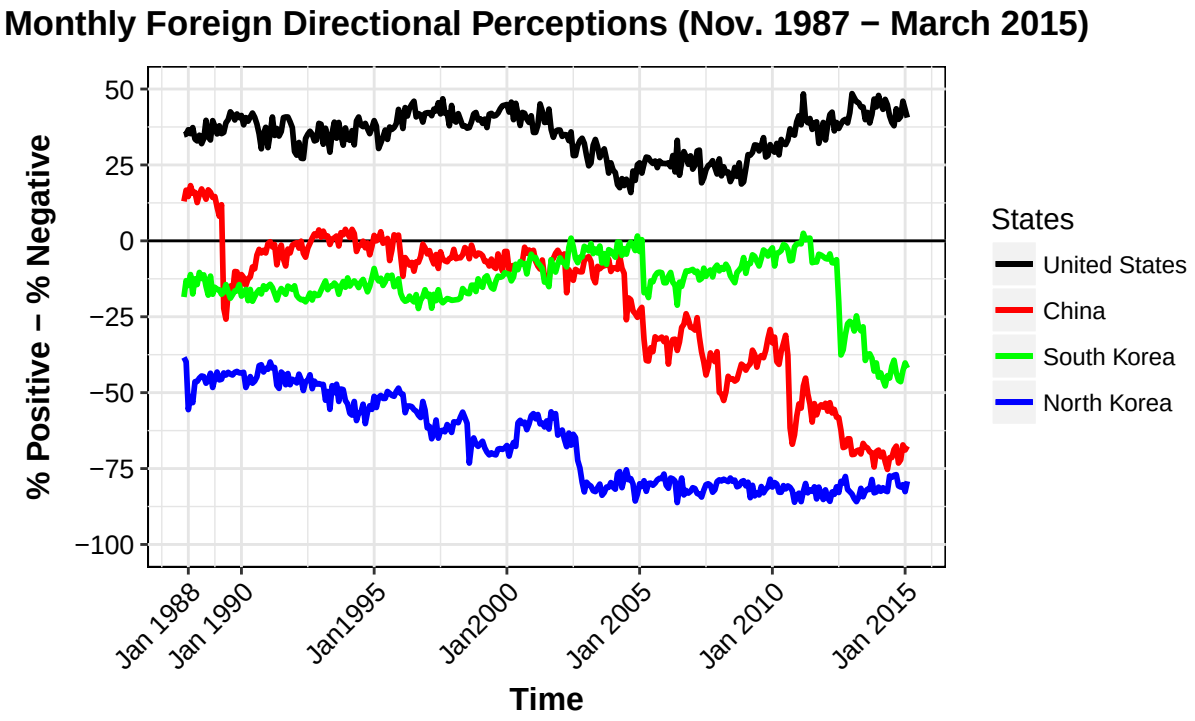

Figure 4: Time-series Plots of Directional Foreign Perceptions

of the up to three favorable or unfavorable countries is recorded for each month. Figure 4 shows the time-series distribution of directional perception. The score is constructed by subtracting the percentage of people who listed the country unfavorable from the percentage of people who listed the country favorably. Here, the perception towards the US is relatively more positive than other countries. And, in contrast to importance, favorability towards China is consistent decreasing tendency for this couple of decades. North Korea records the lowest favorability score for all the period included, but still in declining trend. The graph also shows rapid decrease in the score towards China and North Korea after 2005, South Korea After 2012[22].

Directional Content of Foreign News Coverage. Since there is no sophisticated dictionary of positive and negative Japanese words, I conducted two steps of content analysis to directionally code content of relevant headline for each of four object states: human-coding and machine-learning. The combination of two methods has certain advantages. First, it is more efficient than the all

manual coding of texts. Human-coders only have to code the part of data. Thus the coding process is less time-consuming. Second, automated coding is more reliable. Once machine-learned, the computer can apply coding to all data using the identical criteria that are reliable and reproducible. While it may be valid, human coders potentially use inconsistent criteria to code texts. By combining more valid human-coding and more reliable machine-coding, this hybrid method is expected to produce both valid and reliable data.

The specific procedure is briefly described as follows (see Appendix B for more detailed procedures). As the first step, human coding is conducted to randomly sampled 1000 headlines for each state. Coders are asked to code the headline's impressions – negative, neutral or positive – toward an object state, hypothetically for an average Japanese person. Four coders are assigned to each state, and the inter-coder reliability test of Krippendorf's Alpha (Hayes and Krippendorff 2007) is calculated. For original coding, the alphas score around 0.4 to 0.5 which do not meet the threshold of good reliability of 0.6 to 0.7, while, after considering the coders' tendencies to overly give neutral or directional codings, the Alpha improved to 0.66 for the US, 0.78 for China, 0.79 for South Korea, and 0.61 for North Korea (See Appendix Table B.1).

As the second step of content analysis, using the human-coded training data, machine-learning is conducted with random forest (RF) classifier (Breiman 2001). This method was initially utilized in the field of bioinformatics (e.g. Cutler and Stevens 2006) but recently been applied to texts. Even when applications are not many, for Japanese texts, Jin and Murakami (2007) suggests that performance of RF is better than other popular machine-learning methods to classify authorships of texts. Also, RF also can calculate each variable's level of contribution to the classification, which cannot be produced by other methods. The RF classification proceeds as follows. First, for the training data with 1000 headlines, the word matrix is created with rows representing profiles and columns representing uni-grams (i.e., dummy appearance of words) in headlines[23]. Then, we start with boot-strapping the original data matrix $M_{i,j}$ 300 times[24] with replacement. From those bootstrapped samples, two-thirds are used for classification, and one-third are kept for test the model (out-of-bag test). Then, from each sample to be used for classification, we extract random

Table 2: $p(c|x)$ Based Predicted Proportion is Correlated More Strongly with True Proportion than $d(c|x)$ Based Predicted Proportion

Aggregation Size:			By 10		By 50		By 100	
Metric	Tone	Country	p(c|x)	d(c|x)	p(c|x)	d(c|x)	p(c|x)	d(c|x)
Correlation	Negative	US	0.420	0.219	0.403	0.174	0.402	0.210
		China	0.543	0.404	0.568	0.417	0.550	0.393
		S.Korea	0.595	0.423	0.581	0.381	0.595	0.376
		N.Korea	0.571	0.520	0.547	0.523	0.546	0.491
	Positive	US	0.374		0.353		0.360	
		China	0.180	0.078	0.238	0.095	0.193	0.113
		S.Korea	0.532	0.228	0.527	0.234	0.552	0.258
		N.Korea	0.450	0.132	0.368	0.069	0.448	0.054

No cases for US-positive have predicted probability larger than 0.5.

subsets of $\sqrt{j}^{25}$ variables (uni-grams). Next, by the Gini index shown in below, we construct unpruned decision tree in each of replicated data matrix with reduced uni-grams:

$$GI = 1 - \sum_{c=1}^{n} [p(c|x)]^2 \tag{1}$$

In the above equation, $p(c|x)$ indicates the probability of x (a text with reduced uni-grams) belongs to c (class) (Suzuki 2009). With the majority of votes by $p(c|x)$ of all x, new classifications is given to each text.

