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Effects of Heuristic-Systematic Information Processing About the Flu and the Flu Vaccination

Sang Hee Park

Department of Communication, University of Wisconsin-Whitewater, Whitewater, USA

Email address:
parksa@uww.edu

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Abstract: Every year at least 10 million people get the flu. However, despite receiving flu vaccination campaign messages every year, the majority of the U.S. population does not annually receive the flu vaccination. People have different levels of risk perception of hazardous events based on their knowledge and experiences. Accordingly, this study examined the different ways in which individuals perceive risks and benefits through exposure to health information campaigns. In doing so, this study employed risk perception theory and the heuristic-systematic model (HSM) as a theoretical foundation in order to explore risk perceptions of the flu and the flu vaccination as an antecedent to attitude. This study examined not only how people process different types of risk information regarding the flu, but also how different sources of health information affect perceptions of the flu and the flu vaccination. This study applied a 2 (Message framing: heuristic information message vs. systematic information message) by 2 (expert source vs. non-expert source) online experiment. In doing so, this study manipulated heuristic/systematic information messages and expert/non-expert sources. This study found that risk perception of the flu illness was positively related to benefit perception of the flu vaccination. Heuristic messages affected risk perception of the flu vaccination, but not flu illness perception. The level of capacity for interpreting information and individuals' motivation can affect perceptions of the flu and the flu vaccination. Therefore, this study suggested that heuristic messages with expert's recommendations has the greatest impact on beneficial information processing. Additionally, these findings indicate that health campaigns need to discuss the benefits of the flu and the flu vaccination based on scientific evidence in order to increase awareness of flu illness.

Keywords: Heuristic-Systematic Model (HSM), Risk Perception, Information Processing, Health Communication, Flu, Flu Vaccination

1. Introduction

The Centers for Disease Control and Prevention [1] determined that annually, since 2010, there were 240,000 to 710,000 flu-related hospitalizations in the United States, and an estimated 12,000 to 56,000 flu-related deaths. The CDC also estimated that between 9.2 million and 60.8 million people are infected with the flu every year in the U.S. alone. Children from the age of infancy to preschool and people aged 65 years or older have the highest risk for influenza complications. Therefore, the CDC recommends that receiving the flu vaccination remains the best way to prevent influenza mortality. However, only about 46.8% of United States residents received flu vaccinations during the 2016–2017 flu season [2].

Psychological barriers such as fears over vaccine safety and efficacy caused low coverage of the flu vaccination and cultivated misperceptions of the flu vaccination [3-5]. Notably, individuals misperceive that they can get the flu from the shot; that the vaccination causes side effects; and that it is not necessary for young people to get the shot. These misperceptions are also created and reinforced by the mass media. The mass media often discuss the safety and efficacy of the vaccination without providing conclusive information [5]. This in turn creates mistrust of the vaccination and raises doubts about scientific findings regarding safety and efficacy. It is suspected that despite the well-documented benefits of the vaccination, many people

may not be aware of the benefits of the flu vaccination, or the psychological barriers to receiving the vaccination.

When individuals perceive risks, they draw upon their preexisting experiences, knowledge, and backgrounds. However, if their knowledge is not enough to adequately judge a particular risk, they are motivated to seek risk information [6]. Moreover, if one's significant others, such as doctors, family, and friends, are knowledgeable about an issue, people may have higher trust in information about that issue [7]. In other words, information sources can affect risk perceptions and the tendency to engage in the risk management behavior endorsed by the source. Therefore, this study tested how people differently perceive risks through different types of risk information. This study also examined how different sources of health information affect perceptions of the flu and the flu vaccination.

2. Literature Review

2.1. Risk Perception

A risk is determined by a certain degree of uncertainty. If the consequences of risk behaviors were guaranteed, one might say that risk did not exist [8]. That is, people perceive fear or safety from risks based on their levels of uncertainty. Risk also includes danger, occurrence probability, and potential damage, derived from levels of uncertainty. As a result, how health organizations, health experts, governments, and the media manage uncertainty is important in determining the level of risk perceived by the general population. Trust in information about risks is related to communicators who deal with existing uncertainty. This is because uncertainty of information influences risk perception and decision making. For example, individuals that are exposed to quantitative risk information find it complex and hard to understand. Thus, communicating uncertainty through quantitative information can lead to poorer understandings of risk, increased risk perception, and reduced perceived credibility of the information. Furthermore, reactions to uncertain information were found to relate to the level of uncertainty presented. Communicating uncertainty was also correlated with the level of perceived credibility of the information source. Notably, people who had low trust in information communicated by the media were found to have more trust in information transmitted by the government [9].

