DECISION MAKING DURING A SIMULATED PUBLIC HEALTH CRISIS

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DECISION MAKING DURING A SIMULATED PUBLIC HEALTH CRISIS

Abstract

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The purpose of this study was to investigate the behavior of participants during a simulated public health crisis, and specifically an influenza pandemic. Participants moved through three types of pandemics (mild, moderate, severe) in a randomized order depending upon the condition they were in. They were given information about the status of the pandemic around the world and in the U.S. They also saw maps of the spread of the virus in the U.S. and Washington state. After reviewing this information the participant was asked at which update (1-9) they would obtain their vaccine and why. Individuals could opt not to obtain one. Other variables of interest that were investigated included SVO, religious orientation, values, and questions were asked about the importance of particular types of information they were provided. Finally, the participant's location moved from a town in the northern part of the state to a large city. The same questions about when, or if, the participant would obtain a vaccine were asked.

First, the results showed a differential pattern of behavior during mild, moderate, and severe pandemics such that participants decided to obtain their vaccine earlier in a severe
pandemic and later in mild, with moderate in between. This effect did not appear to be due to
making socially desirable choices or having been sick oneself or knowing others who were sick
recently. Second, those who regularly get their seasonal flu vaccine decided to obtain their
pandemic influenza vaccine at least one update earlier than those who did not and in all three
pandemics. Third, participants made different decisions in terms of when to obtain a vaccine
based on the severity of the pandemic when located either in a small town or located in a big
city, but decide to obtain a vaccine sooner when in the big city. Finally, participants rated the
WA map as most important and the global update as least important in terms of the pieces of
information they were provided. SVO, religiosity, and values did not explain vaccine
consumption behavior of participants. Ramifications of these findings are discussed and future
directions are suggested.
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CHAPTER ONE
INTRODUCTION
SEASONAL AND PANDEMIC INFLUENZA

Seasonal Influenza

Influenza, commonly referred to as the flu, is a contagious respiratory illness caused by influenza viruses and can spread person-to-person, typically from late fall to early spring. Symptoms vary from mild to deadly and may include fever, coughing, sore throat, body aches, chills, runny or stuffy nose, headaches, and fatigue. On average annually, 5 - 20% of the population is infected, more than 200,000 people are hospitalized due to complications, and an estimated 23,600 die (range of deaths 3,300 to 48,600; Centers for Disease Control and Prevention or CDC). Some groups are more likely to have complications than others and include the elderly (age 65 and older), children under two years of age, or any person with a chronic medical condition such as asthma, congestive heart failure, diabetes, or lung disease. Complications of influenza can include dehydration, ear or sinus infections, bacterial pneumonia, and worsening of chronic medical conditions.

Flu viruses occur in three main types - A, B, and C. Type A and B viruses cause widespread outbreaks every year in the United States while Type C infections cause mild respiratory illnesses but not to epidemic proportions. Also, Type A is divided into several subtypes of which H1N1, H1N2, and H3N2 have been found in people worldwide. Most people have natural immunity, and a seasonal flu vaccine is available annually. In fact, vaccination is the best protection against contracting the flu and it is recommended that everyone six months of age and older obtain one.
Colds. It should be noted that the flu and the common cold have similar symptoms and so it can be difficult to tell them apart. In general, the flu is worse than the cold and symptoms such as fever, body aches, extreme tiredness, and dry cough are more common and intense with the flu. Likewise, people with colds are more likely to have a runny or stuffy nose and colds do not typically result in serious health complications.

**Pandemic Influenza**

Flu viruses are ever changing. Small, continuous changes happen in type A and type B influenza as the virus makes copies of itself. The process is called antigenic drift and the drifting is frequent enough to make the new strain of virus often unrecognizable to the human immune system.

As compared to an epidemic in which the outbreak is widespread but only in one country or geographical area, flu pandemics are worldwide outbreaks. To be called a pandemic, three conditions must be met. First, a new subtype of type A virus must be introduced into the human population. Second, the virus must cause serious illness in humans. Third, the virus must be able to spread easily person to person and in a sustained manner.

**Differences between seasonal and pandemic influenza.** The obvious difference between the two types of influenza centers on their frequency. By its name, we know that seasonal strains follow predictable patterns by occurring annually and usually in the winter, and in temperate climates. Pandemic influenza occurs rarely as will be shown in an upcoming section of this chapter. Secondly, people usually have some degree of immunity to seasonal influenza due to previous exposure whereas with pandemic influenza, there is little or no pre-existing immunity. Third, seasonal flu usually affects children, the elderly, and those with certain underlying health conditions who are at increased risk for serious complications, but spares
young adults. With pandemic flu, even healthy individuals may be at increased risk for serious complications.

Fourth, and to be discussed more in the next section, pandemic influenza has the ability to overwhelm health care systems; can cause major impact on society in the form of restrictions on travel, closures, and cancellation of large scale gatherings; and can severely impact the domestic and world economy. Seasonal influenza does not or at worst, causes a modest impact in these areas. Finally, vaccines and antivirals would be available early on during seasonal outbreaks but in the case of pandemics, vaccines probably would not be available in the early stages and effective antivirals may be in limited supply.

Monitoring pandemics. To help keep the world alert to the threat pandemic influenza poses, the World Health Organization (WHO) has defined six phases, occurring before and during a pandemic, that are linked to the characteristics of a new influenza virus and its spread throughout the population. They are as follows:

Inter-Pandemic Period

- **Phase 1**: No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals. If present in animals, the risk of human disease is considered to be low.
- **Phase 2**: No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus subtype poses a substantial risk of human disease.

Pandemic Alert Period

- **Phase 3**: Human infection(s) with a new subtype, but no human-to-human spread, or at most rare instances of spread to a close contact.
• **Phase 4:** Small cluster(s) with limited human-to-human transmission but spread is highly localized, suggesting that the virus is not well adapted to humans.

• **Phase 5:** Larger cluster(s) but human-to-human spread still localized, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).

**Pandemic Period**

• **Phase 6:** Pandemic phase: increased and sustained transmission in general population.

**Defining U.S. response.** Once all three of the aforementioned conditions are met, the WHO will declare Phase 6 or a Pandemic Period. With Phase 6 declared, the Director of the CDC will then make a determination about the severity of the pandemic for the United States using a tool called the Pandemic Severity Index (PSI). The CDC states, "The Pandemic Severity Index provides communities a tool for scenario-based contingency planning to guide local pre-pandemic preparedness efforts. Accordingly, communities facing the imminent arrival of pandemic disease will be able to use the pandemic severity assessment to define which pandemic mitigation interventions are indicated for implementation" (CDC, 2007).

This determination will be communicated to citizens through a familiar system already in place - the hurricane classification system. In short, pandemics will be described as Category 1 - 5, where 1 is mild, 2-3 are moderate, and 4-5 are severe. The five categories are described in Table 1.
Once this determination has been made and reported, specific, targeted community mitigation strategies can be employed as mentioned earlier and shown in Table 2. Briefly, these measures include isolation and treatment of the ill, quarantine of those potentially exposed to the virus; dismissal and closing of schools (private and public grade schools as well as colleges and universities) and school-based activities as well as closure of childcare programs, and finally the use of social distancing measures to "reduce contact between adults in the community and workplace, including, for example, cancellation of large public gatherings and alteration of workplace environments and schedules to decrease social density and preserve a healthy workplace to the greatest extent possible without disrupting essential services" (CDC, 2007).

Source: CDC (2007)
Which strategy is used and how it is employed varies by pandemic severity and so it is important for the CDC to make its determination as soon as possible once WHO declares Phase 6. Communities can then activate the appropriate components of their individual Pandemic Readiness plans. For instance, it is generally not recommended to decrease the number of social contacts in a Category 1 pandemic but should be considered in either a Category 2-3, and is recommended in a Category 4-5.
Assessing the impact of pandemic influenza. First, when a pandemic influenza outbreak begins, it’s global spread is considered inevitable and actions such as border closures and travel restrictions may delay its arrival, but will not stop it. The CDC recommends that preparedness activities assume that the entire world population would be susceptible. In other words, plan for the worst and hope for the best.

Second, pandemics have the power to overwhelm the medical system. Being that most people have no natural immunity to the virus, infection and illness rates would soar. Countries, including the U.S., would be unlikely to have the necessary staff, facilities, beds, and equipment to adequately deal with these numbers. Hence, they would experience a medical surge. Likewise, we would experience a mortuary surge as death rates would be high and contingent upon four factors: "the number of people who become infected, the virulence of the virus, the underlying characteristics and vulnerability of affected populations and the effectiveness of preventive measures" (Pandemic Awareness, flu.gov).

Important medical supplies such as vaccines would also pose a problem as demand will likely surpass supply. In other words, tough decisions would need to be made as to who receives such limited quantities of vaccines. There would also not likely be enough antiviral drugs to go around early on and as with vaccines, difficult decisions concerning allocation would need to be made. Similar issues would exist for hospital beds, ventilators and other supplies.

Finally, economic and social disruption would be experienced as travel bans, closings of schools and businesses, and cancellations of events would need to be enacted and enforced, within communities around the country and world. Care for sick family members and fear of exposure may result in significant worker absenteeism which could leave some businesses and government agencies unable to provide for their customers.
Though this discussion does include a great deal of doom and gloom, the CDC writes, "Education and outreach are critical to preparing for a pandemic. Understanding what a pandemic is, what needs to be done at all levels to prepare for pandemic influenza, and what could happen during a pandemic helps us make informed decisions both as individuals and as a nation. Should a pandemic occur the public must be able to depend on its government to provide scientifically sound public health information quickly, openly and dependably" (Pandemic Awareness, flu.gov).

**Pandemics in recent history.** So is this a real and imminent threat or merely paranoia artificially induced by Hollywood? History provides an answer to this question. The 20th century saw three influenza pandemics (1918-1919, 1957-1958, and 1968-1969, and the 21st has experienced one flu pandemic so far and very recently. Consider events during the 2009-2010 H1N1 flu pandemic.

Timeline of Events for the 2009-2010 Category 1 Pandemic

- April 15, 2009 - First H1N1 case detected in the U.S., in a 10-year old patient in California.
- April 21, 2009 - The CDC begins work to develop a vaccine for the virus.
- April 26, 2009 - The U.S. government declares a public health emergency for H1N1 flu.
- May 10th, 2009 - 29 countries officially report 4,379 cases of which the U.S. has 2,254 of those cases and Mexico has 1,626.
- June 11, 2009 - The World Health Organization (WHO) declares a global H1N1 flu pandemic. At this point there are over 18,000 cases in the U.S. alone.
- November 2009 - Forty-eight states in the U.S., report cases of H1N1 flu, mostly in
young people. By the end of the month some 61 million vaccine doses were ready for distribution.

- June 23, 2010 - The U.S. Public Health Emergency for H1N1 flu expires.
- August 10, 2010 - WHO declares an end to the global H1N1 flu pandemic

The 2009-2010 pandemic was classified as mild by the CDC and was over about a year after it started but not before 214 countries reported laboratory confirmed cases and 18,449 people died (WHO Situation Update 112, 6 August 2010). Many would say that the most recent pandemic in recorded history was tolerable and there were fewer deaths attributed to it than the average flu season. Though this was the case, we must be reminded of how bad it can get.

In 1918-1919 the world was faced with what we would now classify as a Category 5: Severe pandemic and it all began in a little town in Kansas. In 1918, influenza was not a reportable disease to the Public Health Service (PHS) but despite that, health officials in Haskell County, KS sent a note in March informing the PHS of "18 cases of influenza of a severe type." By May, Europe was reporting cases with many young soldiers getting sick. Within two months the flu had spread from the military to civilian population in Europe and was appearing in Asia, Africa, South America and, other parts of North America. This was just the beginning and the 1918-1919 pandemic would occur over three waves - late spring and summer of 1918, fall of 1918, and spring of 1919. All told, about 20 million were killed worldwide and 675,000 of those were in the U.S. One of the grimmest aspects of the Great Pandemic was that funeral parlors ran out of caskets and many bodies were never collected. "As the disease spread, schools and businesses emptied. Telegraph and telephone services collapsed as operators took to their beds. Garbage went uncollected as garbage men reported sick. The mail piled up as postal carriers
failed to come to work” (The Great Pandemic, n.d.).

Pandemics of this magnitude have occurred at different intervals all through history and though our technology today is impressive, it does not afford us protection from such an event. Consider that in 1918 it could take days or weeks to get from destination to destination. In the 21st century, a person can travel to most areas of the world within 24 hours (as was shown in the recent movie Contagion, 2010). Hence, with a latency period of a few days before symptoms are first seen, during which time the soon to be ill are contagious, a novel flu strain can reach pandemic proportions in a short period of time and proceed to overwhelm local medical and mortuary capabilities. In a way, our technology could make us more vulnerable, if even in just the short term. It is therefore imperative that governments develop plans to deal with such public health catastrophes so that critical resources can be allocated in the most equitable way possible.
CHAPTER ONE
INTRODUCTION

PANDEMICS AS A SOCIAL DILEMMA

When a pandemic first breaks out there would be no vaccine immediately available. To help mitigate the spread of the virus, public health and governmental officials can enact isolation protocols for the ill and quarantine of the potentially exposed. If done early enough, these practices, along with social distancing, can minimize spread and maybe even avert disaster. In addition to these practices, antiviral drugs such as Tamiflu and Relenza can make illness milder and shorten the time a person is sick, but must be taken within the first two days of symptoms appearing. Antiviral drugs are about 70% to 90% effective against viruses that are not resistant to the antiviral medication but are not a substitute for a flu vaccine (CDC, n.d.).

Of course the greatest resource at our disposal is a flu vaccine, but a vaccine may not be available for up to 6-9 months from the onset of the pandemic virus. Even once a relatively safe and effective vaccine is developed, it will take time for major pharmaceutical companies to produce it and for governmental entities to distribute it. So in all, antivirals represent a social dilemma in the short run and vaccines represent a dilemma in the long run and difficult decisions will need to be made as to whom receives the limited amounts we have of each, especially if the world is faced with a severe pandemic in which rates of infection are high and mortality is faced daily.

Social Dilemmas: A Closer Look

Hardin (1968) wrote the seminal article on social dilemmas and noted that overpopulation due to unrestricted breeding is a dangerous eventuality because we live in a finite world with
finite resources. Consider the herdsmen who increases his herd by one. Alone this may not be much cause for alarm, but if all other herdsmen in the area do the same, the result will be overgrazing. So the reality of the situation is what Hardin calls the tragedy of the commons, or as Edney (1980) describes, the conflict between individual and group interests in resources over time, both of which are justifiable. This conflict revolves around the issue of morality. Is it moral to add the extra cattle and so take more from a limited resource than others? One possible way to examine the issue is proposed by Fletcher (as cited in Hardin, 1968) - “…the morality of an act is a function of the state of the system at the time it is performed” (p. 1245). If there are plenty of lands for cattle to graze from, then it may not be an issue. If not, then it is. Applied to the issue of pollution, "The rational man finds that his share of the cost of the wastes he discharges into the commons is less than the cost of purifying his wastes before releasing them" (p. 1245). If the eventual cesspool is in frontier conditions, it is not a concern. If it is in a city, it is. Hence, the state of the system/contextual factors need to be considered in ascertaining the salience of a commons dilemma.

Also important is the fact that natural selection favors the forces of psychological denial such that the individual who denies the truth even though the society as a whole that he is part of will suffer, benefits. So the man who pollutes denies its impact on the environment and his fellow man and focuses on his bottom line. Therefore, denial is a manifestation of rationality to Hardin.

Finally, the Universal Declaration of Human Rights says families can determine their size so long as they have their own resources to support it. Though good in principle, this is not the case as people look to common resources for sustenance and so unrestricted breeding becomes a serious issue. Hardin (1968) writes, “People vary. Confronted with appeals to limit breeding,
some people will undoubtedly respond to the plea more than others” (p. 1246). It is possible that those who do not limit their breeding make such a choice because they believe a technical solution will come along and save us in our darkest hour. Hardin is quick to point out that none will. He finishes by saying: “The only way we can preserve and nurture other more precious freedoms is by relinquishing the freedom to breed, and that very soon” (p. 1248). Obviously this goes against the Universal Declaration of Human Rights but this was predicated on the idea that each family was dependent on its own resources. As everyone draws from the common resource pool, the more the population increases the more hands there will be reaching into the cookie jar, taking from the same number of cookies. Hence, "freedom in a commons" (p. 1244) and "freedom to breed" (p. 1248) bring ruin to all.

**Defining Social Dilemmas**

As noted by Edney (1980), social interaction involves a conflict between individual and group interests. Individuals wish to maximize personal or selfish interests while the group seeks to maximize collective interests. If all are motivated by selfish interests, all are worse off than if they had cooperated to maximize their collective interests. These social dilemmas are faced regularly by the majority of people (Komorita and Parks, 1996) and can take several forms.

**Classes of Social Dilemmas**

One major class of social dilemmas is called a *social trap*. This occurs when the behavior of an organism can either cause a small, positive outcome that is immediate, or a large, negative outcome that is delayed. Social traps can take different forms. The most basic social trap is known as an individual, one-person, or temporal trap and occurs in the absence of a group. Platt (1973) stated that a temporal trap was the conflict between short run and long-term consequences. An example of the temporal trap is eating. An individual may obtain an
immediate and pleasurable sensation from consuming high fat or high sugar foods. In the long term though, this can lead to a negative outcome in the form of cardiovascular disease, hypertension, or diabetes. Since this trap involves one person only it technically does not meet the requirements of a social dilemma.

A second type of social trap was the focus of Hardin's article. Called a resource dilemma, this is a situation in which an individual must decide how much of a shared resource to take for him or herself. After each person has extracted their share, the pool is replenished at some rate related to the size of the remaining pool, but the new size of the pool does not usually exceed its initial size. The individual can practice self-restraint and choose to accept a smaller, immediate benefit in order to sustain the resource and accumulate more in the long run. Since individuals begin with nothing, anything constitutes a definite gain.

Overconsumption and potential exhaustion of the resource pool is a serious issue faced in social traps such as resource dilemmas, even if overpopulation is not the reason behind the overuse. It may be that too many individuals are using the same resource in a given area or that there are a reasonable number of people using the resource but they are using it too fast. There could also be a combination of these two factors (Edney, 1980). The amount of time between the onset of overconsumption and the exhaustion of the pool depends on several variables (Edney, 1980). First, is the type of resource. Second, is its accessibility. Resources that are more easily accessible will be used up quicker than those that are difficult to access. Finally, the rate of replenishment is important. Even if there is high consumption, if the replenishment rate is relatively fast, this will delay the inevitable for a longer period of time. To maintain the pool at its current level and avoid exhaustion, individuals would need to adhere to the optimal harvest level. This is the harvest level that if everyone made, the pool would always be replenished to its
Another major class of social dilemmas is called the social fence. Like social traps, there is a short-term and a delayed outcome, but unlike social traps, the short term gain is negative and the delayed outcome is positive. A special case of the social trap is the public goods dilemma. In this paradigm, individuals must decide whether to contribute in order to establish or sustain a public good such as public television or a charity. There is a measure of risk seeking for the individual as he/she will endure an immediate loss in order to gain an uncertain benefit. The public good is characterized by having jointness of supply meaning it cannot be ‘used up’ no matter how many people are consuming it (i.e. public television will not run out of programming) and impossibility of exclusion indicating that it is nearly impossible to restrict noncontributors from consuming it (i.e. not allowing individuals to watch public television programming for failing to contribute; Komorita and Parks, 1996). Individuals choosing to consume the resource without actually contributing to it are said to be free riding. Maybe they believe that if they do not contribute to the good (i.e. donate to charity) other, conscientious individuals will, or they question why they should contribute to a service they would likely never use. If everyone followed this logic, the service could not be sustained leaving all worse off; i.e. losing the benefit of the service.

In either the resource dilemma or public goods dilemma, the outcome is such that the individual has less for him or herself if the choice is made to act in the collective interest. In the resource dilemma, the individual has less if she takes less from the common pool and in the public goods dilemma, the individual has less if she gives more to sustain the common resource.

The decisions to be made in these two types of social dilemmas may be the same in terms of objective appraisal of gains and losses, but they are not seen as such psychologically or
subjectively. In other words, looses loom larger than gains. The problem for social dilemmas is that it is unclear what choice behavior should be seen as a gain and which as a loss. For instance, the act of giving (contributing) in public goods dilemmas is a loss for the participant, though gain for the group, and the act of taking (harvesting) in resource dilemmas is a gain for the individual but a loss for the group.

A third major class of social dilemmas is the Prisoner’s Dilemma Game (PDG). Briefly, the PDG involves two prisoners who are accused of being partners in a crime. While in separate cells, the district attorney makes each prisoner the same offer. If the prisoner decides to “turn state’s evidence” and testify against his partner, he will go free while his partner will receive a long sentence. If both turn state’s evidence though, both will receive an intermediate sentence and if neither prisoner turns state’s evidence, both will receive a short sentence. Essentially, the act of turning state’s evidence involves a decision to *defect* from his partner while refusing to do so involves a decision to *cooperate* with this partner. This decision is made in complete ignorance of the other person’s decision. As Komorita and Parks (1996) note, “The dilemma is based on the fact that individual rationality has led to collectively irrational behavior. By pursuing their own selfish interests, each is worse off. If each could trust the other to cooperate, both would be better off” (p. 7). In the case of the two person PDG, the individuals are faced with the desire to maximize their own interests (defect) which conflicts with maximizing collective welfare (cooperate).

**Potential Explanations for Overconsumption of a Resource**

There are several potential explanations to help explain overconsumption in resource dilemma tasks. These include understanding behavior in social and temporal traps, decision making, social identity theory, and uncertainty.
Understanding Behavior in Social and Temporal Traps

Though Hardin (1968) did place most of the blame for the failure of the commons on the social trap component, is the role of the temporal trap completely negligible? In other words, what is the relative importance of each type of trap in real-world situations? In a study of 56 introduction to psychology students using a regenerating resource pool and subjects either participating alone, in groups of three, or groups of six, Messick and McClelland (1983) found that individuals working alone, for whom the social trap is irrelevant, tended to be more consistent in their harvests across trials but do not perform optimally as four of the six individuals failed to maintain the pool for the full 50 trials. This indicates that the temporal trap is not trivial even for individuals working alone but why is this? The authors point out that the task tends to be unforgiving and that one or two impulsively large harvests will reduce the pool size to such a low level that it would be impossible for the pool to replenish itself. In order to sustain the pool, subjects would need to take only the optimal harvest size.

On the other hand, groups seem to make much higher initial harvests and then decrease the size of the harvest sharply. So individuals working alone have some degree of difficulty dealing with the purely temporal trap whereas individuals in groups have more trouble dealing with both the temporal and social trap. Several explanations are offered to explain the social component. First, social loafing says that if no group member feels personally responsible for the outcome and if each individual feels that he/she can take a bit extra, then overuse if likely. Second, the big pool illusion is the tendency to ignore the number of other users and to focus solely on the relation between one’s harvest and the total resource available. Third, the relationship between the individual’s choice and the group outcome becomes muddied as the number of other's also impacting the outcome increases. Finally, a competitive orientation leads
an individual to want to keep up with the others and not be the one who gets the least.

**Decision Making**

**Factors affecting decision making.** Messick (as cited in Foddy et al., 1999) speculated that how we decide to handle a social dilemma depends on the nature of the outcomes; that is whether we are dealing with profits, costs, jobs, or lives. To determine this, he discussed four dimensions or features that affect how we make such decisions, though he did note that other features such as personal aspects of the decision maker (i.e. Social Value Orientation; SVO) can affect the final decision.

To describe these four and to show how social dilemmas manifest themselves in the real world, Messick utilized five examples. In the discussion to follow, one will be outlined. Messick told the story of a student, Michael, in one of his business ethics classes who was a naval flight instructor. Michael's job was to train naval pilots to fly fighter jets and to make aircraft carrier landings and take offs. At the end of each month, Michael would take his trainees up into the atmosphere and jettison jet fuel. Why would he do this? The Navy's allocation system was based on previous use. If the squadron experienced bad weather the month prior and could not make as many training flights, the next month's allocations would reflect that level of usage. If the weather was nice, the pilots would not be able to make as many flights. So to ensure the squad had its full allocation, fuel was released into the atmosphere, a practice used by many Navy instructors. What is at stake in this situation is lives. If the trainees could not log enough hours in the sky then they may not be as prepared should a war break out. Hence, their lives could be in jeopardy. In that way, Michael was bound by a moral imperative to ready his pilots.

First, when making decisions, the extent to which the social dilemma is explicitly motivated by future considerations is important. In our example, planning involves a time
dependent allocation system to achieve Michael's goal of providing quality training for his pilots. Having past fuel consumption determine future allocations is more an impersonal feature of the environment than a rational, strategic plan.

Second, some problems faced in the real world are explicitly collective in nature while others are essentially individual problems. In Michael's case, the dilemma is not inherently collective, but originates from a poorly designed allocation system and Michael is behaving rationally within the context of the system. His concern lies with his pilots being effectively trained for combat and dumping fuel is an effective way to guarantee that. He does not need to consider the actions of anyone else in the system.

Third, moral or legal concerns are important. When moral issues are involved, decisions may become more rule-based than outcome based, and when legal issues are involved, certain strategies that could make the resolution of the issue easy, may need to be excluded. Moral issues are paramount in the dilemma faced by Michael as lives are at stake. So again, dumping fuel makes sense. Maybe in a way it is a matter of which is the lesser of the two evils.

Finally, outcomes are important and the range of outcome variables is very wide and extremely complex, more so than can possibly be studied in experimental research. In Michael's case, money is not the outcome but the preservation of life, a situation not easily studied by researchers.

Messick argues that social psychology needs a new way to consider decision making in social contexts such as the dilemma described above. He advocates March's (as cited in Foddy et al., 1999) approach using three broad categories of concepts. These include appropriateness, personal (or organizational) identity, and finally rule-based decision processes in addition to consequence-based processes. Hence, the essence of the AIR (Appropriateness, Identity, Rule)
approach is in the perception of the situation. It may be appropriate to make a tradeoff between profits and costs in some situations, but in Michael's case, it was not appropriate to make a tradeoff between lives and costs. As Messick says, "Risk of life dominated his (Michael's) deliberations" (p. 217).

Deliberate action presents an interesting challenge during a pandemic. In a severe pandemic, not everyone can be saved so we will need to decide who lives and who potentially dies. It is ironic, that Messick says to be sure to include outcomes and rules in making decisions. Hence, in terms of moral issues, do not just base decisions on rules but look at the outcomes also. The Navy only looks at rules and not lives in the formulation of their allocation system. Since in a pandemic we may have to make hard choices, the easiest way to do this is when the outcomes are not at the forefront but maybe rules are. The government has tried to come up with vaccine priority groups to decide in what order people will be vaccinated. The CDC and most state health agencies have engaged the public in an ethical debate in the hope that we come to some consensus once the next severe pandemic does occur. This way we pull out our tables saying who gets vaccinated first and this frees governmental authorities from guilt over who is left to die (note that not everyone who would get the pandemic influenza strain would die – many would recover and then have some degree of protection from it).

Decision heuristics. Outside of careful deliberation, how else might we arrive at a decision? Another possibility is that decision heuristics play in. Schelling (1960) stated that we use a focal point or a salient strategy/solution to a decision making problem in which the appropriate behavior is unclear. When communication among group members is impossible, tacit coordination can emerge so long as members realize the focal point as the best solution to the problem and assumes the other group members will recognize this a well. Allison and Messick
(1990) stated that the equality rule, or the idea that whatever is to be allocated should be done so equally among group members, is one such focal point. Rutte, Wilke, and Messick (1987) note that it is a rule to facilitate one's own decision making (the role as a heuristic), thereby providing a solution to an ambiguous social dilemma, and is also a standard to evaluate the behavior of others. The equality rule is violated when situational or task cues making it salient are diminished or due to the presence of competing cues.

Allison and Messick (1990) led subjects to believe they were the first of six group members to take points from a common resource pool and that they could take as many points as desired which could later be exchanged for cash. Three variables were experimentally manipulated. First, subjects in the low payoff condition were led to believe the pool was only 18 or 21 points in size whereas those in the high payoff condition were told the pool consisted of either 24 or 27 points. Second, the pools were divisible (18 and 24) or nondivisible (21 or 27). Third, half of the subjects were placed in the fate control condition and told that if the requests from the six group members exceeded the pool size, then no one could keep any points, while the other half were in the no fate control condition and told there would be no penalties for overconsumption of the pool. Finally, data for a fourth variable, social values, was collected via questionnaire four weeks prior to participation. In all, the study employed a 2 (fate control) x 2 (payoff size) x 2 (divisibility) x 2 (social values) between-subjects factorial design.

Results showed that subjects took the least number of points from the resource pool when the resource was divisible, the payoffs were low, and there was no fate control. On the other hand, subjects took the most points when the resource was nondivisible, the payoffs were high, and subjects were noncooperative. To further demonstrate this point, Allison and Messick (1990) counted the number of inducements to which participants were exposed. This number ranged
from 0 to 4 inducements. Subjects took between one-fifth and one-fourth when there were one or two inducements, took about one-third when there were three inducements, and about half of the pool when all four were present. So the equal division rule was used when there were no temptations to violate equality but as the number of temptations increased, subjects became progressively more likely to overconsume the pool. The authors conclude that the presence of competing cues/factors tends to invite the use of self-serving rules to include "First-come, first-served" and "People who get to go first take more."