To construct the monthly measure of media tone, the resultant machine-coding must be aggregated to represent the *proportion* of category. In the conventional method, each x is first converted to dummy variable $d(c|x)$ of 1 if $p(c|x) > 0.5$ and 0 otherwise. Then, those dummy variables are aggregated by the larger unit. However, this aggregation procedure is suggested to be biased (Hopkins and King 2010). I, therefore, attempts to mitigate those bias by aggregating raw $p(c|x)$ instead of classified dummy. To compare the validity of coding results from $p(c|x)$ aggregation and $d(c|x)$ aggregation, the following procedure is conducted. First, I trained RF classifier based on 80% (800 cases) of the human-coded data. Second, this classifier is used to estimate $p(c|x)$ in the remaining 20% (200 cases) of the human-coded data. Third, from those 200 cases, bootstrapped samples with the size of 10, 50, and 100 are drawn for 1000 times. For each of bootstrapped sample, the

value of $p(c|x)$, $d(c|x)$ (i.e., 1 if $p(c|x) > 0.5$ and 0 otherwise) and human-code are aggregated and averaged to calculate predicted proportions and the true proportion of target category.

In Table 2, each column with $p(c|x)$ and $d(c|x)$ shows the relationship between *predicted proportion* variables and *true proportion* variables based on the human-coded data, aggregated in different sizes. The values in the correlation between predicted proportions and true proportions. It can be seen that, for negative coding, the correlation between $p(c|x)$ based prediction and true proportion is substantively high, with above 0.4 across different sizes of aggregation. On the other hand, the correlation between $d(c|x)$ based prediction and true proportion is significantly lower, especially for US coding. While the correlation coefficient is smaller, the above relative tendency persists for positive headline coding[26]. In sum, as it is expected, $p(c|x)$ based predicted proportion correlate much more strongly with the true proportion than $d(c|x)$ based prediction.

Finally, All headlines in US, China, South Korea and North Korea are machine-coded by the RF classifier trained on full human-coded headlines[27]. By using resultant $p(c|x)$ (not $d(c|x)$), three indicators of negative coverage (NC), positive coverage (PC) and the tone of coverage (PNC) for each state are calculated by following equations:

$$NC = \left(\frac{\Sigma(Asahi.p(Negative|x) * W)}{\Sigma(Asahi.All.HL * W)} * \frac{4}{9} + \frac{\Sigma(Yomiuri.p(Negative|x) * W)}{\Sigma(Yomiuri.All.HL * W)} * \frac{5}{9} \right) * 100$$

$$PC = \left(\frac{\Sigma(Asahi.p(Positve|x) * W)}{\Sigma(Asahi.All.HL * W)} * \frac{4}{9} + \frac{\Sigma(Yomiuri.p(Positive|x) * W)}{\Sigma(Yomiuri.All.HL * W)} * \frac{5}{9} \right) * 100$$

$$PNC = PC - NC$$

Here, NC and PC calculates the coverage in the same way as TC, and PNC is calculated in a parallel way as the measurement of directional perception. Figure 5 shows the time-series distribution of PNC. It can be seen that all countries have fair amount of variance in the tones, while the tone tends to be more negative on average. Comparing across countries, South Korea has less variance in tones (and relatively more positive) than other countries. This may imply that, for South Korea, media may be making fewer attempts to persuade public.

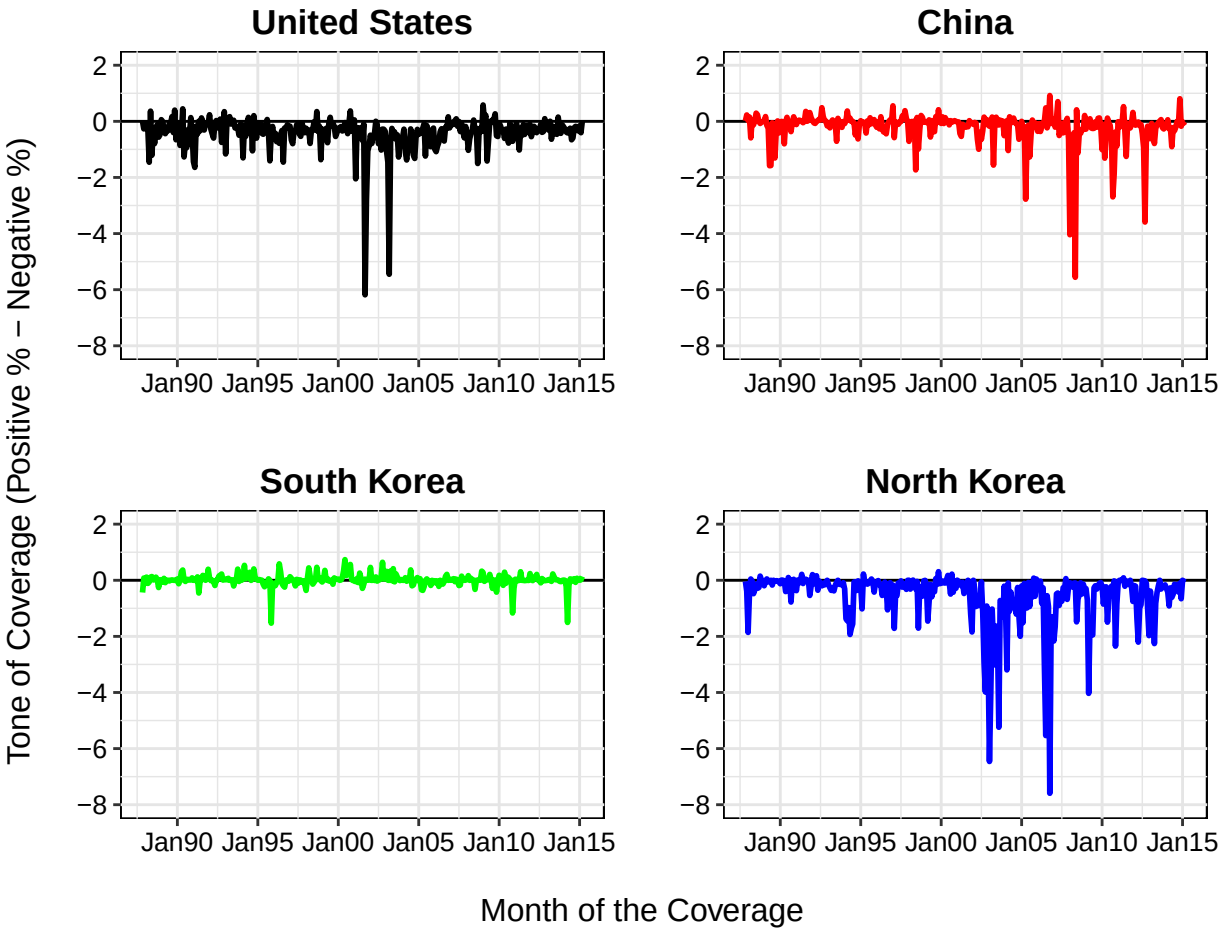

Figure 5: Time-series Plots of Media Tones (PNC), 1987-2015

In summary, this study utilizes the combination of human-coding and machine-learning to construct directional content variables for news headline coverage. The procedure of aggregating predicted probability increases the accuracy of predicted proportion compared to the conventional method of classified category aggregation. The resultant time-series distributions show that there is fair amount variance in the tone of foreign coverage.

