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**Predicting intention to take protective measures during haze:  
The roles of efficacy, threat, media trust, and affective attitude**

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**Abstract**

The annual Southeast Asian haze pollution raises public health concerns in this region. Based on a modified Extended Parallel Process Model, this study examines efficacy (self- and response efficacy) and perceived threat (susceptibility and severity) and incorporates new constructs of media trust and affective attitude. Results from a web survey of 410 undergraduate students in Singapore shows that response efficacy to seek haze-related information mediates the association between perceived self-efficacy and intention to take protective measures during haze. Moreover, self-efficacy is negatively associated with affective attitude (e.g., fear and worry) towards haze-related health problems. Next, perceived severity and perceived susceptibility are positively associated with response efficacy and affective attitude. Affective attitude toward haze is a stronger predictor than response efficacy for behavior intention. Finally, trust in new media is positively associated with young Singaporeans' affective attitude, which positively affects their behavior intention to take protective measures.

Keywords: haze, self-efficacy, perceived threat, media trust, response efficacy

## **Introduction**

Haze is a form of transboundary air pollution that is considered a health hazard by Southeast Asian countries such as Indonesia, Malaysia, and Singapore (Forsyth, 2014; Shadbolt, 2013). Since the 1980s, illegal slash-and-burn farming in Indonesia has resulted in the annual occurrence of haze in these countries, especially during the dry season (Stratieva, 2014). The June 2013 haze crisis was the worst in Singapore's history, resulting to potentially life-threatening health problems among its residents (Kapoor & Taylor, 2013). Although there were no reported deaths due to haze during that period, hospitals attended to more patients with asthma and other breathing problems than usual (Khalik, 2013).

In response to the Southeast Asian haze crisis in 2013 and 2015, several government agencies in Singapore used various media channels to communicate health messages to the public. Traditional mass media outlets such as TV, radio, and newspapers were used to disseminate haze-relevant news. In view of Singapore's technologically-savvy society, new media outlets like social media were utilized to speed up information dissemination of health messages and haze updates. For example, Singapore's National Environment Agency (NEA) used Twitter to provide real-time updates of haze and their tweets were among the most mentioned and most retweeted by Singaporeans during the Southeast Asian haze crisis (Prasetyo, Gao, Lim, & Scollon, 2013). According to Lin and Tan (2013), traditional media in Singapore primarily provided informative news related to the Southeast Asian haze pollution with positive story angles that centered on the efforts of local authorities, while new media tended to have diverse topics and alternative viewpoints with critical tones and negative sentiment. The differences in media messages may lead to variations in audiences' trust levels of old and new media content related to haze issues, and in their attitudes and reactions to take protective measures during such a public health crisis, indicating a need for further scholarly investigation.

Given the health impact of haze pollution in recent years, this study examines factors that may be associated with young Singaporeans' behavioral intention to take protective measures during haze crises. In this study, we adopt and modify key constructs from Witte's (1992) Extended Parallel Process Model (EPPM), a framework widely used in health communication to predict how individuals respond to fear-induced messages. Following recent studies that suggest new approaches for considering the relationship among EPPM constructs (e.g., Krieger & Sarge, 2013), this research treats response efficacy and affective attitude (e.g., fear and worry) as mediating factors between self-efficacy, perceived threat (i.e., severity and susceptibility) and media trust (i.e., traditional media and new media) of behavioral intention for haze protective measures.

Theoretically, the findings of this study will help identify relevant predictors of young people's intention to take protective measures during a public health crisis like haze. Next, they can elucidate how trust in old and new media tends to influence affective attitudes such as fear and worry, which is crucial to select suitable distribution channels of public health messages when traditional media outlets are no longer the dominant platforms for health or crisis communication nowadays (Neuhauser & Kreps, 2003). Practically, this study on the relationships of users' socio-psychological predictors with protective behavior intention can guide health authorities to develop effective communication campaigns for haze and other public health crises.

### ***Haze Pollution in Singapore***

Haze is a result of the accumulation of air pollutants such as dust particles and carbon dioxide in dry weather. Toxic smoke caused by slash-and-burn forest clearing techniques in Indonesia is carried by strong monsoonal winds from June to September, spreading annual haze pollution in the region (Forsyth, 2014). Neighboring countries, like Singapore, have

experienced several haze crises over the past four decades. The haze in June 2013 reached the highest and most hazardous level of air pollution in its history (Shadbolt, 2013). In October 2015, a haze crisis re-occurred and turned into international problems affecting several neighboring ASEAN countries (Sekaran & Shuib, 2015). This time the haze lasted for months at a very unhealthy level in Singapore. The severity of the Southeast Asian haze crisis posed tremendous health risks to Singapore residents, especially vulnerable populations like children and the elderly. During the crisis period, the government (through the NEA) advised the public to engage in protective measures to protect their health, such as wearing N95 masks, limiting outdoor activities, and seeking medical assistance if feeling unwell (Yong, 2013). The Ministry of Health also provided health advisories for the general public recommending specific protective measures depending on their health conditions and levels of haze pollution (National Environmental Agency, 2013). Protective actions that were recommended by authorities usually took into account people's susceptibility to haze-related health problems and their potential severity.