The type of decision heuristic or tacit coordination rule used may vary as a function of the type of social dilemma. Across three experiments (Van Dijik and Wilke, 1995), subjects participated in a four-person group in either a one-trial resource dilemma or one-trial public goods game and their group could obtain a bonus. Group members were identified by the letters A, B, C, or D. In Experiment 1, for the Public Good Dilemma condition, subjects were told their group would receive a bonus of 300 points if they contributed 120 or more points to a group resource. Of the four members, two held 100 points (positions A and B) while the other two held 50 points (positions C and D). If the condition was met, all four members shared the bonus equally (75 points per member) and each individual member would receive the points he/she did not contribute. In the Resource Dilemma condition, subjects were told their group controlled a resource of 300 points. Two members could take 100 points (positions A and B) while the other two could take 50 points (positions C and D). The group would receive a bonus of 300 points if they took 180 points or less and it would be divided equally among all four group members (i.e. 75 points each). As well, each member could keep the points he or she took. In both conditions, participants with a letter C were in the Low Position condition and those with a letter B were in the High Position condition. As well, subjects in both dilemma conditions were informed that the
points could be turned in for money (approximately $.60 per point). Experiment 1 therefore employed a 2 (dilemma type) x 2 (position) factorial design. In Experiments 2 and 3, subjects were also asked how important it was to them, when making their decision, to allocate the final outcomes equally. In Experiment 3, dilemma type was manipulated identical to the first two experiments but subjects were told they would receive either one-third of the bonus (high interest) or one-sixth of the bonus (low-interest).

In terms of choice behavior, Experiments 1 and 2 showed a main effect for position with subjects in the high position giving more points to the group resource or leaving more points in the group resource than subjects in the low position. There was also a significant interaction such that low position subjects facing a public good dilemma gave more points than comparable subjects in the resource dilemma. In contrast, high position subjects facing a resource dilemma gave more points than their counterparts. In terms of coordination rules, results across all three experiments showed that in the public good dilemma, subjects more accurately estimated the number of points considered fair to give using the proportionality rule but in the resource dilemma, the equality rule was best employed to this end.

In Experiment 1, a position x coordination rule interaction was also found and low position subjects used the proportionality rule most accurately whereas high position members used the equality rule. In reality, subjects would have had to use the opposite rule in both position conditions to obtain more favorable outcomes for themselves. The authors note that this behavior is consistent with Mikula and Schwingert's (as cited in Van Dijk and Wilke, 1995) concept of the politeness rule, or the idea that group members turn to rules that result in higher outcomes for their partners, but is contrary to Messick and Sentis (as cited in Van Dijk and Wilke, 1995) who propose that choice of coordination rules are shaped by self-interest.
In Experiments 2 and 3, Van Djik and Wilke (1995) also wanted to find out if subjects facing a resource dilemma were more motivated to minimize differences in final outcomes than subjects in the public good dilemma condition by asking a single question and allowing subjects to respond on a 7-point scale with a 7 indicating it was important and 1 indicating it was not important. Results confirmed this prediction with subjects in the resource dilemma condition reporting a mean of 5.4 and those in the public good dilemma condition reporting a mean of 3.5 in Experiment 2, and means of 5.8 and 4.1, respectively, in Experiment 3.

Finally, results of Experiment 3 showed that in terms of choice behavior, high interest subjects gave more points to the group resource or left more points in the group resource than did their low interest counterparts. Also, high interest subjects facing a resource dilemma left more points in the resource than their counterparts gave in the public good dilemma and low interest subjects facing a public good dilemma gave more to the group resource than low interest subjects facing the resource dilemma took from the resource.

All in all, Van Djik and Wilke (1995) showed that the two dilemmas do cause different choice behavior. Across experiments, subjects in the disadvantaged position (i.e. low endowments/access or low interest) chose to respond more cooperatively in the public good dilemma than in the resource dilemma but the opposite was true for subjects in the advantageous position (high endowment/access or high interest) as these individuals were more cooperative in the resource dilemma. The authors attribute this to a preference for the equality rule in resource dilemmas and for the proportionality rule in public good dilemmas and note that the consequences for real world issues are intriguing. For instance, providing equal outcomes to all people may be more important when deciding how to distribute energy than in setting up a program to prevent excessive energy consumption. In terms of a program such as a water
distribution system, most may prefer the costs be distributed proportionally, that is in terms of the income of the potential users or based on their interest. Hence, Van Djik and Wilke (1995) state that this example should caution researchers not to discuss the results of the two dilemma types interchangeably.

So what are the implications of decision heuristics on pandemics? Pandemics present an interesting scenario as they do not seem to fit in well with a resource dilemma or public good dilemma. Consider the equality norm which states that people receive equal final outcomes. It is impossible to take the total number of available vaccines and divide them across the population (assuming there is not enough for each person to have one). This would result in people getting a fraction of a vaccine which is not useful from a medical perspective. Some individuals will need to renounce their claim to a potentially life-saving vaccine so others can benefit. As for the proportionality rule, should vaccines be given to the public in some proportional manner? This also does not make sense as the person's claim is just one. You cannot give up a proportion of it for the same reason as in a resource dilemma. Hence, the situation is all or nothing.

Inducements (Allison and Messick, 1990) or potential competing cues in a social dilemma are interesting in this discussion. Whatever the relevant heuristic may be in this case, as other factors weaken the cues making it salient or there are other competing factors making its use muddied, we are more likely to act in a selfish manner. Hence, people may be less likely to follow pleas to allow those in critical vaccine groups to obtain the vaccine first and obtain one to protect their own future.

Cognitive load. Kunda (as cited in Roch, Lane, Samuelson, Allison, and Dent, 2000) theorized that high cognitive load leads to a reliance on stereotypes not because it interferes with the processing of relevant information, but because it disrupts the intentional inhibition of
stereotypes. Over two studies, Roch et al. (2000) investigated whether individuals participating in a resource allocation task would make different decisions and use different information processing strategies if they were distracted (high cognitive load) or not distracted (low cognitive load). In the first study, participants in the high cognitive load condition were given 20 seconds to remember an eight digit number and then performed a resource allocation task. Results showed that low-load participants requested more points from the common pool, made more task relevant statements (i.e. statements directly related to the task but not mentioning or implying equality), and made as many statements indicating the use of the equality heuristic as did participants in the high load condition. The larger request sizes are consistent with the notion that low-load participants had the necessary cognitive resources to engage in more systematic processing and therefore consider contextual factors in a more self-serving way. The authors note that given the large variability in the request sizes of low cognitive load participants, individual differences did play in otherwise, assuming they had considered the same situational cues, their requests would have been similar in size. Also, statistical analysis reveals that the number of task-relevant statements alone does not mediate size of the requests and that the number of equality statements must also be included.

In the second study (Roch et al., 2000), subjects were brought in to participate in a resource dilemma game but were not given specific details. They were given a blank sheet and asked to write down whatever questions they had about the game. Subjects in the high cognitive load condition were also given a nine digit number to remember. No resource consumption task followed. Coders evaluated the list of questions and classified them as an anchoring statement, or one that requested information needed if one wished to consume one's equal share of the resource; an adjustment statement, or one that requested information if one wished to consume
either more or less than one's equal share; or as a statement not fitting into either category.

Results showed that participants under high cognitive load generated fewer questions, participants in both conditions asked about the same number of anchoring statements, and those in the low load condition asked more adjustments questions. As for SVO, in the high cognitive load condition, both noncooperators and cooperators asked about the same number and types of questions but in the low cognitive load condition, noncooperators asked more adjustment questions.

The authors conclude that high load participants relied on heuristics to attain their level of desired confidence whereas low load participants relied on both heuristics and systematic or effortful processing to close the gap between their current level of confidence and their desired level of confidence. Although the use of heuristics is not necessarily negative, it is important to be wary of the fact that different decisions are reached when heuristics are used compared to systematic processing. Also, participants with a cooperative social value orientation rely on the equality heuristic regardless of cognitive load possibly because it fulfills their moral imperative. On the other hand, noncooperative individuals have a desire/motivation for might and dominance and typically engage in a more systematic search of the situation for a better outcome for themselves and are therefore more susceptible to cognitive load.

Cognitive load is interesting as one might imagine the amount of stress a policymaker, politician, president, public health professional, etc. may be under during the conditions of a moderate to severe pandemic. In these cases, they are dealing with more than just who receives a vaccine, but also with attempts to maintain public order when law enforcement officials become ill themselves or have to tend to ill family members; how to handle the proper and prompt disposal of deceased individuals and the family’s cries to bury the body in a manner keeping
with their religious beliefs; efforts to keep some semblance of continuance and normality in every day affairs when there is a need to isolate, quarantine, and social distance; how to provide children with school lunches when schools are close for upwards of 3 months at a time (for the many kids who receive free or reduced lunches, this is the healthiest and likely most complete meal they receive each day), figuring out how to handle medical surge and setting up field hospitals and triage units to care for the ill, determining what information to release to the public, etc. Hence, cognitive load will be high so do decision makers fall back onto specific heuristics or norms? The answer to this may vary with the severity of the pandemic.

Social Identity Theory

Defining social identity theory. Social identity theory asserts that people have a proclivity to categorize their social world into meaningfully simplistic representations of groups of people. These representations are then organized as prototypes, or “fuzzy sets of a relatively limited number of category defining features that not only define one category but serve to distinguish it from other categories” (Foddy and Hogg, as cited in Foddy et al., 1999). This social categorization process leads us to emphasize the perceived similarities within our group and the differences between groups and involves the self. We construct in-groups and out-groups and categorize the self as an in-group member. From this, behavior is generated such that the self is assimilated to the salient in-group prototype which defines specific cognitions, affect, and behavior we may exhibit. Conformity, in-group out-group homogeneity, in-group bias, stereotyping, normative behavior, etc. are all based on self-categorization then.

In fact, social norms function to deemphasize egoistic incentives so that the collective may benefit. Types of norms include injunctive which is a moral standard or the ‘ought’ meaning of norms and includes both personal and social norms, and descriptive or norms that function to
tell us what is typical. When individuals feel a high degree of awareness and personal responsibility, personal norms will be activated and direct their behavior. Biel, von Borgstede, and Dahlstrand (1999) examined several factors potentially affecting different social problems. These eight factors included the likelihood of the person changing behavior, need for changes in society, the importance of making behavioral changes, the seriousness of the problem today and in 10 years time, efforts to reduce the problem, arguments for avoiding inconveniences certain actions might cause, a sense of personal responsibility, and the shift of responsibility to politicians and other policymakers. The social problems examined included recycling or the problem of waste products, buying ecological products such as organic food or the problem of pesticides, commuting by car or public transportation or the problem of air pollution, and reducing electric consumption or the problem of electric supply. The results showed that the importance to act, a sense of personal responsibility, and the seriousness of the potential problems correlate substantially with norm perception. If an injunctive norm is perceived, people are likely to report they will act cooperatively and change their behavior.

Levels of inclusiveness. These categorizations are further seen to vary in terms of inclusiveness. Turner (1991, as cited in Foddy et al., 1999) identified three levels of inclusiveness – individual, intermediate in-group, and superordinate. In terms of the individual level, people define themselves in terms of how much they differ from other people. At the intermediate in-group level, focus is on similarities between the self and the in-group but also on differences between the in-group and some salient out-group. Turner notes that some groups are more inclusive than others and therefore more superordinate with humanity representing the highest level of inclusion for a superordinate group.

The shared resource and associated interdependence must form the basis of a
superordinate group identity which serves to remove the conflict among competing subgroups. If subordinate or subgroup identities are made salient such that they emphasize differences between members of a commons, the process of in-group bias and intergroup competition may undermine collective interests. Likewise, if the cost to the individual is too high, the collective good may not be promoted. Kramer and Brewer (1984) found that when a subgroup identity was made salient, male subjects extracted more points across trials as the resource pool approached depletion whereas males for whom a superordinate identity was made salient, decreased their take when resource depletion was obvious. Higher users were also rated as more selfish. The authors notes that individuals with a sense of collective identity may be willing to act to compensate for the selfish behavior of others in the group so long as they are not alone in doing so. Though a superordinate group identity is best, it is difficult to establish and maintain as people have a large repertoire of identities to define themselves by. According to the optimal distinctiveness theory (Brewer, 1991) people in large groups tend to categorize themselves at the subgroup level as it satisfies competing desires to be distinct and to assimilate.

**Social identity and social dilemmas.** Social identity theory has one major implication for social dilemmas then. As a group of people more clearly define themselves as members of a common social group, their collective welfare should prevail over self-interest and they should then behave more cooperatively or practice greater self-restraint. Why is this? A few reasons are possible. First is in-group favoritism such that we see other members of our group in favorable terms and assign them attributes such as being trustworthy, honest, and cooperative. Messick, Wilke, Brewer, Kramer, Zemke, and Lui (1983) found that expectations of reciprocity predicted cooperative response to a resource dilemma. This in-group favoritism also plays out in terms of groups competing for the same resource such that a desire for your own group to gain more than
an out-group emerges. Of course the problem with this is that if the resource is plundered to deny access to a competing out-group, then the in-group is also harmed. Second, it may be that we attach greater weight to collective outcomes than to individual ones. So, outcomes for the other group members or for the group as a whole, are seen as one’s own. Third, social group boundaries are typically fluid or elastic, we have multiple group identities, and they are hierarchically ordered. Inclusion within a common social boundary acts to reduce social distance among group members making it less likely they will make sharp distinctions between their own and other’s welfare.

Brewer and Kramer (1986) examined the effects of social identity, group size, and decision framing in both the resource dilemma and public goods dilemma. Using a 2 (task structure – resource dilemma vs. public goods dilemma) x 2 (level of social identity – individual or collective identity) x 2 (size of group – small or 8 members vs. large or 32 members) factorial design, the authors found that social identity is only an issue when depletion of a common resource has become severe. Individual self-interest or collective well-being is not very acute or apparent when there is an ample supply of a commons. When the choice problem was phrased as a resource dilemma, resource-use decisions were not affected by group size but were affected by group identity when the resource was endangered. Self-restraint increased under the collective identity when the group size was large.

In terms of the public goods dilemma, individuals were more sensitive to diffusion effects such that large groups undermined the positive effects of collective identity. When the collective identity was not made salient, subjects kept a moderately high amount for themselves on each trial regardless of group size. In small groups, the individual’s perceived contribution to the resource makes a difference such that increasing salience and immediacy of collective loss
increased willingness to sacrifice personal gain for the collective welfare. In large groups, perceived contribution makes less of a difference such that enhancing the salience of the group as a whole increased preference for risk and individuals kept as much for themselves in the short run. Brewer and Kramer (1986) conclude that the public goods dilemma seems to be particularly vulnerable to the deleterious effects of group size and group identity is not able to override this.

**Social identity and pandemics.** In cases of pandemics, Biel et al. (1999)'s work on norm perception is useful. It was the seriousness of the situation, personal responsibility, and importance to act that were found to be predictive of norm perception. The authors cite the example of an injunctive norm whose perception made cooperative behavior more likely. Likewise in a pandemic if the individual sees the situation as serious (a moderate or severe pandemic with a great deal of loss of life) than they should feel a greater sense of personal responsibility and an importance to act in terms of giving their entitlement to a vaccine up for those needing protection the most. Hence, this would be the *ought* side of behavior and would be consistent with their values.

If a collective identity is also made salient individuals may be more likely to look to the greater good and not their own selfish desires. If a pandemic represents a novel social dilemma, possibly sharing features of both RDs and PGDs, then the effect of a collective identity is unclear as Brewer and Kramer (1986) show that collective identity was helpful in a RD but not so much in a PGD with a large group. In small groups, collective identity did elicit greater cooperation from participants in the PGD. So maybe to link this back to Brewer’s (1991) optimal distinctiveness theory, make in-group identities salient, which seems to be our proclivity, and then we can induce cooperative behavior in both the RD and PGD. It may be that having a superordinate group identity such as humanity makes the problem seem too large for people but
if a person can focus on helping some salient in-group, then that can make a difference. Of course, this could in turn spawn in-group, out-group competition too.

Social Value Orientation (SVO)

Defining and measuring SVO. Social values are defined as "distinct sets of motivational or strategic preferences among various distributions of outcomes for self and others" (McClintock, 1978). The four possible social values are conceptualized as having either a prosocial or proself orientation. In terms of prosocial orientations, altruism is when a person desires to maximize other's outcomes regardless of their own outcome (Kuhlman & Marshello, 1975). Cooperation is when the person wants to maximize joint outcomes. In terms of proself orientations, individualism is when a person is only concerned with maximizing his or her own outcome whereas competition is an attempt to maximize one's own outcome relative to others.

SVO is most commonly measured using the decomposed game (van Lange et al., 1997) such that participants chose among three options offering points to Self and Other. For instance, Option A may be 480 points to Self and 80 to Other representing a competitive choice, Option B may be 540 points to self and 280 points to other or the individualist choice, and Option C may be 480 points to Self and 480 to Other, representing the cooperative choice. In order to be classified, participants must demonstrate a preference for one of the three orientations by making the corresponding choice on at least 6 of the 9 trials.

SVO and predicting behavior in social dilemmas. When it comes to social dilemmas, how good is SVO at predicting behavior? First, in terms of resource dilemmas (RDs), Parks (1994) found that when faced with a declining resource pool, Cooperatives decreased their harvests across trials, Individualists increased it, and Competitors did not change their harvest level. Utilizing a 2 (SVO - cooperative vs. noncooperative) x 2 (uncertainty - in relation to a high
or low replenishment rate), Roch and Samuelson (1997) found that individual harvest decisions were moderated by SVO but only under high environmental uncertainty and during the middle stages of a resource dilemma task. The authors speculate that when there is little uncertainty about the replenishment rate of a resource pool, noncooperators may not see an opportunity to exploit the situation as their action would be more noticeable and potentially sanctioned by the group. On the other hand, when it is fluctuating across trials, they may see this is an opportunity to take advantage of the situation and maximize their own outcomes at the expense of others. Noncooperators, therefore, seem to be more attune to subtle cues in the decision environment and Roch and Samuelson (1997) attained some support for this statement. When environmental uncertainty was low, both cooperators and noncooperators report the replenishment rate was less uncertain, but the effect was significantly larger for noncooperators. It may be that cooperators are less sensitive to these same cues due to their guiding principles of morality and fairness which are not context sensitive.

Using a decomposed game procedure, Kramer, McClintock, and Messick (1986) found that cooperators generally acquired fewer resources for themselves per trial than did noncooperators. In the sustained use condition, cooperators and noncooperators did not differ from each other much, other than noncooperators initially taking somewhat more for themselves. By the third trial block, the behaviors of both groups were very similar. In the rapid depletion condition, noncooperators took significantly more for themselves indicting no adjustment to the declining resource pool across trials. In the final trial block, faced with imminent loss of access to the valuable resource, noncooperators took more than 7 points for themselves whereas cooperators took less than 5 points. Even at the end, cooperators tended to harvest only what was coming to them. Interestingly, noncooperators lack of reciprocation did not cause cooperators to
abandon their own desire to conserve the resource pool. So how do we account for such differences? Kelley (1979, 1983) argued that an individual's social learning and early reinforcement cause different internalized rules or dispositions to develop which affects later behavior in situations such as those posed by resource dilemmas.

As for public goods dilemmas (PGDs), Parks (1994) found that trust was predictive of contribution behavior because the nature of payoffs necessitates thinking about other’s actions, and that the Trust Scale did not correlate with either a Judgmental Measure or Decomposed Games thereby suggesting it to be a distinct concept. DeCremer and van Lange (2001) found that prosocials contributed more than proselfs to the establishment of a common good and felt more social responsibility. They note that van Dijk and Wilke (1997) argued that in PGDs social responsibility is likely to be more easily activated than in RDs, particularly when the dilemma is portioned. Hence, choice differences between prosocials and proselfs may be more salient in PGDs than RDs.

**SVO and ecological validity.** Van Lange, Bekkers, Schuyt, and Van Vugt (2007) demonstrate the predictive ability of SVO in a non-experimental setting and found that in relation to donating to a noble cause, prosocials engaged in a greater number of donations than did Individualists or Competitors and pursued a greater number of donation goals. The authors conclude that SVO appears to be especially predictive of donations to organizations aimed at helping others who are strongly dependent on such help.

Across three studies, Joireman, Posey, Barnes-Truelove, & Parks (2009) examined the impact of warnings about depleting resources. They hypothesized that warnings would reduce harvesting behavior, that initial warnings would be more effective than later ones, stressing an immediate crisis would be more effective than warnings about a temporally distal threat, that
prosocials would be more responsive to warnings compared to proselves, and that those high in the consideration of future consequences (CFC) would be more responsive to the warnings. In general, their results were supported. Initial warnings and those emphasizing an immediate crisis were found to be more effective than later warnings at reducing harvests and prosocials were more responsive to the warning than proselves.

Finally, Joireman, van Lange, van Vugt, Wood, Vander Leest, and Lambert (2001) explored the conditions under which commuters are willing to financially support a structural solution to their primary dilemma, overreliance on cars. Participants included daily commuters in the Seattle area who were asked if they were commuters and if so, would they be willing to complete a short survey on commuting decisions. Support for the plan was high when participants believed the plan would be effective in reducing congestion and pollution, when participants believed they would personally benefit from the plan, and when the plan was perceived as fair. The relationship between perceived effectiveness at reducing congestion and support for the plan was higher for proselves and for those scoring low on CFC. Finally, prosocials were more sensitive to their belief that the plan was fair.

**SVO and pandemics.** In general, when a resource is being depleted or the replenishment rate is uncertain, non-cooperators take more than cooperators. But what about the behavior of cooperators? Would they become non-cooperative in a pandemic? The existing literature would suggest that the answer is no, but the scenarios presented above are not the same as the conditions under which a severe pandemic would occur. In none of these scenarios was the extinction of the resource likely to lead to death and mayhem. Hence, the pandemic scenario, and other related public health catastrophes or acts of biological terrorism, are unique, real world scenarios that have not previously been tested. Maybe it is as Messick (as cited in Foddy et al.,
1999) noted, some outcomes can be more easily studied in the laboratory than others.

One interesting study found that to induce cooperation, different strategies are needed depending on the social value orientation of the individual (Boone, Declerck, and Kiyonari, 2010). Across three studies, participants expressing a proself orientation were induced to act cooperatively through the use of explicit incentives while cooperation was enhanced for those expressing a prosocial orientation due to trust. In the case of the former, signals were added to "accentuate the win-win nature of cooperation, so that self-interested inclination of proselfs can be aligned with the interest of the larger collective" (pg. 813-814). In the case of the latter, trust was used to help overcome the fear of exploitation. Hence, during a pandemic, it is possible that proselfs be given some incentive to delay obtaining a vaccine. Admittedly, this may be difficult especially if the lethality of the virus is high. For cooperators, assurances would need to be given by government that exploitation of the system is not occurring.

Also, people want to receive fair outcomes, called distributive justice, but people also want authorities to use fair decision making procedures, called procedural justice. Virtually all research has examined the manner in which prosocials and proselfs approach others, judge others, and respond to others when faced with situations that involve questions about distributive justice. Van Prooijen, De Cremer, van Beest, Stahl, van Dijke, & van Lange (2008) examined whether procedural justice effects are stronger for individuals with proself or prosocial orientations. Results showed that procedural justice effects are more pronounced among proselfs than among prosocials. This is relatively interesting in relation to pandemics. Prosocials are interested in equality in outcomes whereas proselfs are interested in fair decision making procedures by authorities. It is these decision making policies during a pandemic that will be critical and under scrutiny. It will be difficult for them to be completely fair when we are talking
about life and death issues. Why is it fair that a 90 year old grandmother who has loving grandchildren be allowed to expire so that a young 30 year old white collar worker can survive? On paper this may seem fair as the latter person has more of a life to live whereas the former has lived her life, but the family of the grandmother will hardly see it as fair. So it will be interesting to put this to the test when lives are at stake.

Finally, noise presents an interesting challenge during a pandemic and is defined as discrepancies between intended and actual outcomes for an interaction partner due to unintended errors (Tazelaar, van Lange, and Ouwerkerk, 2004). There are two types of noise. Negative noise is unintended errors that cause actual outcomes to be worse than intended and is assumed to pose a greater challenge to trust and impressions of benign intent, as well as a stronger deterrent to cooperative interaction. Positive noise is unintended errors that cause actual outcomes to be better than expected. Brucks and van Lange (2007) found that when there was no noise, prosocials adapted to a diminishing pool by reducing their consumption but when noise was present, they increased their consumption.

So what can be done about noise? Tazelaar, van Lange, and Ouwerkerk (2004) showed that the detrimental effects of noise could be reversed if partners communicated in the form of sending messages. The authors noted that by communicating about noise, partners were able to psychologically undo noise, thereby maintaining impressions of benign intent, an important ingredient for cooperative behavior. Klapwijk and van Lange (2009) stated that two strategies can deal with noise. First, noise can be reduced if at least one of the two persons adds generosity to his or her strategy. Second, the building of trust may help such that the self is less likely to perceive an incident of noise as intentional if the self has strong trust in the other. Rumble, van Lange, and Parks (2010) showed similar undoing effects but with a display of empathy, possibly
because empathy increases the positive weight associated with their partner's outcomes and therefore increases levels of cooperation.

Noise can be an issue where government is concerned. Maybe in the case of vaccines, the government does not receive as many vaccines as requested. Citizens go to sites where the vaccine is supposed to be and there is none or very little. This causes a challenge to trust, especially for those low in trust, and now people second guess the ability of government to handle the event. Communicating about an event such as this, especially if it is not the government’s fault, can restore people’s faith and trust in government and keep cooperation high. When people feel like they are deceived they tend to be non-cooperative. This is an important fact because if government does not seem to be competent, there could be a breakdown of basic social order and even the most cooperative person could become uncooperative.

Uncertainty

Another potential explanation for overconsumption centers on uncertainty which can take two different forms. First, environmental uncertainty indicates features of the environment that are unknown or unknowable such as the size of the resource. Second is social uncertainty which centers on the unpredictable nature of other's actions. In general, overconsumption increases as resource uncertainty increases (Budsescu, Rapoport, and Suleiman, 1990) but is reduced or eliminated in cases of social uncertainty if an equal share norm/heuristic is adhered to (Allison & Messick, 1990; Messick & Schell, 1992; Rutte, Wilke, & Messick, 1987). It is possible that this finding for social uncertainty depends on the type of social dilemma and so is not as salient in resource dilemmas as it is in public good dilemmas (Wit and Wilke, 1998).

The equal partitionment of a resource is possible when it comprises discrete, discernable
units of approximately the same size. But many large scale resources, such as water or air, have a nonpartitioned structure, thereby obscuring the equality rule. The only solution in this case is to "partition" the resource through such means as water meters. Also, the sheer size of a partitioned resource may in effect make it a nonpartitioned resource from which members can only estimate their equal share. In a study by Herlocker, Allison, Foubert, and Beggan (1997), subjects reported feeling more satisfied when they left with partitioned units than with nonpartitioned ones and consumed more of the nonpartitioned resource, whether physical, spatial, or temporal, than a partitioned one in large group settings. When members of a large group were given their equal share, they saw it as less than their equal share. On the other hand, Au and Ngai (2003) reported less collective overuse when group size was uncertain as participants acted as if the group was large and showed restraint by requesting less. DeKwaadsteniet, van Dijk, Wit, and De Cremer (2008) found that when the task environment of a social dilemma provides some type of salient cue to guide behavior (i.e. a strong situation) people make their harvest decisions on that cue but if the task environment does not provide such cue (i.e. a weak situation) they based their decision on their own social value orientation. So, prosocials will exercise self-restraint to further the outcomes for all when in a weak situation.

Allison, McQueen, and Schaeerfl (1990) found that subjects drawing from a nonpartitioned resource took more units and said their decision was more difficult to make as they could not easily use the equality rule. Also, members of large groups were less likely to divide equally and took more of the shared resource, implying that the quantity of group members sharing a resource is more important than the quantity of the resource itself. It may be that a person's ability to estimate their equal share decreases as the number of others sharing a nonpartitioned resource increases called the overestimation bias or that people in large groups
are less motivated to divide a nonpartitioned resource equally. So in terms of the former, members of large groups use the equal division rule as a focal point but the overestimation bias distorts their perception of the equal amount and in the case of the latter, people may consume more than their equal share when they sense their overconsumption will be difficult to measure or detect.

Three explanations can be offered for the pattern of behavior seen as a result of uncertainty (Garling, Gustafsson, & Biel, as cited in Foddy et al., 1999). First, the perceptual explanation asserts that overconsumption occurs because participants perceive a positive relationship between measures of central tendency, such as the mean, and variability. As resource uncertainty increases, people overestimate the size of the resource and request too much. This explanation is consistent with the big pool illusion which states that we perceive resources of unknown size as larger than resources of a known size.

The second explanation states that participants weight the upper and lower bounds of the interval when estimating the size of a resource but do so in a way that they overweight the upper bound causing an upward shift in their estimates and request too much. Hence, the participant tends to judge desirable outcomes as more likely. This effect is called the optimism bias, outcome desirability bias (Zakay, 1983), or wishful thinking.