Economy Variables. As control variables for the analysis, this study includes *trade balance*. It is expected to capture strength and characteristics of the tie between Japan and object states, which can become a different route to influence perception. The increase in trade surplus may enhance positive feeling toward the object state (Fukumoto and Furuta 2012), while the increase in trade

deficit may stimulate the negative feeling toward the object state. To construct the variable, the monthly data of exports and imports with the object country are obtained from the website of Trade Statistics of Japan[28]. The trade balance is calculated by subtracting imports from exports. To control for the economy size of Japan at each period, both variables are divided by the gross GDP of Japan of the month[29].

4.2 Model

Similar to the one in the agenda-setting section, using SVECM model with VAR optimal lags up to 12 months, but now include three variables of directional foreign perception, PNC, and trade balance[30].

4.3 Result

The central results for persuasion function is presented in Figure **??**. Similar to the one in the previous section, vertical axes represent SD increase in directional foreign perception given one SD increase in PNC, controlling for trade balance; Horizontal axes represent months from the shock in PNC. The shaded area shows the 95% confidence interval.

Comparing the size of the effects, H2 is confirmed. Except for South Korea, increase in the PNC has statistically significant impacts ($p<.05$) to increase favorability perception. In South Korea, the direction of PNC impact is the same as other countries, but 95% confidence interval crosses zero. The most significant immediate persuasion effect is observed for China, which records more than 1.5 SD increase in response to the 1 SD increase in media coverage. While this effect disappears and becomes statistically insignificant after four months of the shock. It can be seen that the impact for North Korea is persistent and remains statistically significant for a long time. The pattern for the US is more mixed. It seems like the effect disappears once, but it comes back again 10-11 month after the shock.

In sum, H2 is confirmed for United States, China, and North Korea, but not for South Korea. This may be due to the small variance in the media tone for South Korea. Comparing across

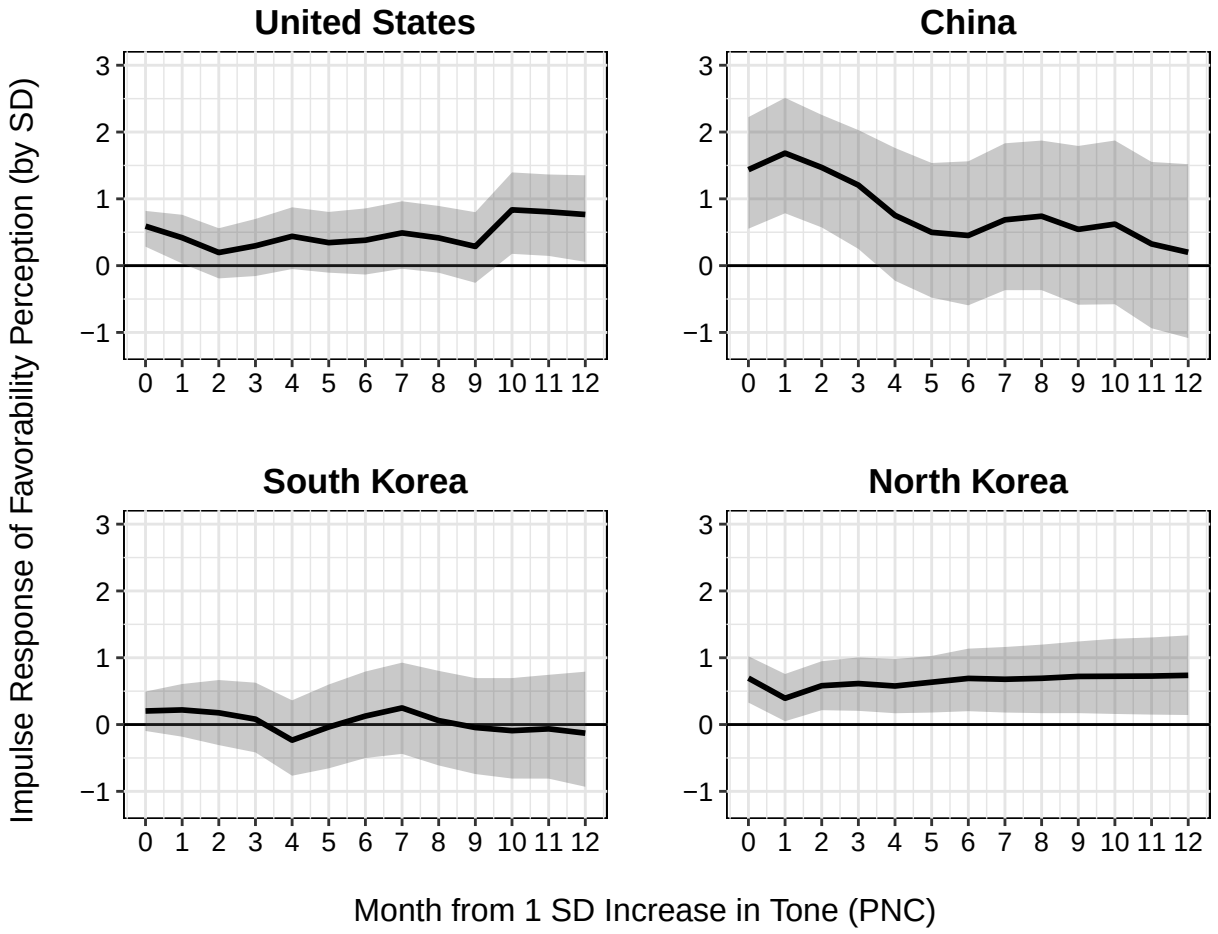

Figure 6: SD Increase in Foreign Favorability in Response to SD Increase in PNC (with 95 Percent Confidence Interval)

remaining countries, especially for duration, North Korea has more persistent effect than other countries. This is considered to be consistent with H5. North Korea is the typical example, again, that people have no direct contact with. Media coverage seems to have more persistent impact on those countries that provide fewer opportunities for direct interactions.

