

Effects of Institutional Environmental Forces on Participation in Environmental Initiatives

Magnum M.L. Lam, The Hong Kong Polytechnic University, China

*Christina W. Y. Wong, The Hong Kong Polytechnic University, China

Winslet T.Y. Chan, The Hong Kong Polytechnic University, China

Chi-hong Leung, The Hong Kong Polytechnic University, China

Cheung Mei-chun, The Chinese University of Hong Kong, China

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Abstract

This paper extends the environmental management literature by theorizing on and empirically validating the impacts of three different institutional environmental forces (IEFs): coercive, normative, and mimetic institutional environmental forces. We use a multi-method research design with two studies to examine the impacts of these forces by first investigating the environmental behaviors of individuals when they encounter these forces in their daily life, then examining their response towards environmental messages that reflect these three different forces. Specifically, we examine in Study 1 how these forces affect the environmental behaviors of individuals in terms of their participation in sorting and reducing waste, and other environmental activities through a mass survey. In Study 2, we investigate how the environmental messages of firms based on their environmental initiatives are emotionally received by individuals through electroencephalography (EEG). The findings suggest the importance of using normative and mimetic IEFs in addition to coercive IEFs to motivate participation in environmental initiatives.

Keywords:

Institutional theory, Institutional environmental forces, Customer participation, Environmental behavior, Environmental initiatives, Multi-method

1. Introduction

In recognizing that human behaviors have a significant role in affecting the environment, previous studies have attempted to contribute to the current body of knowledge by identifying approaches to effectively engage consumers and motivate a sense of environmental responsibility by encouraging participation in environmental initiatives and recycling campaigns, use of environmental alternatives, etc. (Bergsma, Gupta et al. 2012; Chan and Wong, 2012; Wong et al., 2012; Bohner and Schluter, 2014; Ryoo et al., 2017). These studies provide an understanding of the approaches, such as by emphasizing the importance of environmental issues and offering tools to inform on the environmental impacts (Chan et al., 2016; Collins, Galli et al. 2018), which are useful for motivating environmentally responsible behavior. Nevertheless, they are largely piecemeal. The result is a limited understanding on how structural behavioral patterns might emerge through institutionalism. Institutionalism revolves around compliance, the cultivation of customs and routines, and/or establishment of legitimacy.

According to the behavioral perspective of the institutional theory (DiMaggio and Powell, 1983; Huy, 1999; Morgeson and Hofmann, 1999) and previous studies on human behaviors (Sterthal and Zaltman, 1974; Bagozzi, 1982), the institutionalism of individual behaviors can be affected by forces beyond regulatory policies (e.g., levy and fee systems). This perspective argues that other institutional forces, including mimetic and normative institutional environmental forces (IEFs) which are also found in the structuring of behavior, can be effective in influencing behavioral changes at a low cost (Cialdini and Goldstein, 2004). However, there is little empirical evidence to support this claim, and also a lack of understanding on the concept of institutionalism beyond regulations imposition in motivating consumers to become more environmentally conscious, such as taking the initiative to sort and reduce waste, and making environmentally responsible choices. The absence of such related empirical evidence is detrimental to the advancement of an environmentally responsible society as there is little information on how various stakeholders, e.g., the government and business enterprises, could effectively motivate individuals to participate in environmental initiatives aside from enforcing regulations (Wong et al., 2012).

One of the major reasons for the paucity of information on the role of institutionalism in shaping individual behavior is because institutional environmental forces might not originate from the government, but the commercial sector or the local community. The importance of involving private-sector stakeholders in mitigating the challenges in environmental protection has been well recognized by many government bodies (Delmas and Toffel, 2004; Lai, Lun et al. 2011; Wong et al., 2012). For example, the retail industry has been predominantly influential on public behavior because the sector interacts closely with consumers by introducing and offering certain products and services (Lai, Cheng et al. 2010). When retailers promote environmental initiatives (e.g., offering environmentally friendly products and services), they take on a significant role in organizing environmental programs (Lai et al., 2012; Sancha, Wong et al. 2014). Therefore, the success of environmental programs largely relies on public participation. Without evidence on effective approaches that can motivate the participation of individuals in environmental programs, it is difficult for government bodies as well as other stakeholders to develop and implement effective programs.

To encourage and attract the participation of individuals in environmental programs, firms can exert different IEFs, including those that are coercive, mimetic, normative, or their combinations. Yet, what we know about the IEFs and their influence are limited on three fronts. First, the importance of public participation in environmental programs has not received due research attention, even though the practical significance of public involvement in environmental management has already been recognized in the literature (Bitner and Brown,

2008). Second, there is a lack of understanding on the determinants of individual participation in environmental protection initiatives apart from the use of regulatory policies. Specifically, little research work has been carried out on IEFs that instill a sense of gain (i.e., mimetic IEFs), or legitimacy in which individuals are bounded by expectations and norms (i.e., normative IEFs). Third, IEFs are often considered to be independent events with much reliance on regulations enforcement, thus neglecting the complementary relationship between mimetic and normative IEFs in cultivating public participation. This negligence is detrimental because anecdotal evidence shows that relying on a single institutional force is not sufficient enough to effectively gain public support, thus making it difficult to achieve the desirable outcomes (Chan, 2000; Schultz, Nolan et al. 2007; Wong, Miao et al. 2016).

