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MASTER OF BUSINESS ADMINISTRATION

**BUT I MIGHT REGRET IT: THE ROLE OF ANTICIPATED  
REGRET IN HEALTH BELIEFS AND INTENTION TO  
VACCINATE AGAINST EMERGING DISEASES**

The Graduate School  
Of the University of Ulsan

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**BUT I MIGHT REGRET IT: THE ROLE OF ANTICIPATED  
REGRET IN HEALTH BELIEFS AND INTENTION TO  
VACCINATE AGAINST EMERGING DISEASES**

Advisor: Professor Doyle Kim

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By

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February 2022

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## Abstract

The Health Belief Model has long demonstrated effectiveness at predicting health behaviors, particularly preventative behaviors, including vaccination uptake. In this research, HBM constructs, along with descriptive norms, anticipated regret, and internal-HLOC, are evaluated for their predictive ability related to Covid-19 vaccine intention. HBM constructs included in this study are perceived benefits, perceived susceptibility, and perceived severity. All constructs have been linked to health behaviors and vaccination intentions and behavior in prior research. Previous research also suggests that anticipated regret plays a more important role as a mediating variable, through its connections with risk evaluations, fear of missing opportunities, and going against social norms. A questionnaire was developed in English and Korean and distributed online. Respondents to this survey reside mainly in South Korea and the US. A mixed sample of vaccinated and unvaccinated respondents was collected. The research model was analyzed through SEM. While HBM constructs show mixed predictive power in general, perceived benefits, as well as descriptive norms and anticipated regret, significantly predict vaccine intention in this study. In addition, perceived benefits and descriptive norms have significant effects on anticipated regret, and internal-HLOC has partial significance on anticipated regret, implying anticipated regret is a mediating variable between these factors and vaccine intention. These findings suggest that perceived benefits, descriptive norms, and anticipated regret are important factors in addressing vaccine intention, and therefore vaccine uptake, particularly for future emerging diseases. These results suggest that future strategies for encouraging vaccinations for emerging diseases focus on highlighting the benefits of preventative measures such as vaccines, collaborate with community leaders to create vaccination norms within those communities, and emphasize the cognitive-emotional effects of avoiding vaccination, i.e., anticipated regret. This implies a fundamental shift from some current marketing efforts towards vaccination. In order to confirm the results of this study, a larger sample size is needed, particularly one which includes more unvaccinated individuals. Future research may also want to confirm the mediating effect of anticipated regret that is implied in this research, as well as consider additional constructs such as other negative emotions such as fear and worry.

## 초록

건강신념 모델은 백신 접종과 같은 건강 행동 예측에 효과가 있는 것으로 입증되어 왔다. 본 연구에서는 서술적 규범과 예상된 후회, 내적 통제 위치 등 건강신념 모델 구성요소의 코로나 19 백신 접종 의도에 대한 예측 능력을 평가하였다. 모든 구성요소는 건강 행동과 백신 접종 의도와 행동에 관한 이전 연구의 구성요소와 연관되어 있다. 이전 연구는 예상된 후회가 위험평가, 기회 상실 우려, 비규범적 행동과 연관되어 있으므로 중요한 매개변수로 작용한다고 제안한다. 본 연구를 위한 설문조사는 한국어와 영어로 작성되어 온라인으로 배포되었다. 주 응답자들은 한국과 미국에 거주하고 있는 백신 접종자들과 미접종자들이다. 모델분석은 구조방정식 (SEM: Structural Equation Modeling)을 통해 이루어졌다. 일반적으로 건강신념 모델 구성요소의 예측 능력은 일관적이지 않으나 본 연구에서는 지각된 이익, 서술적 규범, 예상된 후회라는 세 가지 요소가 백신 접종 의도에 유의한 예측 능력을 보였다. 또한, 지각된 이익과 서술적 규범이 예상된 후회에 상당한 영향을 끼쳤지만 내적 통제 위치는 부분적 영향을 끼쳤으므로 예상된 후회가 구성요소와 백신 접종 의도 사이에서 매개변수로 작용한다는 것을 추측해 볼 수 있다. 본 연구결과는 지각된 이익, 서술적 규범, 예상된 후회가 미래에 발생하는 신종 질병에 대한 백신 접종 의도, 실제 백신 접종을 다루는 데에 중요한 요소라고 제안한다. 또한 신종 질병에 대한 백신 접종을 장려하는 방법으로 백신을 포함한 예방 조치의 효과 부각, 백신 접종 규범화를 위한 지역사회 지도자들과의 협업, 예상된 후회와 같은 백신 거부의 정서적 영향에 집중하는 것을 제안한다. 이는 현재의 백신 홍보 방안을 근본적으로 바꾸는 것을

의미한다. 더 많은 미접종자를 포함한 광범위한 표본에 대한 설문이 본 연구결과를 입증할 것이다. 또한 후속 연구는 본 연구가 제시한 예상된 후회의 매개효과를 입증하고 우려와 걱정과 같은 부정적 감정을 추가 구성요소로 포함시킬 수도 있을 것이다.



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## **1. Introduction**

The Covid-19 pandemic has exposed a multitude of societal issues that had previously been relatively unnoticed by the general public. These secondary crises include the distribution of food and necessary supplies, inequities in healthcare within and between countries, and, perhaps most importantly, issues surrounding inoculation against Covid-19 through vaccine.

Vaccination is a major pillar of public health. Previously harmful and deadly diseases are close to extinction because of widespread vaccination. With regards to Covid-19, vaccines are a powerful mitigation tool. However, unlike other tried and true vaccines that most people receive in childhood, Covid-19 vaccination uptake is much less of a given. As of the end of October 2021, about 58% of US citizens and 75% of South Korean citizens, the latter comprising the majority of respondents on this survey, are fully vaccinated (Ritchie et al., 2020). A significant percentage of US adults say they will not get vaccinated, though this number seems to be dropping (Vaccine Refusal, 2021). Past pandemic research focused on vaccine uptake also took note of vaccine hesitancy (Prematunge et al., 2012), so it is reasonable to expect that this characteristic will accompany the next emerging disease unless long term efforts are made to understand and adjust these stances.

Inadequate rates of vaccine uptake are a particular problem because benefits from vaccines extend beyond the individual, to society. Without comprehensive vaccination, populations remain at risk of recurrences or new variations of a disease. This is a global concern; if low-income countries have more barriers to vaccination and lag behind others, there is risk of a variation developing, from which current vaccines do not provide protection (Gerrish et al., 2021). Additionally, delayed vaccine uptake will lengthen the economic recovery from the covid pandemic (UN Economic and Social Council, 2021).

Covid-19 is not the first worldwide pandemic humanity has faced, and it will not be the last. It is a matter of when, not if, an emerging disease will present itself. In all likelihood, vaccines will again be paramount to successfully overcoming any new viral illness (Excler et al., 2021). For all these reasons, it is imperative to fully understand the psychology and marketing behind vaccine uptake. Even a small increase in our understanding of vaccine uptake can translate to increasing quality of life and preventing illness for millions of people.

Current Covid-19 vaccine intention and behavior research utilize a variety of behavioral models such as the Health Beliefs Model and the Theory of Planned Behavior. There have been many efforts to adapt the models to better measure vaccine responses (Chu and Lui, 2021; Sinclair and Agerström, 2021; Zampetakis and Melas, 2021; Graupensperger et al., 2021). This study will utilize the Health Beliefs Model. This model has shown effectiveness in predicting preventive health behaviors such as vaccination (Carpenter, 2010; Janz and Becker, 1984). However, given the somewhat unprecedented circumstances surrounding Covid-19, this research adapts this model, based on previous research and theory, to evaluate descriptive norms and anticipated regret, both of which are influential under uncertainty. The role of internal health locus of control is also considered.

The purpose of this study is to investigate the role of anticipated regret, descriptive norms, and internal health locus of control in predicting vaccine intentions for Covid-19. The use of these variables, though well established in the health behavior literature, have not been linked for vaccine intention. The inclusion of these constructs in a model predicting vaccine intention will provide significant insight into dealing with this global crisis as well as any future emerging disease that is mitigated through vaccination.

This paper is organized as follows. A literature review will delve into the Health Belief Model, its constructs, and a brief explanation of its use in predicting health behaviors, particularly preventative behaviors such as vaccination. It will also examine the sources of descriptive norms, health locus of control, and anticipated regret. Descriptive norms and anticipated regret find some commonality in their salience under conditions of uncertainty. Health locus of control generally refers to an internal motivation for making health decisions. All of these constructs are directly relevant when considering receiving a vaccination. Next, I will present the research model and hypotheses. Each of the constructs will be discussed further and their relationships will be directly addressed. Part 4 showcases the methodology, and part 5 examines the results of data analysis. Next, I discuss the results and justify any unexpected outcomes. Lastly, I present limitations of this research, particularly data issues and possible skewed effects. This section also suggests areas for further research.

## **2. Literature Review**

### **2.1 Health Belief Model**

The Health Belief Model (HBM) is one of several prominent health behavioral models used to evaluate behavioral decisions concerning health. HBM is psychosocial in nature, and it focuses on specific beliefs and attitudes towards a behavior or course of action (Connor and Norman, 2015). HBM studies have examined a wide range of health behaviors. Connor and Norman (2015) separated the areas covered into three broad categories: preventive health behaviors, sick role behaviors, and clinic use. Preventive behaviors include health-promoting, health-risk, vaccination, and contraceptive behaviors. Sick role behaviors focus on following medical treatments, and clinic use relates to seeing a doctor. The Health Belief Model can be reformulated as suited for different health behavior studies (Becker et al., 1974; Connor and Norman, 2015).