In previous years, broadcast and print media were essential channels for Singaporeans to obtain haze-related health information. However, since the 2013 Southeast Asian haze crisis, a large number of people have turned to new media for seek information on taking preventive actions. NEA's website attracted about 5 million visitors during the crisis (AsiaOne, 2013). Social media, particularly Twitter, have become a critical platform for haze communication. In order to reach Singapore netizens, NEA established its Twitter presence through the "@NEAsg" account to update the public on haze conditions instantaneously (Prasetyo et al., 2013). As Singaporeans were advised to stay indoors during the haze crisis, many used social media, primarily Twitter, to express their latest views and emotions about the pollution (Lin & Tan, 2013; Prasetyo et al., 2013). Overall, it was estimated that haze-related tweets reached 236 million impressions with more than 290,000 Singaporeans

discussing the haze over 340,000 times on Twitter (Picard, 2013). Based on web analytics, Lin and Tan (2013) found that Twitter was the most widely used social media in Singapore to communicate issues related to the Southeast Asian haze crisis. Their findings also showed that 75% of the tweets had negative sentiments, while positive tweets were mostly from mass media and government-related websites. According to Prasetyo et al. (2013), the majority of tweets posted during the crisis mostly expressed negative sentiments such as fear and worry. Hence, the perceived risk of haze was likely to be amplified when Singaporeans exposed themselves to haze-related social media content to a great degree.

To date, the Southeast Asian haze pollution remains an unresolved public health concern in Singapore. Protective measures such as wearing masks and staying indoors are currently the main effective means to avoid health problems caused by haze. In response to such crisis, traditional and new media are instrumental communication channels that can influence people's risk perceptions of haze as well as their decision making in taking recommended actions to safeguard their health. These underscore the significance of this study in investigating factors affecting young Singaporeans' intention to take protective measures during haze crises.

## **Literature Review**

### ***Witte's Extended Parallel Process Model (EPPM)***

Rogers's (1975) protection motivation theory (PMT), which focuses on the threat and coping appraisal, provides some explanation on why people engage in unhealthy practices and whether possible behavioral changes can occur. It consists of four major constructs: the perceived severity of a threatening event, the perceived probability of the occurrence (vulnerability), perceived self-efficacy, and the efficacy of the recommended protective behavior. Although PMT explains how the danger control processes lead to persuasive

message acceptance, Witte (1992) argued that it could not fully define the factors leading to message rejection and further developed the EPPM. Incorporating Leventhal's (1970) parallel process model to make the distinction between cognitive and emotional reactions to fear appeals, Witte developed the EPPM (Witte, 1992, 1994) to predict how individuals react to fear stimuli and provide strategies on how they can effectively accept a health message. EPPM has been widely applied to public health studies such as influenza (Nan & Kim, 2013; Prati, Pietrantoni, & Zani, 2012) and human papillomavirus (HPV) (Krieger & Sarge, 2013).

### ***Perceived Efficacy (Self-efficacy and Response Efficacy)***

According to Witte, perceived self-efficacy refers to “an individual's belief in his or her ability to perform the recommended response” and perceived response efficacy refers to “an individual's belief as to whether a [recommended] response effectively prevents the threat” (1992, p. 332). However, this study does not regard self-efficacy and response efficacy as parallel predictors for protection motivations but follows Krieger and Sarge's (2013) approach to treat response efficacy as a significant mediator between self-efficacy and behavior intentions for young Singaporeans to take protective actions in the context of the Southeast Asian haze crisis. For instance, Krieger and Sarge (2013) showed that young women's perceived self-efficacy perceptions increases their intentions to talk to a doctor about the HPV vaccine (response efficacy) and concluded that response efficacy is a significant mediator of self-efficacy and behavioral intentions. Moreover, other scholars also supported re-conceptualizing efficacy in prevention research (Cauberghe, De Pelsmacker, Janssens, & Dens, 2009; Choi, Krieger, & Hecht, 2012). Therefore, we hypothesize that:

**H1a:** Perceived self-efficacy is positively associated with response efficacy.

According to Witte (1994), fear appeals in message framing can convince individuals that a threat to them is personally relevant and serious. For instance, fear and worry are useful



motivations for seeking information in a public health crisis like the H1N1 influenza (Ho, 2012). Burns and Slovic (2012) further explain that individuals' perception of the threat in risk situations is highly influenced by affective attitudes or responses (e.g., feelings of fear, dread, or uneasiness) which may have an impact on their rational decision making in taking recommended health actions. Prati et al. (2012) also find that perceived coping efficacy, similar to the concept of perceived self-efficacy, lower the affective responses of the Italian elderly toward influenza vaccination. Hence, in the context of the Southeast Asian haze crisis, we propose that:

**H1b:** Perceived self-efficacy is negatively associated with affective attitude towards haze.

### *Perceived Threat (Perceived Severity and Perceived Susceptibility)*

In the EPPM, perceived threat consists of perceived severity (an individual's belief about the seriousness of the threat) and perceived susceptibility (an individual's belief about his or her changes in experiencing the threat) (Witte, 1992). Several studies have studied susceptibility and severity in relation to risk contexts. For example, Griffin, Dunwoody, & Neuwirth (1999) and Kahlor (2007) labelled perceived severity and susceptibility as perceived hazard characteristics. In the context of global warming, Kahlor (2007) argues that perceived severity and perceived susceptibility plays a major role in how individuals seek and process information in relevant health or environmental risks. According to Witte (1994), when the levels of perceived threat (susceptibility and severity) are low, individuals are not motivated to protect themselves and cause only superficial processing of efficacy of the recommended response. In other words, increased perceived threat, which includes severity and susceptibility, has a positive association with response efficacy as individuals enter the process of protection motivation. In addition, Griffin et al. (1999) and Kahlor (2007) establish

Running head: Intention to take protective measures during haze

a strong correlation between the perceived severity and susceptibility and affective attitude. They both have a positive effect on affective attitude towards health or environmental risks. The process of ‘protection motivation’ in risk situations means that increased severity will increase response efficacy (Rogers, 1975; Witte, 1994). The impact of perceived severity of the risk leading to higher affective attitude is also seen in Kahlor’s (2007) research. Moreover, Liao, Cowling, Lam, Ng, and Fielding (2010) found a significant positive relationship between susceptibility and affective attitude of worry in an influenza context. Thus, this study proposes the following hypotheses:

**H2a:** Perceived severity is positively associated with response efficacy.

**H2b:** Perceived severity is positively associated with affective attitude towards haze.

**H3a:** Perceived susceptibility is positively associated with response efficacy.

**H3b:** Perceived susceptibility is positively associated with affective attitude towards haze.

### ***Media Trust (Traditional Media and New Media)***

Past studies have pointed out the importance of mass media use in crisis situations (Ho, 2012). According to Loges (1994) and Lowrey (2004), when people perceive a presence of threat in social crises, they tend to have a higher dependence on mass media (i.e., television, newspapers, and radio). However, new media play an increasingly significant part in disseminating health or environmental information during public health crisis, especially in digital-savvy societies.

There are positive correlations between media use and trust (Johnson & Kaye, 1998; Tsfaty & Cappella, 2003). Jakob (2010) finds that trust in media plays an important role in influencing individuals’ uptake of health messages communicated in a public health crisis.

This relationship between media dependency and trust is further examined in Bangerter et al.'s (2012) study that discuss the significance of public trust in media to induce eventual behavioral intent and compliance and to determine the success of public health campaigns. Early studies of Ball-Rokeach and DeFleur (1976) suggest that media messages have affective effects on receivers. Liao, et al. (2011) find that media trust tends to lead to increased worry about influenza. On the contrary, Ward et al. (2011) confirm that lack of trust in media reports of health risks cause uncertainty and confusion. The uncertainty stemming from low trust in media is likely to increase affective responses such as fear and worry.

The aforementioned studies show that trust in media is generally important in health crises. However, they do not differentiate between trust in traditional and new media. While there has been a lack of comparisons between trust in old and new media, social media are undoubtedly gaining importance in health crisis situations (McLean & Power, 2013). Reynolds (2010) finds that organizational use of social media in the 2009 H1N1 flu pandemic had improved people's trust in the Centers for Disease Control and Prevention (CDC). Its social media provided a space for the public to express their health concerns which helped reduce their worry during the crisis. Hence, this study proposes the following hypotheses:

**H4a:** Trust in traditional media is negatively associated with affective attitude towards haze.

**H4b:** Trust in new media is negatively associated with affective attitude towards haze.

### ***Behavioral Intention***

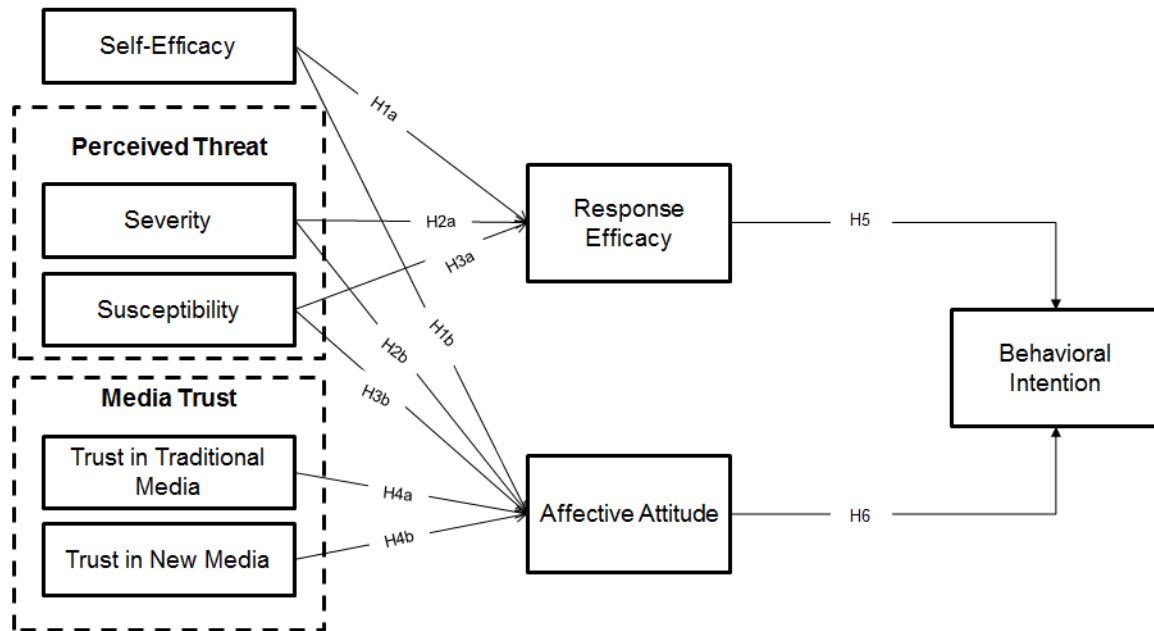
Previous literature has found obvious links between efficacy and behavioral intention. For example, Bandura (1977) stated that perceived efficacy has an influence on the activity of an

individual's efforts in the face of threat. Not only does response efficacy have a direct effect on behavioral intention, Krieger and Sarge (2013) find that increased perceptions of self-efficacy lead to increased response efficacy perceptions and in turn indirectly result in increased behavioral intention. In addition, Witte's (1992, 1994) EPPM already discussed the moderating effect of perceived efficacy on the relationship between perceived threat and behavioral intention, positing that higher response efficacy would have a positive effect on behavioral intention. Hence, we propose the following hypothesis:

**H5:** Response efficacy is positively associated with behavioral intention to take protective actions during the haze.

The studies of Witte (1992, 1994) and Kahlor (2007) suggests that affective attitudes such as fear and worry toward health problems have a direct effect on behavioral intention to take protective actions. In Prati et al.'s (2012) study during the H1N1 influenza, they showed that affective attitude had fully mediated the relationship between cognitive factors (such as perceived threat) and behavioral intention. In other words, affective response to a crisis such as haze can increase behavioral intention in a one-step process or act as a mediating factor between cognitive variables and behavioral intention and increase behavioral intention in a two-step process. Hence, we propose the following hypothesis:

**H6:** Affective attitude is positively associated with behavioral intention to take protective actions during the haze.



**Figure 1.** Research model

Figure 1 shows the research model which demonstrates the relations between variables in proposed hypotheses examining the haze context in Singapore.

## **Method**

### ***Data Collection and Respondents' Profiles***

We conducted a web survey of undergraduate students enrolled in a comprehensive university in Singapore from April to May 2014. The web survey link was sent via email to a representative sample of 2,000 undergraduate students. To increase response rates, students who completed the survey with valid answers were given US\$ 8 as an incentive. About 600 respondents completed the survey which corresponds to a response rate of 30%. After data cleaning, 410 cases were retained for data analysis. The average age of the respondents is 22.88 years old.