Therefore, this research proposes to investigate the institutionalism of individual behavior in environmental practices by examining individual response to participation in environmental programs. Specifically, this research examines: (1) the effectiveness of the different types of IEFs in instilling public participation in environmental programs, (2) public response to the different IEFs, (3) the profile of individuals and their response to the different IEFs, and (4) emotional responses to IEFs that are effective in the form of messages from firms. The findings will be useful for policy development and managerial practices to strategize environmental programs for targeted public groups.

This paper is structured as follows. We first discuss the theoretical background of the study by providing an overview of the institutional theory, and its relationship with customer consumer behavior. We then discuss the different IEFs and their relationship with participation in environmental initiatives. The methodology of Study 1 and the findings are discussed, which are followed by a discussion on the methodology and findings of Study 2.

The two studies are complementary; Study 1 offers an overview of the effectiveness of the different IEFs in motivating customers to participate in environmental initiatives. The results of Study 1 establish the grounds for Study 2, which examines the response of individuals to IEFs in the form of environmental messages. Theoretical and managerial implications of the two studies are considered with limitations and future research discussed at the end of the paper.

2. Theoretical background

2.1 Institutional theory and customer behavior

The institutional theory which has sociological ties suggests that actors have shared meanings which act as constraints on actions to determine behavior and in this case, the behavior of customers (Powell and DiMaggio, 1991). While institutionalism is considered to be the process of instilling values amongst actors, the adaptive process of the actors is infused with values. That is, they are shaped in reaction to the commitments and actions of others, as well as influenced and constrained by their surrounding culture and community norms (Scott, 1987). Isomorphism acknowledges the social interaction among actors that not only allows the construction of actions and behaviors but also shapes them (Berger and Luckmann, 1967). This isomorphic process amongst actors is facilitated by witnessing the actions of peers, programs introduced into the community, and advantages that might be received by adopting the same/similar actions, which institutionalize participation and motivate similar actions, which in this case, revolve around environmental initiatives.

IEFs comprise three types of forces: coercive, mimetic, and normative (Scott, 2001). Coercive IEFs are defined as regulations or guidelines (e.g., public policies) that are established by authorities to guide actions (e.g., levy on plastic bags to discourage their use by consumers). Coercive IEFs in the environmental sense are often implemented through legislation, and retailers respond to government mandates by executing public policies in accordance with the

law (Humphreys, 2010). Customers are then required to follow the regulations that are being enforced by the government through the retailers. On the other hand, normative IEFs influence behaviors through a frame of reference and standards that guide and assess appropriate environmental responsibilities (Waerass and Ihlen, 2009). The level of customer participation reflects the degree to which environmental initiatives are perceived to be congruent with the dominant norms and values of individuals. Normative IEFs prompt actions of individuals who undergo anticipatory socialization towards common and shared values of their environmental responsibilities (Cicourel, 1970). The participation of individuals as a result of normative IEFs is an indication of their attempt to gain legitimacy by complying with social norms in society. Lastly, mimetic IEFs are characterized by the potential benefits of environmental initiatives. Information on the related potential benefits helps to reduce uncertainty of participation, as well as the impact of and benefits from participation. Mimetic IEFs encourages customers to make decisions in deciding on their participation by informing them of the possible benefits from an environmental initiative (Zucker, 1983). For example, customers believe that supporting NGOs can be an effective way to address environmental issues, so that the extent that customers participate in sponsorships or make charitable donations to NGOs is likely to be high.

2.2 Institutional environmental forces and customer participation

In terms of environmental programs, coercive IEFs are grounded on legislative regulations or corporate policies imposed by firms as part of their corporate social responsibility policies. Customers may feel encouraged, persuaded or even forced to participate in environmental programs (Scott, 2001; Lai, Wu et al. 2013; Lai, Wong et al. 2014). The imposing of coercive IEFs based on legislative regulations is likely to motivate customer participation because the public is probably already aware of the regulations and willing to comply because they are legalized already. For example, the imminent and serious problem of over eight billion plastic bags disposed into landfills every year has led to the enactment of an environmental levy scheme on plastic shopping bags in which many governments have banned local retailers from providing free plastic bags to their customers. A charge is often imposed onto the customer as an environmental levy for each plastic shopping bag. Therefore, this legislation mandates firms to stop providing free plastic bags, and customers understand that there is a fee if they wish to receive a plastic bag as this has been made into a regulation. Firms then offer alternatives such as selling reusable bags and baskets, and encouraging the public to bring their own shopping bags (Anonymous, 2008). This coercive IEF disciplines customers to cultivate the habit of bringing their own shopping bags, thus reducing the use and disposal of plastic bags. The use of coercive IEFs can engage public participation when they are presented in the form of rules and structured practices. Customer adaptation and conformity are therefore expected, otherwise, they may experience inconvenience or pay a cost.

H1. Coercive IEFs are positively related to participation in sorting and reducing waste, and other environmental protection activities.

Coercive IEFs, however, may fail to encourage customer engagement in environmental initiatives when the environmental protection activities are voluntary. Normative IEFs create the conditions for the development of a frame of reference for environmental protection and social norms of environmental protection that direct and guide customer participation. Normative IEFs suggest consumption patterns and behaviors that are considered environmentally responsible, which cannot be addressed by coercive IEFs (Campbell, 2007). Normative IEFs compel mutual obligation and understanding amongst customers who wish to gain legitimacy. Firms can also facilitate the acceptance of norms in their customers by

informing them about the common practices and social values of their community, such as quoting a percentage of their customers who recycle and buy environmentally friendly products. Normative IEFs complement coercive IEFs by introducing social norms that direct the participation of customers in environmental initiatives, instead of merely relying on regulations. In addition, normative IEFs can be developed by providing benchmark information related to environmental issues. Normative IEFs rely on social values and expectations, which provoke customer participation, to gain legitimacy to be part of the community. Normative IEFs can also add to coercive IEFs by developing norms of practices that guide consumption behavior.