In addition, people with a higher knowledge levels of health literacy were likely to have more knowledge on uncertain information. They were able to critically think about the information. However, people with low health literacy and health knowledge were found to have lower abilities to question particular issues and notice inadequacies in information [10]. People also used the media as their references, but the media and social groups were influenced by characteristics of hazardous events. An exposure of a few people in an organization or group was less likely to affect risk perception and public response than the exposure of many people in a public context [11]. Therefore, a lack of adequate knowledge about risks creates misconceptions about the levels of risk and remains a significant barrier to controlling public risk perception.

Short [12] conceptualized risk as a social construct and an objective property of dangerous events. Short found that people quickly and automatically analyze risks in their daily life based on their experiences. They used their experiences and feelings as criteria by which to judge risks and make decisions. For example, fear elevates people to a higher sense of risk perception, whereas anger decreases risk estimates. Fear occurs from assessment of uncertainty and situational control, but anger arises from assessment of certainty and individual control. People judge hazardous events based on their preconceptions. If they feel favorable, they judge the hazardous event as low risk with high benefit. However, if they feel unfavorable, they judge the event as high risk with low benefit [13]. That is, the relationship between perceived risk and perceived benefit is inversely connected [14]. For instance, when people judged the risks and benefits of specific hazardous events, they depended on their affection. In other words, if people liked an event, they perceived it as having greater benefit, but lower risk. However, if they disliked an event, they perceived it as having lower benefit, but higher risk [14].

Applying previous research, this study proposed two hypotheses in order to determine the relationship between risk perception of the flu illness and benefit perception of the flu vaccination. This relationship may explain how individuals are willing to process and accept risk information and perform a desired behavior.

H1a. Higher risk perception of the flu illness leads to higher perceived benefits of the flu vaccination.

H1b. Higher risk perception of the flu illness leads to lower risk perception of the flu vaccination.

2.2. Heuristic-Systematic Model (HSM)

The heuristic-systematic model (HSM) determined that individuals' information processing was tied to the formation of preceding attitudes because attitudes were formed when individuals gained information about objects. Systematic information processing requires both ability and motivation, but heuristic information processing is based on the cognitive availability of their associated heuristic cues, such as experiences and observations.

Systematic information processing is analytic orientation of information processing which deals with individuals' judgment of information [15]. Systematic information processing of risk information is related to individuals' beliefs about the costs and benefits of risk behaviors [4]. Individuals who receive systematic information processing scrutinize persuasive argumentation in the messages they receive and think about the information. Systematic information processing is more disrupted by individual differences, such as individuals' capacity for interpreting information rather than heuristic information processing [15].

On the other hand, heuristic processing uses simple

decision rules, such as those drawn from expert sources and consensus in individuals' formulation of judgments and decisions. Heuristic information processing is based on individuals' past experiences and observations and is represented in memory and knowledge [16]. Heuristic information processing occurs when people have a lack of ability to process information in systematic processing. For example, when individuals receive risk information based on scientific evidence, some people cannot interpret the information with systematic information processing. At that time, people focus more on heuristic processing cues such as the credibility of information sources, rather than on systematic information cues [15].

When individuals perceived a risk as being an important issue to their life (higher motivation), they use systematic information processing, although they might lack the ability to comprehend and processes systematic information. However, larger gaps of information and lower abilities to understand information were found to be strongly related to heuristic information processing. Therefore, individuals used one or both modes of information processing when they evaluated information when judging risks or make decisions [6]. If people perceived higher risk toward a hazardous event, they were more likely to pursue a direct message than stylistic messages such as those using metaphors for hazardous events. This is because a message containing substantial information was found to affect individuals' judgments regarding personal risk when engaged in systematic information processing [17]. The gap between the perceived need for additional information and the perceived current knowledge of the risk affected health risk information seeking. Information insufficiency could be influenced by perceived behavioral control (the confidence of individuals' ability to perform a desired behavior) and attitude toward the behavior. Also, positive or negative attitudes toward risks were positively related to the intention to seek risk information [18].