Finally, the egoism bias (Wilke, 1991) asserts that people try to maximize their own outcomes but their greed is constrained by the motive to maintain the resource and to have equal outcomes for all group members. In cases of uncertainty, the equality norm may be less compelling and people request more than they should. They may also not believe that a sufficient number of others will request less than their share. Hence, the goal of efficient resource use conflicts with egoism. An egoism bias may also cause misperceptions of the size of the resource
when the outcomes are dependent on other's decisions that lead to unintentional harvesting (Garling, Gustafsson, & Biel, as cited in Foddy et al., 1999).

So which explanation best accounts for overconsumption in resource dilemmas or underfunding in public good dilemmas? Research seems to point to the outcome-desirability or optimism bias (Gustaffson, Biel, & Garling, 1999 & 2000). If people are unaware of the size of a resource and need to estimate it, they will be too optimistic when the resource is of value to them (make an overestimation in resource dilemmas or make an underestimation in public good dilemmas) and overuse/underfund it.

**Uncertainty in a pandemic: To get vaccinated or not to get vaccinated?** Pandemics present an interesting challenge for public health professionals and politicians as they involve aspects of uncertainty. The most obvious form of uncertainty is in terms of when a vaccine will be available which could take up to 9 months and until there is an actual resource to allocate, there is no resource dilemma. Nonetheless, other decisions policymakers and public health officials have to make are affected such as those concerning social distancing, isolation, and quarantine. These decisions raise concerns about child development (closing schools, not allowing children to play on playgrounds, isolating them if ill, etc.), conformity and how long individuals will be willing to go along with public health admonitions to stay home if sick in light of the need to be financially sound, obedience to their employers who may be telling them to violate these admonitions and come to work, satisfying affiliation needs, and dealing with loss and a likely rise in the incidence and prevalence rates of Post Traumatic Stress Disorder (PTSD). (Note that while the world waits for a vaccine to be developed and mass produced, only antivirals could be allocated to sick individuals but their effectiveness is questionable, representing another type of uncertainty.)
Another type of uncertainty that is important here is that of replenishment rate. Once a vaccine is available, it will not be released in quantities sufficient to vaccinate the entire population. So how many are made available initially and how soon others will come is important. It is possible that it is this type of uncertainty that could cause individuals to not respect the wishes of health care authorities to leave available vaccines for those in high priority groups. This makes sense as we do have a desire to ensure our own survival and those in our immediate in-group (family, close friends, etc.). So if information is not quick in coming and does not provide realistic timetables that are adhered to by governmental agencies at all levels, any attempt to maintain order could be jeopardized.

The preceding factors represent aspects of environmental uncertainty. Of course hinted at was social uncertainty and any vagueness in how others are or will act. If we believe others are following the guidelines given by policymakers, then we will likely too. If not, then we may want to get what we can and even cooperators may fall prey to such behavior in an effort to survive. Most resource dilemmas do not discuss life and death situations. Does a specific resource running out mean life and death for a group of people? It certainly could, but this is not likely what we are talking about. Messick (as cited in Foddy et al., 1999) said when deciding on a course of action in a resource dilemma we must consider the outcome, in this case lives. So if we are worrying about that, and we would be as public health authorities, what decisions can we really make? In light of an aggressive virus for which antivirals may be ineffective or provide limited results, how can we save everyone? We cannot. So to say consider lives is nice, but when making resource allocation decisions in a Category 4 or 5 (severe such as 1918) pandemic, someone will win and others will lose.

**Other considerations.** When we are talking about how people may react, the issue
depends on how severe the pandemic is. It may be possible to see Category 1 pandemics as optimal use as there is not a significant need for vaccines, antivirals, and ventilators (especially of the pediatric kind). Category 2-3 pandemics may be equivalent to moderate overuse which can cause problems as the virus is more aggressive and has a higher mortality rate and so people will be seeking vaccines which will deplete our supply quicker. Finally, Category 4-5 pandemics would be equivalent to severe overuse and exhaust all our resources due to increased and immediate need. This relates to social uncertainty in terms of how others may respond and is linked to environmental uncertainty in that the replenishment rate of vaccines will likely be uncertain and could lead to differential behavior depending on the severity of the pandemic.

Secondly, information that will be reported to the public is in terms of geographical spread of the illness. This will vary from No Activity, to Sporadic, to Local, to Regional, to Widespread. There will not likely be a need to obtain valuable resources when the virus is just sporadically or locally spreading such as being only on the east coast and say in cities. As it spreads out from these population centers into less densely populated areas (making a jump from Sporadic and Local to Regional or Widespread), the need for resources will grow but also the concern of citizens for their own safety. Consider the person living in a small town in the panhandle of Idaho. If the virus never spreads that far, they will not likely feel the need to obtain a vaccine. In fact, the state of Idaho will likely send what vaccines they have been given from the Strategic National Stockpile (SNS) to larger cities such as Boise being that rates of infection will likely be higher there and the risk of transmission greater due to the close spatial proximity of inhabitants. If the virus becomes widespread need will grow greater and so conditions like an uncertain replenishment will be a factor.
A Potential Solution to Overconsumption

Resource dilemmas present several interesting dynamics when it comes to finding a solution. First, the individual has to realize there is a problem with overconsumption. Second, is the level of the consumer's consciousness or how sensitive she is to the ill-effects of overconsumption. Third, is the willingness and ability of the individual to take effective action to prevent a crisis from developing from overexploitation. Though an individual is aware that an issue exists and is sensitive to the ill-effects, does she take the appropriate measures to reduce her use? It may be that she wants to recycle, but her town has no recycling program in place. Finally, even if a reduction in resource use is essential, governmental coercion is ineffective as governmental bodies change over time. Also important to a discussion of fines, but also rewards, is the idea that rewards can be good in the short term but bad in the long term if people depend on their presence to act in a socially responsible way (Edney, 1980).

When it comes to resource dilemmas, the democratic value of equality may be preserved at the expense of another value, freedom such that when mutual self-restraint breaks down, the community must decide whether to compromise its democratic values or further jeopardize its resources (Edney, 1980). So what are potential ways to solve the problem of overconsumption?

Structural Change and Leaders

There are two potential solutions to deal with overconsumption that threatens the commons (Samuelson, 1991). First, individual solutions involve the voluntary, cooperative efforts by members of the group to solve the problem using the current incentive structure. The second possible solution would be the use of a structural solution. These are any actions that abolish or change the incentive structure that created the overconsumption/social dilemma.
Noteworthy is the fact that use of these structural solutions may cause the situation to no longer meet the definition of a social dilemma or it would reduce the difference in reward associated with cooperating and not cooperating (Foddy & Crettenden, 1994 and Rutte, 1990 as cited in Foddy & Hogg, 1999).

The discussion to follow will be organized around to key questions: first, what determinants affect the decision to make a structural change and second, once the decision has been made to execute a structural change, under what conditions are these rival systems chosen?

**Should we make a change?** In terms of the first question, the perception of inequity in a resource dilemma may either facilitate or inhibit structural change depending on the context in which it occurs (Samuelson and Messick, 1986). Samuelson (1991) found that a group member's causal attribution for a group's poor performance in using a common resource is a critical determinant in the decision to make a structural change. Using a 2 (perceived cause - personal greed (subjects told task was easy and previous groups maintained the commons well) vs. task difficulty (told task was difficult and other groups performed poorly in the past)) x 2 (attribution - situational vs. dispositional) between subjects factorial design, subjects in the task difficulty condition thought the group's failure was more due to bad luck and variable replenishment rate (situational attribution) and voted for change whereas those in the personal greed group saw other members as causing the problem (dispositional attribution) and refused change (reasons to follow in the discussion of the second question below). Hence, two factors that play a crucial role include: 1) the perceived effectiveness of the group in managing the resource and 2) if ineffective, what the cause of this ineffectiveness is.

Next, Messick, Wilke, Brewer, Kramer, Zemke, and Lui (1983) hypothesized that when subjects withdrew resources from a commons at too high a rate, the group would be more willing
to change the group decision structure than subjects in optimal or suboptimal conditions. Utilizing a 3 (use - overuse, underuse, and optimal use) x 2 (variance - high and low) factorial design, they found that nearly 70% of subjects in the overuse condition voted to eliminate free access whereas subjects who did not see the pool size decrease (i.e. underuse or optimal use conditions) voted against the elimination of free access, possibly adhering to the adage 'if it is not broke, don't fix it.' Hence, rate of use is a factor in the decision to make a structural change.

Samuelson (1993) noted that changes in social institutions involve transition costs which make the status quo more attractive. Also, there is less uncertainty about the status quo compared to these new systems. Before a change can be endorsed, these two issues must be reconciled. This process involves evaluation of the potential change and is organized around four dimensions. First, *efficiency* is the dimension that represents the capacity of an allocation system to provide sufficient levels of a resource to group members without depleting it. Second, *fairness* involves the degree to which the distribution of resources is equal. Third, *freedom* is the extent to which a system allows individuals personal autonomy to make resource use decisions. Finally, *self-interest* is a member's own evaluation of how his or her personal resource outcomes will be affected by the new system.

Two key factors should influence this evaluation process as well. First, there are systematic differences among individuals in the relative importance assigned to the different evaluative dimensions. As such, this may result in predictably different evaluations. Second, past experience with the status quo system may influence the perceived location of that system on relevant evaluative dimensions.

To test this, Samuelson (1993) used a 2 (social values - cooperative vs. noncooperative) x 2 (resource use - extreme overuse vs. moderate overuse) x 2 (variance - high vs. low) between
subjects factorial design. Results showed that almost half of all subjects ranked efficiency as the most important evaluative dimension with fairness (28%), freedom (19%), and self-interest (4%) as the next most frequent selections. Cooperative individuals ranked fairness as more important and endorsed structural change only under conditions of inefficient management of the common pool, whereas noncooperative subjects assigned greater importance to self-interest and refused structural change regardless of the efficiency of the resource use. In terms of resource use, he found that subjects in the extreme overuse condition rated the free access system as less efficient and rated the status quo system as less fair then moderate overuse subjects and voted to replace the system, similar to the findings of Messick et al. (1983). Hence, the relative importance of different evaluative dimensions is a factor in the decision to make a structural change.

**Which change is best?** Once a decision has been made to make a structural change, a few options are available to the individual/group. The decision may be made to utilize privatization. This is when commonly held resources are converted into privately owned resources and effectively eliminates interdependence among users. Privatization may be done equally or proportionally. Another option is to elect a superordinate authority or leader but as with all alternate choices, it comes with certain costs. It will result in the loss of freedom to utilize the commons resource and in making decisions for the group, some will be upset with the leader's decision and be forced to accept it.

So which type of change is preferred under different conditions? Yamagishi (1986; cited in Samuelson, 1991) noted that members must perceive that the structural change will be effective in attaining the goal of mutual cooperation. Returning to the discussion of the Samuelson (1991) study, when group members made a situational attribution for the group's failure, they were less likely to make negative dispositional attributions about the other group
members and were more likely to elect a leader. When other group members were seen as the source of the problem (i.e. the individual made a negative dispositional attribution as found in the personal greed condition) the leader system was not endorsed. Samuelson speculated that subjects may regard these other group members as too incompetent or untrustworthy to given leadership authority.

Samuelson and Messick (1986b) placed subjects in groups of 6 and told them to harvest resource units from a common, replenishable pool over 10 trials. Subjects had to maximize individual harvests while maintaining the resource pool for future use. Manipulated variables included resource use (2 levels - overuse vs. optimal use), perceived inequality (variance) in other group member's harvests (high with a range of 37 to 269 or low with a range of 104 to 179), and type of alternative to free access (3 levels with leader, equal division, or proportional division). Results showed that overuse subjects voted for structural change more than optimal use subjects with leader receiving the most support followed by proportional and equal division. Equal division was the least popular solution possibly because it was viewed by subjects as a potential threat to their ability to harvest a similar amount of resources in the second session. The lowest rates for equal division came in the optimal use condition where the commons was not in danger of being depleted. Again, the 'if it ain't broke, don't fix it' adage seems to come into play. Subjects were happy with their harvest outcomes and no harm came to the commons. Samuelson and Messick (1986a) conducted a similar study and found that the election of a leader was nearly unanimous among high access/overuse/high-variance subjects. Low access subjects preferred equality-restoring systems.

In the Samuelson (1993) study, equal privatization was rated as most attractive, followed by harvest cap, free access, and the leader option last. Strong endorsement for equal privatization
and harvest cap may be due to it allowing for personal autonomy and a low endorsement of leadership may be explained by the fact that it eliminates self-determination. For instance, noncooperatives, who determined self-interest to be the most important evaluative dimension, rejected the leader option since it would lead to a loss of freedom in accessing the commons and cause them to have to accept whatever decision the leader made.

The type of social dilemma seems to play a role in leader selection too. In public goods dilemmas, the role of the leader would be to decide how much an individual should contribute from their private resources whereas in resource dilemmas, the leader determines how much of a common resource an individual can take. Van Dijk, Wilke, and Wit (2003) showed that subjects in the public goods dilemma were more favorable to leadership after failure feedback likely in an attempt to improve their condition compared to those in the resource dilemma condition for whom their situation did actually improve (they had more at the end then they did at the beginning). This seems to be in keeping with the idea that losses loom larger than gains. On the other hand, when there was no information about the group's success or failure, subjects in the public goods dilemma were more reluctant to install a leader possibly because it is more threatening to give up decision freedom over personal property compared to collective property. Simply, a higher threat to decision freedom was associated with a lower preference for leadership.

Among the types of structural change, leaders seem to be the obvious choice. Why might a leader be able to resolve the conflicting pressures between individual and group interests? Several explanations are plausible (Foddy and Hogg as cited in Foddy et al., 1999). First, they may have access to information about the overall state of the resource that others may not. Second, the leader can possibly coordinate the actions of group members. Third, there is no
longer a resource dilemma as only one person has access to the resource pool. There is one exception to this. In many cases, there are two or more leaders accessing the resource pool on behalf of separate groups or subgroups. In this case, the appointment of leaders does not dissolve the dilemma but retains its features. Fourth, the role of the leader may evoke a leader schema which creates pressure to be fair and responsible. Lastly, making an individual responsible for the welfare of others may invoke a superordinate social orientation where concern for the group may lead to constraint in the dilemma setting.

So if the group decides on the election of a leader as a structural change, who is chosen? Messick et al. (1983) found that when selecting a leader subjects generally voted for themselves or for another group member who had taken a moderate harvest during the first session. Returning to our discussion of social identification, typically, when an individual is part of a group, behavior conforms to the group prototype. This is no different for the leader who occupies the most prototypical group position (Foddy and Hogg, as cited in Foddy et al., 1999). He/she does not actively lead but embodies the aspirations, attitudes, and behaviors of the group as they are manifestations of the group prototype (hence the voting behavior noted by Messick et al., 1983). With the passage of time, this individual can exert some influence in terms of becoming socially attractive and can then gain compliance with their suggestions, orders, or requests and are imbued with charismatic personalities as group members attribute the influence of the leader to his/her personality (dispositional attribution) and not to the prototypicality of the position (situational attribution).

It is also expected that the leader will favor the in-group over out-groups when there is competition for a limited resource due to accountability to the group. This results in a dilemma in and of itself which can be summarized as such: does the leader take more for the in-group at the
expense of the out-group, hence winning the battle of group wills, but at the same time hurting the in-group when the resource is exhausted? Hence, accountability to the group causes the leader to forgo compromise which could result in a mutually beneficial intergroup outcome. In the case of social dilemmas, this problem is faced by subgroup leaders but for superordinate group leaders, it is not an issue and most are particularly conserving of the resource. One possible solution is to have leaders who are not subgroup prototypical, do not identify strongly with their subgroup, and are not highly accountable to the subgroup (Foddy and Hogg, as cited in Foddy et al., 1999).

**Leaders and pandemics.** One leader behavior is noteworthy here. Subjects who took large harvests as individuals also tended to take large harvests when they were leaders (Messick et al., 1983; Stouten, DeCremer, & van Dijk, 2005). It may be they had reason to believe they were making their allocations privately and so may have felt freer to make these allocations consistent with their self-interest. Another explanation may be that they felt they expended more effort and so felt justified in keeping proportionally more points (Messick et al., 1983). Stouten et al. (2005) adds that followers may accept leaders who take more so long as they see the leader as someone who has done more than others, thereby reinforcing perceptions of justice. The authors also note that leaders thought they could exert more influence on the group than followers and harvested more than followers in the high variance condition. These negative leader behaviors are explained by the lack of a clear behavioral norm that group members are assumed to adopt, such as when there is high variability in the harvesting behavior of group members.

In a pandemic, our leadership, law enforcement officers and support personnel, public health professionals, and other select jobs necessary for the continuance of society will be given
vaccines as part of their job duties. Also, this vaccination will be extended to members of their immediate household, the premise being that the person can go to work each day and focus on tending to the needs of others, without having to worry about their own health or that of their immediate family. Most people in society would not likely have an issue with their first responders and leadership receiving this special type of treatment.

**Conclusion**

The literature on social dilemmas has for major implications for pandemic influenza outbreaks. First, in terms of decision making, pandemics could make careful deliberation less likely, may lead to greater use of heuristics, and may cause higher cognitive load as the pandemic becomes more severe. Second is social identity theory and of particular import to pandemics is norm perception and collective identity as ways to induce cooperative behavior. Third, social value orientation suggests potential behaviors of cooperators and noncooperators during a pandemic. Finally, uncertainty is an important topic as both environmental and social uncertainty will be experienced as described previously.
CHAPTER ONE
INTRODUCTION
UNIVERSAL HUMAN VALUES AND PANDEMICS

Defining Values

Values have six main components that define them (Schwartz, 1992, 2005a). First, they are beliefs with emotional aspects. If a person is independent and can achieve it, they are happy. If their independence is threatened, they become highly vigilant, and if it is taken from them, they become upset. Second, values are not linked to specific actions or situations but define behavior in all situations. This is unlike norms which are particular to certain actions or situations. Third, they are linked to specific goals. Fourth, they are ordered meaning some values are promoted above others. Fifth, they are relative. In any given situation, more than one value is relevant. For instance, a religious person pursues conservation values at the expense of openness to change values such as Hedonism, Stimulation, and Self-Direction. Sixth, values are standards by which we can judge our behavior. If our behavior is consistent with our values, this process occurs subconscious but if it is not, it raises to conscious awareness. So when taken together, a value is a (1) belief (2) pertaining to desirable end states or modes of conduct, that (3) transcends specific situations; (4) guides selection or evaluation of behavior, people, and events, and (5) is ordered by importance relative to other values to form a system of value priorities (Schwartz, 1994).

There are ten main values arranged around two main axes. On the one axis, you have Openness to Change values versus Conservation values. Openness to Change includes Hedonism or the pursuit of pleasure, Stimulation or pursing novelty or excitement in life, and Self-direction or independent thought and action. Opposed to these are Conservation values which include Conformity or following social norms, Tradition or following the customs of your group, and
Security or stability and safety. The other axis consists of Self-Enhancement values such as Power or social status and prestige or control over people and resources and Achievement or personal success through demonstrating competence as defined by society. Opposed to them are Self-transcendence values which include Benevolence or care and concern for those in your in-group and Universalism or care for all others. The ten values are arranged as such:

![Diagram of value types](image)

*Fig. 1. Theoretical model of relations among motivational types of values, higher order value types, and bipolar value dimensions (adapted, with permission, from Schwartz, 1992).*

There is also a shared motivational emphasis of adjacent value types such that:

- **Power and achievement** emphasize social superiority and esteem
- **Achievement and hedonism** focus on self-centered satisfaction
- **Hedonism and stimulation** involve a desire for affectively pleasant arousal
- **Stimulation and self-direction** involve intrinsic interest in novelty and mastery
- **Self-direction and universalism** call for reliance upon one's own judgment and comfort with the diversity of existence.

- **Universalism and benevolence** are concerned with enhancement of others and transcendence of selfish interests.

- **Benevolence and conformity** involve a call for normative behavior that promotes close relationships.

- **Benevolence and tradition** promote devotion to one's in-group.

- **Conformity and tradition** entail subordination of self in favor of socially imposed expectations.

- **Tradition and security** stress preserving existing social arrangements that give certainty to life.

- **Conformity and security** emphasize protection of order and harmony in relations.

- **Security and power** stress avoiding or overcoming the threat of uncertainties by controlling relationships and resources.

The motivational differences between the various values are continuous, not discrete, with greater overlap in meaning near the boundaries of adjacent value types.

**Measuring Values**

**The Schwartz Value Survey** (SVS; Schwartz, 1992, 2005a). The first instrument developed to measure values based on this framework is the Schwartz Value Survey (SVS; Schwartz, 1992, 2005a). The SVS presents two lists of value items. The first contains 30 items that describe potentially desirable end-states in noun form; the second contains 26 or 27 items that describe potentially desirable ways of acting in adjective form. Each item expresses an aspect of the motivational goal of one value. An explanatory phrase in parentheses following the
item further specifies its meaning. For example, ‘EQUALITY (equal opportunity for all)’ is a universalism item; ‘PLEASURE (gratification of desires)’ is a hedonism item.

Respondents rate the importance of each value item "as a guiding principle in MY life" on a 9-point scale labeled 7 (of supreme importance), 6 (very important), 5 (unlabeled), 4 (unlabeled), 3 (important), 2 (unlabeled), 1 (unlabeled), 0 (not important), -1 (opposed to my values). The nonsymmetrical nature of the scale is stretched at the upper end and condensed at the bottom so as to be able to map the way people think about values but also allows respondents to report opposition to values that they try to avoid expressing or promoting. This is especially important for cross-cultural studies as people in one culture may reject values held dear in other cultures. The SVS has been translated into 48 languages.

The score for the importance of each value is the average rating given to items designated a priori as markers of that value. The number of items assessing each value ranges from three for hedonism to eight for universalism. Only value items that have demonstrated near-equivalence of meaning across cultures are included in the indexes. Alpha reliabilities of the 10 values average .68, ranging from .61 for tradition to .75 for universalism (Schwartz, 2005b).

The Portrait Values Questionnaire. The Portrait Values Questionnaire (PVQ) is an alternative to the SVS developed to measure the ten basic values in samples of children from age 11, the elderly, and persons not educated in Western schools that emphasize abstract, context-free thinking. The SVS had not proven suitable to such samples.

The PVQ includes short verbal portraits of 40 different people, gender-matched with the respondent (Schwartz, 2005b; Schwartz, et al., 2001). Each portrait describes a person’s goals, aspirations, or wishes that point implicitly to the importance of a value. For example: “Thinking up new ideas and being creative is important to him. He likes to do things in his
own original way” describes a person for whom self-direction values are important. “It is important to him to be rich. He wants to have a lot of money and expensive things” describes a person who cherishes power values.

For each portrait, respondents answer: “How much like you is this person? Potential responses include: very much like me, like me, somewhat like me, a little like me, not like me, and not like me at all. Participants’ own values are inferred from their self-reported similarity to people described implicitly in terms of particular values. Participants are asked to compare the portrait to themselves rather than themselves to the portrait. Comparing other to self directs attention only to aspects of the other that are portrayed.

The verbal portraits describe each individual in terms of what is important to him or her. Thus, they capture the person’s values without explicitly identifying values as the topic of investigation. The PVQ asks about similarity to someone with particular goals and aspirations (values) rather than similarity to someone with particular traits.

The number of portraits for each value ranges from three (stimulation, hedonism, and power) to six (universalism). The score for the importance of each value is the average rating given to these items. Alpha reliabilities of the ten values average .68, ranging from .47 for tradition to .80 for achievement (Schwartz, 2005b).

**Cross-Cultural Variation in Values: Universality and Diversity**

Schwartz and Sagiv (1995) found substantial support for the claim that ten motivationally distinct value types are recognized across cultures and used to express value priorities. In terms of common cross-cultural variations in the locations of single values, spiritual life emerged most commonly in benevolence, universalism, or tradition regions, implying a broad meaning of transcendence of the material interests of the self. What differs are the reasons for transcending
self interest implied by the locations. For instance, the welfare of close others is located in benevolence, the welfare of all others in universalism, and the demands of transcendent authority in tradition. The different locations may represent something about the nature of spirituality in different cultures.

In terms of ‘self-respect,’ it emerged with almost equal frequency in regions of achievement and self-direction values. In Communist countries, when emerging with achievement values, self-respect may be built primarily on social approval obtained when one succeeds according to social standards. Self-respect emerged in the achievement region in almost all Eastern European samples possibly reflecting a socializing impact of communism with its emphasis on grounding self-worth in evaluation of one's group. In Capitalist countries, when emerging with self-direction values, self-respect may be linked more closely to living up to one's independent, self-determined standards. Self-respect emerged in the self-direction region in most strongly capitalist countries (Schwartz and Sagiv, 1995).

Schwartz and Sagiv (1995) also report that ‘healthy’ emerged most frequently in the region of security values signifying a concern for physical and/or psychological safety (i.e. maintaining health and avoiding illness). It emerged less frequently with hedonism values signifying a meaning of enjoying the pleasures of a healthy body rather than fearing ill-health. Not infrequently, it emerged in the region of achievement, which falls between security and hedonism.

For the Japanese, ‘true friendship’ was located in the security values region in the total sample and split half analyses. This may mean that for these students, friendship is valued more for the security it provides rather than for the care it expresses toward close others. For the Japanese, forgiving was located in the middle of the universalism rather than the benevolence
value region in all analyses. This implies that forgiving is motivated more by an appreciation of life's complexities (universalism) than by a desire to be kind to others (benevolence) (Schwartz and Sagiv, 1995).

Three sets of data measuring values differently (the SVS, PVQ, and World Value Survey; sample sizes of 41,968 across 67 countries, 42,359 across 19 European countries, and 84,887 from 62 countries, respectively) addressed the question of how much do values vary across countries and to what extent do citizens within a country share values (Fischer and Schwartz, 2010). Results show that there was greater consensus than disagreement on value priorities across countries with autonomy, relatedness, and competence showing a universal pattern of high importance. Only conformity values seem to measure culture as shared meaning systems.

**Sources of Individual Differences in Basic Values**

**Processes linking background variables to value priorities.** People’s life circumstances provide opportunities to pursue or express some values more easily than others. For example, wealthy persons can pursue power values more easily, and people who work in the free professions can express self-direction values more easily. Life circumstances also impose constraints against pursuing or expressing values. Having dependent children constrains parents to limit their pursuit of stimulation values. People with strongly ethnocentric peers find it hard to express universalism values. In other words, life circumstances make the pursuit or expression of different values more or less rewarding or costly.

Typically, people adapt their values to their life circumstances. They upgrade the importance they attribute to values they can readily attain and downgrade the importance of values whose pursuit is blocked (Schwartz & Bardi, 1997). Thus, people in jobs that afford freedom of choice increase the importance of self-direction values at the expense of conformity.
values (Kohn & Schooler, 1983). Upgrading attainable values and downgrading thwarted values applies to most, but not to all values. The reverse occurs with values that concern material well-being and security. When such values are blocked, their importance increases; when they are attained easily, their importance drops. Thus, people who suffer economic hardship and social upheaval attribute more importance to power and security values than those who live in relative comfort and safety (Inglehart, 1997).

Age and life course. As people grow older, they tend to become more embedded in social networks, more committed to habitual patterns, and less exposed to arousing and exciting changes and challenges (Glen, 1974). This implies that conservation values (tradition, conformity, security) should increase with age and openness to change values (self-direction, stimulation, hedonism) decrease. Once people enter families of procreation and attain stable positions in the occupational world, they tend to become less preoccupied with their own strivings and more concerned with the welfare of others (Veroff, Reuman, & Feld, 1984). This implies that self-transcendence values (benevolence, universalism) increase with age and self-enhancement values (power, achievement) decrease over time.

Gender. Various theories of gender differences have lead researchers to postulate that men emphasize agentic-instrumental values such as power and achievement, while females emphasize expressive-communal values such as benevolence and universalism (Schwartz & Rubel, 2005). Most theorists expect gender differences to be small. Analyses with the SVS and PVQ instruments across 68 countries yield similar results. Gender differences for eight values are consistent, statistically significant, and small; differences for conformity and tradition values are inconsistent. It is important to point out that women gave higher priority than men to tradition values in all 20 European Social Survey (ESS) countries but conformity values in only
13 countries.

So, sex differences were highly consistent for power (men higher in 96% of the samples) and benevolence (women higher in 90% of the samples). Differences were quite consistent for stimulation (men higher), universalism (women higher), hedonism (men higher), and achievement (men higher) and differences were a bit less consistent for self-direction values (men higher in 79%). Men attribute more importance to self-enhancement values (power, achievement) whereas women attribute more importance to self-transcendence values (universalism, benevolence).

In a follow-up study, Schwartz and Rubel-Lifschitz (2009) reexamined sex differences in value priorities across countries specifically to explore a potential relationship of values with gender equality. Previous research has shown that gender equality is correlated highly with such societal characteristics as country wealth, cultural autonomy, and democracy. This pattern led the researchers to assume positive associations of value priorities with benevolence, universalism, self-direction, stimulation, and hedonism, while correlating negatively with security, tradition, conformity, power, and achievement. Though the correlations are in the same direction for both males and females, they may be stronger for one gender over the other, and due to this, changing societal conditions may increase the value's importance more sharply for that gender. Consider that universalism values have been shown to be more important to women (Schwartz & Rubel, 2005) and so if society increases its expectations of citizens to take part in civil rights movements, both genders will see a rise in the importance of the value but that the increase would be greater for women. Likewise, power values are greater for men (Schwartz & Rubel, 2005) and if society imposes sanctions against pursuing self-interest at the expense of others, both sexes will see a decrease in the importance of the value, but that the decrease will be
smaller for men. It should be stated that some values may not hold greater importance to one
gender.