Table 3: **List of Key Words to Extract Frames**

Frame	Key Words
Economy	boeki (trade), toshi (investment), gatto (GATT), kanzei (tariff), en (yen), yunyu (import), yushutsu (export), kin-yu (embargo), shihon (capital), genchi-seisan (production in foreign country), gyogyou-kyotei (fisheries agreement), WTO, FTA, APEC, enjo (assistance), shien (support), keizai (economy), kabu (stock), soba (market price), en-yasu (weak yen), endaka (strong yen), owarine (closing price), shijo (market), akaji (deficit), kuroji (surplus), kokyo-jigyo (public works), sangyo (industry), baburu (bubble), shugyo (employment), doru (dollars), won (Korean currency), tsusho (commerce), sha (company), kozo-kyogi (structual impediment), enshakkan (yen loan), jinmingen (Chinese currency)
Defense	seisai (sanction), buryoku (armed power), gun (army), kaku (nuclear), kokubo (national defense), huantei (instability), antei (stability), yuji (emergency), gunkakku (military expansion), kyoi (threat), shinko (invasion), boei (defense), anzen-hosho; anpo (national security), jieitai (Self Defense Army), kogeki (attack), kosen (combat), bakugeki (bombing), kubaku (air raid), teisen (cease-fire), wahei; heiwa (peace), domei (alliance), jieiken (self-defense right), senso (war), iraku (Iraq), ahugan; ahuganistan (Afghanistan), tariban (Taliban), tero (terrorism), senkaku (territorial dispute with China), rachi (kidnap by North Korea), takeshima (territorial dispute with South Korea), misairu (missile), geigeki (intercept)

5 Analysis 3: Framing Effect

5.1 Data

For framing effect, this study particularly focuses on two major frames in foreign coverage by media: economy and defense. To extract those two frames, I conduct relevant word search in the headlines[31]. Based on the reading of randomly sampled headlines, I listed possible relevant for two frames shown in Table 3. Then I conduct simple search of headlines including these keywords. Since the words that are used in these two frames are distinct and systematic than ambiguous coding of positive or negative, this procedure can be considered as independent from the tone coding.

The result of frame extraction is presented in Figure 7. It shows that there is more defense coverage than economy, and defense coverage has larger variance than economy coverage. Even

when the coverage is small for countries like South Korea, there is significant movement within them. It is not shown in figure, but defense coverage is dominantly negative, while economy frame has some positive and negative coverage of it.

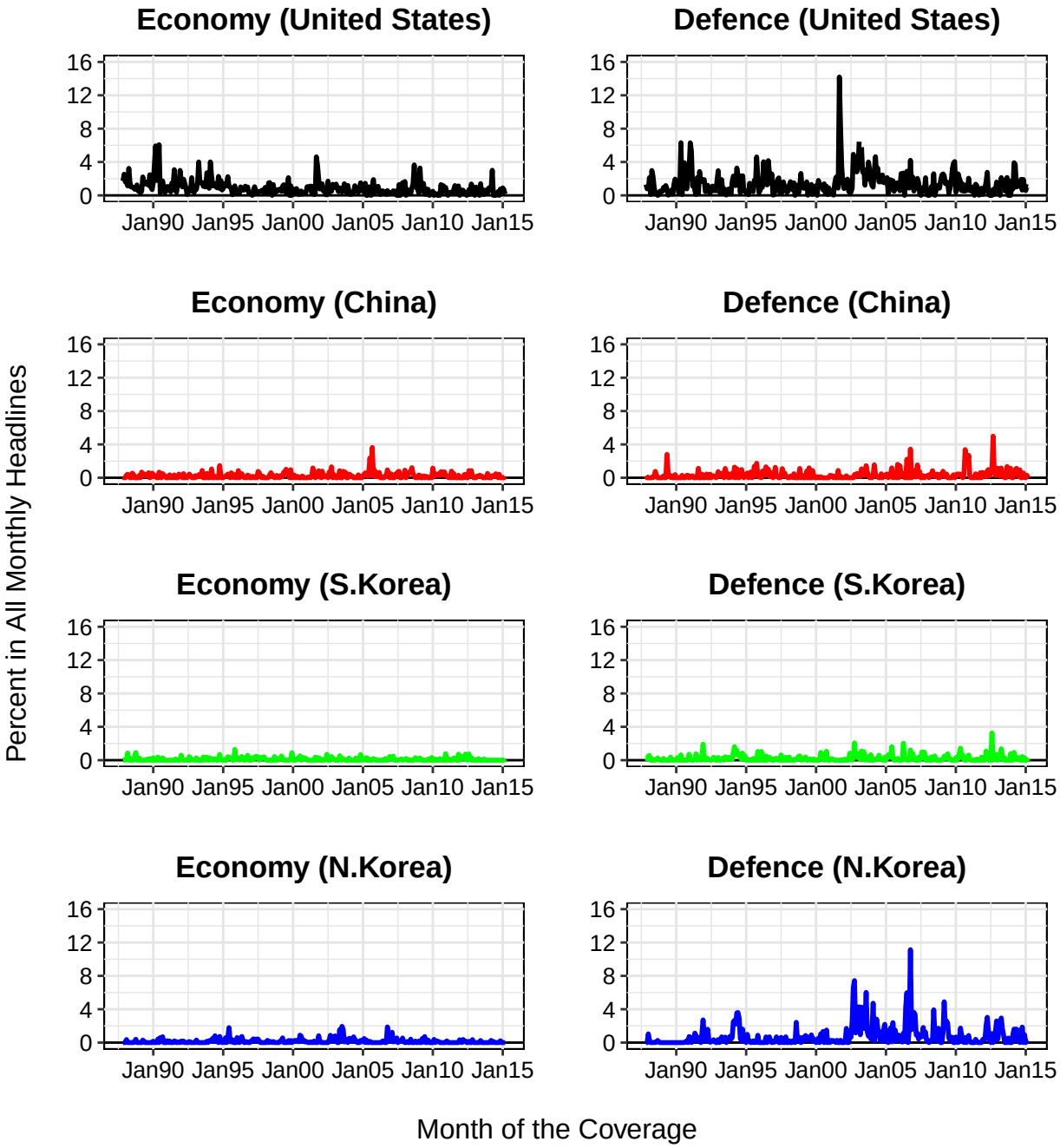

Figure 7: Time-series Plots of Frames

5.2 Model

Since this section is the extension of previous two sections, the analytical models and control variables of the analyses are the same as previous two sections. It uses SVECM model and IRF analysis, and for agenda-setting effect and framing effect analysis, the analysis use framed coverage of economy and defense, and trade volume. For persuasion and framing effect analysis, it uses PNC with economy and defense frame[32].