**Table 1.** Respondents' demographic profile ( $N = 410$ )

		Frequency	Percentage
Gender	Male	167	40.7
	Female	243	59.3
Ethnicity	Chinese	370	90.3
	Malay	16	3.9
	Indian	12	2.9
	Others	12	2.9
Type of housing	1-2 room flat	10	2.4
	3-room flat	44	10.7
	4-5 room flat	241	58.9
	Executive apartment	32	7.8
	Private condominium	33	8.0
	Landed property	50	12.2
College	Business	89	21.7
	Engineering	138	33.7
	Humanities and Social Sciences	83	20.2
	Medicine	2	0.5
	Science	93	22.7
	Sport Science	5	1.2
Year level	First year	29	7.1
	Second year	13	3.2
	Third year	247	60.2
	Fourth year	121	29.5

Table 1 shows the profiles of the respondents. In a nutshell, most of the respondents are female (59.3%) and ethnic Chinese (90.3%). With the majority in the third year of study (60.2%), respondents were enrolled mostly in engineering (33.7%), followed by business (21.7%), and humanities and social sciences (20.2%). This study, which used types of housing to examine family economic status, found that 58.9% live in 4-5 room public housing flats which indicate that most of the respondents are from the middle class of society.

### ***Data Analysis***

This study utilized Partial Least Squares (PLS) as the main statistical method to test the proposed research model. PLS is a form of structural equation modelling (SEM) technique which can be used to test multiple variables in a complex research model (Hair, Sarstedt, Ringle, & Mena, 2012). Although popularly used in marketing and business research (Hair et

al., 2012), PLS has become a “tool of choice” for multivariate analysis of non-experimental social science data (Abdi, 2010). PLS is suitable for this study since it adequately handles non-normal data distributions caused by survey items that are measured in 7-10 point scales (Bontis, Booker, & Serenko, 2007). To perform PLS, the data were analyzed using SmartPLS 2.0 M3 (Ringle, Wende, & Will, 2005).

### ***Measurements and Item Analysis***

Measurements for each constructs were adapted from previous research and subsequently modified to fit the context of haze (Appendix 1). The items used for susceptibility (3 items), severity (3 items) and response efficacy (2 items) were measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) adopted from Krieger and Sarge (2013). Next, the four items for self-efficacy were adopted from Schwarzer, Boehmer, Luszczynska, Mohamed, and Knoll (2005) and was measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Moreover, trust of traditional media (4 items) and trust of new media (4 items) were adopted from Bangerter et al. (2012) and was measured using 5-point Likert scales (1 = strongly disagree, 5 = strongly agree). We adopted items for affective attitude (2 items) from Prati et al. (2012) and measured responses using a 10-point Likert scale (1 = not at all, 10 = extremely). Finally, items for behavioral intention (3 items) adapted from Kahlor (2007) were measured with a 10-point Likert scale (1 = least likely, 10 = most likely). Appendix 1 shows the complete list of items along with their respective factor loadings. To ensure the fitness of items in the proposed research model, items with a factor loading of below 0.70 were removed (Chin, 1998). Consequently, items 1 and 4 for both trust of traditional media and trust of new media were removed.

**Table 2.** Mean and validity measures

Scale	Mean	CR	AVE	Discriminant Validity									
				1	2	3	4	5	6	7	8		
1 Self-Efficacy	3.36	0.89	0.67	<b>0.82</b>									
2 Susceptibility	3.11	0.92	0.80	-0.10	<b>0.89</b>								
3 Severity	3.50	0.88	0.72	-0.03	0.49	<b>0.85</b>							
4 Trust to Traditional Media	3.68	0.77	0.64	0.14	0.21	0.23	<b>0.80</b>						
5 Trust to New Media	3.56	0.81	0.69	0.20	0.21	0.16	0.54	<b>0.83</b>					
6 Response Efficacy	3.85	0.92	0.85	0.36	0.21	0.24	0.35	0.27	<b>0.92</b>				
7 Affective Attitude*	5.67	0.94	0.88	-0.10	0.49	0.49	0.22	0.26	0.19	<b>0.94</b>			
8 Behavioral Intention*	6.65	0.88	0.71	-0.01	0.26	0.33	0.22	0.23	0.27	0.60	<b>0.84</b>		

Note: CR = composite reliability. AVE = average variance extracted. \* = measured in 10-point scale, the rest are 5-point scale. Diagonal elements highlighted in bold are the result of the square root of AVE and should exceed the inter-construct correlations to establish discriminant validity.