H2. Normative IEFs are positively related to participation in sorting and reducing waste, and other environmental protection activities.

H3. There is a stronger positive relationship between coercive IEFs and participation in sorting and reducing waste, and other environmental protection activities when normative IEFs are also found.

Mimetic IEFs shape how customers are informed about the potential benefits of environmental initiatives (Scott, 2001). They can facilitate the understanding of customers on the motivation behind the environmental initiatives and the potential benefits of such initiatives to the environment and/or themselves. By reducing the uncertainty and lack of knowledge of customers, mimetic IEFs affect customer commitment and support. Sharing information on environmental issues and organizational efforts in environmental protection with customers can be considered as mimetic IEF-influenced initiatives as they help to communicate with customers and educate them on the latest developments in environmental protection. Subsequently, the information is incorporated into the schemas of their customers (Hopkins, 2009).

Mimetic IEFs can be useful for encouraging customer participation in relevant environmental initiatives. Mimetic IEFs complement coercive IEFs by shaping a positive perception towards environmental initiatives in addition to mandating participation as mimetic IEFs convey information about the potential benefits to the public as well as the environment. Similarly, mimetic IEFs offer a better understanding of the potential benefits of environmental initiatives to customers. Therefore, mimetic IEFs are more likely to complement normative IEFs as they reinforce the norm of participating in environmental initiatives.

H4. Mimetic IEFs are positively related to participation in sorting and reducing waste, and other environmental protection activities.

H5. There is a stronger positive relationship between coercive IEFs and participation in sorting and reducing waste, and other environmental protection activities when mimetic IEFs are also found.

H6. There is a stronger positive relationship between normative IEFs and participation in sorting and reducing waste, and other environmental protection activities when mimetic IEFs are also found.

3. Study 1: Institutional forces and their influences

3.1 Methodology

A large-scale online survey was conducted on the Hong Kong population in Study 1. We purchased a quota-based sample from Dun & Bradstreet. Of the sample which consisted of 12,500 individuals in the age range of 18 to 65 years old in Hong Kong, we received 1068 completed surveys, which is a response rate of 8.5%, and comparable to that of previous studies. Hong Kong provides an appropriate empirical setting for this study as the city is moving towards a more environmentally responsible position through public education and infrastructure provisions, such as recycling/collection facilities in residential and commercial buildings. The city also imposes environmental regulations (e.g., plastic bag levy) that have impacts on the daily life of its residents (Environmental Protection Department, 2018). There are also fees for disposing construction, chemical, and clinical waste. The implementation of a municipal solid waste disposal fee will be implemented by late 2020. Many businesses, as part of their corporate social responsibility, are initiating activities to engage their customers in environmental initiatives. Yet, the participation has been largely voluntary, except for the disposal of specific types of waste under the Waste Disposal Ordinance that was enacted in 1980. Hong Kong is therefore an appropriate setting to gain a better understanding of the impacts of different IEFs in how they affect the participation of individuals in environmental activities.

3.2 Bias

To address bias that might be introduced due to education, age, and household income, we applied stratified sampling based on the age distribution of Hong Kong. As a result, the age distribution of the sample (i.e., ages 18–29=27.2%, ages 30–39=28%, ages 40–49=22.2%, and ages 50–65=17%) is similar to the population distribution provided by the Hong Kong Census and Statistics Department. The demographics of the sample are summarized in Table 1. Education and household income are the control variables in the statistics analysis.

We checked the possibility of non-response bias. By following Armstrong and Overton (1977), we verified that the early and late respondents do not differ significantly in their responses to a random selection of questionnaire items, at $p < 0.001$. The results suggest that non-response bias is not an issue in the collection of the data.

3.3 Development of measurement

We conducted an extensive literature review and adopted items previously used to improve the reliability and validity of the measures. A pilot test with a group of 30 individuals resulted in slight modifications to the wording of the measurement. In addition, we conducted an exploratory factor analysis to purify the measurement scales. An online survey was used to assess the coercive, normative, and mimetic IEFs based on the enforcement of regulations, appropriate behaviors in the community, and the benefits observed, respectively by the respondents. All items were evaluated on a five-point Likert scale as shown in Appendix 1.

Independent Variable. As coercive IEFs are about the enforcement of regulations, we adapted a measurement scale to assess the regulations or policies that are enforced in the community of the respondents (Liang, Saraf et al. 2007; Ye, Zhao et al. 2013). The respondents were to indicate how frequent they felt that the regulations were being enforced in their daily life, which reflects the magnitude of the coercive IEFs in their community. The magnitude of the normative IEFs is related to the behaviors of individuals that are being observed in the community. Specifically, the normative IEFs at work are reflected in behaviors such as sorting and reducing waste, and supporting environmental activities in daily life. Normative IEFs are therefore categorized as the normative IEFs at play for sorting and reducing waste, and supporting environmental activities. Lastly, the magnitude of the mimetic IEFs is related to

the benefits that could be obtained by supporting environmentally responsible activities. We adapted a measurement scale to assess the extent of the benefits that are observed by the respondents (Liang, Saraf et al. 2007; Ye, Zhao et al. 2013).