5.3 Result 1: Agenda-Setting Effect and Frame

Figure 8 shows the IRF analysis result for agenda-setting and framing effects. It shows the result consistent with H3a. In United States, South Korea, and North Korea, the immediate agenda-setting effect of economy framed coverage is statistically significant ($p < .05$). For the United States and South Korea, the economy TC impact is larger than the defense TC impact. For South Korea, 1 SD increase in economy framed coverage pushes up importance perception toward South Korea by more than 0.4 SD (the contemporaneous effect), while the same amount of increase in defense framed coverage only contribute to less than 0.1 SD increase in importance perception (the contemporaneous effect), and it is not statistically significant. For the United States, the immediate agenda-setting effect of economy TC is statistically significant, but defense TC is not. North Korea economy TC has statistically significant immediate effect on importance perception, but its size is small. The above findings support the claim in H3a. It should also be noted that all economy TC effects are short-lasting. All statistically significant effects disappear in 1-2 months after the shock.

For defense frame, North Korea is the only country with statistically significant defense framed coverage. Immediate agenda-setting effect. On the other hand, the statistically significant impact of defense TC persist for 12 months and does not decay. This observation supports H3b. While only marginally significant, the defense TC impact pattern for the United States also follows the expectation of persistent agenda-setting effect of defense TC. The impact of defense TC for China, on the other hand, functions in the opposite direction: The importance perception responds in negative direction to the increase in defense TC (the effect size is marginally significant). While in

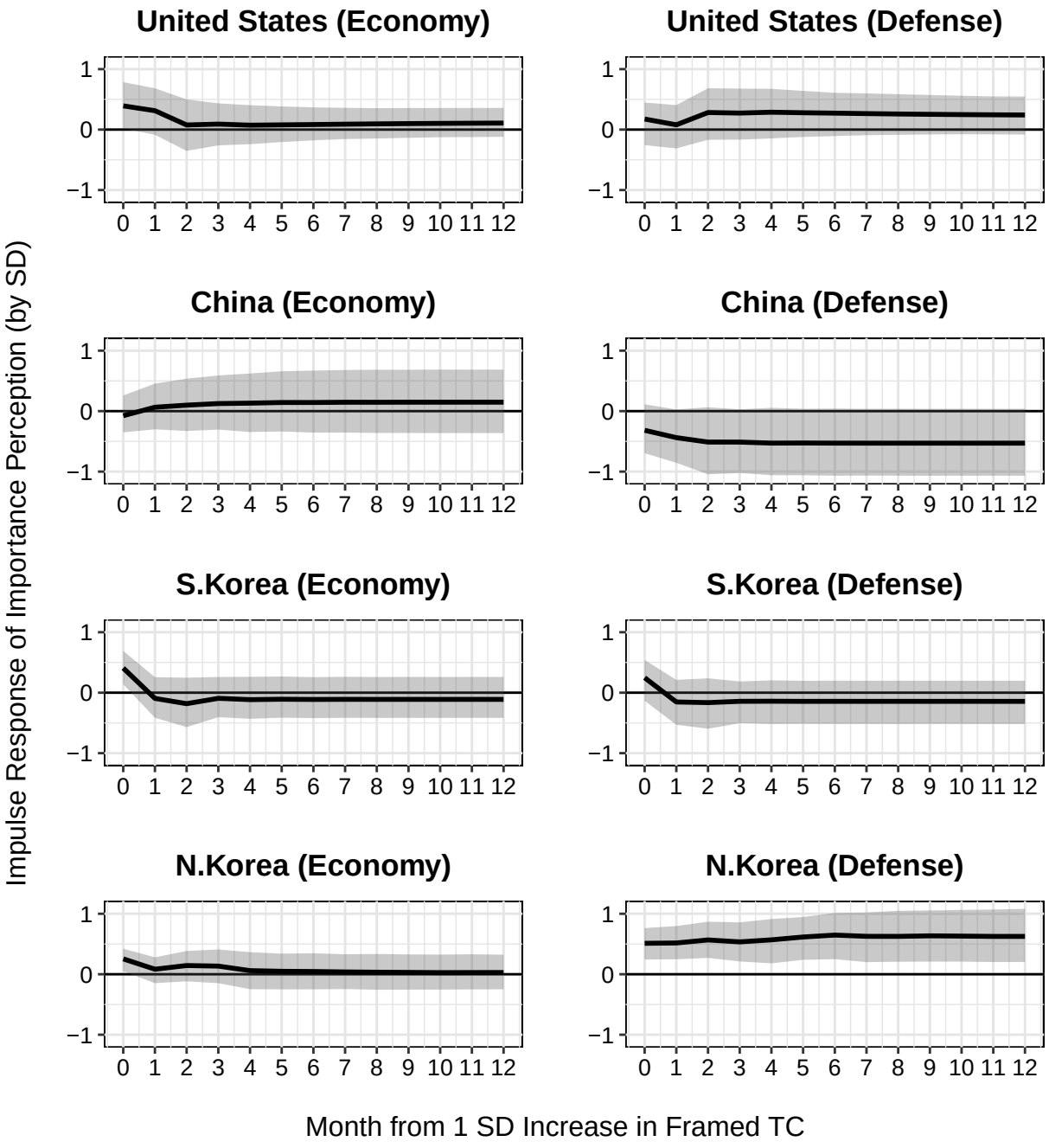

Figure 8: SD Increase in Foreign Importance in Response to SD Increase in Framed TC (with 95 Percent Confidence Interval)

the opposite direction, this impact also persists.

In sum, the patterns for the agenda-setting effects of framed TCs follows the expectations from H3a and H3b. The increase in economy TC contributes the increase in importance perception, but its effect is short lasting. The immediate agenda-setting effect of defense frame is smaller than the

economy frame, but once there is an effect, it persists for a long time. ”