To test the dynamics of this relationship, the authors used a strict probability sample
representing citizens aged 15 and older in each of 25 countries (Study 1) or a sample of college
students from 68 countries (Study 2) and administered either the Portrait Value Questionnaire
(PVQ; Study 1) or the Schwartz Value Survey (SVS; Study 2). Results showed that the
inherently greater importance of benevolence and universalism values for women and
stimulation for men, increases positive effects of gender equality on these values for that gender
compared to the other gender. For men, the greater importance placed on power and achievement
values reduces the negative effects of gender equality on these values. No inherent link was
hypothesized or found for either gender in regards to hedonism, security, conformity, or self-
direction.

In the student sample only, self-direction values showed smaller sex differences in high
gender equality countries while in low gender equality countries, men emphasized these values
more than women. As self-direction values correlate with education and the ratio of women to
men is greater in high as compared to low gender equality countries (119/100 and 49/100,
respectively), it may be that greater equal expectations for independent thought in the
universities of high gender equality countries explain this interesting finding.

Do Values Relate to Personality?

the relationship of the big five personality traits and values by administering the Schwartz (1992)
Values survey, NEO-PI, a positive affect scale, and a single item assessing religiosity to
introductory to psychology students at an Israeli university. For Extraversion, it was found that
values that define activity, challenge, excitement, and pleasure as desirable goals in life (i.e. stimulation, hedonism, and achievement) were important while valuing self-denial or self-abnegation, expressed in tradition values, was antithetical.

For Openness, values that emphasize intellectual and emotional autonomy, acceptance and cultivation of diversity, and pursuit of novelty and change (i.e. Universalism, Self-direction, and stimulation) were important while conformity, security, and tradition values were incompatible. Benevolence, tradition, and to a lesser degree conformity, were important for Agreeableness while power and achievement correlated negatively. In terms of Conscientiousness (C), there was a positive correlation with security values as both share the goal of maintaining smooth interpersonal relations and avoiding disruption of social order and there was a negative correlation with stimulation, indicating an avoidance of risk as a motivator of C.

Finally, there was little association of values with the domain of Neuroticism but a closer inspection of the pattern of correlations with the facets of N suggests two components. First, the angry hostility and impulsiveness facets could be called extrapunitive since the negative emotion is directed outward and tends to correlate positively with hedonism and stimulation values and negatively with benevolence, tradition, conformity, and C values. Second, the anxiety, depression, self-consciousness, and vulnerability facets could be called intrapunitive since the negative emotion is directed inward. This component tends to correlate positively with tradition values and negatively with achievement and stimulation values.

Belief in a Just World. Lerner (1980) assumed that people need to believe in a just world (BJW) in which people get what they deserve and deserve what they get. Wolfradt & Dalbert (2003) investigated the relationship between BJW and the values of conformity,
security, and self-direction as well as personality traits among 104 college students and 108 professionals. Participants completed the General Belief in a Just World Scale, NEO-FFI, and the 12 terminal values by Schwartz and Bilsky (1987). Results showed that BJW was negatively related to Openness to Experience and positively correlated with security and conformity.

**The Ability of Values to Predict Real-World Outcomes**

*Everyday Behavior.* Bardi and Schwartz (2003) generated ten sets of 6-10 behaviors that primarily express one of the ten basic values. Participants completed the SVS. Later, they rated how frequently they had performed each behavior in the past year, relative to their opportunities to perform it. The results showed that some values correlate more strongly with their relevant behaviors than others do. Why is that? The authors note that normative group pressure was greatest for security, conformity, benevolence, and achievement behaviors. Yielding to normative pressure, even when a behavior opposes one’s own values, weakened value-behavior relations. Second, external pressure is weaker for behaviors that express values of little importance to the group, permitting the individual's personal values to have more influence. Tradition and stimulation values had especially low mean importance in these groups. Hence, priorities for these values showed stronger value-behavior correlations.

*Cooperation.* In relation to consumption behavior, Schwartz (1996) asked participants to complete the Schwartz Value Survey and then be paired with another student to play a game. Participants were to choose one of three alternatives for allocating money between self and a member of their group whose identity was not revealed. Each would receive the amount of money they allocated to self plus the amount their partner allocated to them. The cooperative choice entailed taking the equivalent of 1€ for self and giving 0.8€ to the other. Compared to the other choices, this meant sacrificing a little of what one could gain (0.2€) and giving the
maximum to the other. The other two choices were both not cooperative, maximizing either one's absolute gain (individualism) or relative gain (competing). The author found that benevolence correlated most positively and power most negatively with cooperation. These findings were replicated in another study using two new social-dilemma games that simulate interpersonal (Paired Charity Game) and intergroup (Group Charity Game) conflict (Sagiv, Sverdlik, and Schwarz, 2011). This study also showed that when an individual's value hierarchy was accessible, they explained their choices in terms of values that were both important to them and relevant to the situation.

**Religiosity.** In a study examining the relationship of values and religiosity, Schwartz and Huismans (1995) hypothesized that religiosity should correlate most positively with the priority given to the Tradition value and most negatively with Hedonism values. Religion was also hypothesized to have a positive correlation with conformity, benevolence, and security and have a negative correlation with stimulation and self-direction. Across two studies, results indicate that the most positive correlation was with tradition, the most negative correlation was with hedonism, and there were positive correlations with Benevolence, Conformity, and Security and negative correlations with Stimulation and Self-direction. The authors found cross-cultural differences such that pursuit of meaning values sometimes were correlated more highly with religiosity than were submission values (i.e. among Dutch Protestants and Spanish Catholics) and sometimes less highly (i.e. among Israeli Jews and Greek Orthodox). Other interesting findings were that Achievement showed consistent, small negative correlations with religiosity, Power showed near-zero correlations with religiosity, Universalism values consistently were correlated negatively with religiosity, and that security and benevolence correlations with religiosity were generally weak. The authors conclude that valuing certainty, self-restraint, and
submission to superior external truths inclines people to become more religious whereas valuing openness to change and free self-expression inclines people to become less religious.

**Readiness for out-group social contact.** Sagiv & Schwartz (1995) explored how the value priorities of individuals influence their readiness for social contact with out-group members. Across two studies, they found that value priorities were more strongly correlated with readiness for out-group contact in the Jewish sample than in two Arab samples. In terms of the two Arab samples, the correlation of readiness of Christian Arabs for contact with Israeli Jews was most positive for achievement and most negative for conformity. For Muslim Arabs, tradition was the most negative and benevolence was the most positive.

The authors offer two possible explanations for their findings. First, minority group members may view contact with dominant group members more in terms of group differences and characteristics. Their readiness for out-group contact may be more strongly influenced by their own group’s norms, attitudes, and stereotypes toward the out-group. Second, they note that group membership is less salient for members of dominant groups, and so they may view contact with minority group members in more individual terms. As such, they may be more influenced by their personal experiences and characteristics such as their values.

**Values and voting.** Barnea and Schwartz (1998) explored the relationship of values to voting behavior. The authors contrasted classical liberalism which calls for maximizing individual freedom in order to permit people to actualize their goodness with economic egalitarianism which refers to the distribution of income and other resources among societal members, emphasizing equality among individuals, the well-being of all, and cooperation and mutual responsibility. Parties were rated and ordered based on the extent to which they opposed the influence of religion on state legislation or favor it. The results showed that voters for parties
rated as supporting liberal and secular positions attributed high importance to self-direction values and low importance to tradition and conformity values. Also, values were important guides to party choice when value-relevant cues were easily accessible (i.e. parties were ideologically distinctive) but when value-relevant distinction among parties were blurred, voting was found to be more influenced by demographic variables.

**Values and Their Potential Influence on Behavior During a Pandemic**

**Values and worries.** Schwartz, Sagiv, and Boehnke (2000) examined the role of values in relation to worries. A worry is defined as an emotionally disturbing cognition in relation to the state of an object (micro or macro worry) in some domain of life (social, meaning, health, safety) that will become, remain, or become more discrepant from its current state. Values are related to worries as values discuss some desired state one wants to obtain whereas worries discuss some discrepancy from that state. There are two types of worries. Macro worries are those pertaining to larger issues related to all people whereas micro worries relate more to the individual and events in his immediate control or immediate environment.

The results of the study point to two interesting findings. Micro worries as a domain was related to power values and the micro worry domains of safety and health were found to be related to security values. One might expect that during a pandemic, people would be concerned with their own safety, that of loved ones, and events occurring in their immediate neighborhoods or towns. Hence, micro worries. Also a pandemic does involve concerns about safety and health as life domains. Hence, two values become prominent – power and security. Recall that that values which sit adjacent to one another share a motivational emphasis. Specifically, for power and security he says uncertainty (which would cause our security to be in question) leads to a desire to control people and resources.
**Values and trust in institutions.** Devos, Spini, and Schwartz (2002) investigated the relation between value priorities and trust in institutions. Trust in institutions refers to the faith or support people feel toward various institutions. If a person trusts an institution he or she believes this collective entity, on the whole, is competent, fulfills its obligations, acts responsibly, and serves the general interest. The authors examined differences in value priorities between those who are affiliated with a religion (Catholics and Protestants) and those who declared no religion. Also, the authors examined political orientation in relation to left wing and right wing ideologies. The results showed that right wing supporters and the religious display a relatively strong motivation to preserve traditions, the status quo, and certainty in relationships with others - values with a strong affinity to trust in institutions. In contrast, non-religious individuals and left-wing supporters value the pursuit of their independent intellectual and emotional interests more strongly - values consistent with greater skepticism towards institutions.

During a pandemic or other public health catastrophe, trust will be important as key services will be disrupted and the government will need to decide who receives critical resources such as vaccines, antivirals, and ventilators, and who does not. This represents an ethical dilemma for government and everyone cannot be saved. People will need to trust in government to make the right decision.

**Values and empathy.** Balliet, Joireman, Daniels, and George-Flavy (2008) examine the relationship between Schwartz's (1992) ten universal values and individual differences in empathy. Two samples were used - one from a large state university and the other from a small Christian liberal arts university. Participants were administered the Schwartz Value Survey and the Interpersonal Reactivity Index (IRI). Results showed that empathy had its strongest positive correlation with benevolence values and its strongest negative correlation with power. The
authors speculate that benevolence relates most positively to empathy possibly because individuals high in the trait possess a need to justify responses to other group members in a verbal, intentional, and conscious manner. In terms of power, the value relates to the desire for high social status in relation to others and dominance over others and resources. Hence, individuals who rate power values as very important would be less empathetically concerned with the experiences of others.

In terms of pandemics, benevolence is positively correlated with empathy (Balliet et al., 2008) and with cooperation (Schwartz, 1996). As this is a self-transcendence value, those who hold it will be more likely to help others during a pandemic and may be willing to defer their vaccine to others who need it more such as those in high risk groups. Power is most negatively associated with both empathy (Balliet et al., 2008) and cooperation (Schwartz, 1996). Those oriented toward power will want to control resources and would likely be less willing to forgo their vaccine for another.

Recall too that benevolence correlated positively with macro worries or concern for society and others (the most positive correlation was to universalism though but still both are self-transcendence values) and micro worries, which relate more to the individual and events in his immediate control or environment, correlated most positively with power or self-enhancement values (Schwartz et al., 2000). This makes sense in relation to empathy. Those only concerned with their own problems will be less willing to take on another’s perspective.

**Conclusion**

The study of universal human values offers another way to understand behavior during a pandemic. As pandemics will cause individuals to worry about their own health and safety, and
that of their loved ones, they may be likely to try and control resources that are needed for their survival. In the context of a pandemic, they may be willing to forgo cooperative tendencies and procure a vaccine during a moderate or severe pandemic. How much they trust in institutions is important too. In this case, the focal institution is government and its ability to make impartial and just decisions. Those that trust in government may be more willing to forgo their vaccine and follow the guidelines health officials have given as compared to those who are suspicious of government.

Benevolence, a self-transcendence value, emerged as a key value related to religiosity, empathy, macro worries, and cooperation. Power, a self-enhancement value, was found to be negatively related to micro worries, cooperation, and empathy. Hence, these two values may play a central role in the decision to obtain a vaccine.
CHAPTER ONE

INTRODUCTION

PANDEMICS: MAKING MORTALITY SALIENT

Recall that the CDC created the Pandemic Severity Index (PSI) "which uses case fatality ratio (CFR) as the critical driver for categorizing the severity of a pandemic" and "is designed to enable estimation of the severity of a pandemic on a population level to allow better forecasting of the impact of a pandemic and to enable recommendations to be made on the use of mitigation interventions that are matched to the severity of future influenza pandemics" (CDC, 2007). The CFR is defined as the proportion of deaths among clinically ill persons and based on it, pandemics are assigned to one of five discrete categories. Category 1 pandemics are considered mild and projected to kill under 90,000 U.S. citizens, Categories 2 - 3 are considered moderate and projected to kill 90,000 to <450,000 citizens for Category 2 and 450,000 to <900,000 for Category 3, and finally Categories 4-5 are considered severe and projected to kill 900,000 to <1,800,000 for a Category 4 and over 1,800,000 for a Category 5. These mortality estimations are based on the U.S. population in 2006. Depending on the estimation of pandemic severity, specific and targeted community mitigation strategies would be employed.

A Category 1 pandemic is different from a Category 3 and much different from a Category 5 in its ability to kill the afflicted. As such, it would seem logical that the behaviors of individuals in the three different types of pandemics (i.e. mild, moderate, and severe) would also be different. Consider that during the 2009-2010 pandemic, many people did not feel compelled to acquire the H1N1 flu vaccine once released. Had this been a strain more akin to the 1918
Spanish flu, there would likely have been much different vaccine consumption behavior and so it is appropriate to examine the role of mortality salience during pandemics.

**Defining TMT**

Ernest Becker (1962, 1973, & 1975) stated that it is the human capacity for intelligence, to be able to make decisions, think creatively, and infer cause and effect, that leads us to an awareness that we will someday die. This awareness manifests itself as terror and any cultural worldviews that are created need to provide ways to deal with this terror, create concepts and structures to understand our world, answer cosmological questions, and give us a sense of meaning in the world.

Based on this notion, Terror Management Theory (TMT; Greenberg, Pyszczynski, and Solomon, 1986) posits that worldviews serve as a buffer against the anxiety we experience from knowing we will die someday. This cultural anxiety buffer has two main parts. First, we must have faith in our worldviews and be willing to defend them. Second, we derive self-esteem from living up to these worldviews and behaving in culturally approved ways. So, culture supports a belief in a just world and meeting the standards of value of the culture provides us with immortality in one of two ways. Literal immortality is arrived at via religious concepts such as the soul and the afterlife. Symbolic immortality is provided by linking our identity to something higher such as the nation or corporation and by leaving something behind such as children or cultural valued products. It has also been linked to the appeal of fame (Greenberg, Kosloff, Solomon, Cohen, and Landau, 2010).

Finally, based on whether death thoughts are in focal attention or are unconscious, we employ either proximal or distal defenses. Proximal defenses involve the suppression of death-related thoughts, a denial of one's vulnerability, or participating in behavior that will reduce the
threat of demise (i.e. exercise) and occur when thought of death is in focal attention. On the other hand, distal defenses are called upon when death thoughts are unconscious and involve strivings for self-esteem and faith in one's worldview and assuage these unconscious mortality concerns through the symbolic protection a sense of meaning offers.

**The Typical MS Study**

In a typical MS study, participants are told they are to take part in an investigation of the relationship between personality traits and interpersonal judgments. They complete a few standardized personality assessments which are actually filler items to sustain the cover story. Embedded in the personality assessments is a projective personality test which consists of two open ended questions which vary based on which condition the participant is in. Participants in the MS condition are asked to write about what they think will happen to them when they die and the emotions that the thought of their own death arouses in them. Individuals in the control condition are asked to write about concerns such as eating a meal, watching television, experiencing dental pain, or taking an exam. Next, they complete a self-report measure of affect, typically the PANAS, to determine the effect of MS manipulation on their mood. Finally, they are asked to make judgments about individuals who either directly or indirectly threaten or bolster their cultural worldviews.

**General Findings/Testing Alternative Hypotheses**

**Worldview defense.** General findings on TMT have shown that when mortality is made salient, we generally display unfavorable attitudes toward those who threaten our worldview and celebrate those who uphold our view. This effect has been demonstrated in relation to anxious individuals even when part of one's in-group (Martens, Greenberg, Schimel, Kosloff, and Weise, 2010) such that mortality reminders led participants to react more negatively toward an anxious
police liaison from their community (Study 1) or to a fellow university student who was anxious (Study 2). Mortality salience has also been found to elevate preference for political candidates who are charismatic and espouse the same values associated with the participant's political worldview, whether conservative or liberal (Kosloff, Greenberg, Weise, and Solomon, 2010).

Rosenblatt, Greenberg, Solomon, Pyszczynski, and Lyon (1989) examined reactions of participants to those who violated or upheld cultural worldviews across a series of six experiments. In general, they hypothesized that when people are reminded of their own mortality, they are motivated to maintain their cultural anxiety buffer and are punitive toward those who violate it and benevolent to those who uphold it. Experiments 1 and 3 provided support for the hypothesis in that subjects induced to think about their own mortality increased their desire to punish the moral transgressor (i.e. to recommend higher bonds for an accused prostitute) while rewarding the hero (Experiment 3). Experiment 2 replicated the findings of Experiment 1 and extended them by showing that increasing MS does not lead subjects to derogate just any target as it had no effect on evaluations of the experimenter. Also, MS increased punishment of the transgressor only among subjects who believed the target's behavior was truly immoral.

Experiments 4 - 6 tested alternative explanations for the findings. First, self-awareness could lead individuals to behave in a manner consistent with their attitudes and standards. The results of Study 4 showed that unlike MS, self-awareness does not encourage harsher bond recommendations and in fact, heightened self-awareness reduces how harshly a prostitute is treated among individuals with positive attitudes toward prostitution. In Study 5, physiological arousal was monitored and MS was found not to arise from mere heightened arousal. Finally, Experiment 6 showed that particular features of the open-ended death questionnaire did not lead
to the findings of Studies 1-5, but rather to requiring subjects to think about their own deaths.

McGregor, Lieberman, Greenberg, Solomon, Arndt, Simon, and Pyszcznski (1998) tested the hypothesis that MS increases aggression against those who threaten one’s worldview by measuring the amount of hot sauce allocated to the author of a derogatory essay. In the study, politically conservative and liberal participants were asked to think about their own death (MS) or their next important exam (control). They were then asked to read an essay that was derogatory toward either conservatives or liberals. Finally, participants allocated a quantity of very spicy hot sauce to the author of the essay, knowing that the author did not like spicy foods and would have to consume the entire sample of hot sauce. As expected, MS participants allocated significantly more hot sauce to the author of the worldview-threatenng essay than did control participants.

In a second study, participants thought about their own mortality or dental pain and were given an opportunity to aggress against someone who threatened their worldview. Half of the MS participants allocated the hot sauce before evaluating the target while the other half evaluated the target before allocating the hot sauce. Results of Study 2 showed that MS participants allocated significantly more hot sauce when they were not able to verbally derogate the targets prior to the administration of hot sauce. However, when MS participants were able to first express their attitudes toward the target, the amount of hot sauce allocated was not significantly greater than for the controls. This finding suggests that people will choose the first mode of worldview defense provided to them.

**Self-esteem.** According to the anxiety buffer hypothesis, if a psychological structure provides protection against anxiety, then strengthening that structure should make an individual less prone to displays of anxiety or anxiety related behavior in response to threats while
weakening that structure should make a person more prone to exhibit anxiety or anxiety related behavior in response to threats. In support of this, Greenberg et al. (1992) showed that by increasing self-esteem, self-reported anxiety in response to death images and physiological arousal in response to the threat of pain could be reduced. Furthermore, the authors found no evidence that this effect was mediated by positive affect. Additional support for the function of self-esteem in reducing anxiety was provided by Harmon-Jones, Simon, Greenberg, Pyszcynski, Solomon, and McGregor (1997) who showed that individuals with high self-esteem, whether induced experimentally (Experiment 1) or dispositionally (Experiment 2), did not respond to MS with increased worldview defense and that this occurred due to the suppression of death constructs (Experiment 3).

**Alternate explanations.** Greenberg, Simon, Harmon-Jones, Solomon, Pyszcynski, and Lyon (1995) tested (Study 1) the idea that asking subjects to think about their own death simply increases the accessibility of their value system rather than reflecting a heightened need for the protection provided by the cultural worldview. Results showed that causing subjects to think about their mortality led them to recommend a higher bond for an alleged prostitute in the MS salient condition. This effect was not replicated in the value salient condition or control condition indicating that MS effects are not simply the result of reminding people about their personal values and standards of right and wrong.

Studies 2 and 3 examined the possibility that reminding subjects of any worrisome future concern would produce the same effect as a reminder of mortality. Results show that in Study 2, exam salience did not increase bond assessments and Study 3 showed that worry about a variety of concerns college students are likely to have did not have any effect on the evaluation of an anti-US target, compared to MS condition subjects in both studies.
TMT and In-group Bias

Recall that Rosenblatt et al. (1989) found that when mortality is salient, we have a tendency to derogate those who attack our worldview (Study 1) and that this effect does not generalize to just anyone (Study 2) as the experimenter was not viewed negatively. Also, when mortality is salient, those who defend our worldview are seen as a hero. Likewise, Greenberg, Pyszczynski, Solomon, Rosenblatt, Veeder, Kirkland, and Lyon (1990) demonstrated that under MS, we have a tendency to derogate an out-group member (Jewish person) compared to an in-group member (Christian). This tendency to derogate occurs even if we are presented with information concerning their credibility and background. Interestingly, the effects of MS in relation to out-group member evaluation can be reversed if we prime a tolerance norm (Greenberg, Simon, Pyszczynski, Solomon, and Chatel, 1992).

This tendency to favor our in-group was further demonstrated in relation to nationalistic bias (Nelson, Moore, Olivetti, and Scott, 1997). Participants were first shown a video of car crashes with disturbing images or an innocuous driver’s education video. Next, participants were asked to do a thought listing procedure in which they write down all their thoughts about their own death. Finally, they were given a scenario describing a person who was hurt in an accident and was suing the company. For half of the subjects, the company was American and for the other half the company was Japanese. Results showed that when thoughts of death were focused on the participant themselves, the American participants tended to assign more blame on the person when the company was American but assigned more blame to the company when it was Japanese. When thoughts of death were more general or on other family members, assignment of blame fell to the company and less on the person, possibly because they imagined their family members being the one hurt and so they tried to protect them.
Wisman and Koole (2003) explored whether MS can promote affiliation with those who oppose our worldview. In general, the authors found that MS led to increased affiliation with a worldview threatening group (Experiments 1 and 2), even when affiliation with the group forced participants to attack their own worldviews (Experiment 3). It appears that affiliation defenses were powerful enough to override at least some of the participant's concerns with validating their worldview.

Hirschberger, Florian, and Mikulincer (2005) examined responses to people with disabilities (PWDs). The authors suspected that Western cultures may regard PWDs as failing to conform to the physical expectations embodied in the Western cultural worldview and so pose a threat to its validity. Proof for this may lie in the tendency of people to avoid contact with PWDs because of the guilt by association phenomenon. Hence, the costs of emotionally approaching people who are physically different may be amplified under MS conditions. Results showed that when men do not experience high levels of death awareness (control condition), they perceive in-group members with disabilities as part of the in-group and display an in-group bias, but when death is made salient (MS condition), they react to these same in-group members as if they were out-group members and distance themselves from them. For women, MS led to a display of the in-group bias and an expression of compassion toward the in-group target with a disability (Hirschberger et al., 2005).

Finally, McPherson and Joireman (2009) evaluated whether standard MS effects found in previous research are greater under group conditions and whether MS amplifies the tendency for groups to be more aggressive than individuals. Many studies reveal that intergroup interactions tend to be more competitive and more aggressive compared to interindividual interactions, and McPherson and Joireman (2009) hypothesized that this interindividual-intergroup discontinuity
may have important implications for TMT. As in previous TMT research, they found that individuals primed with MS are more aggressive towards an individual who threatens their worldview as compared to controls. Second, their results replicated discontinuity research which showed that groups tend to be more aggressive than individuals. Third and most important, their results showed that participants in the MS condition tended to allocate more hot sauce in a group context and the discontinuity effect was stronger under MS conditions. On a related note, Motyl, Hart, and Pyszczynski (2010) found that intergroup hostility and aggression could be reduced among individuals who tend to be more dispositionally aggressive (i.e. high right wing authoritarianism) if violence is portrayed as something instinctual and creaturely. This ties into TMT's assertion that people are motivated to elevate themselves above animalistic things as a way of denying their creatureliness and mortality. So by linking support for violence to something infrahuman, it can be reduced but only when existential concerns are made salient.

**Implications for pandemics.** There are three ways TMT and in-group bias are important during pandemics. First, certain groups may try and make sure they are the ones who receive the vaccine. If the dominant group embraces power values, they will take control of this valuable commodity and aggress against those who do not embrace their worldview (McPherson and Joireman, 2009; McGregor et al., 1998). The values of power and security sit adjacent to one another and so this shared motivational emphasis indicates the need to control people and resources in an effort to obtain stability and safety in an uncertain world. There could be no situation any more uncertain than a public health catastrophe such as a pandemic, and more so a severe pandemic.

Second, maybe people who are sick and part of the in-group are not seen as part of this group any more (more of an effect for men) under MS (Hirschberger et al., 2005). In a pandemic,
there will be reminders of mortality all around so once a person becomes sick, he/she is one of them and not one of us. But what do we do when those who are sick recover, assuming they do? Do we let them back into the group now?

Finally, MS can lead to increased affiliation during a pandemic which goes against health department recommendations to social distance and to isolate if ill or quarantine if there exposed (Wisman and Koole, 2003). The need to affiliate as a defense against mortality salience can place the individual at risk of exposure to the virus when he/she may have never been exposed.

**TMT and Prosocial Behavior**

Does raising one's awareness of their own mortality affect cooperative behavior? The answer depends. Joireman and Duell (2005) found that as hypothesized, prosocials scored significantly higher than proselves on self-transcendent values, whereas proselves scored significantly higher than prosocials on self-enhancement values. That said, proselves expressed stronger endorsement of self-transcendence values in the MS rather than the dental pain condition. These results suggest that after thinking about their own death, proselves find themselves falling short of a societal injunction to be concerned with the well-being of others and are therefore motivated to reestablish their positive self-regard by more strongly endorsing self-transcendent values. They call this the Ebenezer shift. Prosocials act no different since they are living up to the standard already. It should be noted that studies 2a and 2b showed that when proselves have a positive exemplar, MS is unlikely to lead proselves to endorse self-transcendence values.

In a follow-up study, Joireman and Duell (2007) found that when evaluating charities, participants high in self-transcendence values evaluated charities more favorably overall. Participants low in these values scored significantly higher in the MS condition than the DP
condition whereas those high in self-transcendence values showed no significant difference between the two conditions in terms of evaluation of the charities. Also, those low in self-transcendence values scored significantly lower in terms of their evaluation of the charities than those high in self-transcendence values in the DP condition but did not differ from those high in self-transcendence values in the MS condition.

Self-transcendence values emerge again as important for prosocial behavior. In a pandemic, cooperation will be critical as individuals will need to forgo their entitlement to a vaccine that could be life saving so that someone who needs it more can have it. Norms also emerge as important and so the values of conformity and tradition play in here. MS was shown by Jonas et al. (2008) to increase the need to adhere to a cultural norm but Jonas et al. (2002) showed that whether or not the participants were greedy or generous depended on which norm was made salient.

Finally, Kasser and Sheldon (2000) show that when faced with the prospect of death participants showed a greater propensity for greed, though it was not linked to SVO. Still, people could be led to take what they want for survival reasons, depending on what norms they find to be important to them. Hirschberger, Ein-Dor, and Almakias. (2008) investigated the conditions that promote or impeded prosocial attitudes and behaviors when mortality is salient. Their findings indicated that although prosocial behavior is highly valued in most societies, self-protective concerns can override the general positive feeling one has toward helping others in need and lead to defensive withdrawal. For instance, in Study 2, participants were randomly approached by a research assistant who gave them a flier (either reflecting the MS condition – organ donor - or a control condition – Caring Heart). Then, another research assistant seated at one of two booths solicited these participants to donate. Results indicate that for participants
asked to donate to Caring Heart, MS led to a larger percentage of donations compared to the control condition. However, for participants asked to sign an organ donation card, MS had the opposite effect and led to a smaller percentage of donations. Also, in Study 4, priming death increased prosocial behavior toward nonthreatening worldview-consistent causes (i.e. person without a disability). However, when death was salient, self-protective concerns overrode other-oriented concerns and helping was reduced when the person asking for help was seated in a wheelchair.