Message content with heuristic-systematic information had different effects on risk perception and behaviors. Individuals with low risk perception used heuristic strategies in order to make decisions. Conversely, individuals with higher motivations used systematic information processing, whereas individuals who had sufficient information had the ability to use heuristic information processing [6]. Individuals, thus, use different modes of information processing. In addition, heuristic information cues were found to be related to responses to risk and individuals' affection [19]. Therefore, this study investigated how heuristic and systematic messages generate perceptions about the flu and the flu vaccination.

H2a: A heuristic message generates a higher risk perception of the flu illness than a systematic message.

H2b: A systematic message generates a higher benefit perception of the flu vaccination than a heuristic message.

H2c: A heuristic message generates a higher risk perception of the flu vaccination than a systematic message.

H2d: A systematic message generates a higher intention to get the flu vaccination than a systematic message.

Individuals discuss their health issues with physicians, family, and friends. Based on the expertise of sources, they may change their behaviors and thoughts. People who had little knowledge of vaccinations had many misconceptions about vaccinations. However, people who had more vaccination knowledge were more likely to ask a physician about vaccination information, whereas people who had less vaccination knowledge were less likely to speak with a physician, though they were more likely to talk to a natural health practitioner. If people had more knowledge about vaccinations in turn had a higher intention to get seasonal flu vaccinations, and they were more likely to get vaccinated [20]. Therefore, this study examined how expert vs. non-expert sources affects perception of the flu and the flu vaccination.

H3a: A message coming from an expert source generates higher risk perception of flu illness than a message coming from a non-expert source.

H3b: A message coming from an expert source generates higher perceived benefit of the flu vaccination than a message coming from a non-expert source.

H3c: A message coming from a non-expert source generates higher risk perception of the flu vaccination than a message coming from an expert source.

H3d: A message coming from an expert source generates higher intention to get the flu vaccination than a message coming from a non-expert source.

Decision making is related to heuristic-systematic information along with source expertise, specifically when individuals have low interests in certain subjects. In other words, although individuals receive risk information from an expert, they perceive different levels of risk. Therefore, this study investigated how heuristic-systematic messages interact with source expertise.

H4a: Among the four groups, a heuristic message coming from an expert source generates the highest level of risk perception of the flu illness.

H4b: Among the four groups, systematic messages coming from an expert source generates the highest level of benefit perception of the flu vaccination.

H4c: Among the four groups, heuristic messages coming from a non-expert source generates the highest level of risk perception of the flu vaccination.

H4d: Among the four groups, systematic messages coming from an expert source generates the highest level of intention to get the flu vaccination.

3. Methods

This investigation applied a 2 (message framing: heuristic vs. systematic) × 2 (sources: expert, vs. non-expert) factorial experimental. The experiment manipulated two different types of messages (heuristic information messages and systematic information messages), and CDC information from two different providers (an expert source and a non-expert source).

The manipulated message was in the form of a seven-paragraph essay around 500 words. The first three paragraphs provided general information about the flu and the flu vaccination. The last paragraph also provided general information about where people can get the flu vaccination. All scientific information was based on CDC information and CDC 2012 – 2013 influenza campaigns.

The systematic information processing message provided probabilities of risk, specifically scientific information about the flu vaccination and the flu. The heuristic information message provided metaphors and narratives about the flu and the flu vaccination.

3.1. Information Sources

3.1.1. Expert Source

This study manipulated risk information coming from a doctor on a Mid-Western hospital website. This study designed a web page as an expert source using the Hospital's website displays and images.

3.1.2. Non-Expert Source

This study displayed risk information coming from an unknown individual on a Word Press blog site as a non-expert source and manipulated a message about which a non-expert (an unknown individual) discussed flu information from the CDC.

3.2. Measurement

3.2.1. Knowledge of the Flu Vaccination

Participants were asked 11 questions about their flu vaccination knowledge: (1) The flu shot is not necessary as the flu can be treated; (2) without broadly applied vaccine programs, smallpox would still exist*; (3) the efficacy of vaccines has been proven*; (4) children would be more resistant to illness if they were not always vaccinated against all diseases; (5) diseases like autism, multiple sclerosis and diabetes might be triggered through vaccinations; (6) the immune system of children is not overloaded because of many vaccinations*; (7) many vaccinations are administered too early, so that the body's own immune system has no possibility to develop; (8) the amounts of the chemicals used in vaccines are not dangerous for humans*; (9) vaccinations increases the occurrences of allergies; (10) by means of genetic technology, vaccinations that cause fewer side effects can be produced*; and (11) vaccinations cannot generate the disease they are meant to prevent. * answer is correct. These 11 items were based on Zingg and Ziegrist's study [20]. The knowledge items were agree, disagree, and do not know.