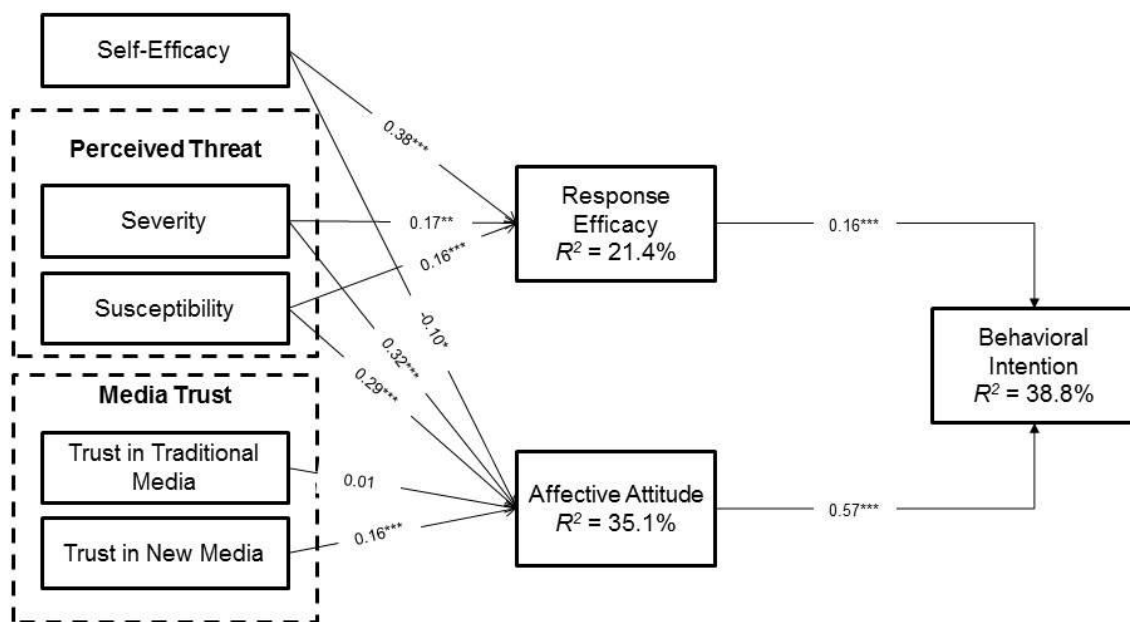
When using PLS for statistical analysis, Henseler, Ringle, and Sinkovics (2009) suggest assessing several validity and reliability criteria to determine if the items and constructs used in the study fit the proposed research model. These reference criteria include composite reliability ( $CR > 0.70$ ), average variance extracted ( $AVE > 0.50$ ) and discriminant validity. In addition to mean values, Table 2 shows that all constructs satisfy recommended values for CR and AVE, thus indicating internal consistency and convergent validity, respectively. Moreover, the constructs possess discriminant validity as it fulfills the Fornell-Larcker criterion where the square root of AVE of each construct was higher than the inter-construct correlations (Hair et al., 2012). Based on the assessment results, the items and constructs fit the proposed model for hypothesis testing.

## Results

Figure 2 shows the results of the PLS analysis. Accordingly, self-efficacy ( $\beta = 0.38, p < .001$ ) was positively associated with response efficacy thus supporting H1a. We also found support to H1b since self-efficacy was negatively associated with affective attitude ( $\beta = -0.10, p < .05$ ). Moreover, perceived severity was also positively associated with response efficacy ( $\beta = 0.17, p < .01$ ) and affective attitude ( $\beta = 0.32, p < .001$ ), thus supporting H2a and H2b.



Similarly, H3a and H3b were also supported as the results show that susceptibility was positively associated with response efficacy ( $\beta = 0.16, p < .001$ ) and affective attitude ( $\beta = 0.29, p < .001$ ). Although H4a and H4b were both rejected, it is important to take note that trust in traditional media had no significant association with affective attitude while trust in new media ( $\beta = 0.16, p < .001$ ) has a positive association with affective attitude. Further analysis shows that the set of predictors (i.e. self-efficacy, susceptibility, severity, and trust in traditional and new media) were able to explain 21.4% of the variance ( $R^2$ ) of response efficacy and 35.1% of affective attitude. Finally, the results support H5 and H6 since response efficacy ( $\beta = 0.16, p < .001$ ) and affective attitude ( $\beta = 0.57, p < .001$ ) were positively associated with behavioral intention to take protective measures during haze. Overall, both factors were able to explain 38.8% of its variance.



Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Figure 2.** PLS analysis results

## Discussion

The Southeast Asian haze pollution is a public health concern that remains an annual health threat to Singaporeans. Given the nature of the haze problem in Singapore, this study aims to identify factors that may influence young people's intention to take protective measures that can reduce haze-related health problems. We developed a research model based on Witte's EPPM (1992, 1994) as it serves as a good framework to analyze how individuals may react in health-related crisis situations such as haze.