The HBM comprises six constructs. The first four constructs are perceived benefits, perceived barriers, perceived susceptibility, and perceived severity. These four are the mainstays of the HBM and are widely used in research that utilizes the HBM. Perceived susceptibility refers to a sense of vulnerability towards an illness. This feeling of vulnerability could induce a person to undertake health behaviors (Carpenter, 2010). Perceived severity is essentially an individual's understanding of how harmful a disease or illness may be. Again, if an illness is perceived as more severe, it is more likely that an individual will pursue health behaviors to mitigate this severity (Carpenter, 2010). Perceived susceptibility and perceived severity essentially form the risk evaluation of the model, also called threat perception (Connor and Norman, 2015).

Perceived benefits refer to the anticipated positive effects from engaging in a particular behavior, such as receiving a vaccine (Connor and Norman, 2015). In particular, the individual must perceive that the considered health behavior will mitigate the negative effects associated with an illness (Carpenter, 2010). Perceived barriers are expected challenges or concerns over a myriad of costs of engaging in the recommended health behavior (Connor and Norman, 2015). The inherent tradeoff in these two constructs is clear. A health behavior that is too difficult, costly, or even painful may offset the known benefits of a behavior (Carpenter, 2010). As such, perceived benefits and perceived barriers form the behavioral evaluation component of the model (Connor and Norman, 2015). Taken in the context of a preventative behavior such as receiving a

vaccine, the HBM encompasses a threat perception of the potential illness and a behavioral outcome assessment of receiving a vaccine for that illness.

The remaining two HBM constructs, health motivation and cues to action, have played a much more limited role in practical research and are often overlooked in HBM studies. Indeed, early and more recent reviews of HBM literature tend to omit these two constructs entirely from their reviews, with perhaps only a passing reference to them (Janz and Becker, 1984; Carpenter, 2010; Connor and Norman, 2015). Health motivation refers to an individual’s concern over health matters; in other words, the importance of health to the individual. So, while present in the traditional model, health motivation rarely appears in HBM literature (Connor and Norman, 2015). The second of the two neglected constructs is cues to action. These are signals, or triggers, that provoke the decision to engage in a health behavior. The source of these cues may be internal, such as symptoms, or external, such as a public advertising campaign or direct messages from one’s healthcare provider (Janz and Becker, 1984). However, it is clear that there is no consistent itemization or definition for cues to action, and they are often omitted or categorized differently in HBM studies (Janz and Becker, 1984; Carpenter, 2010; Connor and Norman, 2015).

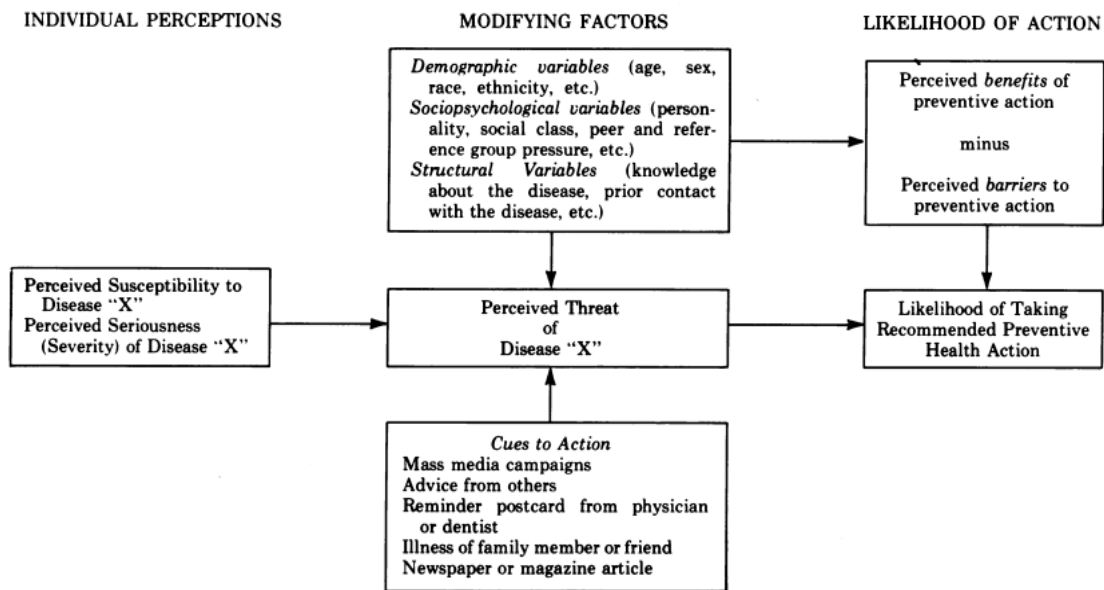


Figure 1: An early HBM (Becker et al., 1974)

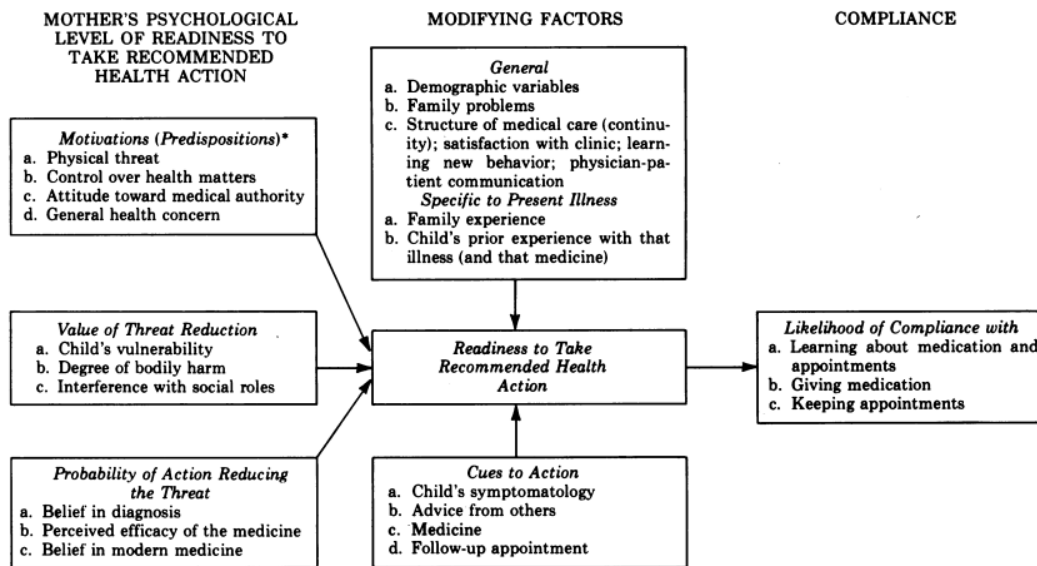


Figure 2: A modified HBM based on figure 1 (Becker et al., 1974)

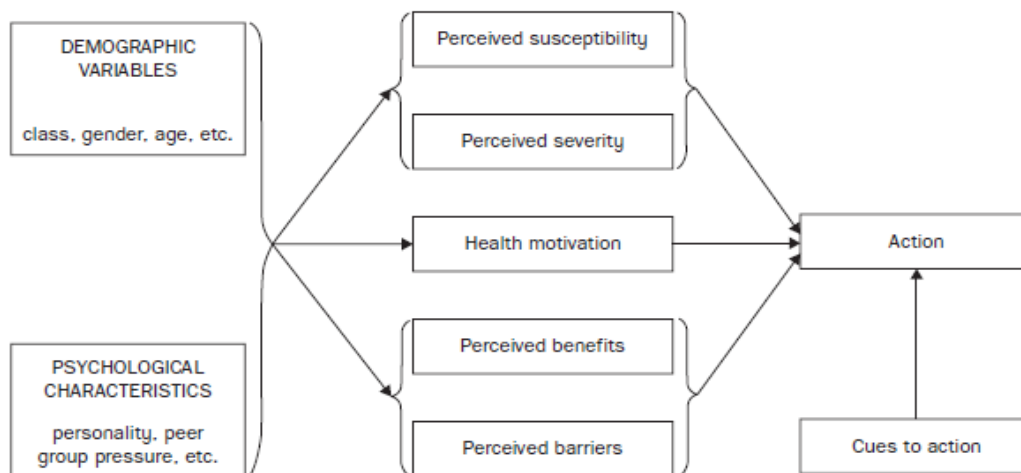


Figure 3: Health Belief Model (Connor and Norman, 2015)

## 2.2 Descriptive Norms

Social norms are the standards for behavior that are shared within a social group (Cialdini and Trost, 1998). It is understood that these norms have an effect on an individual's own behavior. Cialdini et al. (1991) delineate two forms of social norms: descriptive norms and

injunctive norms. Descriptive norms refer to one's perceptions about what others are doing. In turn, this perception can influence the behavior of the individual, perhaps by believing the behavior is effective, simply from viewing others engaging in it. Injunctive norms refer to the understanding of what should be. Simply put, descriptive norms refer to "what is" and injunctive norms refer to what "ought to be" (Reid et al., 2010). Injunctive norms can also be considered the "moral rules of the group" (Cialdini et al., 1991). For example, a group of teenagers may see illicit drug use as common among their peers (descriptive norm). At the same time, they may perceive that their peers also disapprove of illicit drug use due to the health and legal consequences (injunctive norm). A classic example of descriptive norms can be found in Milgram, Bickman, and Berkowitz's 1969 experiment in which a group of people staring into the sky (at nothing in particular) induced passersby to also look towards the sky (Cialdini et al., 1991). Described another way, "descriptive norms inform behavior, injunctive norms enjoin it" (Cialdini et al., 1991).