Recall that Joireman and Duell (2005, 2007) showed that proselfs can act prosocially following reminders of mortality, called the Ebenezer shift. But what about in a true life and death situation where reminders of death are all around the person? How does this affect a person's psychological health? Could the prosel maintain that social value orientation and be joined in the behavior by the prosocial? It is difficult to say and creating conditions indicative of a pandemic may prove challenging in a laboratory setting.

**TMT and Health - Is Death Good for Your Health?**

Two main models help explain how we make health decisions. The traditional health model says that health decisions are fueled by motives to protect one's health and to regulate threats associated with health. In contrast, self-oriented models suggest that motivations surrounding the need to protect the integrity and value of the self can affect individual's decisions about their health. For instance, tanning to improve one's appearance or smoking to fit in with the in-crowd both help enhance the individual's self-esteem.

Given the different directions these two models take, there is a need for a unifying construct that takes into account both models. According to the Terror Health Management Theory (THMT; Goldenberg & Arndt, 2008), when reminders of death are conscious, we may
cope with the threat in one of two ways. First, we may engage threat avoidance behaviors which could include alcohol abuse, smoking, and overeating, all with the point of minimizing attention to the health danger faced by the person. Second, we could engage in health-oriented behaviors such as exercising and using high SPF sun products. Arndt, Cook, et al. (2007) found that engaging in one of these two behaviors will negate the need for the other. All in all, the point is the removal of focal concerns of death by reducing the perceived health-related threat. In this way, both responses are defensive in nature.

What about when death thoughts are unconscious? We may engage in behaviors that have relevance for meaning and self-esteem. First, these may be health-defeating outcomes such as binge drinking (Shehryar and Hunt, 2005; Jessop and Wade, 2008), tanning (Routledge, Arndt, and Goldenberg, 2004), and general risk taking behaviors when locus of control is external (Miller and Mulligan, 2002). Hirschberger, Florian, Mikulincer, Goldenberg, and Pyszczynski (2002) also noted a gender difference in risk taking such that men show immediate relief from existential concerns by participating in risky activities. Furthermore, Vess, Arndt, Cox, Routledge, and Goldenberg (2007) found that participants who were reminded of mortality, followed by a short delay, and who were high in religious fundamentalism, were more likely to endorse prayer as a substitute for medical treatment and saw it as more effective.

Second, these behaviors may also be health facilitating, especially if the person bases their self-esteem on standards that are conducive to health. Cox, Cooper, Vess, Arndt, Goldenberg, and Routledge (2009) found that whereas a manipulation of MS, followed by a delay, led to increased tanning intentions when participants read a fashion column touting "bronze is beautiful," a "pale-is-pretty" prime led to decreased intentions to tan under the same conditions.
Several studies have shown that threats of death can cause people who derive their self-esteem from drinking alcohol to actually drink more (Shehryar and Hunt, 2005; Jessop, Albery, Rutter, and Garrod, 2008). When a simple prime to behave responsibly is presented along with mortality-related facts about driving successfully, young male drivers indicated lower intentions to drive fast (Study 3) and that including a responsibility prime along with a mortality prime resulted in increased accessibility of responsibility related constructs and a reduction in the accessibility of mortality related constructs (Study 4). In relation to smoking, Hansen, Winzeler, and Topolinksy (2010) showed that death-related warnings were ineffective and even increased the intent to smoke among 39 psychology students who based their self-esteem on smoking. Interestingly, warning messages that did not mention death were shown to reduce smoking attitudes the more the participant based their self-esteem on smoking. These warnings include such statements as "Smoking brings you and the people around you severe damage" and "Smoking makes you unattractive" and may be threatening to people who believe that smoking allows them to feel valued by others or for whom smoking boosts their positive self-image. Further support for the efficacy of social exclusion appeals comes from Martin and Kamins (2010).

Finally, Routledge, Ostafin, Juhl, Sedikides, Cathey, and Liao (2010) provide the first evidence of the effects of death-related cognition on psychological adjustment. Specifically, thoughts of one's mortality outside of focal attention were found to decrease overall satisfaction with life, subjective vitality, meaning in life, and exploration while increasing negative affect and state anxiety and exacerbating social avoidance for participants with low self-esteem only. The authors note that one implication of not being able to deal with death anxiety is in the display of anxiety disorders to include social phobia. One bright spot is in the possibility of using
existential concerns in a therapeutic way for mildly depressed individuals (i.e. as a means to affirm greater meaning via worldview defense).

**THMT and pandemics.** There are some important implications of THMT for pandemics. Remember, one strategy likely employed by government during a pandemic will be social distancing. Those who derive their self-esteem from behaviors such as drinking or tanning may be willing to risk acquiring the virus so that they can partake in these activities (maybe to fulfill a self-affiliation need too). Also, the self-oriented model which is the basis of non-conscious response to mortality salience, noted that one’s personal beliefs, such as religious beliefs, may affect health decisions. This could manifest itself in a parent’s refusal to have their child vaccinated or to acquire life saving medical care. Third, people could engage in threat avoidance behaviors which lower their immune system and make them more susceptible to acquiring the pandemic virus. Finally, if the government provides reminders to citizens that not obtaining a vaccine places them at risk for acquiring the virus and potentially dying from it, the effect could be to cause people to do the opposite, and not obtain their vaccine. Of course, a fifth concern may be any combination of the preceding implications which amplify the decision not to obtain a vaccine and place not only the individual at risk, but also the larger society.

**TMT and Religion**

It seems logical to expect that religion is linked to mortality salience/terror management given religion's providence over the afterlife and immortality (Vail, Rothschild, Weise, Solomon, Pysczynski, and Greenberg, 2010). The cliché, 'There are no atheists in foxholes' highlights the fact that when threatened with death, people gravitate to their deities for comfort and salvation. So what does research say about a potential link?

Presented earlier as an example of in-group bias, Greenberg et al. (1990) found that
individuals faced with their own mortality were more likely to defend and uphold their religious faith by showing favoritism to those who shared their beliefs while derogating those who did not. Similarly, among participants with a prior belief in the afterlife, when mortality is made salient they show increased belief in the afterlife as compared to those with a weak or no belief (Osarchuk and Tatz, 1973; Schoenrade, 1989).

Across three studies, Norenzayan, Dar-Nimrod, Hansen, and Proulx (2009) framed a worldview-threatening message in religious terms and found that religious and non-religious participants respond to MS differentially. The non-religious made the typical response of derogating the threatening message while religious participants showed a vastly different response - they showed approval of the message despite it contradicting and potentially threatening their worldview and way of life. The authors interpret the finding by noting the presence of two competing stances that are activated at the same time when messages such as this are presented. The first stance is a divinity-oriented stance while the other is a secular cultural stance. For the non-religious, only the latter is activated when mortality is made salient but for the religious, both are activated which negates the effect of MS. It is however noted that if the "supernatural defensive strategy" (pg. 110) is non-salient or unavailable, then religious individuals would likely respond to threats in the same manner as non-religious individuals.

Maybe the situation is not as simple as being religious or not. Jonas and Fischer (2006) provide evidence which suggests that between the two main religious orientations, intrinsically religious people are better able to deal with prospects of death than extrinsically religious people. The authors explain that it is not mere religious belief that helps to buffer mortality concerns, the quantitative aspect, but the quality of the relationship is what matters. Extrinsically religious people see religion as a means to an end, the end being such things as safety, solace, and social
standing whereas intrinsically oriented individuals see religion as an end in itself and have a mature and sincere faith in which their beliefs are deeply held and guide their actions daily.

Religious beliefs have also been known to take precedence over potentially life-saving procedures recommended by medical professionals for either the person or for procedures meant for others, such as dependent children. Vess, Arndt, Cox, Routledge, and Goldenberg (2009) conducted a series of studies in which they tested the hypothesis that reminders of death would increase the willingness of a person high in religious fundamentalism to substitute medical treatment with faith. The results from five studies supported this hypothesis such that following reminders of mortality, individuals high in religious fundamentalism were more willing to endorse prayer as a substitute for medical treatment or treating physical ailments. The effect held even when participants in Study 4 were made aware of the possibility of integrating prayer and medicine. The authors speculate that this finding highlights how death-focused thoughts can "bring underlying motivations to the surface and endorse decisions they may not otherwise" (pg. 346).

**Unconscious Vigilance - An Alternate Explanation for TMT**

Unconscious vigilance (UV) is defined as, "increased sensitivity to affective stimuli initiated by alarming cues processed below the threshold of conscious awareness" and heightens reactions to stimuli determined to be either dangers or resources by increasing our awareness/perception of them. An example would be paying closer attention to a cabin after peripherally seeing a bear. The brain structures thought to control such alarm reactions are the amygdala and anterior cingulate (Holbrook, Sousa, and Hahn-Holbrook, 2011). It is possible that the effects reported by worldview defense researchers are better explained by UV. To test this, the authors induced MS prior to the presentation of pleasant and aversive worldview neutral
sounds (Study 1) and images (Study 2). They also exposed participants to subliminal cues of death or more general threats and measured their reaction to standard worldview defense dependent measures (Studies 3 and 4).

Results of Study 1 showed that a death manipulation significantly biased judgments of a sound stimuli without affecting self-reported affect and in Study 2, MS lead to much different evaluations of pleasant vs. aversive images. The authors conclude that Studies 1 and 2 show that cues bias one’s judgment of incidental affective stimuli due to the strong feelings the stimuli elicit and not their ideological content. They write, "Cultural convictions are important for the worldview defense effect only to the extent that they imbue evaluation targets with affective valence" (pg. 7).

In Study 3, participants were given a gender classification task which allowed for the priming of one of four faces - happy (positive), angry (threat), skulls (death), and neutral (control). Next, they read two essays - one complimentary and one critical toward the U.S. Participants were asked to rate the author on a 9-point Likert scale. As predicted, exposure to a subliminal angry face evoked worldview defense which is a finding consistent with UV and not TMT. Participants in the skull condition were also found not to exhibit worldview defense which was contrary to other research using a subliminal presentation of the words "death" or "dead." The authors note, "However, given that the amygdala responds primarily on the basis of eye contours (Whalen et al., 2004), the subliminal skull images were likely processed as emotionally ambiguous or neutral because of their circular eye sockets" (pg. 9). They also propose that the use of the skull image occurs so frequently in contemporary media and fashion that participants may have habituated to it.

Finally, Study 4 tested the prediction that subliminal presentations of the words 'dead' and
'pain' should cause worldview defense relative to the word 'field,' though the effect should be greater for 'dead.' Results confirmed the hypothesis such that dead produced the highest level of pro-US bias followed by pain and field. This supported the UV hypothesis but challenged the TMT claim that subliminal MS inductions are unique in their ability to generate worldview defense (i.e. the word pain should not have).

Taken together, the results of the four studies challenge the assertions made by not only TMT but also coalitional psychology. These approaches see worldview defense as the output of a functional adaptation designed to either reduce the anxiety produced by thoughts of death or to recruit allies by exacerbating one's commitment to cultural values. The findings show that inputs to the process go beyond death or coalitional concerns and the outputs go beyond cultural values. The authors conclude, "Worldview defense therefore appears better explained as a by-product of unconscious vigilance than as the output of a terror or coalition management adaptation" (Holbrook et al., 2011, pg. 11). Though this may be the case, the evolutionary origin at UV is currently unclear and the results only show that the unconscious detection of threat cues polarizes evaluation of different affective stimuli, which can but are not required to relate to cultural values.

**Conclusion**

Given the power of pandemic influenza outbreaks to kill, mortality will be salient and may affect how people respond to other groups, use their faith, make health decisions, and whether or not they cooperate with others. This will vary depending on how salient mortality is. Category 1 pandemics which are little more than seasonal outbreaks will not likely raise mortality concerns at all. Category 2 and 3 pandemics will likely raise concerns some and affect behavior. Finally, Category 4 and 5 pandemics will greatly affect the aforementioned domains.
especially given the spatial proximity of the virus to the individual. In other words, things could be really bad throughout the nation and world, but if the virus is not barking down your door (i.e. mortality concerns are in your face), behavior may not be affected at all. This relationship represents an interesting area to explore.

Unconscious vigilance offers a new and exciting way to understand human behavior in response to thoughts of death. Recall that a person may pay closer attention to a cabin after peripherally seeing a bear. Though the bear is not an immediate threat and so has not been moved into our conscious awareness, we still note it and find a way to escape or move to safety. Evolutionarily, survival is one of the primary motives driving behavior. Maybe during a pandemic we are subconsciously aware of the spatial proximity of a virus to our current location and have taken note of resources such as potential antiviral and vaccine distribution locations, both of which can aid in our survival especially in a severe pandemic. So like the cabin and the bear, we take note of the virus and potential life saving interventions. If the bear comes closer or the virus now appears in our city or county, then we pay attention to it at the conscious level and make use of the resources we noted before. Even if the virus is not killing many people, as in a Mild pandemic, it still could be a very uncomfortable and painful illness to bear, and so we seek out a vaccine.
CHAPTER ONE

INTRODUCTION

DISSERTATION PURPOSE AND RESEARCH DIRECTIONS

So far through Chapter 1 research on social dilemmas, universal human values, and terror management theory was summarized but none of the preceding discussions does justice to the extant literature published in each area. The idea was to give an overview of the contribution each area makes to understanding behavior during a pandemic, both in relation to how governments may make decisions and how individuals may respond. In the first part of this chapter common themes throughout the three research areas will be addressed and key findings presented together. The second part of the chapter will examine the unique contribution each area makes to understanding how people may respond to the threat a pandemic or other public health catastrophe presents. Finally, the overall purpose of the dissertation will be given and some basic hypotheses stated.

Common Themes Across the Research Areas

**Social identity, values, and in-group bias.** The basic idea of social identity is that people have a natural inclination to categorize their social world into meaningfully simplistic representations of groups of people. Because of this, we construct in-groups and out-groups and manifest behaviors such as conformity, in-group bias, self-categorization, and prejudice and discrimination. In-group bias or favoritism rears its ugly head as groups compete for resources (Messick et al., 1983; Brewer and Kramer, 1986), when mortality is made salient and there is a worldview threatening target (Greenberg et al., 1990; Nelson et al., 1997; McPherson and Joireman, 2009), and we may even re-categorize in-group members as out-group members if they fail to meet certain cultural norms as in the case of people with disabilities (PWDs;
Hirschberger et al., 2005).

In-group bias can be reversed if a collective identity is made salient (Brewer and Kramer, 1986), if we prime a tolerance norm during times when mortality is made salient (Greenberg et al., 1992), if the desire to affiliate is greater than the desire to validate one's worldview (Wisman and Koole, 2003), if support for violence is linked to something infrahuman (Motyl et al., 2010), and if the individual's value priorities allow for contact with out-group members (Sagiv and Schwartz, 1995).

**Cooperative behavior.** Social values are the motivational or strategic preference a person displays among the distribution of outcomes for self and others (McClintock, 1978). In general, social values have been found to be predictive of behavior across all major classes of social dilemmas (Parks, 1994; Kramer et al., 1986; Roch and Samuelson, 1997; McClintock and Liebrand, 1988); in relation to the decision to donate to a noble cause (Van Lange et al., 2007), responsiveness to warnings about depleting a resource (Joireman et al., 2009), and support for a plan to reduce congestion (Joireman et al., 2001); and even proselves who express self-enhancement values can show a shift to self-transcendent values and display more cooperative behavior when mortality is made salient (Joireman and Duell, 2005 and 2007).

To help induce cooperation, several studies suggest reducing noise (Tazelaar et al., 2004; Rumble et al., 2010; Klapwijk and van Lange, 2009), ensuring procedural justice is adhered to (van Prooijen et al., 2008), offering incentives to proselves or assuring trust for prosocials (Boone et al., 2010), fostering self-transcendence values such as benevolence and minimizing self-enhancement values such as power (Schwartz, 1996; Sagiv et al., 2011; Schwartz et al., 2000 in relation to worries and power), and being aware of the role an individual's values play in how much trust they put into institutions such as government (Devos et al., 2002) or in the display of
empathy (Balliet et al., 2008).

**Unique Contributions of Each Area of Research**

In the preceding section links were made between the literature on social dilemmas, universal human values, and terror management theory. It is also important to briefly summarize the unique contribution each area makes to understanding behavior during a pandemic influenza outbreak.

**Social dilemmas.** As leaders will need to make important decisions about the allocation of scarce resources, social dilemmas research can help us to understand factors affecting decision making (Foddy et al., 1999), the use of decision heuristics (Allison and Messick, 1990; Rutte et al., 1987; van Djik and Wilke, 1995), and how decisions are made when leaders are under high cognitive load (Roch et al., 2000). Uncertainty is also important to understand as individuals will be faced with both environmental uncertainty in terms of knowing when more vaccines may be available and social uncertainty in terms of knowing the decision others will make to obtain a vaccine or not (see Herlocker et al., 1997; Wit & Wilke, 1998; DeKwaadsteniet et al., 2008; Au and Ngai, 2003; Allison et al., 1990 for a discussion of uncertainty in social dilemmas).

**Values.** Much of the literature on values shows that ten motivationally distinct value types are recognized across cultures (Schwartz and Sagiv, 1995) and that there is greater consensus than disagreement on value priorities across countries with conformity values only measuring culture as a shared meaning system (Fischer and Schwartz, 2010). The values literature also shows that the values people express may vary as a function of life circumstances (Schwartz & Bardi, 1997), age (Glen, 1974; Veroff et al., 1984), and gender (Schwartz & Rubel, 2005; Schwartz and Rubel-Lifschitz, 2009). As pandemics have the power to induce terror, religiosity may be important and the values that relate to it (Schwartz and Huismans, 1995).
Though previously mentioned, values and worries are an important discussion and maybe better classified as a unique contribution of this area of research. It was shown by Schwartz et al. (2000) that micro worries related to power values and the specific micro worry domain of safety and health related to security values. These values sit adjacent to one another and share a motivational emphasis such that uncertainty leads to a desire to control people and resources.

**Terror management theory (TMT).** In terms of TMT, one unique contribution is in regards to the Terror Health Management Theory (Goldenberg & Arndt, 2008) which posits that we may deal with conscious reminders of death through either threat avoidance behaviors such as alcohol abuse, smoking or overeating or health-behavior oriented behaviors such as exercising or using sun tan lotions. In regards to unconscious death thoughts, we can engage in behaviors important to self-esteem such as binge drinking, tanning, and risk-taking behavior (all classified as health-defeating outcomes) or reduce such behaviors in terms of health facilitating outcomes. It has also been shown that providing reminders of death in public service announcements can lead to the unintended effect - that is, such reminders lead people to drink more (Shehryar and Hunt, 2005; Jessop et al., 2008) or smoke more (Hansen et al., 2010).

As with values, TMT offers insight into religious behavior. In general, non-religious people make the typical response of derogating a worldview threatening message when MS is salient but for religious people, no such response occurs. In fact, they show approval of such messages despite it contradicting and potentially threatening their worldview (Norenzayan et al., 2009). Further refinement is provided by Jonas and Fischer (2006) who show that among religious individuals, the intrinsically religious deal with prospects of death better than those who are extrinsically religious. Of great importance to this dissertation, TMT research shows that religious beliefs at times take precedence over the decision to obtain life-saving procedures.
recommended by medical professionals either for the individual herself or for others (Vess et al., 2009).

**Purpose and Method Preview**

The purpose of this study is to investigate the behavior of participants during a simulated public health catastrophe, and specifically a pandemic. Participants will move through each of the three types of pandemics in a randomized order depending upon the condition they are in. They will be given information about the status of the pandemic around the world and in general in the U.S. They will also see maps of the spread of the virus in the U.S. and in WA state. After reviewing this information the participant is asked at which update they would obtain their vaccine and why. Individuals could very well opt to not obtain one. Other variables of interest that will be investigated are SVO, religious orientation, values, and questions are asked about the importance of particular types of information they were provided. Finally, their location in the state of WA moves from a town in the northern part of the state to a large city. The same questions about when, or if, the participant will obtain a vaccine are asked.

**Hypotheses**

**Hypothesis 1: Procuring a vaccine.** It is hypothesized that in general, participants will decide to obtain a vaccine later in the scenario, or not at all, during a mild pandemic and will obtain one earlier in a severe pandemic. Moderate pandemic will fall in between these two. This deserves a brief explanation. In the 9 updates stretching from July to October, the virus does not get close to the participant's location until Update 5 and then is in the adjacent county to the south. Update 7 shows it reaching their county but in the northeast corner and then exploding in that area by Update 8. In Update 9 the virus is present in the county and all adjacent counties. So to say the participant may get the vaccine earlier in a severe pandemic means he/she will want to
get it before the virus ever reaches his/her county and has a chance to explode, may wait until it
gets to near the county for moderate, and may be willing to let it reach the county and explode in
a mild pandemic as the likelihood of dying if the person gets sick is very low.

This will be analyzed within subjects as each participant will experience all levels of
pandemic severity (mild, moderate, and severe) in a randomized manner. The potential effect of
this randomization in terms of generating a 'history effect' of sorts will also be investigated but in
an exploratory manner (no hypothesis). Consider that if the individual started with the severe
scenario their decisions in moderate and mild could be affected such that they are more likely to
obtain a vaccine and earlier. If they started with mild and waited much later to obtain a vaccine
or did not obtain one at all, they may not be worried about a severe pandemic and could wait
thinking the mild pandemic was not that bad, why should the severe be? The latter example is
what the world faces now in light of the very mild 2009-2010 pandemic.

**Hypothesis 2: Seasonal flu vaccine behavior.** This study is unique because not only are
all three pandemic severities investigated for potential differences in individual behavior, but
baseline or control data is gathered in terms of what the person does during seasonal influenza
outbreaks. Hence seasonal and pandemic behavior can be compared. It is hypothesized that if an
individual obtains a vaccine during the normal flu season he/she will do so during a pandemic as
well, regardless of severity, and will do it sooner than those who do not usually obtain a vaccine.
If the individual does not obtain a vaccine during the normal flu season he will not in a mild
pandemic, may in a moderate pandemic, and will definitely in a severe pandemic, but no matter
what, obtains these vaccines later than those who normally obtain a seasonal vaccine.

**Hypothesis 3: Shifting location.** Hypothesis 1 looks at resource consumption behavior
when the individual is located in the northern part of the state of WA and in a small town or
small city. What if the participant's location in the state was not here, but in one of the major cities such as Seattle? This will be tested as well and it is predicted that the trend proposed in Hypothesis 1 occurs in the new location as well, but participants will obtain a vaccine earlier than they did in 1, or if they never obtained one when in the north, they will now when in the large city.

**Hypothesis 4: Social value orientation.** It is hypothesized that proselfs will be more likely than prosocials to obtain a vaccine in severe and moderate pandemics, possibly mild also, and that for seasonal influenza there will no difference (Hypothesis 4.1). It is further hypothesized that prosocials will wait to obtain a vaccine until those who need it more have one or until vaccine is present in sufficient quantities, as compared to proselfs. In mild to moderate pandemics, the Ebenezer shift is predicted to occur but then disappear with severe pandemics. In fact, in the latter case, prosocials may even show a shift of their own to proself behavior as their survival instinct kicks in. (Hypothesis 4.2).

**Hypothesis 5: Religiosity - Intrinsic vs. Extrinsic.** Religious orientation will be of interest and intrinsically religious individuals are predicted to put others before themselves and not obtain vaccines, though the behavior may disappear in a severe pandemic. Extrinsic individuals will obtain their vaccine in keeping with their self-motivated concerns and desire for safety.

**Hypothesis 6: Values.** Does one's values affect their vaccine consumption behavior such that those higher in self-transcendence as compared to self-enhancement values are more likely to cooperate and leave vaccines for those who need them more and if so, is this function of pandemic severity? To investigate this basic question, the relationship of values to SVO was investigated in this study and it is hypothesized that prosocials will be higher in self-
transcendence values and proselves will be higher in self-enhancement.

**Hypothesis 7: Information Salience** - Finally, the participant's rank order of the five types of information given in the updates will be examined. This information included the global and U.S. updates, maps for the U.S. and WA showing the spread of the virus, and the number of U.S. deaths. Participants were asked to rank the five pieces of information in terms of which most to least affected their decision about when to obtain a vaccine. It is hypothesized that the WA map will be considered the most important piece of information and the global update the least important. No hypothesis is given for the other three pieces of information.

**Final Note**

Maybe before entering into a discussion of the methods used in this dissertation, it is important to hear the concern from the horse's mouth. In the CDC's 2007 *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States - Early, Targeted, Layered Use of Nonpharmaceutical Interventions* it is stated:

A severe pandemic in a fully susceptible population, such as the 1918 pandemic or one of even greater severity, with limited quantities of antiviral medications and pre-pandemic vaccine represents a worst-case scenario for pandemic planning and preparedness. However, because pandemics are unpredictable in terms of timing, onset, and severity, communities must plan and prepare for the spectrum of pandemic severity that could occur.

This statement, written in the Introduction to the document, depicts the true horror of the situation - one shrouded in uncertainty, a social dilemma unlike no other, and constant reminders of mortality. Essentially, its everything Hollywood has warned us
about and even the CDC could no longer ignore with its 'Zombie Apocalypse' campaign in May 2011.
CHAPTER TWO

METHOD

Participants

Participants were 202 students taking at least one psychology course at Washington State University (62.4% female, 37.6% male; 67.3% Caucasian, 10.9% Asian American, 7.9% Hispanic, 4.5% African American, and 9.4% classified themselves as Other) and needing to either complete a research requirement or earning extra credit. The age of the participants ranged from 17 to 26 ($M = 19.25$, $SD = 1.56$). In terms of education, 60.4% were students in their first year of college with the remaining sample (39.6%) Sophomore status or higher. Participants earned one research credit for their time (45-60 minutes) and upon arriving for the study were randomly assigned to be in one of six different randomized arrangements of the mild, moderate, and severe pandemic conditions, versions A and B consisting of 33 participants each and versions C - F consisting of 34 participants each.

Materials and Procedure

Participants waited in the hall until the start of the session. As they entered the lab, they signed a participation log and then were seated at a computer terminal with one of six versions of the study in front of them. Each version was a different order of three pandemic severities (A - Mi, Mo, Sev; B - Mi, Sev, Mo; C - Mo, Mi, Sev; D - Mo, Sev, Mi; E - Sev, Mi, Mo; F - Sev, Mo, Mi). There were no other differences between versions.

Next, they were read a set of instructions stating what their task would be but more importantly telling them that three times during the study they would need to ask the researcher for update sheets. As the researcher could only know when participants needed these sheets by being in the room and watching their screens, it was impractical for this to occur and could place
unnecessary stress on the participant if they believed they were being observed the whole time. As such, the experimenter remained in an adjacent room while the study was completed and participants walked into this room to ask for the update sheets. Participants were instructed that they would know when these sheets were necessary as a large 'Stop sign' would appear at the top of the screen with instructions to ask for the Mild/Moderate/Severe update sheets from the experimenter. In pilot testing, some participants never asked for the sheets and when queried at the end, stated they were confused as to when they had to ask. The stop sign and instructions before the study commenced were added to minimize this problem and appeared to be completely effective at that. If there were questions the experimenter answered them and once this was done to everyone's satisfaction, the participants were allowed to begin.

The study was completed via Survey Monkey. Participants were first asked to give informed consent by electronically providing their signature and date of participation. Failure to provide consent would lead to the participant being promptly exited from the study and being shown a 'Thank You' screen.

1. **Demographics.** Participants were given a demographics questionnaire assessing race, gender, age, and highest level of education. Their current religious and political affiliations, two questions asking whether the participant is married or involved in a long-term relationship, and another question about whether they have children, and if so, the age of the oldest and youngest child were asked. As the sample primarily consists of freshman in their late teens to early 20s the questions concerning marital status and children will be ignored for subsequent analyses. These questions were added in the event that a second, more diverse sample is acquired in the future.

2. **Social Value Orientation (SVO).** Next, SVO was assessed using a set of nine, three-alternative decomposed games (van Lange et al, 1997). For example, in one game Option A
consisted of 500 points to self and 500 to other (the Cooperative or prosocial choice where the joint gain is the greatest and there is the least difference in outcomes), Option B consisted of 500 points to self and 100 to other (the Competitive choice which has the highest relative gain), and finally Option C consisted of 570 points to self and 300 to other (the Individualistic choice with highest own gain). Participants were classified if they showed a clear preference for one of the three orientations in at least six of the nine games. In the current study, 110 (54.5%) participants were classified as Cooperators, 38 (18.8%) as Individualists, and 33 (16.3%) as Competitors. The latter two groups were combined to form a proself category including 71 participants (cf. Van Lange & Liebrand, 1991). Only 21 participants were non-classifiable.

3. Schwartz Value Survey (SVS). Values will be assessed next via the SVS (Schwartz, 1992, 2005a) which presents two lists of value items. The first contains 30 items that describe potentially desirable end-states in noun form; the second contains 26 or 27 items that describe potentially desirable ways of acting in adjective form. Each item expresses an aspect of the motivational goal of one value. An explanatory phrase in parentheses following the item further specifies its meaning. For example, ‘EQUALITY (equal opportunity for all)’ is a universalism item; ‘PLEASURE (gratification of desires)’ is a hedonism item. Respondents rate the importance of each value item "as a guiding principle in MY life" on a 9-point scale labeled 7 (of supreme importance), 6 (very important), 3 (important), 0 (not important), -1 (opposed to my values). Internal reliabilities for the values and higher-order value types are as follows: power $\alpha = .77$, achievement $\alpha = .78$, hedonism $\alpha = .66$, stimulation $\alpha = .76$, self-direction $\alpha = .62$, universalism $\alpha = .79$, benevolence $\alpha = .83$, tradition $\alpha = .71$, conformity $\alpha = .68$, and security $\alpha = .70$; self-transcendence (benevolence and universalism) $\alpha = .87$, self-enhancement (power, achievement, hedonism) $\alpha = .84$, openness to change (stimulation and self-direction) $\alpha = .78$, and
conservation (tradition, conformity, and security) $\alpha = .84$. These reliabilities are consistent with those reported by Joireman and Duell (2005 and 2007 for ST values only).