Based on the results, the positive associations between perceived self-efficacy to cope with haze-related health problems and response efficacy support the findings of previous studies (Caugherge et al., 2009; Choi et al., 2012; Krieger & Sarge, 2013). To further determine if response efficacy mediates the relationship between self-efficacy and behavioral intention, we ran an alternative model where self-efficacy was also a direct predictor of behavioral intention. The results show that self-efficacy has a non-significant association with behavioral intention ( $\beta = 0.02$ , n.s.) whereas the association from self-efficacy to response efficacy ( $\beta = 0.38$ ,  $p < .001$ ) with behavioral intention ( $\beta = 0.16$ ,  $p < .001$ ) is positively significant. The results indicate that though people may believe they can protect themselves from adverse health effects due to haze (i.e. self-efficacy), it is important that they attain a strong belief on a particular action (i.e. response efficacy to seek health information) to be able to increase their intention to take protective measures during haze. Our results provide additional empirical support to Krieger and Sarge's (2013) proposition that response efficacy is a significant mediator of self-efficacy and behavioral intentions.

On the other hand, self-efficacy had a negative association to affective attitudes of fear and worry, which is consistent with previous findings (Burns & Slovic, 2012; Prati et al., 2012). A possible interpretation here is that belief in one's capacity to take action can reduce feelings of fear and worry of experiencing adverse health effects during haze. This

information is important to health authorities as strategies that increase individuals' self-efficacy during health crises such as haze may reduce fears and prevent unnecessary panic.

In terms of perceived threat, we found that its two dimensions, perceived susceptibility and perceived severity, are positive predictors of response efficacy and affective attitude. However, it is important to consider that both dimensions of perceived threat have a relatively weaker impact on response efficacy than to affective attitude. This suggests that perceptions of severity and susceptibility during haze will likely lead to greater affective attitudes of fear or worry than response efficacy. The findings are of high importance to public health professionals since it shows that the fear appeal in health messages may result from realizing one's susceptibility and severity to haze. Our findings confirm the relationship between perceived threat and fear (affective attitude) as proposed by Griffin et al. (1999), Kahlor (2007) and Witte (1992, 1994).

When environmental and health crises occur, it is essential to utilize traditional and new media platforms to disseminate information and keep the public informed and calm (Ho, 2012; Jakob, 2010). However, in the context of young adults in Singapore, the results show that trust in traditional media has no significant effect while trust in new media can positively predict a fearful affective attitude towards haze. As mass media in Singapore face constraints of tight content regulation, the majority of young adults may be more trusting of new media than their older counterparts (Lin, 2015). In this study, our respondents might have little exposure to haze information via traditional media (e.g., newspapers, TV, and radio) which explains why it did not have any association with their affective attitude. On the other hand, news and social media content on the Internet and mobile platforms (e.g., Facebook, Twitter, and blogs) are the main sources for young adults to access haze-related information. Nonetheless, the most intriguing finding is the inverse relationship between trust in new media and affective attitude. Instead of reducing fear, trusting information over new media

creates more fear and worry about haze-related health problems. This may be due to negative haze-related sentiments found online (Lin & Tan, 2013; Prasetyo, et al., 2013). Following the framework of social amplification of risk (Kasperson et al., 1988; Renn, Burns, Kasperson, Kasperson, & Slovic, 1992), it can be argued that the majority of negative sentiments found on social media during the 2013 Southeast Asian haze crisis may intensify people's fear and worry and thus increase their perceived risk of the hazard. However, it is a mixed blessing as the fearful affective attitude caused by trust in new media can positively affect intentions to take protective measures during haze.

Moreover, when examining the relationships between response efficacy and affective attitude with behavioral intentions, the results show that both factors are associated with behavioral intention. However, affective attitude ( $\beta = 0.57$ ) produces a stronger effect than response efficacy ( $\beta = 0.16$ ). According Burns and Slovic (2012), fear provides a justification towards behavioral change. This study also shows that emotional responses (i.e., feeling scared or worried about haze-related health problems) are much more persuasive than cognitive responses in seeking haze-related information to solve problems or make decisions. Hence, if health messages that are framed using emotional appeals results in fearful attitude towards a hazard (e.g., haze), the public are more likely to take recommended protective measures. The results add to the long list of literature depicting the power of fear which can effectively trigger protective motivations and behavior changes in the realm of health, risk and crisis communication (Krieger & Sarge, 2013; Prati et al., 2012; Rogers, 1975; Witte, 1992).