In a review of descriptive norm research, Gelfand and Harrington (2015) identify three general motivational forces that give descriptive norms the power to influence behavior: uncertainty and threat, impression management, and power and dependence. Uncertainty and threat may imply the desire to reduce ambiguity, the presence of time or cognitive pressure, or the general need for closure. In these cases, individuals are more likely to turn to heuristic thinking and thereby utilize descriptive norms. Also, when under uncertainty or threat, identity plays a larger role in decision making, inducing the use of descriptive norms in behavior. Impression management refers to the use of descriptive norms to inform socially beneficial behavior. Under this motivation, anonymity and accountability play an important role. In other words, social incentives constrain behavior. Lastly, power and dependence can influence adherence to descriptive norms. For example, in high power and low dependence situations, individuals may be freer from descriptive norms because they are less reliant on cooperating with others. (Gelfand and Harrington, 2015).

While descriptive norms are, by definition, associated with a group, it is not always easy to delineate the group, an individual's adherence to the group, or even the consistency of the norm. Cialdini et al. (1991) found that "an individual's actions are likely to conform to the norm that is currently focal." Later research has shown that an in-group norm can be overridden by a



contradicting out-group norm, reinforcing the idea of a “focal” norm, or an “overall” norm (Pryor et. al., 2019).

Descriptive norms have been used in analyzing a variety of health behavior intentions and outcomes, including Covid-19 behaviors such as social distancing and stockpiling (Rudert and Janke, 2021), use of preventative measures in sunbathing (Jackson and Aiken, 2000), AIDS prevention-related behavior (Kelly et al., 1990), binge-drinking (Cooke et al., 2006), condom use (Hynie et al., 2006), and in health-related messaging research such as HPV vaccine messaging (Xiao and Borah, 2020). Indeed, the link between descriptive norms and messaging has long been established. Cialdini et al. (1991) note that many advertisers use descriptive norms in commercials to show people with whom consumers may identify using and enjoying the products advertised. In recent years, more attention has been given to the role descriptive norms play in vaccination intention and outcomes, and descriptive norms have been shown to have significant effects on vaccine intentions (Wang et al., 2017; Xiao and Borah, 2020; Sinclair and Agerström, 2021; Graupensperger et al., 2021; Chu and Lui, 2021). The significant effects of social norms were also confirmed to have a causal relationship with health behaviors in an extensive review (Sheeran and Maki, 2016).

### **2.3 Health Locus of Control**

The origins of locus of control stem from Rotter’s 1954 book, *Social Learning and Clinical Psychology*. Locus of control refers to the extent that individuals feel they are in control of outcomes in their lives (Galvin et al., 2018). The original model poses two extremes, internal locus of control and external locus of control. An individual with an internal locus of control perceives themselves as a main determiner of outcomes in their life. An external locus of control places external power, or fate, as a determiner of outcomes. In the area of health research, locus of control was adapted to the multidimensional health locus of control (MHLC) scales. These scales suggest that in addition to the internal locus of control (I-LOC), the external locus of control aspect be broken into two separate components, chance (C-HLOC), and powerful other (P-HLOC) (Wallston et al., 1978). Chance is related to the idea of fate, whereas powerful other refers to trust in or obedience to a healthcare provider. The internal health locus of control is stronger when an individual believes health decisions stem from decisions and behaviors that

they, themselves, make and do. The other two main health loci of control are external (powerful other and chance) and imply a relinquishing of individual control over health outcomes to an outside force.

Though extensively used in research over the last few decades the three constructs of the MHLC scales have shown mixed significance in predicting behavior. However, recent research suggests the three-factor MHLC model, in which the external component is broken into two constructs, is superior to the two-factor model that contains a single external construct. (Kassianos et al., 2016). The developer of the scales has even developed additional scales that are occasionally employed with the three main constructs, such the God-HLC (Wallston, 2005). However, it is common to review research which contains only the constructs that are pertinent to the theories or behavior under examination. For example, the external MHLC scale was tested as a mediator between religiosity and vaccine intention, and in another study, internal locus of control moderated types of anticipated regret based on norms (Hernandez et. al., 2020; Olagoke et. al., 2020; Wallston, 2005).

Use of the MHLC scales has shown a variety of significant and non-significant results depending on the behavior studied (Slopieck and Chrapek, 2019; Helmer et al., 2012). In response to the myriad ways the MHLC scales were being utilized, as well as the variety of results produced, Wallston, the developer of the MHLC, provided further insight. The strength of the MHLC scales to predict health behavior outcomes may lie in the interactions they have with other variables (Wallston, 2005). The MHLC scales are meant to be adaptable to specific health behaviors, yet consistent enough to apply broadly to health behaviors. Indeed, it was intended to be “partway between a trait-like and state-like measure” (Wallston, 2005).

Of particular focus in this research is the Internal-MHLC construct, based off internal locus of control. Internal locus of control has been shown to mitigate immediate negative emotions from adverse events, perhaps because of proactive behaviors demonstrated by individuals with a high internal locus of control (Buddelmeyer and Powdthavee, 2016).

## **2.4 Anticipated Regret**

Regret is a well-established dimension in post-purchase consumer behavior. Regret is particularly interesting as a cognitive emotion, combining affect and cognition. In a broader

context, regret can be examined in any behavioral decision-making circumstance. Zeelenberg (1999) defined regret as a “negative, cognitively based emotion that we experience when realizing or imagining that our present situation would have been better, had we decided differently.” Simply put, when looking back on a decision one has made, we consider alternative outcomes that may be more desirable than the current outcome. These ruminations may be imagined (counterfactual thinking), or they may be based in reality, when information on the unchosen alternative outcomes is available (i.e., investing in the stock market).

Regret theory is an expansion of expected utility theory. It remedies a shortcoming of EU by explaining behaviors under conditions of uncertainty (Bell, 1982). It also adds to utility theory by comparing outcomes of the chosen alternative to outcomes of the rejected alternatives. For the purposes of this paper, there are some important implications of regret theory. Practically speaking, almost all decisions contain the potential for regret, as there are pros and cons with any outcome. There is rarely a “perfect solution,” and regret can represent an awareness of the tradeoffs inherent in any outcome (Zeelenberg and Pieters, 2007). Second, regret is relative. It is based on comparisons of alternative outcomes, not a fixed point. Last, it is generally understood that individuals are regret-averse. Basically, people want to reduce the amount of regret they feel (Zeelenberg and Pieters, 2007).

While regret is a feeling that occurs post-behavior, it is possible to consider the regret one might feel after a decision, before making the decision. This is known as anticipated regret (Zeelenberg, 1999). Janis and Mann (1979) provide a description from a psychological perspective: “Anticipatory regret is a convenient generic term to refer to the main psychological effects of the various worries that beset a decision maker before any losses actually materialize ..., which include anticipatory guilt and shame, provoke hesitation and doubt, making salient the realization that even the most attractive of the available choices might turn out badly.”

Anticipated regret has made extensive inroads into many areas of research. A brief search of the literature shows that anticipated regret has been measured for decision-making in health (Abraham, C. and Sheeran, P., 2004; Brewer et al., 2016), ethical behavior (Fredin, Amy J., 2011), social problems (Conner et al., 2006; Tochkov, K., 2009), and entrepreneurial behavior (Hatak and Snellman, 2016). Particularly, anticipated regret has been well-studied in health behaviors and decision-making.

As noted above, regret is particularly helpful for understanding decisions under uncertainty (Bell, 1982). Uncertainty surrounds current Covid-19 vaccines. Public discourse leaves many questions yet to be answered about the future of the disease and the vaccines themselves. This is in stark contrast to well-established vaccines that are much less controversial as preventative treatments. We reasonably expect that many of the issues surrounding uncertainty and hesitancy concerning coronavirus vaccines will be present for potential emerging diseases and pandemics (Excler et al., 2021). Given regret's role in decisions under uncertainty, it is the central concept in this research.

Regarding health decisions and behavior, anticipated regret has been extensively studied (Brewer et al., 2016). A review by Brewer et al. (2016) shows that anticipated regret plays a part in many types of health care behaviors, including cancer screening, safe sex practices, driving practices, smoking, alcohol use, healthy dieting, and vaccinations. Specifically, anticipated regret has been broken down into two types: anticipated action regret and anticipated inaction regret. Anticipated action regret refers to regret one might feel after taking an action. This was more closely associated with proximal or risky behaviors. Anticipated inaction regret refers to regret one imagines feeling over not taking an action. This was more closely associated with preventative health care measures and distal behaviors. Still, it is possible for both types of regret to manifest in certain decisions (Brewer et al., 2016; Sandberg et al., 2016). However, in general, it was found that inaction regret is strongly associated with intention to vaccinate (Brewer et al., 2016; Ziarnowski et al., 2009). An example of anticipated action regret over vaccination may be related to potential side effects if taking the vaccine. Inaction regret would be about contracting the virus, or even facing a degree of social isolation because of vaccine status.

### 3. Hypotheses and Model

This research model aims to investigate the effectiveness of the HBM model in determining vaccine intention. In addition, it examines the impact of descriptive norms and internal MHLC on intention. Lastly, the effects of HBM constructs as well as descriptive norms and internal MHLC on anticipated regret are evaluated.