5.4 Result 2: Persuasion and Frame

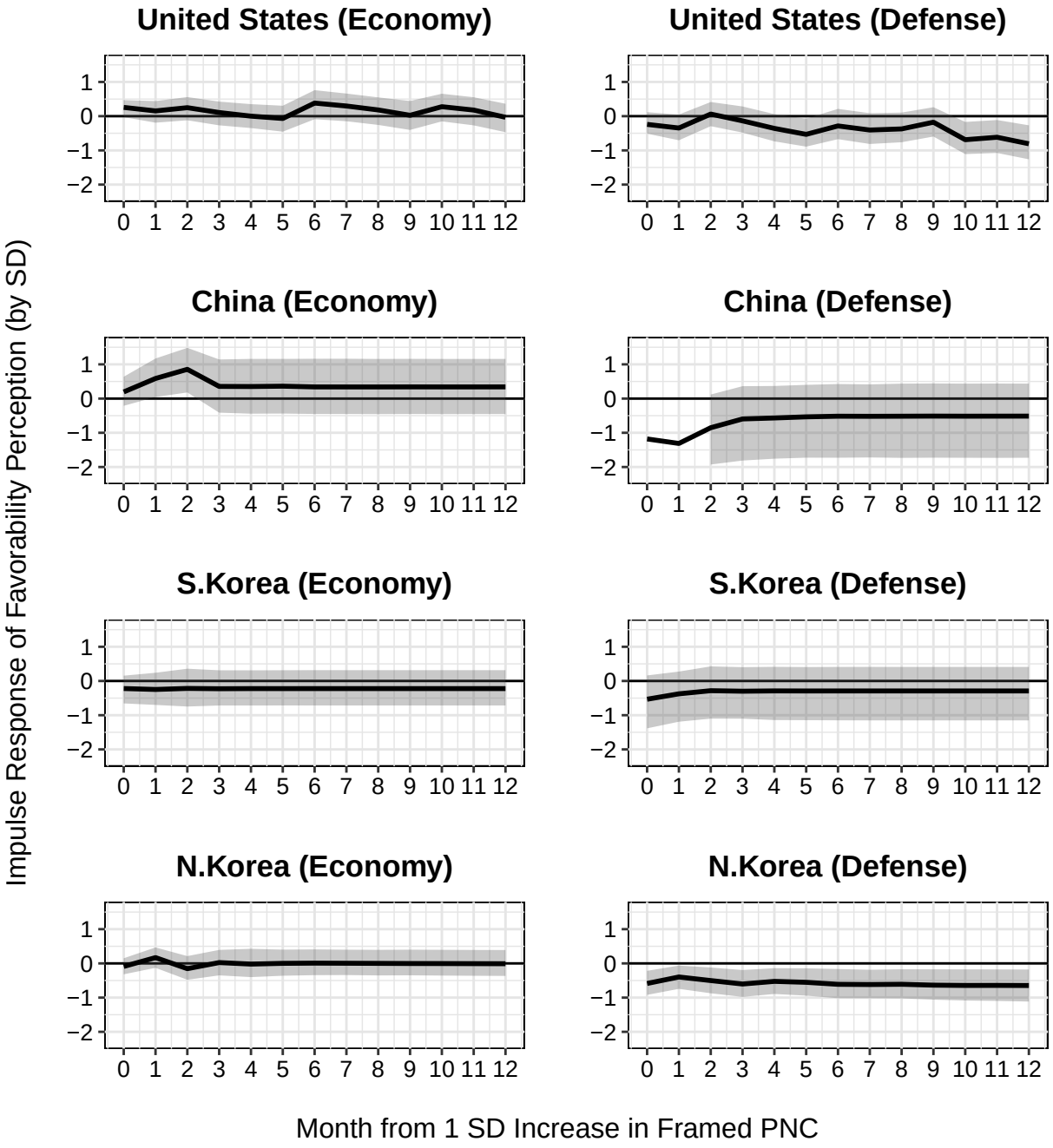

Figure 9: SD Increase in Foreign Favorability in Response to SD Increase in Framed PNC (with 95 Percent Confidence Interval)

Figure 9 shows the IRF analysis result for persuasion and framing effect. The result is less clear than the one in the previous subsection. On the economy PNC, the only country with statistically significant ($p < .05$) persuasion effect is China. The effect becomes statistically significant two months after the shock and decay in one month. This pattern is consistent with the expectation from H3a. None of the defense PNC has statistically significant persuasion effect in expected direction. Interestingly, the impact of defense PNC on favorability perception is negative for *all* countries, and statistically significant for United States, China, and North Korea. The more positive defense coverage leads to the more negative perception towards the country. It can be speculated here that positive statement on defense coverage may be made at the time of crisis, but those supposedly positive messages may further enhance the negative feeling of the people. Partially consistent with H3b, those opposite persuasion effects tend to persist for a long time.

6 Conclusion and Future Directions

In summary, the initial hypotheses are supported in the analysis. Firstly, as H1 expects, the increase in the total coverage of an object state produces the increase in the perception of importance toward an object state. Newspapers do have agenda-setting effect over foreign perception. Second, persuasion function is also confirmed. As H2 expects, the change in the tone towards the negative direction is followed by the decrease in favorability perception. Third, the framing effect hypotheses are partially supported. For economy frame (H3a), economy framed coverage tend to have larger agenda-setting effect than defense framed coverage, but its impact is short lasting. For defense frame (H3b), on the other hand, defense framed coverage, if there is an effect, has more persistent impact on the foreign perception.

Comparing across foreign states, there are partial supports for H4 and H5. First, as H4 expects, agenda-setting effect is the largest for those countries with middle-level long-run media coverage: Russia and South Korea. The impact is smaller for highly covered countries (i.e., US and China) and rarely covered countries (e.g., Taiwan and Oceania). Africa is a notable exception. The media

has large and persistent agenda-setting impact on Africa. Second, the pattern in North Korea (and partly Russia) give strong support for H5. The media has much more persistent agenda-setting effect persuasion on North Korea – where people almost never update information from sources other than media – than other foreign states.

This study gives the comprehensive understanding of when and how media influences foreign perceptions. Also, it makes three methodological contributions. First, it presents the integrative framework to study different types of media effects. The analysis shows that three media functions agenda-setting, persuasion, and framing can be captured by distinctive measurements, and have different implications. Second, the use of longitudinal data makes it possible to explore implications beyond cross-sectional studies. It enables us to study long-term, in addition to short-term, influence of media coverage. Third, it introduces partially automated ways to extract information from headline texts. Those methods may both reduce the time and increase reliability in data generation process compared to the method of fully-manual human-coding.

Several caveats remain. One is the limitation in content analysis. There is room for improvement in the accuracy and validity of the content coding. To capture the media content more accurately, it may need more sophisticated framework to code directional content of the news coverage. Another limitation is aggregated nature of the data. The aggregation of headlines and public perception may be useful to capture central tendency in the society but may miss out important component of individual differences. The "accessibility bias" (Iyengar 1991) logic of the agenda-setting is primarily an individual phenomenon. Note that the design of this study makes it impossible to observe the micro-level phenomena.

The next steps for this study can go in at least three directions. First, as an additional control variable, the elite communication between Japan and object states can be included. Goldsmith and Horiuchi (2009) shows that the visit of the US president can have the power to influence the perception of US in foreign country. This could be a critical variable because media intensively cover the foreign states when there is elite communication (e.g., conference, meeting of political leaders). Second, it can split the target period of the analysis. As Wu et al. (2002) suggests, the

characteristics of the effect may change by different period. For example, the favorability toward China has been in rapid decrease after around 2005. The characteristics of an effect may change by before and after those significant time point. Third, it is also possible to compare the effect across different newspaper companies and media formats. (Kepplinger et al. 1989) finds the strong effect of news magazines compare to the daily newspapers. Japanese paper is known to have less content variance across different companies, but if there is a significant difference between companies or the format, it could be quite interesting. Answering the above questions will contribute to the further understanding of media effects: how large and how persistent can it be across different conditions.