4. **Seasonal activity.** Participants will next be given a short information blurb about seasonal influenza and then answer three 'Yes-No' questions about whether they have obtained a seasonal flu vaccine in years past, whether they will this year, and whether there is anything that might make it more likely they would obtain their vaccine. Next, qualitative data is captured about what may make it more likely for them to get their vaccine and they are given space to share any other thoughts they think are important. Seasonal activity will be equivalent to the dental pain control in normal MS studies as though we are talking about the actions of a virus, most people do not become upset about the prospect of getting the flu as the majority of participants would have had the flu in the past and recovered from it. Also, few would know of someone who died and so taken together, seasonal activity should not induce mortality and can serve as a baseline measure of vaccine consumption behavior.

5. **Background information.** Participants will be given information about pandemic influenza and how a pandemic and epidemic differ from one another. They will also be told about several pandemics that have occurred in the past century to include the 2009-2010 and 1918-1919 pandemics. This serves an educational purpose but also is a way to provide operational definitions for the study. Also, it enhances the salience of the study itself to know that a pandemic occurred so recently.

(Note: Participants had been asked if there was a religious, personal, cultural, or health reason that would deter or prevent them from getting a vaccine. If they answered 'yes' to any of these reasons they were exited from the study as they would never obtain a vaccine but for no reason other than they could or would not. It should be noted this question was removed about
half way through data collection as some participants had advanced knowledge of it and used it as a way to get out of the study and still earn their research credit. On average, this occurred 1-2 times per experimental session. This question was still important and was added to the description of the study and listed as exclusion criteria from participating. IRB approval was obtained for this procedural modification. Therefore, anyone who signed up for the study after this point, when they should not have, were either removed from the final sample if they participated any way, or would have been asked to leave the session if they revealed this fact to an experimenter. In the latter case they would not have been granted credit.

6. **Priming mortality.** In standard TMT studies mortality is made salient by asking participants to write about what they think will happen to them when they die and the emotions that the thought of their own death arouses in them. A similar procedure was followed in the current research but the questions modified to read: 'Please briefly describe the emotions that the thought of your own death during a pandemic arouses in you' and 'Jot down, as specifically as you can, what you think would happen to you as you were physically dying from a novel strain of the flu bug.'

7. **Instructions for the participant.** Participants are next instructed about the experimental task they will complete. They are told they will be given information about the status of the influenza outbreak at the global and U.S. levels, shown maps of the spread of the virus in the U.S. and state of Washington, and finally be told about the number of deaths in the U.S. as of the time of the update. This information is given on nine updates representing a period of time from July to October and the updates are all given to the participant at the same time. The reason for this is explained as such, "the scenario is our best guess as to what the next pandemic will be like and is based on our knowledge of previous pandemics." They are also told they will
need to state when, or if, they will obtain a vaccine by indicating the update number they would act at. Participants are informed this task will be completed three times and they will know they need to ask for the update sheets when they see the stop sign. They are further instructed that a brief comprehension check follows and to review the instructions again or ask any questions of the experimenter before continuing.

8. Comprehension checks. To ensure the participant understood the instructions given on the previous screen they are asked 6 true-false questions (i.e. at the time of the first update, there are sufficient quantities of vaccines for all citizens; the star on the state map shows your position in the state for the purposes of the study; it is not necessary to review the Global update each time). After answering they select 'Continue' and are taken to the next screen where they see the questions again as well as the correct answers. Hence, these questions are not exclusionary in nature and necessitating a certain score to continue, but highlights critical aspects of the experimental procedure to follow. It is important that even if wrong on all six questions, participants have a chance to see the correct answer and to clear up any misconceptions they may have.

9. Experimental task, Part 1. It is at this point in the study where participants will see the first of their three pandemic conditions - mild, moderate, or severe. Even though participants in the same session may be in different conditions, all participants will be experiencing the same general procedure. What will change is the information they are given. The description to follow will be for all three pandemic severity conditions the participants experience in the study.

First, participants will be given historical context for the pandemic. This information will state that in "late April the U.S. government reported the first confirmed cases of Swine Influenza A/H1N1" and will move them to late June when the WHO declares a pandemic. They
are next told that the CDC determined the pandemic severity to be mild/moderate/severe and projects that X number of people may die. A table is shown comparing the number of deaths in that pandemic, highlighted by a red box, to the other two pandemic types and to seasonal influenza. Finally, they are given a statement as follows: "For perspective, the population of the U.S. in 2010 was 308,745,538. This means that in a mild pandemic, 1 in every 5,000 people would get sick and die. The likelihood that you would know one of those people would be pretty slim." Similar statements are given for moderate and severe pandemics, but reports 1 in every 500 or 1 in every 165 people would get sick and die during them, respectively. The importance of this statement is to present the numbers in terms better processed by the participant. To say that in a moderate pandemic 625,000 people may die has no real meaning especially when the participant is told that the population of the U.S. in 2010 was 308,745,538. These numbers seem too large and it may even seem that the situation is not as bad as it really is. But to say that about 1 out of every 500 would get sick and die is to present numbers that can be more easily cognitively processed.

To ensure the participant understands how bad that pandemic really is, they are asked this next and given a 10-point scale to make the assessment. This scale moves from Not Really Bad (1), to Bad (4), to Very Bad (7), and finally to Extremely Bad (10).

It is at this point the participant sees the first stop sign and are given these instructions: "Please ask the experimenter for a copy of the (Mild/Moderate/Severe) Update sheets if you have not been given them already. Take as much time as you need to review them and the information they contain. Remember, on the next screen you will be asked at which update, if any, you would obtain a vaccine. Press Next when ready." These sheets are printed on legal size paper with two updates per sheet expect for the final sheet that has one only.
Participants will first be given a Global Update from WHO describing the current phase, number of countries reporting cases, number of worldwide cases with the number of new cases since the last update in parentheses, and the number of deaths worldwide. Next, there will be a U.S. update that gives information about: Mitigation Strategies Employed, Hospital Status, Mortuary Status, First Responder Staffing, Federal Government, Public and Private Schools, Colleges and Universities, Stores and Restaurants, and Public Parks and Playgrounds. Information that has changed since the last update is highlighted in red to make it easier for the participant to identify worsening conditions. The purpose of this information is to inform the reader as to the impact of the pandemic on the U.S.

The next component of the updates are two maps. The first map shows H1N1 activity across the U.S. and identifies the activity as follows (CDC):

- **No Activity**: No laboratory-confirmed cases of influenza and no reported increase in the number of cases of ILI.
- **Sporadic**: Small numbers of laboratory-confirmed influenza cases or a single laboratory-confirmed influenza outbreak has been reported, but there is no increase in cases of ILI.
- **Local**: Outbreaks of influenza or increases in ILI cases and recent laboratory-confirmed influenza in a single region of the state.
- **Regional**: Outbreaks of influenza or increases in ILI and recent laboratory confirmed influenza in at least two but less than half the regions of the state with recent laboratory evidence of influenza in those regions.
- **Widespread**: Outbreaks of influenza or increases in ILI cases and recent laboratory-confirmed influenza in at least half the regions of the state with recent laboratory evidence of influenza in the state.
Directly below this map is information on the number of deaths in the U.S.

The second map shows activity in the state of Washington. The participant's location in the state is indicated with a star and the words "You are here." The legend at the bottom indicates how many cases there are in a given area. A small blue dot indicates less than 10 confirmed cases, a slightly larger green dot indicates 11-100 confirmed cases, a larger light green dot indicates 101-500 cases, and finally a very large red dot indicates greater than 500 confirmed cases. The WA map tracks spread across the state and in particular, how close the spread is to the participant.

In Update 1 there is no activity in WA and so no dots on the map. Update 2 shows sporadic activity whereas updates 3-4 show local activity. Regional activity was used in Updates 5 - 7 and show more and more spread across the state, but not to exceed half the counties. The spread does not make it close to where the participant is until Update 5 (in an adjacent county to the south) and finally arrives in their county in Update 7. Updates 8 - 9 show widespread dispersion of the virus and in Update 9, H1N1 is present in their town. Note that the activity depicted on the U.S. map for WA is consistent with the level of spread shown on the WA map such that if the U.S. map shows Regional spread as it does for Update 5, the WA map shows no less than two, and no greater than half, the counties affected. Also, U.S. maps were carefully selected so that they made sense and showed the virus getting worse over time. All maps were taken from flu.gov.

Participants are given all 9 updates at the same time so they can look across each and make a decision as to if, and when, they would obtain their vaccine. They record this answer by selecting one of the nine buttons corresponding to Update 1, 2, 3, etc. or by selecting 'I have decided to not obtain a vaccine.' If the participant decides to obtain a vaccine on or before the 9th
update, they are asked to answer the following questions: Why did you make this decision? and What factors influenced your decision? If the participant decides not to obtain a vaccine on or before the 9th update, they are told there are now sufficient quantities of vaccine for everyone to obtain one and are asked: Why did you not obtain a vaccine sooner? and Will you obtain one now and why?

The final component of the experimental task is much like what was described earlier with the exception that their location on the WA map changes. Instead of being in the northern part of the state, the participant is asked to consider what their response would be if their location was closer to one of the major cities in the state. They are presented with the original map showing the northern location and a new map showing a star on Seattle, WA. They are then asked: "With the new location in mind, look at the 9 updates in your current scenario again and tell us how this would affect the decision you initially made?" Choices include the following: I would now obtain a vaccine EARLIER than I did before, I would obtain a vaccine at the same update as I did earlier (my decision is unaffected), and I would now obtain the vaccine LATER than I did before. As in the original task, they select a specific update number or 'I have decided to not obtain a vaccine' and then explain their reasoning. Once finished the participant moves to the next part of the survey.

10. Social desirability. Social desirability was then measured using the Marlowe-Crowne Social Desirability Scale (MCSD; Crowne and Marlowe, 1960). The scale consists of 33 items that describe desirable but uncommon behaviors such as admitting mistakes or undesirable but common behaviors such as gossiping. Participants answer either 'True' or 'False' to 18 items scored in the true direction and 15 items scored in the false direction, creating a range of scores from 0 to 33. Higher scores represent a higher need for approval. In the current study, a mean of
15.2 (SD = 5.13) was found which is consistent with other samples using college students (Crowne and Marlowe, 1964: $M = 15.5, SD = 4.4, n = 300$; Paulhus, 1984: $M = 13.3, SD = 4.3$ for an anonymous condition and $M = 15.5, SD = 4.6$ in a public disclosure condition, $n = 100$). The alpha coefficient of the MCSD was .758 which was also consistent with prior research. The highest score obtained in this study was a 29 (1 participant) and there were 6 scores of 25 or greater.

11. **Experimental task, Part 2.** Participants next completed the second of the three pandemic conditions with the same procedure as the first time.

12. **Measuring participant religiosity.** Religiosity was measured next using the Intrinsic/Extrinsic Religious Scale, Revised (I/E-R; Gorsuch & McPherson, 1989) and allows for the measurement of intrinsic religiosity (I-Revised) and two categories of extrinsic religiosity (Ep/Es - Revised) - personally oriented (Ep - Revised) and socially oriented (Es - Revised). The scale consists of 14-items measured on a 5-point "strongly disagree" (1) to "strongly agree" (5) scale. Eight items tap the intrinsic orientation, three of which are reverse scored. Three items each measure the two categories of extrinsic religiosity. The score for each of the three scales is calculated by summing its items' responses. This results in a range of scores of 8-40 for the intrinsic orientation and 3-15 for each of the extrinsic scales.

The mean and standard deviation for I (Revised) were 21.54 and 5.61, E (Revised) were 14.65 and 5.72, Es (Revised) were 6.10 and 2.95, and finally Ep (Revised) were 8.61 and 3.59. These numbers were a bit lower than what was found in the original study. Cronbach's alphas in the current study were as follows: I (Revised) = .63, and all three extrinsic scales (Ep/Es, Ep, and Es, Revised) reported alphas of .86 after rounding was done.

13. **Experimental task, Part 3.** Participants then completed the final of the three
pandemic conditions with the same procedure as in the first two times.

14. Values. Participants next completed the Brief Inventory of Values (BIV; Stern, Dietz, & Guagnano, 1998). The BIV combines several items from the SVS into a single value item. In the current study, 15 items were presented to participants and they were asked to indicate how important each statement was as a guiding principle in their life using a 6-point scale where 0 indicates the participant is opposed to the value, 1 means 'Not at all important,' 3 is 'Somewhat important,' and 5 means 'Extremely important.' Three items assess self-transcendent values and include: (a) a world at peace, free of war and conflict; (b) protecting the environment, preserving nature; and (c) social justice, correcting injustice, care for the weak. Reliability of the self-transcendent items is .719. Three items assess self-enhancement values and include: (a) influential, having an impact on people and events; (2) wealth, material possessions, money; and (c) authority, right to lead. Reliability of the self-enhancement items is .706. Openness to Change was assessed with three items: (a) a varied life, filled with challenge, novelty, and change; (b) an exciting life, stimulating experiences, and (c) curious, interested in everything, exploring. Reliability of the openness items is .805. Finally, the Conservation values include: (a) honoring parents and elders, showing respect, (b) family security, safety for loved ones, and (c) self-discipline, self-restraint, resistance to temptation. Reliability of the conservation items is .582. Alphas for all four scales were consistent with Stern et al. (1998) though conservation was a bit lower than their reported values of .64 and .65 across two studies. Joireman and Duell (2005) did not assess the openness and conservation higher order values but the alphas for self-transcendence and self-enhancement in the current research are consistent with the alphas they reported (.76 and .66, respectively).

15. Illness check. It is possible that the participants own recent illness or that of friends,
families, or acquaintances could affect their decision to obtain a vaccine in this research. As such, these questions were next presented and participants were asked to report any such illnesses in the past 2-3 weeks.

16. Information salience. On each of the nine updates across the three pandemic conditions participants were given several pieces of information to aid them in making their decision to obtain a vaccine or not. Though participants were previously asked why they made the decision they did, it was in a qualitative fashion. One last scale was included to gather quantitative data about the same question. Participants were asked to rank each of the five pieces of information from 'Least Important' to 'Most Important' in terms of the general importance of the piece of information in their decision to obtain a vaccine or not. The advantage of using Survey Monkey for a scale such as this one is that the participant was limited from making a choice more than once (i.e. giving Global Update and U.S. Map the same rank of 3) and from leaving any piece of information inadvertently void of a rank. They were also given space to report any other factors they felt were important.

17. Assessing affect. Participants finally completed the 60-item PANAS (Positive Affect, Negative Affective Scale) to assess affect induced by the MS manipulation.

18. Debriefing. Upon completion of the PANAS participants were debriefed and then moved to a 'Thank You' page. The debriefing included a statement about the goal of the study and contact information if the individual had questions or concerns. Also, they were shown a table comparing seasonal and pandemic flu as a final attempt at health education.
CHAPTER THREE

RESULTS

The purpose of this study was to investigate the behavior of participants during a simulated public health catastrophe, and specifically a pandemic. Of interest are seven main research questions:

1. Does vaccine consumption behavior vary with pandemic severity? Another important question, though no hypothesized relations are offered, is does the order of which pandemic came first for the participant affect the decisions in the other pandemic severities?

2. Do participants obtain a vaccine during a pandemic if they usually procure one during the normal flu season. Secondly, for those who do not usually obtain a vaccine during the flu season do they change this behavior during a pandemic and if so, at which severity level?

3. Does the location of the participant in the state affect their decision to obtain a vaccine depending on whether they are in a small town in a secluded area of the state or a big city?

4. Does one's social value orientation affect the decision to obtain a vaccine such that proselves are more likely to act than prosocials and if this is true, is it a general trend or a function of pandemic severity?

5. Given that pandemics can lead to death especially the worse they are, does one's belief in a higher power affect the decision to obtain a vaccine and is there a difference between those who are intrinsically oriented compared to those who are extrinsically oriented?
6. Does one's values affect their vaccine consumption behavior such that those higher in self-transcendence as compared to self-enhancement values are more likely to cooperate and leave vaccines for those who need them more and if so, is this function of pandemic severity? Also, are individuals who have values consistent with trust in institutions more likely to abide by the advice of public health and government officials?

7. Are some pieces of information given to the participant more influential on the final decision to obtain a vaccine than other pieces?

Each of these questions and their accompanying hypotheses will be addressed in order.

**Question 1: Procuring a Vaccine**

**Research question 1.1. and hypothesis.** Does vaccine consumption behavior vary with pandemic severity? It is hypothesized that in general, participants will make the decision to obtain a vaccine later in the scenario, or not at all, during a mild pandemic and earlier in a severe pandemic. Moderate pandemic will fall in between these two.

**Manipulation check.** Before examining the hypothesis above, it is important to know if participants understood that the three pandemics studied were different in terms of their capacity to disrupt normal activities and cause death. Participants were asked to rate how bad they thought that pandemic would be on a 10-point scale where 1 meant 'Not Really Bad' and 10 meant 'Extremely Bad.' It would be expected that minimally, the mean for severe be significantly higher than mild. Means and SDs for the three pandemic conditions are presented in Table 3. As expected and confirmed via three paired samples t-tests, all means were significantly different from one another at \( p < .001 \) (two-tailed) as follows: Mild-Severe: \( t(201) = -32.56 \);

\[ \text{Mild-Moderate: } t(201) = -18.49; \text{ Moderate-Severe: } t(201) = -24.00. \] The expected difference in
severity between mild ($M = 3.82, SD = 1.72$) and severe ($M = 8.4, SD = 1.67$) was recognized by participants but also, moderate ($M = 5.84, SD = 1.68$) was clearly distinguished from both mild and severe. Hence the manipulations used in the current research were effective and understood by participants.

**Results for research question 1.1.** Do participants obtain their vaccines earlier in a severe pandemic and later in a mild pandemic? Does moderate fall in between? To test vaccine consumption behavior in the different pandemics, median update was used due to the difficulty in interpreting decimals in the means. For example, if it was found that participants decided to obtain their vaccine at update 3.27 in a severe pandemic, how would the .27 be interpreted? Though updates do represent some amount of time from update to update, this exact amount is not stated in the study and furthermore, the decimal could indicate an exact time on a specific day in between updates 3 and 4. Hence, this is impractical to interpret.

The median update for each pandemic condition is as follows - Mild: 6, Moderate: 5, and Severe: 4. To test whether there is a difference in when the individual decides to obtain a vaccine during the three pandemics, a Friedman test was conducted. In short, this test ranks each participant's three values from lowest to highest. If a participant decided to obtain a vaccine at update 7 for Mild, 5 for Moderate, and 3 for Severe, the pandemics would be ranked Severe (1), Moderate (2), and Mild (3). Then the average ranks in each condition are calculated and a consistent pattern checked for. In this study, it is hypothesized that most ranks of 1 will occur in Severe, 2 in Moderate, and 3 in Mild. Given that ranks across three conditions only are compared, small differences will be important.

A significant difference was found ($\chi^2(2) = 199.04, p = .00$ (two tailed) and all pairwise comparisons were significant at $p < .001$ (two-tailed). The sample average ranks were as follows:
Severe: 1.42, Moderate: 1.93, and Mild: 2.65. In the current study, participants made different decisions in terms of when to obtain a vaccine based on the severity of the pandemic.

**Exploratory research question 1.2.** To control for a potential unintended effect of presenting the three pandemic conditions in the same order to each participant, namely Mild-Moderate-Severe, participants were placed in one of six randomized orders. Though order effects could then be minimized or removed through this design, a unique experimentally induced history effect could occur. Public health officials have long been concerned about the next pandemic to strike given their ability to disrupt society and to kill. To that end, extensive public health education initiatives were implemented by local, state, and federal health departments after the turn of the new century warning of potential doom to come. In 2009, predictions of an imminent pandemic were realized and the world braced. The pandemic we experienced over the next year was not only mild, but was milder than normal seasonal flu outbreaks. It is possible many people developed the belief that pandemics were blown out of proportion by the government, thereby lowering their guard for the next appearance which could very well be severe. This may have been the impetus behind the movie *Contagion* (2011).

Hence, another important question is does the order of which pandemic came first for the participant affect the decisions in the other pandemic severities? In other words, might participants under-react to the subsequent pandemic if presented with Mild first or overreact if Severe came first.

**Results for exploratory research question 1.2.** To answer this question, each Update DV was compared against Version to see if there were differences in the decisions made by participants in each pandemic severity (mild-moderate-severe) across the six versions. Of particular import were the following comparisons: in the Mild DV data, mild occurred second in
Versions C and E; in the Moderate DV data, moderate was second in Versions A and F; and finally in the Severe DV data, severe was second in Versions B and D. Results of three Kruskal-Wallis tests found no significant differences (Mild: $H(5) = 5.58$; Moderate: $H(5) = 5.43$; Severe: $H(5) = 4.95$, all $p_s > .05$) indicating that the participants in the six versions did not make significantly different decisions from one another on any of the three pandemics.

There appeared to be no order effect or history effect in the data and it was justified to combine pandemic scenario data into one file and not treat Version as a unique between subjects variable.

**Social desirability.** Responding in this study, especially as it relates to obtaining a vaccine when others may need one, could be affected by making socially desirable responses. In this sample, the average score on the MCSD was 15.20 ($SD = 5.13$). The maximum score possible on the scale is 33 and the highest score observed in the sample, which belonged to just one individual, was 29. Five participants had scores of 25 or 26 and seven had 24. In all, the mean reported was consistent with other research and there appears to be no issue with social desirability in this study.

**Illness history and a potential effect on participant responding.** The final concern was whether participants who were ill themselves or who knew friends or family who were recently ill responded differently than those with no illness to report. In the current study, 10 participants reported being ill in the past two weeks (Yes-No) while a total of 52 reported having at least one other acquaintance or family member who was ill. Of the 52, 32 knew of no more than 2 others who were ill while 20 knew of three or more.

To test whether the participant being sick in the past two weeks may have caused differential responding on the update variables, three Mann-Whitney U tests were conducted. No
significant differences were found on any test (Mild: $U = 908.0$; Moderate: $U = 638.5$; Severe: $U = 767.0$, all $ps > .05$). The same test was conducted to see if being sick caused a difference in their perception of how bad the pandemic was and again, no significant difference was found for any of the three pandemic scenarios (Mild: $U = 969.5$; Moderate: $U = 934.5$; Severe: $U = 734.0$, all $ps > .05$).

Next, differences in levels of how many others were sick (none, 1-2, 3 or more) and the three update variables were assessed via three Kruskal-Wallis tests. No significant differences were found (Mild: $H(2) = 1.90$; Moderate: $H(2) = .861$; Severe: $H(2) = 1.10$, all $ps > .05$) indicating that the groups did not different significantly from one another.

Differences were also assessed for the three manipulation checks and a Multivariate Analysis or Variance (MANOVA) showed significant differences only for the severe pandemic. In this case, '1-2 others with the flu' differed from both 'no others' and '3 or more,' but '0 others' and '3 or more' were not different. Maybe it was that simply knowing at least one other person caused a change in how a severe pandemic was viewed but that effect leveled off after 2 people, returned to levels comparable to knowing no one who was ill (See Table 4 for means and standard deviations for the three levels of Other Ill in a severe pandemic).

**Question 1 summary.** The results of the current study show a differential pattern of behavior during mild, moderate, and severe pandemics such that participants decide to obtain their vaccine earlier in a severe pandemic and later in mild, with moderate in between. This effect does not appear to be due to making socially desirable choices or to having been sick oneself or knowing others who were sick recently. The manipulation checks worked as participants clearly distinguished how bad each pandemic was with mild being rated the least bad and severe being the most. Finally, randomizing the order of pandemics minimized order effects
Question 2: Seasonal Flu Vaccine Behavior

Research question 2.1. and hypothesis. Do participants obtain a vaccine during a pandemic if they usually procure one during the normal flu season? Secondly, for those who do not usually obtain a vaccine during the flu season do they change this behavior during a pandemic and if so, at which severity level? It is hypothesized that if an individual obtains a vaccine during the normal flu season he/she will do so during a pandemic as well, regardless of severity, and will do it sooner than those who do not usually obtain a vaccine. If the individual does not obtain a vaccine during the normal flu season he will not in a mild pandemic, may in a moderate pandemic, and will definitely in a severe pandemic, but no matter what, obtains these vaccines later than those who normally obtain a seasonal vaccine.

Quantifying seasonal flu behavior. Participants were asked first do they usually get the flu vaccine and second, will they during the 2012 flu season. To the first questions, 86 (42.6%) of participants said they do (Yes) while 116 (57.4%) said they do not (No). To the second question, the results were similar though only 83 (41.1%) said yes while 119 (58.9%) said no. Three people decided not to get a vaccine this year for reasons unknown and not solicited in the study. Being that the margin of difference is so small, the variable asking whether the person usually gets the flu vaccine will be used for all analyses.

Results for research question 2.1. So is there a difference between those who do and those who do not get a seasonal flu vaccine if they had to make the same decision but during a pandemic? The short answer is yes and significant differences were observed in all three pandemic conditions as obtained via Independent Samples Median tests. For mild ($t(1) = 9.44$, $p$
The same trend was observed for Moderate ($t(1) = 6.32, p = .012$ (two-tailed) and for Severe ($t(1) = 14.88, p = .00$ (two-tailed)). In all comparisons, those who regularly get their seasonal flu vaccine acted at least one update sooner which in terms of time may represent several weeks earlier. In a pandemic, time is literally of the essence and so waiting even just a few weeks or a month or more is to gamble with one's life.

An additional question that came to mind in light of the findings so far was whether people who always get their seasonal flu vaccine interpret the severity of each pandemic as worse than those who do not obtain their vaccines. Three independent samples $t$-tests were conducted with the aforementioned seasonal flu question as the grouping variable (Yes-No) and the manipulation checks for the three pandemics entered as the dependent measures. No result provided a significant $t$ value though it is worth noting the trend was in the expected direction (Mild - Yes: 4.06 and No: 3.64; Moderate - Yes: 6.05 and No: 5.69; Severe - Yes: 8.65 and No: 8.21). Those already getting their seasonal vaccines tend to perceive how bad it will be to be worse than those who do not.

The results for question 1 show that participants make different decisions depending on the severity of the pandemic such that they obtain a vaccine earlier and earlier from mild to severe. The final analysis in Question 2 confirms the same trend when screening based on how people act during normal flu seasons. Hence, two Friedman tests were conducted - one for the 86 individuals indicating 'Yes' and one for the 116 indicating 'No.' Both tests were significant. First, for Yes: $\chi^2(2) = 87.45, p = .00$ (two-tailed); mean ranks were Mild: 2.60, Moderate: 1.99, and Severe: 1.41. For No: $\chi^2(2) = 113.05, p = .00$ (two-tailed); mean ranks were Mild: 2.69, Moderate: 1.89, and Severe: 1.42.

**Question 2 summary.** It was found that those who regularly get their seasonal flu
vaccine decided to obtain their pandemic influenza vaccine at least one update earlier than those who do not and in all three pandemics. In a second analysis, the decision to obtain a pan flu vaccine was investigated within subjects and participants made different decisions about when to obtain a vaccine in each of the three pandemic scenarios. This trend was observed for both those getting a seasonal flu vaccine and those who do not. There was no significant difference between those who regularly obtain their seasonal flu vaccine and those who do not, in terms of interpretation of how bad the pandemics would be though the trend was for seasonal to see each of the three pandemics as worse.

**Question 3: Shifting Location**

**Research question 3.1. and hypothesis.** Does the location of the participant in the state affect their decision to obtain a vaccine depending on whether they are in a small town in a secluded area of the state or a big city? It is predicted that the trend hypothesized in Question 1 occurs in the new location as well, but participants will obtain a vaccine earlier than they did in 1, or if they never obtained one when in the north, they will now when in the large city.

**Results for research question 3.1.** In Question 1 it was shown that individuals make different decisions about obtaining vaccines based on how severe the pandemic is. The initial question placed the participant in a small town in northern Washington state. A Friedman test was conducted on the decisions made in each pandemic but for the new location. Results reveal a significant $F$ value: $\chi^2(2) = 148.87$, $p = .00$ (two tailed) and all pairwise comparisons were significant at $p < .001$ (two-tailed). The sample average ranks were as follows: Severe: 1.52, Moderate: 1.99, and Mild: 2.49. Hence, participants in the new location also make different decisions based on the severity of the pandemic, with the trend being to obtain a vaccine earlier
in severe and latter in mild. Moderate was in the middle as before.

To find out if participants decide to obtain a vaccine earlier when in a big city compared to the small town, three Wilcoxon tests were used. Results show significant differences between old and new location for all three pandemic conditions - Mild: \( Z = -9.95, p = .00 \) (two tailed); Moderate: \( Z = -8.63, p = .00 \) (two tailed); Severe: \( Z = -7.35, p = .00 \) (two tailed).