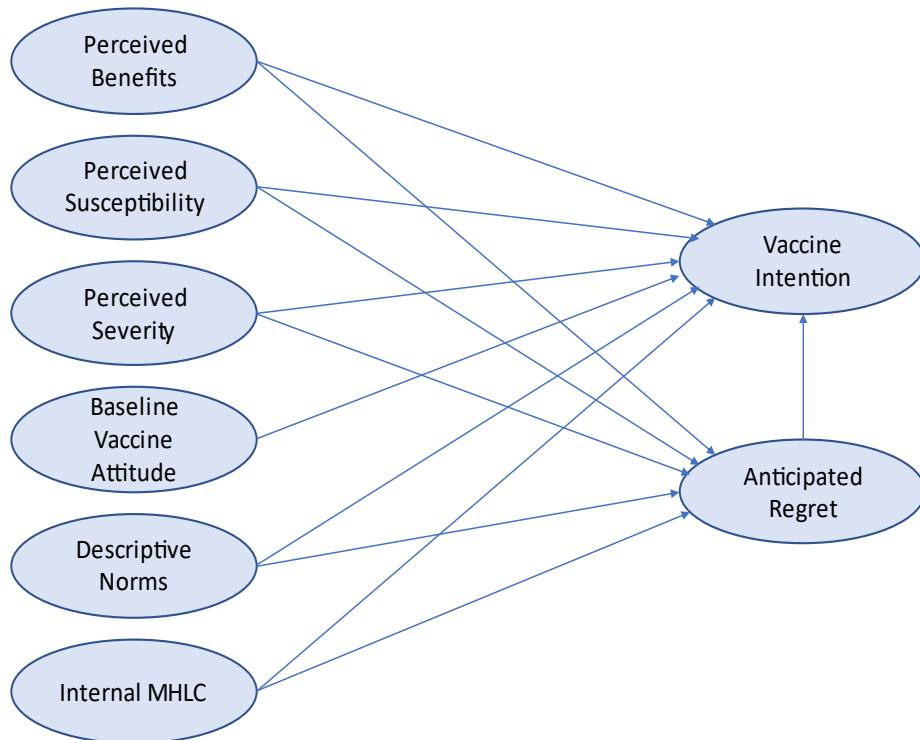


Figure 4: Research Model

#### The Effect of HBM Constructs on Vaccine Intention

While older HBM models suggest six constructs, the lack of sufficient empirical evidence for the two constructs of health motivation and cues to action, as well as their absences in key literature reviews of the HBM precludes their inclusion in this research (Janz and Becker, 1984; Carpenter, 2010; Connor and Norman, 2015). Another necessary consideration for this research is the health behavior context in which the HBM is being applied. The first four constructs (perceived susceptibility, perceived severity, perceived benefits, perceived barriers) may have

variable significance depending on the type of health behaviors under examination. For example, the significance ratio for perceived severity in preventative health behaviors and sick role behaviors was 36% and 85%, respectively (Janz and Becker, 1984), perhaps undermining its importance as a construct. Janz and Becker (1984) also found that, in recent research at that time, perceived barriers demonstrated the highest significance ratios across all behaviors. However, a more recent review, which drew upon the work of Janz and Becker (1984) and others, found that although the effect of perceived susceptibility on behavior was nearly nothing, all four constructs continued to influence behavior in the predicted direction (Carpenter, 2010). Of course, the strengths of the predictions were related to the type of behavior studied. Covid-19 vaccination, the focal behavioral outcome of this study is very clearly a preventative behavior. Perceived benefits and perceived barriers are the strongest predictors of behavior, especially in a preventative context. Here, perceived benefits of receiving a vaccine for Covid-19 may be immunity, social freedom, and perhaps even less emotion distress. Perceived barriers also demonstrate a negative relationship with intention; the harder it is to receive a vaccine, or the less safe it perceived make an individual less likely to engage in this behavior. However, due to widespread efforts to reduce barriers to Covid-19 vaccination, it can be reasonably suggested that the effects of barriers in this research will be severely hindered. Indeed, cost barriers can be seen as nonsignificant, while safety barriers may have a significant negative effect (Chu and Lui, 2021; Alobaidi, 2021). Despite reasonable doubt to the significance and coherence of perceived barriers in this study, I will stick with its long-established predictive power. Therefore:

H<sub>1</sub>: Perceived Benefits will have an effect on Vaccine Intention.

In Carpenter's 2010 review of HBM, perceived severity showed weak predictive power towards behavior, and perceived susceptibility showed almost no relation to behavior. Carpenter (2010) suggests that this extremely weak predictive power is due to individuals already being diagnosed in treatment conditions, so susceptibility was unchanged during treatment and therefore did not affect treatment behaviors; however, the weak relationships of perceived susceptibility and perceived severity exist in preventative contexts as well. Research into Covid-19 vaccination uptake confirms these weak relationships (Alobaidi, 2021; Chu and Lui, 2021).

What's more, this recent research was published in early 2021, before vaccines were widely available to the public, but after Covid-19 was already widespread. Therefore:

H<sub>2</sub>: Perceived Susceptibility will have an effect on Vaccine Intention.

H<sub>3</sub>: Perceived Severity will have an effect on Vaccine Intention.

### **The Effect of Baseline Vaccine Attitude on Vaccine Intention**

The Health Belief Model measures beliefs and attitudes towards a specific illness and a behavioral component aimed at reducing the effects of that illness. In this study, the illness is Covid-19, and the behavioral component comprises vaccines aimed at preventing that specific virus. In addition to these focused beliefs and attitudes, it is useful to understand baseline attitudes towards the prevention mechanism in general. This baseline attitude measurement as an indicator of general vaccine acceptance/hesitancy was found to significantly affect Covid-19 vaccine intentions (Chu and Lui, 2021). It was also found that baseline attitudes toward optional vaccines positively affects intention towards HPV vaccination (Wang et. al., 2017).

H<sub>4</sub>: Baseline Vaccine Attitude will have an effect on Vaccine Intention.

### **The Effect of Descriptive Norms on Vaccine Intention**

In their review of HBM studies, Janz and Becker (1984) suggested that other variables, such as norms could be added to the model. Reid et al. (2010) also conclude that descriptive norms are “strong motivators of behavior.” Descriptive norms have been consistently linked with Covid-19 behaviors and vaccination intentions (Graupensperger et. al., 2021; Rudert and Janke, 2021; Chui and Lui, 2021). Descriptive norms have even been more effective at predicting Covid-19 vaccine intention than injunctive norms (Graupensperger et. al., 2021). Descriptive norms are regularly used in conjunction with health behavior theory models such as HBM and TPB (Theory of Planned Behavior) (Jackson and Aiken, 2000; Chui and Lui, 2021; Sheeran and Orbell, 1999; Wang et al., 2017). In one meta review of health behavior studies that considered

attitudes, norms, and self-efficacy, the manipulation of norms confirmed a direct effect on health-related intentions and behavior (Sheeran and Maki, 2016). This confirmed path of norms on health behaviors provides a strong basis for:

H<sub>5</sub>: Descriptive Norms have an effect on Vaccine Intention.

### **The Effect of Internal MHLC on Vaccine Intention**

Internal MHLC, also called internal health locus of control, has been linked to health behavior intentions and outcomes. One study found that lower internal health locus of control was related to lower adherence to a retroviral treatment regimen (Barclay et al., 2007). Another study linked internal health locus of control of parents with children's vaccine uptake (Aharon et al., 2018). On the other hand, some research on Covid-19 vaccine intentions found internal MHLC to be negatively associated with vaccine intention (Pisl et al., 2021). However, they suggest that this negative association is perhaps due to a highly informed subject pool. In this situation, a highly internal health locus of control individual would rather pursue their own determinations of health behavior, rather than following the advice of their doctor and/or social pressure. In a less educated sample, they suggest, following one's judgment might lead them to vaccination instead of rejecting vaccination (Pisl et al., 2021). Regardless, their results for internal MHLC were not strong compared to other predictors. So, following the advice of Pisl et al. (2021) and considering the results of previous studies:

H<sub>6</sub>: Internal MHLC has an effect on Vaccine Intention.

### **The Effect of Anticipated Regret on Vaccine Intention**

Anticipated regret is a long-studied and well-established predictor of health behaviors (Kim, 2020; Wang et al., 2017; Brewer et al., 2016; Connor et al., 2015). Anticipated regret is often categorized as anticipated action regret and anticipated inaction regret (Brewer et al., 2016). Anticipated inaction regret was found to be more closely related to distal outcomes related to a decision, a similar context to receiving a vaccine. Indeed, inaction regret is more



strongly associated with vaccine intention, though action regret can also play a role (Brewer et al., 2016). When considering a course of action, it is easy to imagine possible outcomes and anticipate regretting that current course of action. For example, when considering engaging in physical activity, inaction might lead to future regrets over health. Vaccination provokes the same thoughts, particularly with inaction regret. While some studies operationalize both forms of regret and evaluate their effects on health behavior (Brewer et al., 2016), this research will focus on anticipated inaction regret, due to the strength of anticipated inaction regret in predicting vaccine intentions (Kim, 2020; Brewer et al., 2016):

H7: Anticipated Regret has an effect on Vaccine Intention.