Dependent variables. We evaluated participation by considering participation in environmentally friendly activities, including sorting and reducing waste, and supporting environmental activities, and adapted the measurement scales from the literature (Pisano and Lubell, 2017; Wang, 2017).

Control variables. We use gender, education, age, and household income as the control variables as they correspond to attitude, understanding, and knowledge of environmental issues (Gustafson, 1998; Harris and Jenkins, 2006).

3.4 Validation of measurement

We performed a confirmatory factor analysis (CFA) by using AMOS 24.0 to evaluate the psychometric properties of the factor structures. We followed the guidelines in Gerbing and Anderson (1988) and used maximum likelihood estimation with covariance. The CFA results of the measurement scales are summarized in Appendixes 1a and 1b. The measurement items load significantly (i.e., $p < 0.01$ and $t > 2.0$) onto their respective constructs with loadings that range between 0.50 and 0.93, which indicates convergent validity of the constructs (Anderson and Gerbing, 1988). To assess the discriminant validity, we follow Fornell and Larcker (1981) by evaluating the average variance extracted (AVE) estimates of all the constructs, which are found to be greater than the squared correlation between any pair of them, thus suggesting that the measurement items share common variance with their hypothesized constructs more than with the other constructs, which provides evidence of discriminant validity. The composite reliability, Cronbach's alpha, and AVE of each construct are also summarized in Appendix 1b. The composite reliability represents the shared variance among a set of observed variables that measure the reliability of an underlying construct (Fornell and Larcker, 1981), and the composite reliability of all the constructs meet the criterion of 0.60. The Cronbach's alpha values obtained ranged from 0.70 to 0.93, thus exceeding the threshold value of 0.70 recommended by Nunnally (1984), and suggesting a reasonable degree of internal consistency between the corresponding measurement items.

Normative IEFs are a second-order construct that includes three complementary facets of normative IEFs: sorting and reducing waste, and supporting environmental activities in daily life, which co-vary and interact with each other. We examined if we should use a more parsimonious measure for normative IEFs at a second-order level to test the hypotheses. We followed prior study to conduct three tests for comparing the first-order and second-order models of this construct (Tanriverdi, 2006). First, we compared the goodness-of-fit statistics of the second-order model (root mean square residual (RMR)=0.08, incremental fit index (IFI)=0.91, and comparative fit index (CFI)=0.91) and the first-order model (RMR=0.08, IFI=0.91, CFI=0.91). The result suggests that the second-order model has better goodness-of-fit statistics. Second, the first order factors load significantly onto the second-order construct at $p < .05$, which supports the presence of a second-order model. Third, we computed the target coefficient value (T) and found that it is equal to 1.0, which means that the relationships of these results suggest that the second-order measure of normative IEFs is appropriate for testing the hypotheses.

3.5 Results

We used AMOS 24.0 to test the hypotheses by using maximum likelihood estimation with a sample covariance matrix as the input. The results of the structural model of IEFs, and participation in recycling, sorting, reduction, and other environmental protection activities are

summarized in Table 2. The structural model provides a reasonable fit of the data with the goodness-of-fit indices of RMR=0.05, IFI=0.90, and CFI=0.90.

We examined the relationships between IEFs and participation in environmental initiatives in terms of sorting and reducing waste, and supporting environmental activities. We found that normative IEFs are the most effective in driving participation in sorting waste ($\beta=.75$, $p < .001$), reducing waste ($\beta=.27$, $p < .001$), and supporting other environmental activities ($\beta=.25$, $p < .001$). The observation of the participation of peers in environmentally related initiatives motivated the study participants to engage in the activities. These results lend support to H2.

Coercive IEFs are positively related to participating in sorting waste ($\beta=0.10$, $p < .001$) and supporting environmental activities ($\beta=0.09$, $p < .05$). However, they are not related to participating in reducing waste ($\beta=0.03$, $p > .05$). The enforcement of environmental regulations and policies motivate individuals to participate in sorting materials for recycling and supporting environmental activities (e.g., purchase environmentally friendly products), but does not motivate reductions in resource consumption by reducing the amount of disposed waste, and use of energy. A possible explanation for this result might be attributed to the contextual environment of the study as Hong Kong does not impose any regulations that force individuals to reduce consumption and waste.

On the contrary, mimetic IEFs are positively associated with reducing waste ($\beta=.78$, $p < .001$) and supporting environmental activities ($\beta=.55$, $p < .05$), but not sorting waste. The observed benefits of participating in environmentally friendly initiatives drive individuals to reduce waste and resource consumption, and support environmental activities. However, these benefits do not motivate individuals to participate in sorting, especially since Hong Kong does not have related schemes (e.g., pay-as-you-throw) to promote sorting which would reduce disposal costs (Zhang and Zhao, 2018). Customers would have difficulties in seeing the benefits by merely observing the participation of their peers in sorting waste.

In line with our theorization, the combined coercive and normative IEFs, coercive and mimetic IEFs, and normative and mimetic IEFs are positively associated with participation in sorting and reducing waste, and supporting environmental activities. Positive results suggest that IEFs in isolation are less effective in motivating individuals to participate in different types of environmental activities. Instead, unlike previous studies that often only acknowledge the effectiveness of coercive IEFs, the addition of normative and mimetic IEFs could be more effective in motivating environmental responsibility while reducing the cost of legal enforcement activities by the government and firms.