3.2.2. Attitude Toward the Stimuli Messages

This study adopted two trust factors: cognitive and affective. Cognitive trust in the stimuli message was asked through 12 adjectival items: well-informed, professional, accurate, qualified, experienced, trustworthy, objective, credible, reliable, capable, effective, and rational. Affective trust in the stimuli message was asked through 11 adjectival items: empathetic, open-minded, personal, willing to listen, interested in my well-being, attentive to my interest, unquestionable, indubitable, emotionally invested, candid, and warm. These adjectival items were based on Koh and Sundar's study [21].

3.2.3. Risk Perception of the Flu Illness

This study categorized two flu illnesses: flu illness and flu mortality. Risk perception of flu illness was measured by six statements: (1) I think risks associated with influenza are too high; (2) I think influenza is a big danger for my family, friends, and colleagues; (3) I do not worry about dangers associated with influenza; (4) Influenza risks should not be over-dramatized; (5) There is not enough knowledge about possible health risks associated with influenza; and (6) I'm more likely to get the flu than other people (these six items are based on previous research) [22, 23]. Risk perception of flu mortality was measured by six statements: (1) Flu threatens public safety; (2) I think the chances of getting the flu are very low; (3) I think people experience minor pain when they get the flu; (4) I think many people suffer from the flu every year; (5) I think the chance of dying from the flu are very low; (6) I think many people die from the flu every year.

3.2.4. Benefit Perception of the Flu Vaccination

Benefit perception of the flu vaccination was measured by asking: "I am willing to get a flu vaccine," "If I don't get vaccinated, I will probably get the flu," "I feel that getting a flu shot is a wise thing to do" "Without the flu vaccination, people would be faced with a flu crisis," and "I think that media should inform people about the benefits of the flu vaccination." These five statements were based on previous research conducted by Siegrist et al. [23] and Zimmerman et al. [24].

3.2.5. Risk Perception of the Flu Vaccination

Risk perception of the flu vaccination was measured by asking: "I think a flu shot causes the flu," "I worry about side effects from the flu shot," "I feel that a flu shot will not prevent the flu." These three statements were based on Zimmerman and his colleagues' study [24].

3.2.6. Intention of the Flu Vaccination

This variable was measured by one question: "How likely is it that you will receive the flu vaccine in the future?"

4. Results

After checking the manipulation, 178 participants (73.25%) out of the original 243 participants successfully passed the manipulation checks and were included in the final analysis. Only three participants (1.7%) correctly answered all 11 questions about knowledge of the flu vaccination. On the other hand, 15 participants incorrectly answered all questions about knowledge of the flu vaccination. About 76% of participants provided wrong answers about knowledge of the flu vaccination in more than

half the questions. The interesting result is that 20 participants (11.24%) agreed with one item: diseases like autism, multiple sclerosis and diabetes might be triggered through vaccinations. Ninety-three participants responded that they did not know the answer to this question. This result showed that due to this fear associated with the flu vaccination, participants might not get vaccinated.

The result showed that for benefit perception of the flu vaccination, statistically significant differences were found among three levels of risk perception of the flu illness: low (M = 2.77, SD = .75), medium (M = 3.11, SD = .64), high (M = 3.60, SD = .80). There were statistically significant differences between benefit perceptions of the flu vaccination among the three levels of risk perception of the flu mortality: low (M = 2.95, SD = .94), medium (M = 3.20, SD = .70), higher (M = 3.55, SD = .67). Participants who had higher risk perception of the flu illness and the flu mortality had the highest benefit perception of the flu vaccination.

Table 1. *One-Way Analysis of Variance for the Relationship between Flu Risk Perception and Flu Vaccination Perception.*

Variable and Source	SS	MS	F(2, 175)	p
Flu Vaccination Benefit Perception				
Risk Perception of Flu Illness	21.66	10.83	20.01	.00
Risk Perception of the Flu Mortality	9.03	4.51	7.36	.00
Flu Vaccination Risk Perception				
Risk Perception of Flu Illness	1.48	.74	.95	n.s.
Risk Perception of the Flu Mortality	.32	.16	.20	n.s.