### **The Effect of HBM constructs (Perceived Benefits, Perceived Susceptibility, and Perceived Severity) on Anticipated Regret**

A study on HPV vaccinations, perceived benefits significantly influenced anticipated regret over inaction (Ziarnowski et al., 2009). Anticipated regret was shown to be strongly associated with perceived benefits in a study on physical activity health behaviors (Rhodes and Mistry, 2016). In this study, sources of anticipated regret were explored, and reasons connected to perceived benefits of physical activity were by far the dominant category. This suggests that anticipated regret from not engaging in a health behavior is strongly linked to a feeling of missing opportunities (Rhodes and Mistry, 2016). For vaccination, the perceived benefits are numerous, such as socialization, reduced exposure to illness, even acceptance at one's workplace. It stands to reason that the more benefits an individual associates with a preventive health behavior such as vaccination, the more that individual would anticipate regretting the loss of those benefits by not engaging in that health behavior. Therefore:

H8: Perceived Benefits has an effect on Anticipated Regret.

Among the HBM constructs, perceived susceptibility and perceived severity are considered the risk assessment variables (Connor and Norman, 2015). Several studies have found that anticipated regret mediates perceived risk and various health behaviors, including vaccine

intention (Chaman and Coups, 2006), (Lagoe and Farrar, 2014), (Brown et al., 2019). Perceived risk was even evaluated by its two HBM constructs, perceived susceptibility and perceived severity, and anticipated regret was found to mediate both (Lagoe and farrar, 2014), (Chapman and Coups, 2006). Risk can be seen as a vulnerability to a negative outcome (Brown et al., 2019). Anticipated regret is the cognitive emotion that a decision will result in a negative outcome compared to other possible outcomes. Therefore, as risk under uncertainty becomes more salient, it increases the possibility of feeling regret over a chosen outcome, or anticipated regret. Perceived susceptibility and perceived severity have also been linked to anticipated regret in vaccine research (Ziarnowski et al., 2009).

H<sub>9</sub>: Perceived Susceptibility has an effect on Anticipated Regret.

H<sub>10</sub>: Perceived Severity has an effect on Anticipated regret.

### **The Effect of Descriptive Norms on Anticipated Regret**

Anticipated regret (and other negative emotions) as a mediator of norms and health behavior intention has been successfully modelled in previous studies (Ahn and Kahlor, 2019; Hynie et al., 2006; Kim, 2020). Anticipated regret “results from an evaluation of the consequences of one’s future action – or one’s anticipated failure to take action” (Ahn and Kahlor, 2019). They confirmed that perceptions of norms regarding a behavior would contribute to anticipated regret over inaction related to the norms. This is directly applicable to Covid-19 and vaccine intentions. Particularly in this research, model items relate to norms of Covid-19 behavior and vaccines, receiving a vaccine as an outcome, and anticipated regret over not receiving a vaccine. Ahn and Kahlor (2019) also suggest that in times of uncertainty, people are more likely to use norms to make judgments and decisions. Indeed, one of the powerful motivators for reliance on norms for judgment and decision making is conditions of uncertainty (Gelfand and Harrington, 2015). Anticipated regret is also more salient under conditions of uncertainty (Bell, 1982), and is a strong predictor of vaccine intentions (Brewer et al., 2016). Put another way, if descriptive norms proscribe a certain behavior (preventive behaviors), then

anticipated inaction regret (over not adhering to those behaviors) will increase. It stands to reason that descriptive norms will have a significant positive effect on anticipated regret.

H<sub>11</sub>: Descriptive norms will have an effect on Anticipated Regret.

### **The Effect of Internal MHLC on Anticipated Regret**

For this research, the MHLC model is linked with anticipated regret, particularly through the Internal MHLC component. A high score in this construct implies a higher engagement in health conducive behaviors (Wallston, 2005). Higher internal locus of control was also associated with less intensity of regret (Wrosch and Heckhausen, 2002). However, this effect was reversed later in life. Tendencies towards certain MHLC constructs also imply that individuals may take different approaches under uncertainty, such as vaccination for an emerging disease. Internal MHLC may lead some to pursue behavior in line with their attitudes and confidence in themselves. A powerful other MHLC-oriented individual will be more obedient towards a doctor's suggestion. Indeed, external health locus of control individuals may give up more of their autonomy regarding health decisions.

Previous research has shown that internal locus of control individuals may actually engage in health adverse behaviors, perhaps due to overconfidence in their own abilities. For example, internal locus of control individuals engaged in riskier driving behavior, presumably out of a sense of control and confidence in their driving skills, while external locus of control individuals were more cautious, especially under the PO-MHLC condition (Lemarié et al., 2019). And in one study, some high internal MHLC patients suffering chronic disease avoided routine checkups, perhaps due to confidence in their ability to carry on treatment (Slopieck and Chrapek, 2019). Essentially, a high internal health locus of control person may take a wider range of actions regarding their health and be confident in those actions. Perhaps if a wrong decision is made, that individual would experience regret after knowing the outcome. However, one study found that among elderly subjects, a higher internal locus of control was associated with fewer regret experiences (Joo and Chong, 2009) (even though Wrosch and Heckhausen (2018) found internal locus of control to be associated with regret feeling in later life).

Regret implies a feeling of self-blame (Zeelenberg and Pieters, 2007). Specifically, blame over not taking opportunities, or making a poor decision and wishing the outcome had been different. Regret and self-blame implicitly recognize the role that the decision-maker plays in the decision process. Taken together, this suggests that an individual with a high internal locus of control sees their role as more central, and thus opens him/herself up to more regret. However, when considering anticipated regret, it is more likely that high internal MHLC individuals *expect* to feel less regret due to their sense of agency to make the right decision. Therefore, given the sense of agency associated with an internal health locus of control, an individual feels that they will make the right choice regarding their health. They will expect to feel less regret from this decision than another. This suggests that internal health locus of control will have a negative relationship with anticipated regret:

H<sub>12</sub>: Internal MHLC has an effect on Anticipated Regret.

## 4. Methodology

### 4.1 Sample

An open, online survey conducted through Google Forms was used to collect responses. Of 274 submitted responses, 89.1% (n=244) were used in the dataset. Several surveys were submitted blank or were missing a large number of responses. Some respondents also seemed to have trouble with the formatting of a particular multi-item question, which led to the remaining omitted surveys. The survey was issued in Korean and English languages, with 62.7% (n=153) of responses in Korean and 37% (n=91) in English. 19.3% (n=47) of respondents had not yet completed a vaccine regime for Covid-19, while 80.7% (n=197) had received a vaccine. Respondents were 55.3% female (n=135), 43.4% male (n=106), and 1.2% responded with an alternative option (n=3). This alternative option may refer to someone who identifies as non-binary or simply does not want to disclose their gender. The sample skewed heavily towards education with only 4.1% (n=10) of respondents having only finished a high school degree, 0.8% (n=2) with no answer, and the remaining 95.1% (n=232) indicating completion of some level of tertiary education. Respondents represented a variety of age groups as well, with 3.7% aged under 20 (n=9), 19.7% aged 20-29 (n=48), 25.8% aged 30-39 (n=63), 29.5% aged 40-49 (n=72), 11.9% aged 50-59 (n=29), and 9.0% aged 60 or over (n=22). See Table 1 for the sample profile.

Table 1. Sample Profile

Demographic Variable		Frequency	%
Gender	Male	106	43.4%
	Female	135	55.3%
	Other	3	1.2%
Age	<20	9	3.7%
	20-29	48	19.7%
	30-39	63	25.8%
	40-49	72	29.5%
	50-59	29	11.9%
	60+	22	9.0%
Education	Secondary	10	4.1%
	Tertiary	232	95.1%
	N/A	2	0.8%
Vaccinated	Yes	197	80.7%
	No	47	19.3%

Language	Korean	153	62.7%
	English	91	37.3%

## 4.2 Measurement

The survey questions were designed based on previous work done in various constructs. The constructs evaluated were Internal MHLC, Vaccine Baseline Attitude, Descriptive Norms, Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Anticipated Regret, and Vaccine Intention. All items were measured using 5-point Likert scales, with 1 = “strongly disagree” and 5 = “strongly agree.” The four HBM variables of Perceived Susceptibility, Perceived Severity, Perceived Benefits, and Perceived Barriers were adapted from Chu and Lui (2021) since they were applied in the same behavioral context as this study. The MHLC scales used in this study were developed by Wallston et al. (1978) and applied by Helmer et al. (2012). Baseline Vaccine Attitude was derived from Chu and Lui (2021). Anticipated Regret items were developed from a short pilot study related to the specific behavioral context of the study. Descriptive Norms were also adapted from Chu and Lui (2021). Lastly, items for Vaccine Intention were adapted from Chu and Lui (2021) and Mercadante (2021). See Table 2 for measurement items.

Table 2. Measurement Items

Construct	Item	Content
Internal MHLC	HLOC_I1	The main thing which affects my health is what I, myself, do.
	HLOC_I2	I am in control of my health.
	HLOC_I3	If I get sick, it is my own behavior which determines how soon I get well again.
Vaccine Baseline Attitude	VA_1	In general, vaccines are good.
	VA_3	In general, vaccines are foolish.
	VA_4	In general, vaccines are harmful.
Descriptive Norms	DN_1	People important to me have been or want to be vaccinated against Covid-19.
	DN_3	People close to me take preventative measures against Covid-19.
Perceived Susceptibility	PerSus_2	I am at risk of getting Covid-19.
	PerSus_3	It is possible that I will get Covid-19.
Perceived Severity	PerSev_1	I believe that Covid-19 is a severe health problem.
	PerSev_2	I believe that Covid-19 has serious negative consequences.