The findings of this study should be balanced with its limitations. First, the results may not reflect other age groups as the respondents are primarily young adults. It will be interesting to conduct cross-comparison between age groups within the study's context as a future research endeavor. Next, although affective attitudes of fear and worry can positively

predict behavioral intention to take protective measures against haze-related health problems, this study is not able to account for the level of fear required to initiate such action.

According to Witte (1994), too little or too much amount of fear may result in adverse effects (i.e., defensive avoidance). Thus, it is crucial to conduct additional research to clarify the amount of fear that can lead to uptake of protective measures in various crises. In addition, the study was not able to assess the characteristics of the actual messages viewed by our respondents in both new and traditional media. Future research may need to examine if message framing moderates the association between media trust and affective attitude.

Finally, as the Southeast Asian haze is one of many public health concerns in the world, other health crises may produce different results when other scholars utilize our model. Therefore, we suggest future studies to apply and refine this model to various contexts for further improvement.

### ***Conclusion***

This study found that response efficacy and affective attitudes of fear or worry mediated the association between self-efficacy and perceived threat (i.e., severity and susceptibility) to behavioral intention to take protective measures during haze. Comparing trust between traditional and new media, trust in new media tends to facilitate a greater affective attitude of fear and worry during haze. The results also points out that affective attitude has a higher association with behavioral intention than response efficacy. This indicates that affective attitudes of fear and worry may likely increase the chances of people taking precautions during haze. Overall, these findings may enhance Witte's (1992, 1994) EPPM model by integrating cognitive and affective variables with media-related ones. Aside from the theoretical implications mentioned above, the findings can help health and media authorities effectively frame their health messages during public health crises such as haze. Future

research may evaluate the effectiveness of media campaigns (in both traditional and new media) in creating awareness to take protective measures during haze in consideration to the factors discussed in this study.

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**Appendix 1. Survey items**

	Factor Loadings
<i>Susceptibility (Krieger &amp; Sarge, 2013) 1 = strongly disagree, 5 = strongly agree</i>	
1 I am at high risk for getting health problems from haze.	0.86
2 It is likely that I will get health problems from haze.	0.91
3 There is a high chance that I will get health problems from haze.	0.92
<i>Severity (Krieger &amp; Sarge, 2013) 1 = strongly disagree, 5 = strongly agree</i>	
1 If I were to get health problems related to the haze, it would be a very serious threat to my quality of life.	0.89
2 If I were to get health problems related to the haze, it would be a very severe threat to my health.	0.89
3 Health problems related to the haze would be harmful to my well-being.	0.76
<i>Affective Attitude (Prati et al., 2011) 1 = not at all, 10 = extremely</i>	
1 To what extent do you currently worry about health problems related to the haze?	0.94
2 Do you feel scared about health problems related to the haze?	0.94
<i>Trust in Traditional Media (Bangerter et al., 2012) 1 = strongly disagree, 5 = strongly agree</i>	
1 Traditional media (e.g., newspaper, TV, radio and magazine) have exaggerated the risk posed by haze.	Dropped
2 Information in the traditional media helps avoid an outbreak of health problems caused by haze.	0.78
3 Extensive traditional media reporting is necessary to attract people's attention to the dangers of haze.	0.97
4 One cannot trust what one hears in traditional media about haze.	Dropped
<i>Trust in New Media (Bangerter et al., 2012) 1 = strongly disagree, 5 = strongly agree</i>	
1 New media (e.g., Web & mobile news, blogs, facebook, twitter) have exaggerated the risk posed by haze. (dropped)	Dropped
2 Information in the new media helps avoid an outbreak of health problems caused by haze.	0.71
3 Extensive new media reporting is necessary to attract people's attention to the dangers of haze.	0.94
4 One cannot trust what one hears in new media about haze. (dropped)	Dropped
<i>Self-Efficacy (Scwarzer et al., 1995) 1 = strongly disagree, 5 = strongly agree</i>	
1 I can prevent myself from getting health problems from haze.	0.79
2 I can easily handle health problems from haze.	0.89
3 I am confident that I could efficiently deal with health problems from haze.	0.85
4 I can usually handle whatever health problems come my way.	0.76
<i>Response Efficacy (Krieger &amp; Sarge, 2013) 1 = strongly disagree, 5 = strongly agree</i>	
1 Seeking health information related to the haze is an effective way to prevent my health problems.	0.92
2 Seeking health information related to the haze will help me make good decisions about my health.	0.93
<i>Behavioral Intention (Kahlor, 2007) 1 = least likely, 10 = most likely</i>	
1 I intend to limit heavy outdoor activities in future during haze.	0.76
2 I intend to wear a face mask outside in future during haze.	0.87
3 I intend to go for clinical body examination in future during haze.	0.88