Acknowledgment

The earlier version of this paper is presented at *Annual Meeting of Japanese Association of Electoral Studies*, Kumamoto, Japan, May 17, 2015, and *International Workshop: New Developments in Political Communication Research*, Waseda University, Tokyo, Japan, June 24, 2015. I would like to express special thanks to Professor Airo Hino, who has initially recommended me to develop my term paper at his content analysis class. Also, I would like to thank Professor Shanto Iyengar and Professor Amber Boydstun for the insightful comments in the workshop and class. Lastly, I thank the students at Waseda University who kindly cooperated to this study as coders of headline contents.

Notes

[1]Foreigners here mean those people "who still have the nationality of their home country." The data are from 2013, taken from OECD database (https://data.oecd.org/migration/foreign-population.htm).

[2]Priming, one other highly discussed effect, is often considered to be the extension of agenda-setting effect (Cacciatore, Scheufele and Iyengar 2016, 11).

[3]The original data is referenced from *Jiji Yoron Chosa Tokuho* (Jiji Public Opinion Poll Reports), published four times in a month by Jiji Press. The target population is 2000 for each survey, randomly sampled from all over Japan. Interview method is face-to-face interview.

[4]Those states and region never scored 5 percent or more are excluded from the analysis, so it just has twelve states and regions.

[5]According to the public opinion poll conducted in 2014 by *Shimbun Chosakai [Newspaper Research Association]*, the Japanese public interest incorporated foundation. See http://www.chosakai.gr.jp/notification/pdf/report7.pdf for the detail (in Japanese).

[6]This is the case for commercial TV stations. NHK, national public service television station is an exception here.

[7]Data are extracted from Waseda University Library access of online newspaper article databases: *Yomidas Rekishikan* http://www.yomiuri.co.jp/database/rekishikan/ for *Yomiuri Shimbun*, and *Kikuzo II Visual* https://database.asahi.com/library2/ for *Asahi Shimbun*.

[8]Since this step is an automatic coding, there are some errors in the extraction process. Though, the coding system is successful in extracting correct relevant headlines.

[9]"Month" in this study is defined as the period from the starting date of the interview of current *Jiji-Poll* to a day before the starting date of the interview of the poll in the next month. *Jiji-poll* starts their interviews on the Monday of the second week of each month, so month(t) TC includes the first week of the current month(t) and second through last weeks of the previous month (t-1). The rationale for this operationalization is following. If the "month" in this study coincides with the month in the calender, month(t) would miss out first few days in a month preceding the interview date of next *Jiji-Poll*. Therefore, to include those days in the month, it is more appropriate to operationalize month(t) here as the period between each *Jiji-Poll*

[10]The data is referenced from *Yomiuri-Shimbun* website adv.yomiuri.co.jp/yomiuri/circulation/. The number is from 2014, but it is fairly consistent over the years.

[11]http://www.customs.go.jp/toukei/suii/html/time.htm

[12]The original data is obtained from the website of Cabinet Office, Government of Japan http://www.esri.cao.go.jp/jp/sna/menu.html.

[13]The estimation is done by `|ur.df|`function in `|urca|`package in R. The lag for the test is determined automatically determined by AIC. The trend and constant terms are included if the variable shows the clear trend, and the constant term is included if the variable does not have 0 as a mean.

[14]United States for Agenda-Setting is the exception. To be consistent, this case is also estimated using VECM.

[15]When $lag = 1$ is selected, the lag is set to $lag = 2$, since one need more than one lag to estimate VECM.

[16]The `|ca.jo|`function in `|urca|`package is used. I also used maximal eigenvalue test to check the validity of trace test. The recommendations are mostly the same in both tests.

[17]To identify the SVECM, one needs to put the restriction on the coefficients. I set the impacts of contemporaneous media coverage of trade volume, contemporaneous public perception on trade volume, and contemporaneous public perception on media coverage as zero.

[18]Africa, interestingly have two peaks – 2 months after and five months after – but each of the strong effect decay after few months

[19]Furthermore, four countries receive adequate coverage from the Japanese media to conduct content analysis

[20]The original data is referenced from *Jiji Yoron Chosa Tokuho* (Jiji Public Opinion Poll Reports), published four times in a month by Jiji Press. The target population is 2000 for each survey, randomly sampled from all over Japan. Interview method is face-to-face interview.

[21]The same variables of favorability and unfavorability are utilized in Fukumoto and Furuta (2012).

[22]This movement in itself is the interesting study target, but I omit the discussion here. Please read Fukumoto and Furuta (2012) for somewhat more detailed comments on the time trends.

[23]Words in profiles are identified by Japanese morphological analysis system, *MeCab*. The morphological analysis is conducted by *RMeCab* (http://rmecab.jp/wiki/index.php?RMeCab), developed by Motohiro Ishida.

[24]Number of bootstrapping is optimized from 50, 100 or 300, using accuracy score. Therefore, for some variable, 50 or 100 is used instead of 300.

[25]For some of the data, we use $ln\,j$ instead. Also, see the previous note.

[26]It should be noted that the correlation for China positive coding is weak (around 0.2) even for $p(c|x)$ based prediction. Compared with other codings, this result implies the ambiguity in "positive" news coverage towards China.

[27]RF classifier is trained for 500 times using bootstrapped samples of full human-coded headlines. The average predictions from all 500 classifiers are used in the analysis.

[28]http://www.customs.go.jp/toukei/suii/html/time.htm

[29]The original data is obtained from the website of Cabinet Office, Government of Japan http://www.esri.cao.go.jp/jp/sna/menu.html.

[30]To identify the SVECM, one needs to put restriction on the coefficients. I set the impacts of contemporaneous media coverage of trade volume, contemporaneous public perception on trade volume, and contemporaneous public perception on media coverage as zero.

[31]Before starting the search; I use RMecab (http://rmecab.jp/wiki/index.php?RMeCab) to conduct morphological analysis. Since the Japanese language has no space between words, it separates words and fixes verb back into basic form.

[32]To identify the SVECM, one needs to put restriction on the coefficients. I set the impacts of contemporaneous media coverage of trade volume, contemporaneous public perception on trade volume, and contemporaneous public perception on media coverage as zero. Also, the contemporaneous relationship between defense and economy coverage is set to zero.

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A Wording for the Original Questions of Foreign Perceptions

Importance

Q: In the next 5 years, which of the relationships with following countries and areas will become important for Japan? List up to 3 countries and areas.

A: United States; Canada; Russia; The Former Soviet Union other than Russia; European Countries; China; Taiwan; South Korea; North Korea; South East Asian Countries; Central and South America; The Middle and Near East; Africa; Oceania; Don't Know. (From June 2010, the question started to offer India as an additional option)

Favorability

Q: List up to 3 countries you like.

A: United States; Soviet Union (Russia); UK; France; West Germany (Germany); Switzerland; India; China; South Korea; North Korea; None; Don't Know.

Unfavorability

Q: Conversely, list up to 3 countries you don't like.

A: United States; Soviet Union (Russia); UK; France; West Germany (Germany); Switzerland; India; China; South Korea; North Korea; None; Don't Know.