	PerSev_3	I believe that Covid-19 is extremely harmful.
Perceived Benefits	PerBen_1I	Covid-19 vaccines will be effective in preventing Covid-19.
	PerBen_2I	If I get a vaccine, I will be less likely to get Covid-19.
Anticipated Regret	AR_3I	I will regret not receiving a vaccine if I get Covid-19.
	AR_4I	I will regret not receiving a vaccine if I cannot participate in social activities.
	AR_5I	I will regret not receiving a vaccine if someone in my community gets Covid-19.
Vaccine Intention	VI_1	I intend to be fully vaccinated against Covid-19.
	VI_2	I will make an effort to get vaccinated against Covid-19.
	VI_3	I will get vaccinated if a vaccine is made available to me.

## 5. Results

### 5.1 Exploratory Factor Analysis

Exploratory factor analysis was run using SPSS 26. In the first attempt, the items for perceived barriers did not load properly. Additionally, one item for descriptive norms did not load properly, and two items for perceived benefits may have represented a separate construct entirely. After removing the offending items, as well as the perceived barriers construct from the data, exploratory factor analysis shows factor loadings are acceptable. Cronbach's alphas for each factor mostly range from .762 to .909, demonstrating high internal consistency. One factor showed a lower Cronbach's alpha of .580, but this is still deemed moderately reliable (Hinton, 2004). Items were analyzed through varimax rotation, and KMO (.844) and Bartlett's test (Chi-Square = 3352.703,  $p < .000$ ) showed the revised data was suitable for factor analysis.

Table 3. Results of Exploratory Factor Analysis

Factor Loadings									Cronbach's Alpha	Eigenvalue	Cumulative explained variance (%)
Items	1	2	3	4	5	6	7	8			
HLOC_I1	.004	-.035	-.059	.017	<b>.806</b>	.067	.128	-.002	.762	3.178	15.132
HLOC_I2	-.043	-.104	-.106	-.085	<b>.857</b>	-.017	-.087	.034			
HLOC_I3	-.039	-.013	-.056	-.085	<b>.793</b>	-.071	.016	-.084			
VA_1	.125	.298	.151	<b>.758</b>	-.037	.032	.090	.148	.831	2.675	27.871
VA_3	.173	.146	.024	<b>.872</b>	-.038	-.031	.070	.020			
VA_4	.255	.052	.004	<b>.812</b>	-.105	-.050	.037	.131			
PerSus_2	.007	-.009	.025	-.075	.053	<b>.920</b>	-.004	.081	.790	2.519	39.865
PerSus_3	.052	.082	.113	.032	-.079	<b>.884</b>	.095	-.144			
PerSev_1	.081	.104	<b>.856</b>	.086	-.045	.116	.138	.103	.880	2.351	51.063
PerSev_2	.081	.094	<b>.878</b>	.047	-.128	-.008	.096	.010			
PerSev_3	.137	-.026	<b>.896</b>	.021	-.070	.049	.000	.122			
PerBen_1I	.464	.205	.196	.218	-.026	.019	.210	<b>.646</b>	.801	2.110	61.109
PerBen_2I	.361	.179	.170	.194	-.063	-.096	.116	<b>.772</b>			
DN_1	.424	.094	.142	.200	-.099	.027	<b>.674</b>	.009	.580	1.679	69.105
DN_3	.078	.132	.116	.032	.143	.074	<b>.847</b>	.173			
AR_I3	.176	<b>.876</b>	.045	.157	-.095	.042	.093	.142	.911	1.375	75.655
AR_I4	.171	<b>.888</b>	.019	.150	-.030	.016	.045	.061			
AR_I5	.293	<b>.838</b>	.130	.154	-.060	.030	.110	.070			



VI_1	<b>.880</b>	.227	.109	.222	-.023	.044	.118	.162	.976	1.268	81.695
VI_2	<b>.877</b>	.239	.116	.216	-.042	.029	.152	.192			
VI_3	<b>.898</b>	.239	.115	.181	-.023	.017	.104	.181			

## 5.2 Confirmatory Factor Analysis

As seen in Table 4, all factor loadings for CFA are significant. GFI = .889, AGFI = .848, NFI = .915 and RMSEA = .056. Other measures are over .9. AVE (Table 5) ranged from .500 to .770. These measures indicate adequate discriminant validity in CFA.

Table 4. Results of Confirmatory Factor Analysis

Construct	Item	Standardized regression coefficient	S.E.	t value	P
Baseline Vaccine Attitude	VA_4	.590			
	VA_3	.697	.124	9.010	***
	VA_1	.940	.141	10.897	***
Internal MHLC	HLOC_I3	.648			
	HLOC_I2	.868	.131	8.263	***
	HLOC_I1	.668	.113	8.384	***
Perceived Severity	PerSev_3	.866			
	PerSev_2	.826	.063	14.820	***
	PerSev_1	.838	.062	15.042	***
Anticipated Regret	AR_I5	.888			
	AR_I4	.851	.052	17.637	***
	AR_I3	.899	.055	19.214	***
Perceived Susceptibility	PerSus_3	.802			
	PerSus_2	.817	.105	10.462	***
Vaccine Intention	VI_3	.976			
	VI_2	.976	.021	47.263	***
	VI_1	.944	.026	36.750	***
Perceived Benefits	PerBen_2I	.767			
	PerBen_1I	.876	.081	12.732	***
Descriptive Norms	DN_3	.528			
	DN_1	.775	.241	6.106	***
Model Fit Indices	Chi-square = 354.891, df = 202, p=0.000, Chi-square/df = 1.757, GFI = .889, AGFI = .848, NFI = .915, RMSEA = .056				

Table 5. AVE and Correlation Matrix

Construct	Mean	SD	CR	I_HLOC	VaxAtt	PerSus	PerSev	PerBen	DN	AR	VaxInt
I_HLOC	4.142	0.739	0.856	<b>0.664</b>							
VaxAtt	4.172	0.922	0.892	-0.144	<b>0.675</b>						
PerSus	3.598	1.004	0.882	0.075	-0.024	<b>0.714</b>					
PerSev	3.899	0.987	0.909	-0.185	0.196	0.096	<b>0.768</b>				
PerBen	4.000	0.932	0.662	-0.110	0.477	-0.034	0.353	<b>0.500</b>			
DN	4.393	0.667	0.732	0.010	0.329	0.127	0.289	0.463	<b>0.581</b>		
AR	3.869	1.128	0.895	-0.144	0.453	0.073	0.190	0.447	0.327	<b>0.740</b>	
VaxInt	4.422	1.016	0.910	-0.102	0.504	0.071	0.273	0.680	0.481	0.508	<b>0.770</b>

### 5.3 Hypothesis Testing

All hypotheses from the research model were evaluated using structural equation modelling (SPSS AMOS 26). Model fit indices were Chi-square = 415.867, df = 177, Chi-square/df = 2.35. GFI = .851, AGFI = .805, NFI = .880, CFI = .927, and RMSEA = .075. These indices suggest adequate fit. Of the thirteen hypotheses, one was not tested. Five were fully supported, and two were partially supported. The remaining five hypotheses were not supported. Perceived Benefits have a strongly significant effect ( $p < .000$ ) on Vaccine Intention (H1 supported). Perceived barriers was excluded at the EFA stage, and was not tested (H2 not tested). Perceived Susceptibility has a nonsignificant positive effect on Vaccine Intention (H3 not supported). Perceived Severity has a nonsignificant negative effect on Vaccine Intention (H4 not supported). Baseline Vaccine Attitude has a significant effect ( $p = .007$ ) on Vaccine Intention (H5 supported). Descriptive Norms have strongly significant effect ( $p < .000$ ) on Vaccine Intention (H6 Supported). Internal MHLC has a nonsignificant positive effect on Vaccine Intention (H7 not supported). Anticipated Regret has a significant effect ( $p = .018$ ) on Vaccine Intention (H8 supported). See Table 6 for a summary of hypothesis testing.

Table 6. Research Path Results

	<b>Research Hypothesis</b>	<b>Std. Estimate</b>	<b>S.E.</b>	<b>C.R.</b>	<b>P</b>	<b>Result</b>
H1	Perceived Benefits → Vaccine Intention	.609	.08	8.385	***	Supported
H2	Perceived Susceptibility → Vaccine Intention	.040	.036	0.514	.607	Not supported
H3	Perceived Severity → Vaccine Intention	-.005	.046	-.108	.914	Not supported
H4	Baseline Vaccine Attitude → Vaccine Intention	.140	.056	2.716	.007	Supported
H5	Descriptive Norms → Vaccine Intention	.223	.154	3.606	***	Supported
H6	Internal MHLC → Vaccine Intention	.018	.075	0.34	.734	Not supported
H7	Anticipated Regret → Vaccine Intention	.154	.056	2.365	.018	Supported
H8	Perceived Benefits → Anticipated Regret	.481	.093	6.607	***	Supported
H9	Perceived Susceptibility → Anticipated Regret	.070	.071	0.53	.596	Not supported
H10	Perceived Severity → Anticipated Regret	-.033	.069	-.522	.602	Not supported
H11	Descriptive Norms → Anticipated Regret	.130	.2	1.87	.061	Partially Supported
H12	Internal MHLC → Anticipated Regret	-.114	.111	-1.70	.089	Partially supported

## **6. Conclusion**

### **6.1 Discussion and Practical Implications**

This research attempted to better understand the factors that predict vaccination intention for Covid-19, with the hope that the insights gained will guide future efforts towards managing this disease, as well as future emerging diseases. The results illuminate some unique and perhaps not well studied concepts. First, the importance of perceived benefits cannot be overstated. Perceived benefits was the strongest predictor and had a direct effect on vaccine intention and anticipated regret. This is essentially the source of the “value” of the vaccine, or the expected positive outcomes one expects if they engage in the proscribed health behavior. This suggests that, when it comes to vaccination (and perhaps other preventive behaviors, people are forward-thinking and easily consider mid- and long-term benefits. This finding is in line with a review of HBM studies which found that perceived benefits and perceived barriers were the strongest predictors of preventative behaviors (Carpenter, 2010). This construct may also have been particularly salient because this study was conducted amid ongoing vaccination efforts. Widespread social distancing efforts and public occupancy limitations have most likely left many respondents acutely aware of benefits related to vaccination.