The results also showed that gender and age are positively related to sorting and reducing waste. This is consistent with the findings in the literature that females are more likely to demonstrate environmental behaviors, as they are more concerned than men about the environment (Zelezny, Chua et al. 2000; Arnocky and Stroink, 2010; Liu, Sun et al. 2018). In line with previous studies, age is also positively related to environmental concerns and behaviors, thus suggesting that older individuals are more concerned about the environment and take actions to protect the environment (Dietz, Kalof et al. 2002). While Hong Kong offers facilities to sort waste and resources to reduce consumption that are convenient, participation in other types of environmental activities (e.g., purchasing environmentally friendly products and participating in public policy development) is relatively less attainable. This may explain why gender and age have no relationship with participation in environmental activities.

4. Study 2 Identification of effective messages in driving participation

4.1 Methodology

An experimental study was conducted in Study 2 which used electroencephalography (EEG) to further investigate the emotional responses of individuals to specific messages, which reflect the IEFs, in the promotion and participation of firms in environmental initiatives scalp by using metal electrodes attached onto the head (Teplan, 2002). Our research team has used quantitative EEG measures to explore different mental states, such as attention (Cheung, Law et al. 2014), memory (Cheung, Chan et al. 2017) and emotions (Cheung, Law et al. 2019). Given their objectivity, quantitative EEG measures can avoid common method bias introduced from social expectations towards environmental protection and allow us to recognize the emotional responses of individuals towards environmental initiatives with more accuracy. Previous studies suggest that emotions are also important and can be determined with quantitative EEG measures when for instance, in making economic decisions. That is, they are often used to identify brain activity and stimuli, which can range from pictures, messages, window displays, personal-appearance styles to light, and often used in consumer and marketing research (e.g., Harmon-Jones, Gable et al. 2010; Rutherford and Lindell, 2011; Price, Peterson et al. 2012; Cheung, Law et al. 2019).

Different mental states are reflected by different frequency bands during brain activity¹ In typical EEG research work that focus on affective responses, an individual may show attenuation of the frequency of the alpha band after s/he is presented with emotionally positive or negative stimuli (Brown and Klug, 1974). As this study is related to emotional responses in the decision making of individuals based on environmental messages, the frequency of the alpha band (8–13 Hz) in the frontal region is examined. We observed the power of the frequency of the alpha band in the left (F3) and right (F4) frontal regions of the brain to measure emotional responses (Allen, Urry et al. 2004; Maxwell and Davidson, 2007) as the most commonly used measure of emotional responses is the frontal alpha asymmetry² which is calculated as follows (Coan and Allen, 2004; Carver and Harmon-Jones, 2009; Berkman and Lieberman, 2010):

$$\text{Frontal alpha asymmetry index} = \log(\text{right alpha power}) - \log(\text{left alpha power})$$

The frontal alpha asymmetry index is calculated by subtracting the log-transformed alpha power of the left hemisphere from that of the right hemisphere. This is a unidimensional scale that reflects the relative frontal EEG activation of the two hemispheres with a midpoint (zero) equal to symmetrical brain activation to external stimuli. According to this scale, a higher score reflects relatively higher left frontal activation as the left frontal alpha power is inversely related to left frontal activation. Conversely, a lower score reflects relatively higher right frontal activity. Thus, a positive score reflects a relatively higher left frontal activation (i.e., which reflects experiencing a positive emotional response). Conversely, a negative score reflects a relatively higher right frontal activation (i.e., reflects experiencing a negative emotional response).

4.2 Stimuli development

¹ Various brain wave patterns manifest different mental states. Delta waves (0–4 Hz) indicate the mental state of deep sleep. Theta waves (4–8 Hz) indicate the mental state during the early sleep stage and relaxation (Teplan, 2002). Beta waves (13–30 Hz) show the amount of mental concentration (Andreassi, 2000). Alpha waves (8–13 Hz) show emotional experiences and change based on changes in mental state. These different kinds of waves make EEG research interesting.

² The most sensitive positions in the International 10-20 system for measuring frontal alpha asymmetry are F3/F4 and F7/F8. The inverse relationship between alpha power and brain activation means that a smaller alpha wave reflects increased engagement. The frontal alpha asymmetry is associated with motivation of approaching and withdrawing. A relatively higher alpha power in the left frontal hemisphere is linked to an inclination to approach something triggered by an experienced positive emotional response. On the contrary, a relatively higher alpha power in the right frontal hemisphere is associated with the likelihood to withdraw from something which is associated with a negative emotional response (Coan and Allen, 2003; Coan et al., 2006).

In the development of the stimuli, we identified 12 environmental messages that are often used by firms as motivation to participate in their environmental initiatives. We conducted a content analysis and the messages were randomly mixed and each researcher coded the messages based on their conceptualization of normative and mimetic IEFs. As Study 2 aims to identify the engagement of individuals through the environmental messages delivered by firms, coercive IEFs are therefore omitted in this phase of the study as they are influenced by the enforcement of government regulations. Three of the authors were invited to serve as coders. They assigned messages to the IEFs based on the coding rules. The consistency of coding was first assessed by using Cohen's kappa (Cohen, 1960) and Krippendorff's alpha inter-coder reliability (Harwood and Garry, 2003) which are 89%, .83 and 0.83, respectively, and all are above the recommended threshold of 0.70 (Neuendorf, 2002). The coding rules were refined after the first round of coding to improve face and content validity. In the final content analysis, the coding reliability improved to 90%, 0.87 and .87, respectively, which suggests face and content validity of the messages in reflecting the concepts. The messages are shown in Table 3.