B Procedures in Content Analysis

As the first step of Content Analysis, I extracted the headlines involving related words to United States, China, South Korea and North Korea, using KH coder, the text analytic software developed by Koichi Higuchi at Ritsumeikan University, Japan (http://khc.sourceforge.net/en/).

After the extraction of all the country-relevant headlines, I asked eight human-coders to code randomly sampled 1000 relevant headlines for two of four foreign states. Since each coder is randomly assigned to code headlines for two states, each foreign state is coded by four human-coders. Here, specifically, sampled headlines are splitted into 500 randomly sampled *Yomiuri Shimbun* headlines and 500 randomly sampled *Asahi Shimbun* headlines, but the dataset given to the coders are randomly ordered, thus they don't know which headline is for which newspaper. Coders are undergraduate junior, senior and graduate students of Waseda University. All students major in political science or economy.

Each coder are asked to judge whether a headline would give positive, neutral or negative impressions toward an object states for average Japanese. For the exact wording in coding manual, please contact the author at gento.badger@gmail.com.

Table B.1 shows the initial result of inter-coder reliability test. The values shown are the Krippendorf's Alpha. For original coding, it scores around 0.4 to 0.5 which do not meet the threshold of good reliability of 0.6 to 0.7. Here, It is observed that some coders have a tendency to overly give directional codes while others have a tendency to overly give neutral codes. To consider this issues in count, second and third rows in the table show the inter-coder reliability scores after the slight fix along the above tendencies. Fixed result show the rise in inter-coder reliability, and all countries have the score above 0.6. Confirming the fair-level of inter-coder reliability, I create the training dataset for the next step – machine learning – by the majority rule of human codes in each state.

Table B.1: Inter-Coder Reliability of Attributes of Foreign Headlines

	U.S.	China	S.Korea	N.Korea
	Kripp.Alpha	Kripp.Alpha	Kripp.Alpha	Kripp.Alpha
Original Coding*1	0.4284	0.4761	0.5038	0.4009
Overly Directional Codes Recoded*2	0.5403	0.6584	0.6688	0.4403
Overly Neutral Codes Recoded*3	0.6639	0.7821	0.7911	0.6194
Num. of Coders	4	4	4	4
Num. of Coding Categories (Ordered)	3	3	3	3

*1 "Don't Know" to neutral. Irelevant Headlines Dropped.

*2 When 3 out of 4 coders are neutral, recode the last one to neutral.

*3 In addition to *2, when 3 out of 4 coders have the same pos/neg codes, recode the last one to have the same code.

C Tables for IRF Results

Table C.1: IRF Analysis Results Table (Agenda-Setting)

Country		0	1	2	3	4	5	6	7	8	9	10	11	12
US	Response	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	p<.05													
China	Response	0	-0.2	-0.5	-0.2	-0.1	0	-0.2	-0.5	-0.3	-0.7	-0.4	-0.3	-0.1
	p<.05			*										
S.E.Asia	Response	0	0.2	0.1	0	0	0.2	0	0	0.1	0.1	0	0.1	0
	p<.05													
S.Korea	Response	0.8	0.2	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
	p<.05	*												
Europe	Response	0.2	0.3	0	0	-0.1	-0.2	0.2	0.1	0.1	0.1	0	0	0.1
	p<.05		*											
Russia	Response	0.8	0.6	0.3	0.5	0.4	0.3	0.3	0.4	0.3	0.4	0.4	0.3	0.3
	p<.05	*	*	*	*				*		*	*	*	*
N.Korea	Response	0.6	0.7	0.8	0.7	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.9	0.9
	p<.05	*	*	*	*	*	*	*	*	*	*	*	*	*
M.N.East	Response	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0	0	0	0
	p<.05	*												
Taiwan	Response	0.1	0.1	0.1	0	0.1	-0.1	0	0	0	0	0	0	0
	p<.05													
M.S.Ame.	Response	0.1	0.1	0	0	0.1	0	0	0	0	0	0	0	0
	p<.05		*											
Africa	Response	0.2	0.3	0.3	0	0.8	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.3
	p<.05	*	*	*		*	*	*	*	*	*	*	*	*
Oceania	Response	0	0	0	-0.1	0	0	0	-0.1	0	0	0	0	0
	p<.05													

Table C.2: IRF Analysis Results Table (Agenda-Setting/Framing)

Country		0	1	2	3	4	5	6	7	8	9	10	11	12
US (Econ)	Response	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	p<.05	*												
China (Econ)	Response	-0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	p<.05													
S.Korea (Econ)	Response	0.4	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
	p<.05	*												
N.Korea (Econ)	Response	0.3	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0
	p<.05	*												
USA (Def)	Response	0.2	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
	p<.05													
China (Def)	Response	-0.3	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
	p<.05													
S.Korea (Def)	Response	0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
	p<.05													
N.Korea (Def)	Response	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	p<.05	*	*	*	*	*	*	*	*	*	*	*	*	*

Table C.3: IRF Analysis Results Table (Persuasion)

Country		0	1	2	3	4	5	6	7	8	9	10	11	12
US	Response	0.6	0.4	0.2	0.3	0.4	0.3	0.4	0.5	0.4	0.3	0.8	0.8	0.8
	p<.05	*	*									*	*	*
China	Response	1.4	1.7	1.5	1.2	0.8	0.5	0.5	0.7	0.7	0.5	0.6	0.3	0.2
	p<.05	*	*	*	*									
S.Korea	Response	0.2	0.2	0.2	0.1	-0.2	0	0.1	0.2	0.1	0	-0.1	-0.1	-0.1
	p<.05													
N.Korea	Response	0.7	0.4	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	p<.05	*	*	*	*	*	*	*	*	*	*	*	*	*

Table C.4: IRF Analysis Results Table (Persuasion/Framing)

Country		0	1	2	3	4	5	6	7	8	9	10	11	12
US (Econ)	Response	0.3	0.2	0.2	0.1	0	-0.1	0.4	0.3	0.2	0	0.3	0.2	0
	p<.05													
China (Econ)	Response	0.2	0.6	0.9	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	p<.05		*	*										
S.Korea (Econ)	Response	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
	p<.05													
N.Korea (Econ)	Response	-0.1	0.2	-0.2	0	0	0	0	0	0	0	0	0	0
	p<.05													
USA (Def)	Response	-0.2	-0.3	0.1	-0.1	-0.4	-0.5	-0.3	-0.4	-0.4	-0.2	-0.7	-0.6	-0.8
	p<.05						*					*	*	*
China (Def)	Response	-1.2	-1.3	-0.9	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
	p<.05	*	*											
S.Korea (Def)	Response	-0.5	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
	p<.05													
N.Korea (Def)	Response	-0.6	-0.4	-0.5	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
	p<.05	*	*	*	*	*	*	*	*	*	*	*	*	*