**Question 3 summary.** In the current study, participants made different decisions about whether to obtain a vaccine based on the severity of the pandemic when located either in a small town (Question 1) or a big city (Question 3), but decided to obtain a vaccine sooner when located in the big city.

**Question 4: Social Value Orientation**

**Research question 4.1. and hypothesis.** Does one's social value orientation affect the decision to obtain a vaccine? It is hypothesized that proselves will be more likely than prosocials to obtain a vaccine in severe and moderate pandemics, possibly mild also, and that for seasonal influenza there will no difference (Hypothesis 4.1). It is further hypothesized that prosocials will wait to obtain a vaccine until those who need it more have one or until vaccine is present in sufficient quantities, as compared to proselves. In mild to moderate pandemics, the Ebenezer shift is predicted to occur but then disappear with severe pandemics. In fact, in the latter case, prosocials may even show a shift of their own to prosel behavior as their survival instinct kicks in. (Hypothesis 4.2).

**Results for research question 4.1.** Recall that in the current sample there were 110 prosocials and 71 proselves, with 21 individuals who could not be classified. To test whether there is a difference between prosocials and proselves as to when they decide to obtain a vaccine, an
Independent Samples Median test was used with SVO as the grouping variable and the three update variables as the DVs. All analyses were non-significant indicating no difference between when prosocials and proselfs obtain a vaccine during any of the three pandemics.

Given that there is no difference in the behavior of prosocials and proselfs during a pandemic, at least in the current study, it would be assumed the same would be true of these individuals during the normal flu season. SVO (prosocial vs. proself) was crosstabulated with the seasonal flu vaccine question (Do you usually get the flu vaccine? - Yes or No) and it was found that as during a pandemic, there was no difference during the flu season. For prosocials, 44.5% get a vaccine whereas 55.5% do not. For proselfs, 42.3% get the vaccine while 57.7% do not.

**Question 4 summary.** It was hypothesized that there may or may not be a difference in mild pandemics but certainly one by severe for prosocials and proselfs. Though no difference was found in mild, somewhat consistent with prediction, none was found in severe either. Does this mean that Hypothesis 4.1 was not supported, or did the predicted shift in Hypothesis 4.2 appear. In other words, mild was not dangerous enough (i.e. mortality causing) to prompt proselfs to act differently than prosocials, which may be true given no differences during normal flu seasons, and severe was so bad that both groups obtained a vaccine out of fear for their safety. So the difference would potentially lie in moderate pandemics. The results did not support this unless participants see a mild pandemic as much like a seasonal outbreak and so behave the same, and also see a moderate pandemic as much like a severe pandemic and behave accordingly. This could be so but recall that the hypotheses in Question 1 were supported and there were differences in when participants obtained their vaccine. So it appears social value orientation was not the source of this variation and other explanations will need to be sought.
Question 5: Religiosity - Intrinsic vs. Extrinsic

Research question 5.1. and hypothesis. Given that pandemics can lead to death especially the worse they are, does one's belief in a higher power affect the decision to obtain a vaccine and is there a difference between those who are intrinsically oriented compared to those who are extrinsically oriented? One alternative explanation is religiosity.

Allport (1966) said those adopting an intrinsic orientation when it comes to religion see faith as supreme in its own right, are focused toward brotherhood, and attempt to rise above all self-centered needs. In contrast, extrinsically oriented individuals see religion as strictly utilitarian and use it to gain social standing, solace, and an endorsement of their way of life. Given this, it is hypothesized that intrinsically religious individuals will put others before themselves and not obtain vaccines, though the behavior may disappear in a severe pandemic. Extrinsic individuals will obtain their vaccine in keeping with their self-motivated concerns and desire for safety. It should be noted that given the failure of SVO to explain vaccine consumption behavior, and the similarity of descriptions between intrinsic religiosity and prosocial behavior, as well as extrinsic with proself orientations, these predictions will not likely be supported.

Results for research question 5.1. Recall that religiosity was measured using the Intrinsic/Extrinsic Religious Scale, Revised (I/E-R; Gorsuch & McPherson, 1989). In the current study, the mean and standard deviation for Intrinsic were 21.54 and 5.61 and for Extrinsic were 14.65 and 5.72, respectively. These numbers were lower than what was found in the original study (n = 771; Means and SDs were - Intrinsic: 37.2 and 5.8 and Extrinsic: 25.6 and 5.7). Hence, the current sample was much less religious than the sample used by Gorsuch and McPherson (1989). Correlations of intrinsic and extrinsic scores with each of the updates produced no significant Pearson coefficients and due to this, no further analyses were attempted.
**Question 5 summary.** As with SVO, religiosity offered no explanatory power for vaccine consumption behavior. The sample was weakly religious and so this may account for the non-significant finding for religiosity in the current sample. Hence, follow-up work with a more religious sample is needed to discern if religiosity is a factor or not.

**Question 6: Values - Preliminary Findings**

**Research question 6.1. and hypothesis.** Does one's values affect their vaccine consumption behavior such that those higher in self-transcendence as compared to self-enhancement values are more likely to cooperate and leave vaccines for those who need them more and if so, is this function of pandemic severity? To investigate this basic question, the relationship of values to SVO was investigated in this study and it is hypothesized that prosocials will be higher in self-transcendence values and proselfs will be higher in self-enhancement.

**Results for research question 6.1.** Recall that Schwartz (1996) found that benevolence correlated most positively and power most negatively with cooperation. Joireman and Duell (2005) found that when using the SVS to measure values before a MS manipulation, mean self-transcendent values were higher for prosocials and mean self-enhancement values were higher for proselfs. It was these two relationships that needed to be replicated in the current study.

Values were first measured using the Schwartz Value Survey (SVS). Two paired samples t-tests were conducted to compare prosocials and proselfs on self-transcendence and self-enhancement values. Proselfs ($M = 6.75, SD = .86$) were found to have statistically higher mean levels of self-enhancement values than proselfs ($M = 6.38, SD = .91$): $t(169) = -2.66, p = .009$ (two-tailed). In terms of self-transcendence values, prosocials ($M = 6.89, SD = .83$) had higher mean levels than proselfs ($M = 6.72, SD = 1.05$), but this difference was not statistically significant. The results for both higher level values matched Joireman and Duell (2005), at least
in terms of the predicted trends being there (self-transcendence was not significant).

In terms of the BIV, which was assessed after all pandemic conditions, two paired samples *t*-tests were used to make the same comparison. Results showed that prosocials had statistically higher mean levels of self-transcendence values than proselfs: \( t(177) = 2.20, p = .029 \) (two-tailed) while proselfs had statistically higher levels of self-enhancement values: \( t(178) = -2.98, p = .003 \) (two-tailed). Hence, there was no shift from self-transcendence to self-enhancement values in prosocials as predicted by the Hypothesis 4.2.

`Question 6 summary.` In the current sample, prosocials and proselfs did show differences on self-transcendence and self-enhancement values, consistent with the values literature. Future research will need to investigate the role of values in terms of worries and trust in institution. The current research did not allow for this as scales assessing these two constructs were unable to be included due to time constraints.

**Question 7: Information Salience**

**Research question 7.1. and hypothesis.** Are some pieces of information given to the participant more influential on the final decision to obtain a vaccine than other pieces? It is hypothesized that the WA map will be considered the most important piece of information and the global update the least important. No hypothesis is given for the other three pieces of information.

**Results for research question 7.1.** For each of the five pieces of information the mode was obtained and all five could be ranked independent of one another (the mode of 1 only appeared once, 2 only once, etc.; there were no ties). As predicted, the global update was rated as
least important by 124 participants (61.4%; next closest piece of information to being ranked least important (1) was only selected by 14.9% of participants and was the WA map) and the WA map was rated as most important by 118 participants (58.4%; next closest piece to being most important (5) was only selected by 12.4% of participants and was U.S. death toll). Therefore, participants clearly identified a most and least important piece of information found on the update sheets.

What about the other three pieces of information? With the WA map being rated most important (given a 5), the next most important piece of information was the number of U.S. deaths (selected '4' by 37.1% of participants), then the U.S. map (selected '3' by 37.1%), then the U.S. update (selected '2' by 33.2%).

**Qualitative data - results and discussion.** Participants were also asked to explain why they made the decision they did for each of the three pandemic conditions - mild, moderate, and severe. At the conclusion of the study, one rater read each decision and listed unique reasons on a spreadsheet. Each time this decision was encountered in subsequent explanations it was recorded via tally mark. At the end, all tally marks for each reason were added up which indicated how many times participants cited that reason as important to them. For each participant, more than one reason may have been coded (i.e. a participant may have said how close the virus was to their location was important, but also the number of US deaths. Hence, each factor on their final decision was given one tally mark. Some participants had as many as four factors that were important to them). In all, a list of 17 different reasons were cited and all reasons occurred at least twice (US Map was mentioned twice each in Mild and Moderate, and four times in Severe).

Results are presented in Table 5. The Information Salience variable revealed that for all
participants, the WA map indicating spatial proximity of the virus to their location was most important. The least important was the global update. The results of this analysis show spatial proximity to be most important, though its importance decrease across pandemic conditions.

In mild, spatial proximity was cited 76 times by participants with 'Not Very Severe' being cited 42 times. Hence, many participants were willing to wait until the virus was very close to them before getting a vaccine. Also commonly cited was it is 'Better to be safe than sorry.' So participants were also getting the vaccine in case things got bad, or because they normally get their vaccine.

In moderate, spatial proximity was the most cited reason (52 times) but school reopening was the second most cited (44 times). Close behind that was 'Better safe than sorry' and US deaths, both at 34 times (rank 3.5). Finally, social distancing was cited 22 times (rank 5). Noteworthy is concern over the pandemic's severity which was cited 16 times. Participants were beginning to become aware of the number of deaths and how bad the pandemic could be. This reason was not cited at all in Mild.

In severe, spatial proximity shared the top spot with severity concerns (44 times each) which signifies that many participants were willing to get a vaccine before the virus made it their way (ranks 1.5). The third most cited was U.S. deaths (38 times), fourth was social distancing (29 times) and fifth was 'Better safe than sorry' (17 times). Noteworthy are the large number of people citing isolation and quarantine as important (13 times - the next highest was 5 times in a moderate pandemic) and worldwide information - both deaths and cases (18 and 15 times, respectively). Medical surge was an issue for 13 people. Interestingly, mortuary surge issues were only mentioned by one person whereas in the mild pandemic it was mentioned 9 times and 4 times in moderate. From mild to severe, that fact that morgues cannot handle the bodies is not
as great a concern, though concern over US deaths goes up across pandemics. It may be that participants are more concerned with the number of dead than with how they are being handled, expecting the system to be overwhelmed. Also note that social distancing (adult and child, issues with malls being open or parks) becomes more alarming for people from mild, to moderate to severe (4 to 22 to 29 times cited).

The open ended questions used in this study added rich detail to understanding why people make the decisions they do. The qualitative data confirmed the quantitative data and so both complement each other. It should be noted that the Information Salience variable mentions the US update as important to the participant but groups everything together on this update (isolation and quarantine, schools, social distancing, first responders, etc.). Examination of the qualitative data shows that some of this information is more important to the participant than other information and so maybe this should be broken down in follow-up work.

For example, it was surprising how much schools reopening were mentioned though this is a college sample and school is important to students. Many participants did not just mention college though. Many also mentioned K-12 being closed as important. So it was not just college for them, but all schools being closed. Interestingly, only 7 participants mentioned it in Mild, 44 in Moderate, and 19 in Severe. Maybe the peak was during moderate because participants expected schools to be open in a mild pandemic but disrupted in Severe and were more upset about the social distancing measures taken by the government.

The Information Salience variable was asked at the end of the study and asked in general. Obviously, this analysis shows that the factors that most affect a person's decision to get a vaccine or not are not the same in the three pandemics. Hence the question should be asked after each pandemic condition. Alternatively, a between subjects design can be used and it asked at
the end. Then the decisions compared across pandemic condition (as an IV). But this is worth looking at again.

**Question 7 summary.** As predicted and confirmed quantitatively and qualitatively, participants rated the WA map as most important and the global update as least important. It is worth noting that the number of U.S. deaths was rated next most important. So participants seemed to be concerned about the spread of the virus in their state first and then how many people were dying in the U.S. This trend varies by the severity of the pandemic though.

**Review of Results**

Several findings are noteworthy. First, the results show a differential pattern of behavior during mild, moderate, and severe pandemics such that participants decided to obtain their vaccine earlier in a severe pandemic and later in mild, with moderate in between. This effect does not appear to be due to making socially desirable choices or having been sick oneself or knowing others who were sick recently. The manipulation checks also worked as participants clearly distinguished how bad each pandemic was with mild being the least and severe being the most.

Second, those who regularly get their seasonal flu vaccine decided to obtain their pandemic influenza vaccine at least one update earlier than those who did not and in all three pandemics. In a second analysis, the decision to obtain a pan flu vaccine was investigated within subjects and participants made different decisions about when to obtain a vaccine in each of the three pandemic scenarios. This trend was observed for both those getting a seasonal flu vaccine and those who do not.
Third, participants made different decisions in terms of when to obtain a vaccine based on the severity of the pandemic when located either in a small town or located in a big city, but decide to obtain a vaccine sooner when in the big city. And finally, participants rated the WA map as most important and the global update as least important in terms of the pieces of information they were provided.

In terms of non-significant findings, SVO, religiosity, and values did not seem to explain vaccine consumption behavior of participants. Also, randomizing the order of pandemics minimized order effects without creating an experimentally induced history effect.
CHAPTER FOUR
DISCUSSION

The purpose of this study was to investigate the behavior of participants during a simulated public health catastrophe, and specifically a pandemic. Three pandemics were investigated - mild, moderate, and severe - and each is fundamentally different from the others in their ability to kill and disrupt life. A mild pandemic is expected to be worse than the normal seasonal flu outbreak but still bearable and likely not necessitating significant life changes. The 2009-2010 pandemic supports this assessment. Moderate and Severe, on the other hand, are expected to cause substantial issues which overwhelm the ability of government at all levels to respond. Though there are no recent examples to cite, the moderate pandemics of 1957 and 1968 and the severe pandemic of 1919 at least demonstrate these morbid expectations. Of course given our greater knowledge of the flu and detailed response plans, the exact way any pandemic plays out in the 21st century is unclear. What our plans speak to are our best guesses and make preparations for the worst scenario imaginable. In essence, it is better to over-respond than under-respond when lives and our way of life are at stake. It could be that the extreme mildness of the 2009-2010 pandemic, the first of this century, was due to advances in medicine and meticulous planning by the public health field. Only time will tell and through the occurrence of additional pandemics of the moderate and severe variety.

When to Vaccinate

At its most basic level, this study investigated whether participants would recognize the three types of pandemics as fundamentally different from one another and so make different decisions about obtaining a vaccine. Each scenario begins in April with sporadic cases around the world (of epidemic proportions) and then escalates to 110 countries and all continents.
showing cases by late June. It is at this time that a pandemic is declared by the World Health Organization. For the participants, all three scenarios pick up in July and they are presented with five types of information on the updates - a global update, U.S. update, and statement of deaths in the U.S. These pieces of information vary across the three pandemic scenarios. The other two pieces of information are the U.S. and state (WA) maps which show the spread of the virus and which appear exactly the same in all three pandemics.

The basic premise of the study, as outlined above, was supported in a few ways. First, the manipulation check asked participants how bad they thought the pandemic would be. If the three are easily distinguished from one another, then participants should give the mild pandemic the lowest rating and severe the highest, with moderate in the middle. This is what occurred and the means were all significantly different from one another.

Second, the actual decision of when to obtain a vaccine was examined. Being that participants saw the three pandemics as becoming worse from mild to severe, they should then decide to obtain their vaccines increasingly earlier from mild to severe. This prediction was supported as well. Recall that the median update at which a decision to obtain a vaccine occurred, was used instead of the mean due to the difficulty of interpreting the decimal in the mean. A decision was made at the sixth update for mild, fifth for moderate, and fourth for severe. In terms of time, the difference between sixth and fourth updates represents about a month or more. Though this does not seem like a great deal of time, in terms of a pandemic, it is. Consider that once a pandemic starts, it will take between six to nine months to develop, test, mass produce, and distribute a vaccine. Our technological advances may bring this wait time to the lower end of the range but six months is still a lot of time. The pandemic would likely have gone through about two waves at that point during which deaths and disruption of life would be
occurring to different degrees depending on the pandemic being experienced. Across all pandemic conditions, Update 4 occurs in August while Updates 5 and 6 occur in September. Again, this could represent a month or more of time which is about 1/6 or 17% of the total time the world would wait for a vaccine.

Also of import is to understand what the spread of the virus is in the state up to those updates. Figure 2 lays out the nine state maps side-by-side for easy comparison. Briefly, Update 1 shows no activity while Update 2 shows only sporadic activity, confined to one county. The dot on the map signifies less than 10 cases but this represents the first appearance of the virus in the state. In Update 3, the spread is still just Local though two dots now appear in the originating county. Update 4 marks a transition from the virus being confined to one county to four now. In Update 5, and through Update 7, the virus moves to Regional spread (less than half the counties in the state). Update 6 shows the first dot signifying greater than 500 confirmed cases and in Update 7 there are now two dots of this size. In Update 8 (and 9) the virus moves from Regional to Widespread dispersion. By Update 9 there are five large dots and every county has flu activity. Additionally, the virus makes it to the participant's location.

How does the information about when the update occurs and what the spread is like in the state help shed light on the decisions made by participants in this study? First, consider that in a mild pandemic, participants wait until the virus has spread to regional levels. On this map, most of the spread is confined southwest of the participant's location. Two cities in the adjacent county to the southwest are reporting less than ten confirmed cases as well as a city in the county directly south. Additionally, the virus has spread into the two counties in the northeast part of the state and this is the first time cases are in that area. The virus appears to be moving in the direction of the participant and this is confirmed in Update 7 when a town in the northeast part of
their county reports the first cases. Then in Update 8 a cluster of cases appears in neighboring towns. By Update 9 there are cases in the person's town.

The decision to obtain a vaccine in a Moderate pandemic occurs at Update 5. At this point, the virus is still Regional in its spread but this update is the first time the virus approaches the participant's location. One small dot appears in the adjacent county to the southwest and though not nearby, a larger city a few counties to the east shows a dot indicating 11-100 confirmed cases.

For Severe, the Update 4 state map shows no cases in the immediate vicinity of the participant but the major change from Update 3 to 4 is that though the spread is still defined as Local by the CDC, the number of counties involved has increased from 1 in Update 3 to 4 in Update 4 and furthermore, there are several dots in the original county now whereas in Update 3 there were only 2. Also, Update 4 shows another major city showing cases. In the three maps prior to 4, either 0 or 1 county is involved. Update 4 represents the first major movement of the virus within the state which begs the question, does this then lead participants to chose it over other updates. The answer could be yes, but if this was so, the median update would be 4 in all pandemic conditions and it was not.

The general pattern was that participants waited for the virus to come closer to their location in mild but did not wait in severe. In Update 6, a total of five counties near the participant have cases, in Update 5 only two, and in Update 4 no counties immediately near the participant have cases but again, the virus jumps from affecting just one county (Updates 1-3) to four. The participant appears to be cautiously watching the spread of the virus and making his/her decision based on that. If this is true, participants would have rated the state map as the most important piece of information they used to make their decision when asked to rank the
five. This was the case and no other piece of information emerged nearly as important.

Participants rated the global update as least important indicating they found virus proximity to be a salient cue determining their behavior. Interestingly though, in the severe condition, several participants were watching the global update and in particular information being given about civil unrest and bodies being burned in other countries.

The next most importance piece of information was the number of U.S. deaths indicating that mortality was also salient for them and especially in a severe pandemic. It would then be logical to propose that if the pandemic was extremely severe all around the world but not in the U.S. or at least in their state, participants would have decided not to obtain a vaccine at all, or at least acted in a way consistent with their behavior during normal flu seasons and irrespective of the events of the pandemic. This seems true too because social distancing, a measure taken in the U.S. to minimize spread of the virus, was cited with increasing frequency from Mild to Severe, as was Isolation and Quarantine guidelines, per the qualitative data.

The study did not provide information about deaths in the participant's state. Since U.S. deaths were important, as well as the state map, one must wonder if inclusion of state deaths would have ranked in between state map and U.S. deaths. It is one thing to say there are many deaths across the U.S., but even if the virus is spreading freely around the state if there are very few deaths due to potential measures taken by state authorities, then the participant may not feel inclined to act. This is an interesting question for future research.

Though the randomization of pandemic conditions to minimize an order effect did not produce an experimentally induced history effect as was predicted, the presence of one in real life is still of concern. Recall that the 2009 pandemic was classified as mild according to the CDC's Pandemic Severity Index. In a mild pandemic, it is estimated that no greater than 90,000
citizens would die. On average, seasonal flu kills 23,600 so one would expect a mild pandemic to kill between 23,601 and 89,999 people in the U.S. The 2009 pandemic did not follow this trend and killed about 13,000 only, which is obviously less than what seasonal does. This is a curious fact and may have left many people underestimating the true destructive ability of pandemics. Hence, it is logical to assume that if another pandemic breaks out in the next five to ten years and is one that could be classified as moderate or severe, people would under-react initially since the only recent experience they have is that of a pandemic being not that bad at all. Why should they expect anything else? It is possible Hollywood has sensationalized such catastrophes so much that people have become numb to them or think them improbable. Consider that when pandemics are placed on the big screen it is often followed by the dead reanimating in the form of flesh eating zombies. Even the CDC launched their Zombie Apocalypse campaign in 2011 as a way to pique people's interest in pandemics. It may be hard to take it seriously then and the 2009 pandemic seems to have confirmed that. Even when a pandemic broke out it was not like what Hollywood portrays or what the government warns about. So why worry?

Some evidence that people are referring back to history was found in this study. Though not occurring a significant number of times, several participants did cite the first or second pandemic they encountered in the experimental procedure and indicated that it affected their decision on the current severity condition. Some participants in Conditions E and F (severe first) noted that they had already had experienced the worse pandemic nature could throw at them and so everything else was bearable after that. Others in Conditions A and B (mild first), noted that the pandemic was not that bad early on and they would wait a bit longer to see what happened. It needs to be stated again that the number of participants making such statements was a minority but the issue of history was on participant's minds to some extent and maybe was just not
mentioned by others.

Hardin (1968) wrote about the problem of breeding and said many people expect a technical solution to come along and save us. He adds none would. Of course, Hardin was writing 44 years ago. A lot has changed since then and now we do have the technology to both destroy ourselves but also to save ourselves. It is possible people are justified in their faith in science and medicine. Only time will tell if this faith is misplaced.

The third way to see behavior varying in relation to the severity of the pandemic is when the participant's location shifts. This actually adds an interesting twist and begs the question of whether people living in big cities would make different decisions about obtaining vaccines than those living in rural areas? The answer is yes. First, participant's differences in decisions across pandemic conditions were examined, and confirmed, such that vaccines were obtained earlier in severe and latter in mild. This is consistent with the trend for the old (rural) location. Second, and more importantly, the median update when the decision to obtain a vaccine was made in both the new (big city) and old (rural town) locations were compared. In all scenarios, the participant obtained a vaccine about one update earlier in the big city compared to the rural town. Though the spread of the virus has emerged as a salient decision cue for participants, it is not alone and location also presents itself as important.

Fourth and finally, baseline data about how participants behave during normal flu seasons was gathered. In this sample, most participants did not obtain seasonal flu vaccines which may be more related to their age than anything else. The average age of the sample was 19.25 years. Young adults are at their peak for health and likely are not thinking that something as simple as a flu bug could kill them. In fact, fears of dying do not usually make their thoughts at this time. Hence, many chose not to obtain their vaccines. Still a sizeable number did obtain their vaccine.
(about 40%) and this could be by force of habit if their parents had made them over the years or due to concerns over living in dorms on campus.

So are their differences between those getting their seasonal flu vaccines and those who do not once a pandemic breaks out? The answer is yes. Participants getting their seasonal vaccines acted at least one update sooner than those who did not in all pandemic conditions, including severe. This could again be due simply to force of habit or to an awareness of the potential harmful effects of influenza. Some modest support for the latter was obtained in this study. Participants who regularly get their seasonal flu vaccine rated how bad each pandemic would be as worse than those who do not, though no difference was significant (the range of differences stretched from .36 to .44).

SVO, Religiosity, and Values

Participants make decisions about when to obtain a vaccine that are dependent on not just the severity of the pandemic in relation to its ability to kill, but also to the proximity of the virus to their geographical location. These represent factors outside the person. What about those present in the person that may affect their decision making? This study investigated three such factors - social value orientation (SVO), religiosity, and values. In short, the first two did not help explain this behavior and the last was only investigated in an exploratory manner as key constructs related to values were not assessed.

SVO and mortality. There was no difference between prosocials and proselfs in the decision they made in any of the pandemics and the two orientations show a very similar pattern of behavior in relation to seasonal flu. The explanation for this lack of findings may be contextual and linked to the severity of the pandemic.

First, a mild pandemic is generally worse than a seasonal flu outbreak but still not so bad
as to raise concern in participants of either orientation. The manipulation even tells the participant that they are 'not very likely' to know anyone who became ill and died which again, is consistent with seasonal flu as most people are surprised to learn anyone dies from it in the U.S. It may be that proselfs who would normally act greedily to ensure their own survival, do not feel threatened enough to do so in a mild pandemic. Are they then showing the Ebenezer shift (Joireman and Duell, 2005) and trying to meet the societal injunction to be concerned with the welfare of others by espousing self-transcendent values linked to cooperation? Likely not. Prosocials, on the other hand, appear to be cooperative when in reality they are just acting with the same lack of concern that proselfs have. So SVO is not needed to explain behavior in either seasonal flu or mild pandemic conditions.

On the other hand, a severe pandemic makes the participant's mortality very salient. In fact, in the MS inducement they are told that 1 in every 165 people would get sick and die and there is a 'very strong chance' they would know one of these people. So in respect to this, proselfs should act earlier to secure their own survival and in the current study this occurred, but for prosocials also. This seems to suggest the hypothesis that prosocials will display prosel tendencies in a severe pandemic so they survive was correct. Or was it? If this is true, we should see differences in a moderate pandemic since people are not dying on such a large scale as in severe but are dying at higher rates than in mild. Hence, proselfs may err to get their vaccine while prosocials decide to wait it out. Like mild and severe, there was no difference between orientations. It could be that participants see moderate much like severe and mild like seasonal. In the manipulation they are told that the likelihood they would know someone who became ill and died would be 'pretty good.' This description is closer in similarity to severe than mild. It then seems logical to compare mild with moderate/severe to find differences in SVO. In the
current study, this difference did not exist either.

In general it seems that mild is not bad enough to make anyone worry and severe could be bad enough that everyone worries, but differences did not exist in moderate unless moderate is perceived as severe. SVO has shown the ability to predict behavior in resource dilemmas such that when a resource pool is declining Cooperators decreased their harvests across trials, Competitors did not make any change, and Individualists increased it (Parks, 1994). Other studies investigated the moderating effect of SVO in conditions of uncertainty (Roch and Samuelson, 1997). Briefly, proselfs did not exploit the resource pool when the replenishment rate was known and their actions could be more easily noticed and sanctioned, but did so when it was uncertain. Replenishment rate is a form of environmental uncertainty as is size of the resource. How do people respond when there is social uncertainty or when the actions of others are unpredictable? In general, overconsumption can be reduced or eliminated in cases of social uncertainty if group members are held to a equal share norm (Allison & Messick, 1990; Messick & Schell, 1992; Rutte, Wilke, & Messick, 1987). Furthermore, DeKwaadsteniet et al. (2008) found that when the task environment provides a salient cue in terms of how to act (strong situation), the harvest decision is based on that cue but if a cue is not present (i.e. weak situation), the decision is based off of SVO.

So what does this all mean for the current study? It could be DeKwaadsteniet et al. (2008) explains the lack of findings exclusively and participants have very clear cues as to how they should behave. These cues arise from their experience with seasonal flu outbreaks and constant admonitions by public health officials to get a flu vaccine. In fact, if everyone obtained a vaccine as directed this would reflect making the socially responsible decision and not to obtain one is irresponsible. If the population is vaccinated against a flu strain its lethality greatly
decreases, people live, and society continues to function as normal. Citizens are taught this all throughout life and so getting a vaccine has nothing to do with being prosocial or proself. The only uncertainty during a seasonal flu outbreak is whether the person next to you was wise enough to get his/her vaccine (social uncertainty). Even if you do not and everyone else around you did, and you do not mingle with strangers who may not have gotten a vaccine, you are safe because everyone around you is protected. Of course it is difficult, and maybe improper, to go around screening all your friends, family, coworkers, etc. as to whether they went to the doctor to get their vaccine. Maybe a bit of trust is in order or the safer bet is to ignore the behavior of others and just get a vaccine for yourself. As for environmental uncertainty, the main ways it would materialize is in wondering if others around you are carrying the virus but it is easily resolved if we get our vaccine, and in knowing whether there is enough vaccine for all. Typically there is and even if not, most people do not die from seasonal flu unless they are in at-risk groups.