4.3 Experiment

An Emotiv Epoc+wireless headset was used in the experiment to capture the EEG data while examining the environmental messages from firms that aim to encourage participation in environmental activities. The Emotive Epoc+wireless headset has fourteen data collection electrodes and two reference electrodes that operate at a sampling rate of 128 Hz, a bandwidth of 0.2–45 Hz with digital notch filters to suppress noise of 50 Hz and 60 Hz. In compliance with the International 10–20 system of electrode placement, the electrodes in this study are marked as: AF3, F7, F3, FC5, T7, P7, O1, O2, P8, T8, FC6, F4, F8 and AF4. In the experiment, the data collected from F3 and F4 were processed to measure the preference (engagement vs. withdrawal) of the subjects towards the stimuli. Frontal alpha asymmetry of F3 and F4 reflect a positive or negative emotional response to a stimulus, respectively.

We recruited subjects and conducted a screening survey to ensure the appropriateness of this study. We recruited a total of 12 subjects who are on average 21 years old. They are healthy and right-handed and, at the time of the experiment, did not suffer from neurological or mental disorders, depression, anxiety or a chronic disease. They also did not participate in Study 1 to avoid bias. The 12 environmental messages (i.e., stimuli) that were tested for face and content validity were presented to the subjects consecutively on a typical 17 inch computer screen. Each stimulus was presented for five seconds and the period of each inter-trial interval was 0.5 s with a cross (+) at the center of the screen as shown in Fig. 1. MATLAB was used to perform data analysis as it has strong computational power with many built-in functions, including fast Fourier transform (FFT) which converts the raw data collected by the headset into brain waves of various frequency bands. The EEG epochs for each environmental message were spanned at intervals from 250 ms pre-stimulus to 750 ms post-stimulus.

4.4 Results

As mentioned earlier, a positive frontal alpha asymmetry index indicates a positive emotional response, while a negative frontal alpha asymmetry index suggests a negative emotional response. As shown in Table 3, the positive frontal alpha asymmetry suggests that the subjects have a positive emotional response towards the environmental messages embedding normative and mimetic IEFs. Subjects show positive emotional response towards the messages demonstrating commitment to cleaner production, recycling, reduction of resource consumption, improved energy efficiency of products, and so forth. The results suggest that the subjects process the messages positively, thus indicating their likelihood to elicit a favorable reaction towards environmental activities that are associated with the environmental messages. Subjects process the messages positively when they indicate corporate efforts in

protecting the environment and bringing benefits to them as customers through their environmental efforts.

5. Discussion

Study 2 complements Study 1 by providing insights into how firms phrase their messages by embedding institutional configurations to motivate the participation of their customers. The EEG results suggest that the subjects demonstrate positive emotional responses towards both normative and mimetic messages, which are largely consistent with the results in Study 1. In Study 1, the participants support organizational commitments in (i) cleaner production, (ii) reducing consumption of resources, and (iii) reducing emission, while in Study 2 the subjects show positive emotional response towards the messages that suggest organizational commitment to environmental protection and bringing benefits to customers through their environmental efforts. Specifically, individuals tend to support the environmental commitment of firms to reduce their environmental impacts, despite the specificity of the environmental objectives (e.g., 20% vs. unspecified carbon dioxide emissions reduction) and the outcomes of such a commitment.

The findings of Study 2 indicate that the individuals respond positively towards the environmental messages which hint at giving them benefits in terms of ensuring a green environment, improving the energy efficiency of products, and saving them money. This is in line with the results of Study 1, which reveals that mimetic IEFs are positively associated with participation in environmental initiatives in terms of reducing waste and supporting environmental activities. These findings are consistent to the institutional theory that individuals tend to share meanings and act accordingly due to social interactions and norms (Berger and Luckmann, 1967; Scott, 1987) and the positive emotional response to environmental messages (Baxter and Gram-Hanssen, 2016; Lu, Kua et al. 2018). The positive responses of the individuals when they face the various IEFs indicate their efforts in complying to the institutional forces to gain legitimacy of being environmentally responsible through participating in sorting and reducing waste, and supporting environmental activities.

6. Theoretical implications

This study provides empirical evidence that the institutionalism of individual behavior toward environmental protection is affected by forces beyond regulations (i.e. coercive IEFs) based on the institutional theory. While Study 1 suggests that coercive IEFs are effective in motivating individuals to participate in sorting waste and environmental activities, normative and mimetic IEFs improve participation in all three types of environmental endeavors discussed here, including sorting and reducing waste, and supporting environmental activities. The findings also suggest that individuals respond well to normative IFs, which motivate them to participate in environmental initiatives. Mimetic IEFs, on the other hand, motivate individuals to participate in reducing waste and other environmental activities. These findings are consistent with our theorization that institutionalism is effective for motivating consumers to carry out environmentally responsible actions (Campbell, 2007). In addition to the regulatory efforts of the government, firms also play an important role in imposing normative and mimetic IEFs to motivate a sense of environmental responsibility (Scott, 2001).