Note. N = 178, n.s. = not significant

This study examined the relationship between risk perception of the flu vaccination and benefit perception of the flu vaccination. The result indicated that there was a negative relationship between risk perception of the flu vaccination and benefit perception of the flu vaccination. Higher risk perception of the flu vaccination led to low risk perception of the flu vaccination. This study also tested the relationship between flu illness risk perception and flu vaccination perception. The result indicated that higher risk perception of flu illness led to higher benefit perception of the flu vaccination, whereas risk perception of flu illness did not lead to an increased level of risk perception of the flu vaccination.

Between groups who received a heuristic message and a systematic message, there were no statistically significant differences in the level of risk perception of the flu illness. Additionally, between groups who received a heuristic message and a systematic message, there was no effect on the level of risk perception of flu mortality. The outcomes from the groups who received a heuristic message and a systematic message were not different in the level of benefit perception of the flu vaccination. Between groups who received a heuristic message or a systematic message, there was no difference in the level of intention to get the flu vaccination. However, participants who received a heuristic message perceived higher risk of the flu vaccination than a systematic message.

Table 2. *Group Differences for Flu Risk Perception, Flu Vaccination Perception, and Flu Vaccination Intention between a Heuristic Message and a Systematic Message.*

	Heuristic Message		Systematic Message				
	n = 80		n = 98				
	M	SD	M	SD	F(1 ,174)	p	η^2
Flu Illness Perception	3.00	.67	2.89	.81	.86	n.s.	.01
Flu Mortality Perception	2.78	.85	2.61	.79	1.71	n.s.	.01
Flu Vaccination Benefit Perception	3.30	.79	3.11	.82	2.24	n.s.	.01
Flu Vaccination Risk Perception	2.99	.82	2.58	.90	10.61	**	.06
Flu Vaccination Intention	2.96	1.34	2.98	1.38	.02	n.s.	.00

Note. N = 178, ** p < .01, n.s. = not significant

The results showed that between groups who received a message coming from non-expert source and a message coming from expert source, there was no difference in the level of risk perception of the flu illness. Participants who received a message coming from an expert source perceived higher benefit perception of the flu vaccination than those coming from a non-expert source. Between groups who received a message coming from non-expert source and a message coming from expert source, there was no statistical difference in the level of risk perception of the flu vaccination. Participants who received a message coming from an expert source are therefore more likely to get the flu vaccination than those receiving a message from a non-expert source.

Table 3. *Group Differences for Flu Risk Perception, Flu Vaccination Perception, and Flu Vaccination Intention between a non-Expert Source and an Expert Source.*

	Non-Expert Source		**Expert Source**				
	n = 85		**n = 93**				
	M	**SD**	**M**	**SD**	**F**	**p**	**η^2**
Flu Illness Perception	2.97	.81	2.91	.69	.27	n.s.	.00
Flu Mortality Perception	2.71	.72	2.66	.91	.17	n.s.	.00
Flu Vaccination Benefit Perception	3.08	.76	3.30	.85	3.86	*	.02
Flu Vaccination Risk Perception	2.81	.95	2.72	.83	.68	n.s.	.00
Flu Vaccination Intention	2.79	1.32	3.14	1.37	3.44	†	.02

Note. N = 178, *p < .05, †p < .10, n.s. = not significant

The interaction between heuristic-systematic messages and source expertise was marginally significant. Comparing the level of benefit perception of the flu vaccination among the four groups, heuristic messages coming from an expert source generated the highest level of benefit perception of the flu vaccination. On the other hand, heuristic messages coming from a non-expert source generated the lowest level of benefit perception of the flu vaccination.

Table 4. *Summary Table for the Factorial ANOVA of the Effects of Heuristic-Systematic Messages and Source Expertise on Benefit Perception of the Flu Vaccination.*

Source	df	F	p	η^2
Heuristic-Systematic message	1	2.24	n.s.	.01
Source Expertise	1	3.86	†	.02
Heuristic-Systematic × Source Expertise	1	3.29	†	.02
Within Cells	174			
Total	178			

Note. N = 178, †p < .10, n.s. = not significant

5. Discussion

Previous research found a positive relationship between risk perception of the flu illness and benefit perception of the flu vaccination [25]. This study also found a positive relationship between risk perception of the flu illness and benefit perception of the flu vaccination. Although risk perception of the flu illness did not affect the level of risk perception of the flu vaccination, higher risk perception of the flu illness led to a higher intention to get the flu vaccination. Benefit perception of the flu vaccination was also found to be a significant predictor for intention to get the flu vaccination.