In past HBM studies, perceived barriers were a strong predictor of intention and uptake (Carpenter, 2010). However, the circumstances surrounding the current Covid-19 vaccination efforts suggest a rethinking of this construct. Perhaps because of previous studies showing the negative effect of perceived barriers on vaccine intention, it seems that unprecedented efforts to reduce barriers to vaccination have been undertaken. From offering free vaccines, to opening drive-thru vaccination services, countries around the world have worked to reduce perceived costs of vaccination. However, safety barriers still exist (Chu and Lui, 2021). But, if these types of efforts to reduce barriers exist for the next emerging disease, this construct may have to be adjusted to reflect perceived barriers more accurately. In one study, respondents who will not get vaccinated indicated that vaccine efficacy and vaccine safety were the main concerns, among others (Guiliani et al., 2021). It is reasonable to expect that perceived barriers still play a significant role in vaccine intention.

According to the Health Beliefs Model, perceived susceptibility and perceived severity were expected to have a significant positive effect on vaccine intention. However, neither were significant, which was not surprising, and perceived severity’s direction of effect on intention

was negative, an unexpected finding. First, both constructs have shown mixed results in meta-analyses of studies utilizing Health Belief Model constructs, and were generally weak predictors of behavior (Carpenter, 2010). It is quite reasonable to expect that receiving a vaccine would also have a notable effect on susceptibility, even to skew it towards non-significance. This has in fact been shown in previous vaccination research (Ziarnowski et al., 2009), in which risk perceptions of a disease were lower after receiving a vaccine. It must be noted that many of the respondents for this study were already vaccinated for Covid-19 prior to participating in the survey.

The negative, although insignificant, direction of perceived severity on vaccine intention could perhaps be explained by the design of the construct. First, Carpenter (2010) noted other studies had found negative directions of perceived severity for preventative behaviors, and overall, perceived severity had a poor relationship with these behaviors. Perhaps the issue is with the construct items, which measure a generalized perception of the severity of the disease (for example, “I believe that Covid-19 is a serious health problem”) rather than personal severity. This could lead to an “optimism bias” (Weinstein, 2001). An optimism bias occurs in risk assessment when an individual perceives their own personal risk as below average compared to the risk to people in general. While reporting a high general severity of Covid-19, a respondent may feel that the severity of the disease for them, personally, is actually low. Potentially over-inflated perceived severity values could have skewed the direction of the effect towards a negative sign, as inappropriately high perceived severity values corresponded with accurate, low intention values. Lastly, the insignificant results of perceived susceptibility and perceived severity in this study, and in many previous studies (Carpenter, 2010), suggest that much more research is needed to derive the appropriate modelling of these constructs, perhaps through interactions with other variables, but particularly for preventative health behaviors.

The results regarding internal-MHLC were partially predicted. Internal-MHLC did not have a direct effect on vaccine intention. It is possible that attitudes instead mediate this relationship (Aharon et al., 2018). Interestingly, internal-MHLC had a negative effect on anticipated regret. This is perhaps again related to the conditions of uncertainty surrounding an emerging disease such as Covid-19. Internal-MHLC individuals recognize their own agency in making health decisions. As discussed earlier, this can lead to positive and negative health behaviors (Lemarié et al., 2019; Slopieck and Chrapek, 2019). However, confidence in one’s

ability to decide for him/herself suggests a negative relationship with anticipated regret. This is a unique finding and deserves to be explored further.

While this study showed that internal-MHLC did not have a significant effect on vaccine intention, it is possible attitudes could mediate a negative effect of internal-MHLC on intention. A link between internal locus of control and vaccine hesitancy was found in the UK and Ireland (Murphy et al., 2021). This work suggest that a variety of psychological factors contribute to vaccine hesitancy, such internal locus of control, lack of trust in others, preference for authoritarian societies, and disagreeable, impulsive personalities.

The results of this research strongly support the inclusion of descriptive norms and anticipated regret as predictive factors of intention, as well as the effect of descriptive norms on anticipated regret. This is unsurprising, as the context of an emerging disease such as Covid-19 gives way to a great deal of uncertainty, and both descriptive norms and anticipated regret become more influential under conditions of uncertainty. Creating vaccination norms can be a powerful tool to increase vaccine uptake. Marketing messages, particularly concerning public health often invoke norms (Moran, 2019). Studies show that it's even possible for conflicting norms to exist, but the focal norm that is salient in the moment will often win out (Cialdini et al., 1991; Pryor et al., 2019), suggesting that careful norm creation may push vaccination rates slightly higher. Certainly, as more information is available regarding vaccines and their benefits and risks, norms continue to develop.

Anticipated regret has certainly proven to have predictive power on vaccine intentions, in this study and in others (Brewer et al., 2016). While there has previously been little research, it seems that there is strong reason to believe that anticipated regret acts as a mediating variable for perceived benefits and descriptive norms on vaccine intention. As norms become more influential in pursuing a health behavior, pursuing a decision against those norms creates more opportunity for regret. As perceived benefits become more salient for engaging in a health behavior, the possible loss of those benefits stimulates anticipated regret over inaction. Additionally, the tendency to consider mid- and long-term future benefits regarding vaccination links with anticipated regret. Inaction regret relates to distal outcomes more than action regret (Brewer et al., 2016), so it reasonable to expect these constructs to be significant in this model.

## 6.2 Limitations and Directions for Future Research

This research is not without its fair share of limitations. Perhaps most obvious is the fact that many respondents to the survey had already received vaccination. The possible effects of this were discussed earlier. Also, the respondents skewed heavily towards education, with a much higher percent of the sample having 4-year university degrees and post graduate degrees than the average population. In the interest of protecting privacy and encouraging respondents to answer truthfully, some demographic information, such as country of origin or residence, was not collected through the survey. This inhibits the full comprehension of the data. Furthermore, issues with some construct loadings may have led to differences in the results, though I do not believe them to be significant.

The characteristics of the data also call into question the use of Vaccine Intention as a construct. Why measure intention when many respondents have engaged in the behavior in question? It was expected that there would be a mix of vaccinated and unvaccinated respondents; however, I expected this mix to be more representative of the sample. Then the vaccinated and unvaccinated samples could be compared to evaluate the effectiveness of intention as a predictor. However, the sample sizes did not allow for an effective comparison. Additionally, it was not feasible to conduct a longitudinal study, particularly because of the sensitive personal information that would be required for such a study. On the other hand, intention provides a more nuanced look into a respondent's thoughts and motivations behind vaccination. If only behavior was measured, it could obfuscate certain factors that led to vaccination, such as an external requirement like a mandate. Thus, intention, even post behavior, provides some useful insight into vaccine motivation; it is possible that someone will have low vaccine intention but still get vaccinated due to an unmeasured external variable. However, measuring intention for individuals post behavioral outcome may skew the measured values of intention. I attempted to mitigate this gap by prompting respondents to consider their intentions at the time of vaccination. While not perfect remedy, intention is a better predictor when in close proximity to behavior (Webb and Sheeran, 2006).

The model focused on anticipated regret, but this left some potential weaknesses in the paths of the other constructs, and therefore opportunities for further research. For example, the attitude constructs in the HBM and baseline vaccine attitude are possible mediators of MHLC constructs (Aharon et al., 2018), of which only one construct, internal-MHLC, was included.

Additionally, it is clear the roles of perceived susceptibility and perceived severity were not adequately modelled. Future research may want to focus on the moderating and mediating relationships between these variables and vaccine intention. Lastly, anticipated regret, as a cognitive emotion, deserves further evaluation to clearly delineate the role it plays in health decision-making, especially in the context of emerging diseases and vaccination. For instance, its mediating role for perceived risk constructs, such as perceived susceptibility and perceived severity, may be significant if those constructs are reordered or moderating variables are considered. Lastly, it is worth investigating the connections between internal-MHLC, anticipated regret, and vaccine intention. Since internal-MHLC can be associated with both engaging and avoiding health behaviors, it is likely that there are moderating factors that affect this relationship. Additionally, if internal-MHLC truly has a negative relationship with anticipated regret for vaccine behaviors, are there any moderators to this relationship, as suggested by Wrosch and Heckhausen (2002).

The sample may have skewed the importance of the perceived benefits construct. Since a higher percentage of respondents were already vaccinated compared to the general public, it is possible that they have a higher-than-average belief in the benefits of receiving a vaccine. It will be useful for future research to specifically study population samples with higher rates of unvaccinated persons.

Lastly, the research survey included several questions on vaccination preferences that were not incorporated into the model. Responses suggest that efficacy rate and side effects are the most salient factors for individuals who are considering getting vaccinated (scoring the most '4' and '5' responses on a 5-point Likert scale). These concerns are incorporated in the perceived benefits and perceived barriers constructs, respectively. However, other factors such as government approval may also affect brand preferences. In future research, it may be worthwhile to incorporate constructs that reflect real-time vaccine concerns and preferences.