The findings in Study 2 provide further evidence of the importance of normative and mimetic IEFs. In line with prior studies that suggest importance of environmental messages in engaging individual to participates in environmental initiatives (Rhodes, Beauchamp et al. 2014, Baxter and Gram-Hanssen, 2016), Study 2 suggests that the individuals respond positively to environmental messages of firms which are used to show their commitment to environmental protection through cleaner production, emission reduction, and reduction of

resource consumption. The results also suggest that individuals respond positively to messages that hint at benefiting them (e.g., energy efficient products). These findings are consistent with the findings in Study 1 which suggests that normative and mimetic IEFs are effective in motivating environmental responsibility. Individuals are likely to support firms that deliver messages that suggest their commitment to the environment and their customers.

7. Managerial implications

This study has implications for firms in that they could convey IEFs. First, the findings suggest that the influence of normative and mimetic IEFs motivate individuals to be more environmentally responsible. This suggests the important role of firms in creating a culture that encourages participation in their environmental initiatives, as well as offering benefits to encourage participation. Second, the findings suggest that normative and mimetic IEFs complement coercive IEFs in motivating individuals to participate in sorting and reducing waste, and supporting environmental activities. The introduction of norms and benefits to both the environment and individuals can improve the effectiveness of regulations imposition. Third, in line with prior studies (Baxter and Gram-Hanssen, 2016), environmental messages that emphasize the commitment of firms to environmental protection and reduction of environmental impacts as well as the cost benefits to customers are positively received. Firms are therefore encouraged to develop an environmentally friendly culture amongst their customer base to support related initiatives and publicize this culture to inform other potential customers. Firms may also consider introducing benefits to customers as a form of motivation to participate in their environmental initiatives.

8. Limitation and future research

This study is subjected to a number of limitations and they can serve as topics for future research. First, although the sample contributes to solid empirical grounds for understanding the influence of IEFs, the study findings suggest that the contextual background potentially influences participation in environmental initiatives. Future studies may consider adopting other sampling frames with different contextual backgrounds. Second, we examine the response of individuals to environmental messages by collecting data about their emotional response with the use of EEG in Study 2. Although emotional response can be regarded as a state of action readiness (Frijda et al., 1989), behaviors and actions might be different based on behavioral psychology. Future studies might consider conducting further experiments to determine the actual actions taken by individuals after viewing the messages. Third, this is a cross-sectional study that offers limited insights into the dynamics of IEFs, participation in environmental initiatives, and emotional responses to environmentally related messages. Future studies may consider conducting a longitudinal or experimental study to determine the changes in participation in environmental initiatives and emotional responses of individuals due to changes in the IEFs.

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Tables and Figure

Table 1. Sample Demographics (Study 1).

Education	n	Percentage
Kindergarten or illiterate	4	0.4
Primary education	13	1.2
Secondary education	308	28.8
Tertiary education	597	55.9
Post-graduate studies	145	13.6
Unknown	1	0.1
Monthly Domestic Household Income		
Below \$20,000	167	15.6
\$20,000-49,999	670	62.7
\$50,000 or above	165	15.4
Unknown	63	6.2
Age		
18-29	290	27.2
30-39	299	28.0
40-49	237	22.2
50-65	176	16.5
Unknown	66	6.1

Table 2. Hypotheses Testing Results

	Participation in sorting waste	Participation in reducing waste	Participation in environmental activities
IEFs			
Coercive IEF	.10**	.03	.09*
Normative IEF	.75***	.27***	.25***
Mimetic IEF	.04	.78***	.55**
Interaction			
Coercive x Normative IEFs	.34***	.48***	.45***
Coercive x Mimetic IEFs	.32***	.47***	.47***
Normative x Mimetic IEFs	.32***	.05*	.71***
Control variables			
Gender	.05*	.08**	.02
Age	.09***	.11***	.03
Education	.04	.05	.01
Monthly household income	.03	.01	.01

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 3: Results of Frontal Alpha Asymmetry

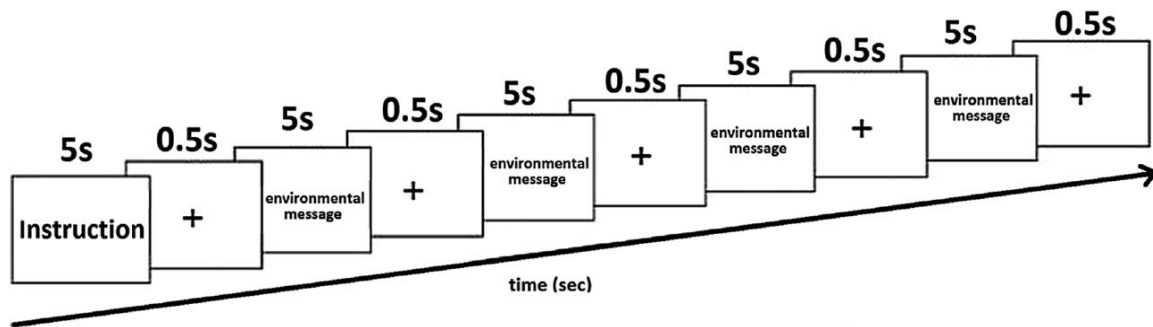
Message ID	Environmental Messages from Firms	Asymmetry index
1	Our company's products are committed to generating less waste. ⁿ	.30
2	Our company's production process is committed to generating a smaller carbon footprint. ⁿ	.05
3	Our company applies a conservation approach to the environment. ⁿ	.07
4	Using 30% less undesirable chemicals is our company's environmental goal. ⁿ	.19
5	Production with a 20% smaller carbon footprint is our company's environmental goal. ⁿ	.18
6	Production with a smaller carbon footprint is our company's environmental goal. ⁿ	.12
7	Using recycled materials in our production process is our company's environmental goal. ⁿ	.10
8	Our company achieves recycling efficiency. ⁿ	.19
9	Growing new trees is our company's environmental goal. ⁿ	.38
10	Keeping the world green for our customers is our company's mission. ^m	.10
11	Producing energy efficient products for our customers is our company's mission. ^m	.09
12	Reducing costs to our customers (e.g., reducing maintenance cost and energy consumption) is the company's mission. ^m	.06

Note:

ⁿ represents normative IEF.