In addition, this study supported the foundation of previous research [14, 26, 27] about the reverse relationship between risks and benefits toward hazardous events. When people perceived risks from an event, they might try to find a way to protect themselves from those risks. High risk perception of the flu illness led to flu vaccination benefit perception and intention to get the flu vaccination as one of the ways to protect themselves from the flu. Therefore, flu campaigns should place more focus on the benefits of the flu vaccination with regards to flu illness and mortality.

Participants who were exposed to the systematic message had lower risk perception of the flu vaccination than those exposed to the heuristic massage. Because systematic information processing consisted of an analytic orientation of information [15], when participants were exposed to the systematic information message, they focus more on comparisons between benefits and risks about the flu and the flu vaccination. Hence, they evaluated low risk perception of the flu vaccination. On the other hand, this study did not find differences between a heuristic message and systematic message for flu illness risk perception, flu vaccination benefit perception, and intention to get the flu vaccination. Eagly and Chaiken [15] suggested that systematic information processing required both the ability of interpreting information and motivation, whereas heuristic information processing was based on experiences and observation. This might be related to individuals' capacity for interpreting information and their motivation to know about the flu and the flu vaccination. Due to low capacity and motivation, participants also might have low knowledge about the flu and the flu vaccination, even though they read a message about the flu and the flu vaccination. Thus, health campaigns need to consider individuals' comprehension of health information including scientific facts that can be easily understood.

In addition, participants who received a message coming from an expert source had higher benefit perception of the flu vaccination and higher intention to get the flu vaccination than those exposed to the non-expert source message. However, risk perception of the flu illness, flu mortality, and the flu vaccination was not different between a message coming from an expert source and a non-expert source. These findings indicated that people focused more on risk information than critically analyzing between benefits and risks. In other words, when participants faced risk information, they focused more on risks of certain issues, even though they did not know the credibility and accuracy of the information. They might not be able to educate themselves, ask experts such doctors regarding the

incredible information, or seek health information.

Participants who received a heuristic message coming from an expert source had the highest benefit perception of the flu vaccination, whereas participants who received a heuristic message coming from a non-expert source had the lowest benefit perception of the flu vaccination among the four different types of messages. Due to the lack of knowledge, they focused more on heuristic cues such as expert sources and emotional appeals. Therefore, a heuristic message coming form an expert source was effective on benefit perception of the flu vaccination. When people analyzed benefits and risks of a health issue, information processing required analytical information processing ability. For instance, when people perceived the benefits of health issues, they analyze information based on scientific facts, source expertise, their own experiences, observations, and the experience and/or observations of others. However, when people perceived risks, they focused more on just the risks, even though the information was not based on scientific facts and/or professional opinions due to a lower ability for interpreting information. Therefore, heuristic messages with an expert source were more effective on benefit flu vaccination perception and flu vaccination intention than other messages.

6. Conclusion and Future Research

The most difficult challenge in health campaigns is providing information that is easily understood by everyone. Presumably, highly educated participants of this study from a college campus held lower knowledge of the flu vaccination and a lower ability to interpret health information. Health campaigns almost always target populations who may not have high education. Health campaigns should consider literacy levels in order to increase the level of understanding of health information, especially when presenting health statistics.

A potential remedy for the effects of heuristic and systematic information processing is to investigate which information processing individuals' adopt when they perceive risks. Even though people receive systematic cues, they may not engage in systematic information processing because of their capacity to interpret information, experience, and/or observation. Information sufficiency means the extent to which people satisfy their information. Testing information sufficiency is recommended for achieving positive effects from heuristic and systematic information processing, because the level of motivation to learn about the flu and the flu vaccination may affect the understanding of the information.

This study found that knowledge of the flu vaccination was important to increase risk perception of the flu illness and the benefit perception of the flu vaccination. In order to increase knowledge, literacy of health information is important. Future studies should analyze levels of health information literacy. Research may be able to assist how literacy affects individuals' attitudes and behaviors.

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