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## Sample Questionnaire (English)

### Graduate Research on Covid-19 Vaccination Perceptions

This survey is part of research towards a graduate degree at the University of Ulsan, South Korea. Responses to this survey are completely confidential, and no personally identifiable information is collected. All responses are on a 1 - 5 scale (1 = "strongly disagree," 2 = "somewhat disagree," 3 = "neutral," 4 = "somewhat agree," and 5 = "strongly agree").

1. The main thing which affects my health is what I, myself, do.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

2. I am in control of my health.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

3. If I get sick, it is my own behavior which determines how soon I get well again.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

4. Regarding my health, I can only do what my doctor tells me to do.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

5. Having regular contact with my physician is the best way for me to avoid illness.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

6. Health professionals control my health.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

7. My good health is largely a matter of good fortune.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

8. Luck plays a big part in determining how soon I will recover from an illness.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

9. If it's meant to be, I will stay healthy.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

10. I have received a vaccination in the last 2 years. (Flu, HPV, etc.)

*Mark only one oval.*

Yes

No

Not sure

11. In general, vaccines are (1 "Strongly Disagree" to 5 "Strongly Agree"):

*Mark only one oval per row.*

	1	2	3	4	5
Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beneficial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Foolish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Harmful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. It is likely that I will get Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

13. I am at risk of getting Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

14. It is possible that I will get Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

15. I believe that Covid-19 is a severe health problem.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

16. I believe that Covid-19 has serious negative consequences.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

17. I believe that Covid-19 is Extremely harmful.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

18. Covid-19 vaccines will be effective in preventing Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

19. If I get a vaccine, I will be less likely to get Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

20. Covid-19 vaccines protect the health of my community.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

21. Having myself vaccinated against Covid-19 is beneficial for the health of others in my community.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

22. Safety concerns make it difficult for me to be vaccinated against Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

23. The cost of receiving a vaccine affects my decision to receive a vaccine.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

24. Getting vaccinated requires time and effort.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

25. People important to me have been or want to be vaccinated against Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

26. People important to me have had a negative experience with Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

27. People close to me take preventative measures against Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

28. The differences between available vaccine brands are not significant to me.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

29. Receiving my preferred vaccine brand is important to me.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

30. It is not important to receive my first choice of vaccine.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

31. Before I would receive a particular vaccine, it is important to consider the (1 "Strongly Disagree" to 5 "Strongly Agree"):

*Mark only one oval per row.*

	1	2	3	4	5
manufacturer of the vaccine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
efficacy rate of the vaccine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
country of origin of the vaccine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
known side effects of the vaccine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
status of governmental approval of the vaccine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32. If I get vaccinated, I expect to feel regret.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

33. If I don't get vaccinated, I expect to feel regret.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

35. I will regret NOT receiving a vaccine if (1 "Strongly Disagree" to 5 "Strongly Agree"):

I do not receive a preferred vaccine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I experience side effects from the vaccine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get Covid-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A vaccinated person I know gets Covid-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. I will regret NOT receiving a vaccine if (1 "Strongly Disagree" to 5 "Strongly Agree"):

*Mark only one oval per row.*

	1	2	3	4	5
I miss a chance to receive a preferred brand of vaccine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
I get Covid-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I cannot participate in social activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Someone in my community gets Covid-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

37. I intend to be fully vaccinated against Covid-19. (If you are already fully vaccinated, please answer using your earlier intentions.)

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

38. I will make an effort to get vaccinated against Covid-19.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

39. I will get vaccinated if a vaccine is made available to me.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

40. I am fully vaccinated against Covid-19.

*Mark only one oval.*

Yes

No

41. Age Group

*Mark only one oval.*

< 20

21-30

31-40

41-50

51-60

> 60

## Sample Questionnaire (Korean)

### 백신관련 대학원 설문

이 설문은 울산대학교 대학원 논문 연구 관련 설문입니다. 응답에 대해서는 보안유지가 철저히 이루어집니다. 해당 연구는 정책입안자와 연구자들이 백신에 관한 대중의 생각과 반응을 더 잘 이해할 수 있는 정보제공 목적으로 사용됩니다. 질문에 솔직하게 답해주시기 바랍니다.

가장 부합한다고 생각하는 답변을 선택해주시요. (1 번 “매우 동의하지 않음”에서 5 번 “매우 동의”까지)

1. 내 건강에 가장 큰 영향을 미치는 것은 나의 행동이다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

2. 내 건강은 내가 관리한다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

3. 몸이 안 좋을때, 내가 하는 행동이 얼마나 빨리 낫는지를 결정한다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

4. 나는 건강에 관해서는 의사가 지시하는 대로만 한다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

5. 아프지 않기 위해서는 의사와의 정기적인 상담이 가장 좋은 방법이다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

6. 건강 전문가들이 내 건강을 관리한다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

7. 좋은 건강은 대체로 운에 달린것이다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

8. 건강회복의 주요한 부분은 운에 달려있다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

9. 별탈없다면 나는 건강할것이다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

10. 2년이내에 백신을(감기, 유두종 바이러스 등) 맞은 적이있다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

11. 일반적으로 백신은 (1번 “매우 동의하지 않음”에서 5번 “매우 동의”까지):

Mark only one oval per row.

	1	2	3	4	5
좋다 도움이 된다	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
어리석은 것이다	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
위험하다	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. 나는 코로나19에 걸릴 수도 있다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

13. 나는 코로나19 감염 위험이 있다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

14. 나도 코로나19에 걸릴 가능성이 있다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

15. 나는 코로나19가 심각한 건강문제라고 생각한다.



Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

16. 코로나19는 심각하게 부정적인 결과를 가져온다고 생각한다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

17. 코로나19는 극도로 유해하다고 생각한다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

18. 코로나19 백신은 코로나19 예방에 효과적인 것이다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

19. 나는 백신접종을 받으면 코로나19에 감염될 가능성이 적을 것이다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

20. 코로나19 백신은 내가 속한 지역사회의 건강을 보호한다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

21. 내가 코로나19 백신접종을 받는 것은 내가 속한 지역사회 구성원의 건강에 이득이 된다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

22. 코로나19 백신의 안전성에 대한 염려는 나의 백신접종 결정을 어렵게 한다.

Mark only one oval.

	1	2	3	4	5	
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	매우 동의

23. 백신접종 비용은 접종결정에 영향을 준다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

24. 백신을 맞는 것은 시간과 노력이 드는 일이다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

25. 내가 아끼는 사람들은 코로나19 백신접종을 이미 했거나 하고 싶어한다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

26. 내가 아끼는 사람들은 코로나19 백신으로 부정적인 경험을 했다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

27. 나와 가까운 사람들은 코로나19 예방조치를 준수한다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

28. 나는 백신의 브랜드를 중요하게 생각하지 않는다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

29. 내가 선호하는 백신 브랜드로 접종받는 것은 중요하다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

30. 내가 선호하는 백신 브랜드로 접종받는 것은 중요하지 않다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

31. 백신을 맞기전 고려해야 할 중요한 사항은 (1번 “매우 동의하지 않음”에서 5번 “매우 동의”까지)

Mark only one oval per row.

	1	2	3	4	5
백신 제조사이다..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
백신의 효능이다..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
백신 제조국이다..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
알려진 부작용이다..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
정부로부터의 허가여부이다..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32. 백신접종을 받은 후에 후회할 것 같다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

33. 백신접종을 받지 않는다면 후회할 것 같다.

Mark only one oval.

	1	2	3	4	5
매우 동의하지 않음	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
매우 동의					

34. 나는 아래의 경우 백신접종을 받은 것을 후회할 것 같다. 만약, (1번 “매우 동의하지 않음”에서 5번 “매우 동의”까지)

Mark only one oval per row.

	1	2	3	4	5
내가 선호하는 백신 브랜드를 접종받지 못한다면..					
백신접종에 따른 부작용을 경험한다면..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
코로나 19에 감염된다면..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
백신접종을 마친 내 지인이 코로나 19에 감염된다면..					

35. 나는 아래의 경우 백신접종을 받지 않은 것을 후회할 것 같다. 만약, (1번 “매우 동의하지 않음”에서 5번 “매우 동의”까지)

Mark only one oval per row.

	1	2	3	4	5
선호하는 종류의 백신을 접종받을 기회를 놓친다면..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
코로나19에 감염된다면..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
사회활동에 참여할수 없다면..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

내가 속한 지역사회 일원이  
코로나19에 감염 된다면..

---

36. 나는 코로나19 백신접종을 받을 의향이 있다.(만약 이미 백신접종을 받았다면 백신접종전 상황을 가정해 답변바랍니다.)

Mark only one oval.

1 2 3 4 5  
매우 동의하지 않음      매우 동의

37. 나는 백신을 맞기 위해 노력할 것이다.

Mark only one oval.

1 2 3 4 5  
매우 동의하지 않음      매우 동의

38. 백신접종 신청이 가능하다면 나는 백신을 맞을 것이다.

Mark only one oval.

1 2 3 4 5  
매우 동의하지 않음      매우 동의

39. 나는 코로나19 백신접종을 완료했다.

Check all that apply.

- 네  
 아  
니  
오

40. 연령대

Check all that apply.

- 20 세 미만  
 30 세 미만  
 40 세 미만  
 50 세 미만  
 60 세 미만  
60 세 이상

41. 연령대

*Check all that apply*

- 고  
졸
- 전문  
대
- 4년제 대졸 이상

42. 성별

*Check all that apply.*

- 여  
성
- 남  
성
- 응답하기 원하지 않음

43. 본 설문지에 제공한 정보를 연구목적으로 이용하는 것에 동의합니다.

*Check all that apply.*

- 동  
의
- 동  
의  
하  
지  
않  
음