^m represents mimetic IEF.

Figure 1: Presentation Sequence of Stimuli in Experiment



Appendix 1a Questionnaire and Measurement Items (Study 1)

Construct (Scale)	Measurement item	Loading
Coercive IEF (1 = never to 5 = always)	Please indicate the frequency of the following regulations or policies that are being imposed in your community:	
	C1: Government regulations related to environmental levy (e.g., plastic bag levy).	0.60
	C2: Government policy related to recycling.	0.71
	C3: Government regulations related to handling harmful materials usage.	0.71
	C4: Local community policy related to waste disposal.	0.79
	C5: Government regulations that prevent damage to the environment (e.g., switch off idling car).	0.72
Normative IEF on Sorting Waste (1 = very little number of people to 5 = a lot of people)	Please indicate the extent of the following that you have observed as normal behavior in the community around you:	
	NS1: Sort paper for recycling.	0.83
	NS2: Sort plastic for recycling.	0.89
	NS3: Sort metal for recycling.	0.86
	NS4: Sort glass for recycling.	0.79
Normative IEF on Reducing Waste (1 = very little number of people to 5 = a lot of people)	Please indicate the extent of the following that you have observed as normal behavior in the community around you:	
	NR1: Reduce use of disposable utensils/products (e.g., paper cups, plastic straw).	0.74
	NR2: Reduce consumption of water.	0.83
	NR3: Reduce disposed waste.	0.82
	NR4: Use recyclable shopping bags.	0.58
	NR5: Reduce the consumption of energy or fuel.	0.82
Normative IEF on Supporting Environmental Activities (1 = very little number of people to 5 = a lot of people)	Please indicate the extent of the followings norms you observed as appropriate behaviors in the community around you:	
	NS1: Prefer buying environmentally friendly products.	0.68
	NS2: Avoid certain activities for pro-environmental reasons (e.g., avoid driving a car and use public transportation).	0.51
	NS3: Make a donation to environmental organizations.	0.79
	NS4: Participate in public policy development of environmental protection.	0.89
	NS5: Joint environmental volunteer activities.	0.84
Mimetic IEF (1 = very little to 5 = always)	Please indicate the extent of the following that you have observed as normal behavior in the community around you:	
	M1: Cost-saving benefits.	0.87
	M2: Gained health benefits.	0.77
	M3: Convenient to participate.	0.88
	M4: Collection of monetary benefits.	0.67
	M5: Perceived as an environmentally responsible person.	0.71
	M6: Protect the environment.	0.77
Participation in Sorting Waste (1 = never to 5 = always)	Please indicate the frequency of your participation in the following:	
	PS1: Sort paper for recycling.	0.68
	PS2: Sort plastic for recycling.	0.73
	PS3: Sort metal for recycling.	0.69
	PS4: Sort glass for recycling.	0.79
Participation in Reducing Waste (1 = never to 5 = always)	Please indicate the frequency of your participation in the followings:	
	PR1: Reduce use of disposable utensils/products (e.g., paper cups, plastic straw).	0.68
	PR2: Reduce wasting water.	0.84
	PR3: Reduce disposed waste.	0.82
	PR4: Use recyclable shopping bags.	0.60
	PR5: Reduce the consumption of energy or fuel.	0.79
Participation in Environmental Activities (1 = never to 5 = always)	Please indicate the frequency of your participation in the following:	
	PA1: Buying environmentally friendly products.	0.55
	PA2: Avoiding certain activities for environmental reasons (e.g., avoid driving).	0.76
	PA3: Make donation to environmental organizations.	0.80
	PA4: Participate in public policy development for environmental protection.	0.88
	PA5: Volunteer for environmental activities.	0.84

Appendix 1b Goodness of Fit Indices of Constructs (Study 1)

Constructs	CFI	IFI	TLI	RMR	Cronbach's alpha	Composite reliability	AVE
Coercive IEF	0.98	0.98	0.96	0.03	0.84	0.83	0.50
Normative IEF on Sorting	0.98	0.98	0.96	0.03	0.84	0.83	0.50
Normative IEF on Reduction	0.98	0.98	0.96	0.03	0.88	0.87	0.58
Normative IEF on Supporting Environmental Activities	0.94	0.94	0.90	0.06	0.88	0.87	0.50
Mimetic IEF	0.93	0.93	0.90	0.05	0.89	0.90	0.53
Participation in Sorting	0.98	0.98	0.93	0.03	0.82	0.81	0.52
Participation in Reduction	0.98	0.98	0.95	0.03	0.86	0.86	0.56
Participation in Environmental Activities	0.92	0.92	0.90	0.05	0.88	0.88	0.60