Now to a pandemic which represents a unique situation as there will not be enough vaccines for everyone early on. Some will be able to get one while most will not. Who gets the vaccine then? Why do they decide to obtain one when others do not? This is where SVO was believed to factor in or do participants still make decisions in keeping with their behavior during seasonal outbreaks? Not only is a pandemic influenza strain a novel virus, but pandemics as events are novel in that people do not deal with these year in and year out. In fact, many people alive today (i.e. born after 1969) had never experienced a pandemic until 2009 and even then it was only a pandemic in name as it was really no different than a seasonal flu outbreak. It is hard to know how to act when you have no experience to go off of and need to simply follow the advice from the government as to how to act. Does this then represent a strong situation with a
norm of getting the flu vaccine clearly stated? Those who conform are socially responsible and those who do not are not. Possibly not because again, not enough is available for upwards of nine months. In the interim the general counsel to obtain a vaccine is being overridden with advice to only obtain one if in a certain vaccine priority group. Enter mortality. In a mild pandemic this advice is followed. In a severe pandemic when deaths are abundant and spread is close to home, is it still followed? Do people gamble with their lives and the lives of their loved ones? Do they remain prosocial or act proself? Is wanting to survive selfish though? Darwin and natural selection may beg to differ. The literature on unconscious vigilance may beg to differ. Consider that Kasser and Sheldon (2000) showed that participants faced with the fear of death acted greedily though this was not linked to SVO. Hirschberger et al. (2008) found that though prosocial behavior is valued in most societies, self-protective concerns can override these positive feelings toward helping others in need.

**Religion and mortality.** Like SVO, religiosity was found not to explain vaccine consumption behavior. Recall that mean level of religiosity was very low in this sample compared to past research. Hence, the failure of religiosity to shed light on behavior may be due to this fact and this fact alone. Follow-up work will need to be done to find a sample that is more religious.

Let's assume temporarily that the results for religiosity found in this study will hold even in a more religious sample and enter into a brief discussion of why this is so. First, consider that many people call upon a higher power to guide them through very difficult times but likely do not pray when sick with the flu as they might see illness as a normal part of life and think it foolish to take up the higher power's time. Also, they likely had the flu in the past and recovered and so know things will get better with time. Consistent with these notions, differences between
the religious orientations was not found in a mild pandemic.

Next, if the severe pandemic is so bad that everyone wants to survive, we might see differences in religiosity such that the extrinsically oriented obtain their vaccine more than those who are intrinsically oriented. The latter would leave their fate in the hands of God whereas the former would want to take matters into their own hand. Greenberg et al. (1990) found that those who believed in the afterlife showed greater favoritism to this belief when mortality was made salient. It would make sense that intrinsically oriented individuals not decide to get a vaccine in a severe pandemic as they would be looking to a greater existence after the physical one and have peace with potentially dying. Research by Jonas and Fischer (2006) support this assertion as they found that intrinsically oriented people are better able to deal with prospects of death than their extrinsic counterparts and those high in religious fundamentalism are more likely to forgo medical treatment and substitute prayer after being reminded of their mortality (Vess et al., 2009). This line of reasoning was not supported in the current study as there were no differences between intrinsic and extrinsically oriented individuals but this was possibly due to the weak religiosity of the sample and not to a lack of difference. In any event, religiosity failed to differentiate behavior in mild and severe pandemics.

Religiosity also presents another challenge not explored in this study - the presence of the in-group, out-group bias. When we think of deeply religious individuals we think of them being cooperative with all people. But many cooperate only with members of their own denomination and thumb their nose at individuals who are not religious or members of other denominations in their faith or other religions all together. When it comes to the decision to obtain a vaccine or not, people may look to their in-groups, religion being one, for information about how to act and chose to protect their in-group over out-groups. This is consistent with the values literature since
religion has been found to correlate positively with Benevolence, defined as care and concern for your in-group, while correlating negatively with Universalism, defined as care and concern for all others (Schwartz and Huismans, 1995). It is also consistent with the TMT literature as Greenberg et al. (1990) found that when individuals are faced with their own mortality, they are more likely to defend and uphold their religious faith by showing favoritism to those who shared their beliefs and derogating those who did not. Interestingly, this effect can be overrode by the desire to affiliate with others (Wisman and Koole, 2003) and may lead individuals of one religious faith to interact with those not of that faith, thereby reducing the in-group bias during a pandemic. Though information was collected about the person's current religious affiliation, follow-up work will need to be done to obtain a more diverse religious sample and see if such a bias exists and if it can be overrode due to the affiliation need, and more so in a severe pandemic than a mild pandemic.

**Values and mortality.** The examination of values espoused by both prosocials and proselfs was generally consistent with the literature. Prosocials showed greater tendencies towards self-transcendence values as shown via the BIV while proselfs reflected self-enhancement values as shown via the SVS and BIV, consistent with Joireman and Duell (2005). Values were assessed twice - before any MS manipulation and after all manipulations were completed and research has shown that proselfs can act prosocially following reminders of mortality, called the Ebenezer shift (Joireman and Duell, 2005, 2007). This study is unique as it is not a simple question of whether mortality was brought to the participant’s attention, but to what degree it was. Obviously, mortality is more salient in a severe compared to a mild pandemic. Due to this, the Ebenezer shift may not work the same. Proselfs and prosocials acted no different in mild and severe pandemics but possibly for different reasons as explained earlier.
In Joireman and Duell (2005) proselfs expressed stronger endorsement of self-transcendence values after an MS manipulation compared to the control condition. Whether or not this effect was present in the current study is unclear and is due to a limitation of the design. The BIV was given to participants after all pandemic conditions were completed. By that point, they would have had mortality made salient at a low, moderate, and high level. To more accurately assess the effect of the three pandemics on values, the SVS would need to be given before any manipulation and then the BIV after each manipulation. The issue is that by the second and definitely the third administering of the BIV a practice effect would ensue. Hence, a between-subjects design could be used in which the SVS is given before the only manipulation the participant would encounter and then the BIV directly after it. Then a comparison could be made between each of the three pandemics in terms of the ability of any one pandemic to shift values. It may be that the predicted shift of prosocials to a proself orientation in the severe pandemic does occur and could be seen through this design. Mild pandemics are not very potent in their ability to kill and so no shift is likely to occur and proselfs mirroring prosocials would not be due to the Ebenezer shift for reasons outlined earlier.

Another issue is that the average age of the sample was 19 which is considered late adolescence or early adulthood at best. At this time, individuals espouse values related to openness to change (self-direction, stimulation, hedonism) and self-enhancement (power and achievement). Participants did make different decisions about obtaining vaccines across the three pandemics but it is possible that the current sample may have taken the vaccines consistently earlier than a hypothetical sample 20 years older would have. Why? The older participants would have shifted to values related to tradition, conformity and security (Glen, 1974) and universalism and benevolence (Veroff, Reuman, & Feld, 1984). Or maybe the older sample would decide to
obtain a vaccine earlier than the younger sample but for reasons unrelated to SVO, religiosity, mortality, or values. Maybe they decide to get the vaccine due to health concerns. In this case then, looking at worries, as outlined below, would be useful. For the older sample, worries about health are likely more easily accessible than for a younger sample in the prime of their life. Age comparisons could then be made.

The true advantage of investigating values further is in looking at worries and trust in institutions, which were not assessed in the current study. When it comes to worries, the domain of micro worries related to power values and the micro worries of safety and health were found to be related to security values (Schwartz, Sagiv, and Boehnke, 2000). Power and security sit adjacent to one another and share a motivational emphasis, namely the control of people and resources in conditions of uncertainty. Also important is trust in institutions and of the ten values, Devos, Spini, and Schwartz (2002) found tradition to matter most. This was also the most important value for religious individuals (Schwartz and Huismans, 1995). Future research should look at both worries and trust in institutions alone, and their intersection and how they affect decisions in public health catastrophes.

**Final Word and Recommendations to the CDC**

Pandemics represent a significant threat to the safety and security of individuals and the stability of society. As such, plans must be developed to minimize the negative effect of such public health catastrophes and such a step has already been taken over the past 5-10 years. It is also important to understand potential behavior of individuals during a pandemic and how this behavior may deviate from normal conditions (seasonal flu). In the current study, it was found that participants do see the three types of pandemics as fundamentally different from one another and adjust their behavior accordingly. In a mild pandemic, participants decided to obtain a
vaccine but waited several months after the WHO declaration to do so and until the spread of the virus in their state has presented itself as a threat to their town. This is contrasted with severe in which participants move much sooner to obtain a vaccine, a little more than a month after the initial declaration, and do not wait until the virus comes close to home but act when it begins to show spread within the state beyond the initial county. Moderate falls in the middle and participants wait until the virus first hits a county due south of their location and spread is first classified as 'Regional.' The lesson for public health officials is that participants living in rural areas are more likely to act when the virus gets close to home, the exception being severe of course.

If the participant is in a big city, they act before the virus even hits their city in severe and once cases are reported in mild and moderate. In this case, participants express concern about the ability of the virus to spread rapidly in the bigger city, as compared to the small, remote town. Hence, they act in a way to protect themselves. Public health officials need to be aware of the different decisions city and rural citizens will make and ensure that vaccines are sent to the cities before more remote locations. Maybe isolation, quarantine, and social distancing strategies will be more effective in remote towns than in big cities and so vaccines be sent to the most vulnerable locations.

Furthermore, special attention should be paid to participant's behavior during the flu season as in the current study, participants did make different decisions about getting a vaccine depending on whether they usually obtained their seasonal flu vaccine or not. For those who do not normally obtain a vaccine during the flu season, public health messages should be targeted at these individuals to raise their awareness of the importance of obtaining a vaccine during a pandemic.
Finally, 'those who do not learn from the past are doomed to repeat it' is a common expression that may haunt us in the next pandemic. Unfortunately when it comes to our personal and collective histories in relation to pandemics, a significant number of people alive today have no prior experience with a pandemic. Even though many are alive from the 1957 and 1968 moderate pandemics, the medical system was still so large after the 1918 pandemic that it was able to easily absorb the large number of cases each pandemic produced. In 2009, we experienced a mild pandemic that really did not live up to its name. Hence, very few understand the true threat a pandemic presents us with. It's hard to relate to the 1918 pandemic as society has changed greatly since then and most believe that technology and medicine will be able to save us. The CDC will want to continue its public outreach initiatives to educate the public and help everyone be prepared. Of course, campaigns such as Zombie Apocalypse in 2011 may have done more harm than good. Hollywood has already glamorized viruses in the form of flesh eating zombies leaving many to see the true threat of pandemics to be an invention of fiction. The CDC may have confirmed that belief for many by joining the bandwagon.

This study was the first to investigate decision making during a simulated public health crisis. Though the findings were important and shed some light on behavior, much more work remains to be done. A few design issues will need to be addressed by future researchers and how individual differences may moderate decision making will need to be explored further. In all, this study represents a step in the right direction for answering some very important questions about how people behave in pandemics and beyond.
BIBLIOGRAPHY


defense without adaptations for terror, coalition, or uncertainty management. *Journal of Personality and Social Psychology*,


APPENDICES
Table 3
Means and Standard Deviations of Severity Estimates for all Pandemic Conditions

<table>
<thead>
<tr>
<th>Pandemic Condition</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>3.82</td>
<td>1.72</td>
</tr>
<tr>
<td>Moderate</td>
<td>5.84</td>
<td>1.68</td>
</tr>
<tr>
<td>Severe</td>
<td>8.40</td>
<td>1.67</td>
</tr>
</tbody>
</table>
Table 4
Means and Standard Deviations of Other Ill in the Severe Pandemic Condition

<table>
<thead>
<tr>
<th>Other Ill</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Others</td>
<td>8.29</td>
<td>1.64</td>
</tr>
<tr>
<td>1-2 Others</td>
<td>9.25</td>
<td>1.05</td>
</tr>
<tr>
<td>3 or More</td>
<td>7.85</td>
<td>2.18</td>
</tr>
</tbody>
</table>
Table 5. Decision Reasons by Pandemic Condition, From Qualitative Responses

<table>
<thead>
<tr>
<th>Reason</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial proximity - WA map, spread in state, # cases in state, dots on map</td>
<td>76(^1)</td>
<td>52(^1)</td>
<td>44(^{1.5})</td>
</tr>
<tr>
<td># of US Deaths</td>
<td>21(^4)</td>
<td>34(^{3.5})</td>
<td>38(^3)</td>
</tr>
<tr>
<td>School reopening - actual reopening or delay</td>
<td>7()</td>
<td>44(^{2})</td>
<td>19(^{5})</td>
</tr>
<tr>
<td>Worldwide Info - (deaths/cases)</td>
<td>14(^5)</td>
<td>8/16</td>
<td>18/15</td>
</tr>
<tr>
<td>Medical Surge</td>
<td>7()</td>
<td>15()</td>
<td>13()</td>
</tr>
<tr>
<td>Mortuary Surge</td>
<td>9()</td>
<td>4()</td>
<td>1()</td>
</tr>
<tr>
<td>&quot;Better Safe Than Sorry&quot;</td>
<td>30(^3)</td>
<td>34(^{3.5})</td>
<td>17(^{6})</td>
</tr>
<tr>
<td>Federal Government Issues - problems with sustaining operations</td>
<td>5()</td>
<td>5()</td>
<td>5()</td>
</tr>
<tr>
<td>Social Distancing - Adult and Child, business closures, parks, etc.</td>
<td>4()</td>
<td>22(^{5})</td>
<td>29(^4)</td>
</tr>
<tr>
<td>Not Very Severe - in relation to the pandemic</td>
<td>42(^{2})</td>
<td>4()</td>
<td>-()</td>
</tr>
<tr>
<td>Severity Concerns</td>
<td>-()</td>
<td>16()</td>
<td>44(^{1.5})</td>
</tr>
<tr>
<td>Pre-existing Health Issues - auto-immune problems</td>
<td>4()</td>
<td>1()</td>
<td>3()</td>
</tr>
<tr>
<td>US Map - spread throughout the country</td>
<td>2()</td>
<td>2()</td>
<td>4()</td>
</tr>
<tr>
<td>Isolation and Quarantine - recommended or required</td>
<td>4()</td>
<td>5()</td>
<td>13()</td>
</tr>
<tr>
<td>First appearance of virus in state</td>
<td>-()</td>
<td>5()</td>
<td>6()</td>
</tr>
<tr>
<td>First Responder issues - calling out sick</td>
<td>-()</td>
<td>7()</td>
<td>2()</td>
</tr>
<tr>
<td>I am 'generally healthy'</td>
<td>6()</td>
<td>8()</td>
<td>3()</td>
</tr>
</tbody>
</table>

Note: Exponent indicates rank for top 5 to 6 factors on the final decision; ‘-’ indicates the reason was not cited in that pandemic condition; \(n = 202\)
Appendix D: Establishing Severity Numbers for Mild, Moderate, and Severe Pandemics

The mild, moderate, and severe levels of MS depict different categories of pandemics as defined by the Pandemic Severity Index. All 5 pandemic categories reflect increasing levels of severity and from the perspective of TMT, should yield greater and greater levels of mortality salience in people. Three steps were used to establish the final numbers.

**STEP 1: Establish the Multipliers**

<table>
<thead>
<tr>
<th>Category</th>
<th>Potential Fatalities, based on Case Fatality Ratio (CFR)</th>
<th>Difference in Severity, Multipliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;90,000</td>
<td>Base</td>
</tr>
<tr>
<td>2</td>
<td>90,000 - 450,000</td>
<td>Up to 5 times as bad</td>
</tr>
<tr>
<td>3</td>
<td>450,000 - 900,000</td>
<td>Up to 10 times as bad</td>
</tr>
<tr>
<td>4</td>
<td>900,000 - 1,800,000</td>
<td>Up to 20 times as bad</td>
</tr>
<tr>
<td>5</td>
<td>Over 1,800,000</td>
<td>Greater than 20 times as bad</td>
</tr>
</tbody>
</table>

The key thing to know with this chart is that the number of potential fatalities is based on an unmitigated pandemic without interventions. Unless the virus somehow escaped surveillance at the health departments and doctor offices, there would be interventions that could affect how many people were killed. Ignoring the numbers in the middle column for now, the focus is on how much worse each pandemic is expected to be as you move up the categories (last column). Hence, these are the multipliers that will be used.

For perspective, in the 20th century, we experience seasonal flu activity that is at about the Category 1 level annually, the 1957 and 1968 pandemics have since been classified as Category 2, and finally the 1918 pandemic is regarded to have been a Category 5 pandemic. In the 21st century, the 2009-2010 pandemic was a Category 1.
STEP 2: Determine the Base

Having established the multipliers, a base needs to be decided upon. The base of 90,000 (max at Category 1) could be used but this seems too high. The 2009-2010 pandemic could also serve as a base since it was a Category 1 pandemic but this seems too low (deaths = 12,470 or 12,500 to have a nice round number; this is less than what is average for seasonal flu).

Hence the decision was made to take the number from the most recent pandemic and then multiply it by 5. This resulted in a new base of 62,500 deaths which is below the max of 90,000 according to the PSI, but higher than normal seasonal flu deaths.

STEP 3: Determine Final Numbers Used in Dissertation

The numbers reported to participants will be as such:

<table>
<thead>
<tr>
<th>Category of Pandemic</th>
<th>Base Number of Deaths</th>
<th>Multiplier</th>
<th>Number Reported in this Dissertation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>62,500</td>
<td>none</td>
<td>62,500</td>
</tr>
<tr>
<td>2</td>
<td>62,500</td>
<td>5</td>
<td>312,500</td>
</tr>
<tr>
<td>3</td>
<td>62,500</td>
<td>10</td>
<td>625,000</td>
</tr>
<tr>
<td>4</td>
<td>62,500</td>
<td>20</td>
<td>1,250,000</td>
</tr>
<tr>
<td>5</td>
<td>62,500</td>
<td>30</td>
<td>1,875,000 (greater than 20)</td>
</tr>
</tbody>
</table>

The rows in yellow will be the numbers representing different pandemic severities.

According to the CDC, a Category 1 pandemic is considered mild and so 62,500 will be the number of deaths reported at this level. Categories 2 and 3 are considered moderate and so Category 3 projections will be in the study. Participants will be told that in a moderate pandemic,
up to 625,000 people may die. Finally, Categories 4 and 5 are considered severe pandemics and so Category 5 projections will be used and the number of 1,875,000. I decided to take the higher of the two categories for Moderate and Severe pandemics.
Appendix E: Establishing Global Update Numbers

Participants will first be given a Global Update from WHO describing the current phase, number of countries reporting cases, number of worldwide cases with the number of new cases since the last update in parentheses, and the number of deaths worldwide with the number of new deaths since the last update in parentheses. These numbers were derived as such:

Calculating Numbers on the Global Update

1. Start with number of worldwide deaths.

2. To calculate number of U.S. deaths, multiple worldwide deaths by .6759. Rationale - During the 2009-2010 pandemic there were 12,470 U.S. deaths and 18,449 in the world. Hence, U.S. deaths accounted for 67.59% of all deaths and since the current scenario has the U.S. at the forefront again, the numbers were kept consistent.

3. To calculate the number of cases worldwide, multiply the number of worldwide deaths by 20. Hence, the percentage of deaths to cases worldwide is always 5%.

Example:

Mild Pandemic Update 1 shows 180 deaths to start which is consistent with the back story in the Mild Pandemic Manipulation prior to starting the spread salience part of the experiment.

U.S. Death Total - Multiply 180 by .6759 to get 121.66. So, 121/180 = .6722 which is a bit below but is hard to find exact numbers without using fractions when the numbers are this small. Update 10 shows 28,166 deaths worldwide and 19,037 in the U.S. which comes out to .6759 or 67.59% exactly.

Worldwide Cases - In the case of Update 1, take 180 and multiply it by 20 to get 3,600. Hence, the deaths are 5% of all cases. (180/3,600 = 5%).

With these numbers established on the mild pandemic paradigm, the numbers for moderate and severe can be calculated easily by using the previously established multipliers:
For **Moderate**, multiple the number of cases and number of deaths worldwide, and the number of U.S. deaths by 10.

For **Severe**, multiple the number of cases and number of deaths worldwide, and the number of U.S. deaths by 30.

Example for Update 13 (between subjects design)

<table>
<thead>
<tr>
<th>Update Statistic</th>
<th>Mild (Base)</th>
<th>Moderate (x10)</th>
<th>Severe (x30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide Deaths</td>
<td>61,522</td>
<td>615,220</td>
<td>1,845,660</td>
</tr>
<tr>
<td>Worldwide Cases</td>
<td>1,230,440</td>
<td>12,304,400</td>
<td>36,913,200</td>
</tr>
<tr>
<td>U.S. Deaths</td>
<td>41,582</td>
<td>415,827</td>
<td>1,247,482</td>
</tr>
</tbody>
</table>

In general, this holds constant the number of worldwide deaths at 5% of all cases and the number of U.S. deaths at about 67.59% of all deaths.
Figure 2: State Maps Used in All Pandemic Scenarios

Update 1 State Map - July, No Activity

Update 2 State Map - July, Sporadic

Update 3 State Map - August, Local

Update 4 State Map - August, Local

Update 5 State Map - September, Regional

Update 6 State Map - September, Regional
WASHINGTON STATE UNIVERSITY  
Department of Psychology  

Research Study Consent Form  

Study Title: Decision Making During a Simulated Public Health Crisis, Study 1  

Researchers: Dr. Craig D. Parks, 209 Johnson Tower, parkscd@wsu.edu  
Mr. Lee Daffin, 206 Johnson Tower  

You are being asked to take part in a research study carried out by Dr. Craig Parks and Mr. Lee Daffin. This form explains the research study and your part in it if you decide to join the study. Please read the form carefully, taking as much time as you need. Ask the researcher to explain anything you don’t understand. You can decide not to join the study. If you join the study, you can change your mind later or quit at any time. There will be no penalty or loss of services or benefits if you decide to not take part in the study or quit later. You may not participate if you are under 18 years of age.  

What is this study about?  

This study researches factors that may affect a participant's decision to obtain a vaccine during a pandemic. If you agree to participate you will work for up to 90 minutes.  

What will I be asked to do if I am in this study?  

If you agree to participate, you will complete four short surveys before moving into the main part of the study. You will be told about a novel influenza virus that has reached pandemic proportions and over a series of global and U.S. updates, will be given information about the virus' spread and lethality. After each update, you will be asked if you will obtain your vaccine at that point. Upon completing the main task, there will be one final scale and then you will be debriefed.  

Are there any benefits to me if I am in this study?  

During the study you will be provided background information on seasonal and pandemic influenza. At the end of the study we will give you an information sheet that explains the purpose of the study and the psychological processes that we think affect how you made your decisions. This will give you a chance to learn something about how people may rationalize the decision to obtain vaccines during a severe public health catastrophe. Since pandemics have occurred with regularity throughout history, the task is relevant to all participating. Consider that we have had a pandemic as recent as 2009-2010.
Are there any risks to me if I am in this study?

The most likely risk is that the study presents a very realistic scenario and so it may be anxiety provoking to some. We want to reassure you that nothing in the material is intended to produce a negative reaction, but sometimes a person may see or read something that, for personal reasons, just bothers him/her. If this happens, all you need to do is tell us that you want to stop, and we'll stop your participation. We won't even ask you what the problem is. Of course, you will still receive your participation credit if this happened.

Will my information be kept private?

The data for this study are being collected anonymously. Neither the researcher(s) nor anyone else will be able to link data to you. You will not provide your student number, social security number, or name. A person who looks at the data will have no way of knowing who was involved in the study, or even when the study was conducted. The data for this study will be kept for 3 years.

Are there any costs or payments for being in this study?

There will be no costs to you for taking part in this study. You will receive 1.5 participation credits for taking part, even if you leave the study before finishing the task.

Who can I talk to if I have questions?

If you have questions about this study or the information in this form, please contact Dr. Parks in 209 Johnson Tower or at parkscd@wsu.edu. If you have questions about your rights as a research participant, or would like to report a concern or complaint about this study, please contact the Department of Psychology at 509-335-2632, or e-mail at psych@wsu.edu, or regular mail at: Johnson Tower 233, PO Box 644820, Pullman, WA 99164-4820

What are my rights as a research study volunteer?

Your participation in this research study is completely voluntary. You may choose not to be a part of this study. There will be no penalty to you if you choose not to take part. You may choose not to answer specific questions or to stop participating at any time.

What does my signature on this consent form mean?

Your signature on this form means that:

- You understand the information given to you in this form
- You have been able to ask the researcher questions and state any concerns
- The researcher has responded to your questions and concerns
- You believe you understand the research study and the potential benefits and risks that are involved.
Statement of Consent

I give my voluntary consent to take part in this study. I will be given a copy of this consent document for my records.

__________________________________  _____________________
Signature of Participant     Date

Printed Name of Participant

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect.

I certify that when this person signs this form, to the best of my knowledge, he or she understands the purpose, procedures, potential benefits, and potential risks of participation.

I also certify that he or she:

• Speaks the language used to explain this research
• Reads well enough to understand this form or, if not, this person is able to hear and understand when the form is read to him or her
• Does not have any problems that could make it hard to understand what it means to take part in this research.

__________________________________  _________________________
Signature of Person Obtaining Consent   Date

__________________________________  _________________________
Printed Name of Person Obtaining Consent  Role in the Research Study
Please answer the following about yourself:

1. Your Race:
   - Caucasian
   - African-American
   - Hispanic
   - Asian American
   - Other _______________

2. Your Gender:
   - Male
   - Female

3. Age on your last birthday: ____________

4. Highest Level of Education You Have Obtained:
   - High School (if a Freshman in college)
   - Some College (if a Sophomore or above)
   - Bachelor’s Degree
   - Masters or PhD

5. Your Current Religious Affiliation: ________________________________

6. Your Current Political Affiliation: ________________________________

7. Are you married?
   - Yes
   - No

8. If not married, are you in a long-term relationship?
   - Yes
   - No
   - N/A (if married)

9. Do you have children?
   - Yes
   - No

10. What is the age of your oldest child? ________ (if you have only one child, enter their age here)

11. What is the age of your youngest child? ________ (if only one child, enter nothing here)
In this task we ask you to imagine that you have been randomly paired with another person, whom we will refer to simply as the "Other." This other person is someone you do not know and that you will not knowingly meet in the future. Both you and the "Other" person will be making choices by circling either the letter A, B, or C. Your own choices will produce points for both yourself and the "Other" person. Likewise, the other's choice will produce points for him/her and for you. Every point has value: The more points you receive, the better for you, and the more points the "Other" receives, the better for him/her.

Here's an example of how this task works:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get:</td>
<td>500</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td>Other gets:</td>
<td>100</td>
<td>500</td>
<td>300</td>
</tr>
</tbody>
</table>

In this example, if you chose A you would receive 500 points and the other would receive 100 points; if you chose B, you would receive 500 points and the other 500; and if you chose C, you would receive 550 points and the other 300. So, you see that your choice influences both the number of points you receive and the number of points the other receives.

Before you begin making choices, please keep in mind that there are no right or wrong answers. Choose the option that you, for whatever reason, prefer most. Also, remember that the points have value. The more of them you accumulate, the better for you. Likewise, from the "other's" point of view, the more points s/he accumulates, the better for him/her.

For each of the nine choice situations, circle A, B, or C, depending on which column you prefer most:

<table>
<thead>
<tr>
<th>Question 1</th>
<th>A</th>
<th>B</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>You get:</td>
<td>480</td>
<td>540</td>
<td>480</td>
</tr>
<tr>
<td>Other gets:</td>
<td>80</td>
<td>280</td>
<td>480</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 2</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get:</td>
<td>560</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Other gets:</td>
<td>300</td>
<td>500</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 3</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get:</td>
<td>520</td>
<td>520</td>
<td>580</td>
</tr>
<tr>
<td>Other gets:</td>
<td>520</td>
<td>120</td>
<td>320</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 4</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get:</td>
<td>500</td>
<td>560</td>
<td>490</td>
</tr>
<tr>
<td>Other gets:</td>
<td>100</td>
<td>300</td>
<td>490</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 5</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get:</td>
<td>560</td>
<td>500</td>
<td>490</td>
</tr>
<tr>
<td>Other gets:</td>
<td>300</td>
<td>500</td>
<td>90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 6</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get:</td>
<td>500</td>
<td>500</td>
<td>570</td>
</tr>
<tr>
<td>Other gets:</td>
<td>500</td>
<td>100</td>
<td>300</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 7</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get:</td>
<td>510</td>
<td>560</td>
<td>510</td>
</tr>
<tr>
<td>Other gets:</td>
<td>510</td>
<td>300</td>
<td>110</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 8</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get:</td>
<td>550</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Other gets:</td>
<td>300</td>
<td>100</td>
<td>500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 9</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get:</td>
<td>480</td>
<td>490</td>
<td>540</td>
</tr>
<tr>
<td>Other gets:</td>
<td>100</td>
<td>490</td>
<td>300</td>
</tr>
</tbody>
</table>
**Directions:** Shown below are a number of things people might value. Using the scale shown below, please rate the extent to which each value is important to you. Please place your rating in the space provided to the left of each item. For each value, complete the following sentence: **As a guiding principle in my life ______ is:**

<table>
<thead>
<tr>
<th></th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Opposed to My Values</td>
<td>Not Important</td>
<td>Important</td>
<td>Very Important</td>
<td>Of Supreme Importance</td>
<td></td>
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</tr>
<tr>
<td>1.</td>
<td>equality – equal opportunity for all</td>
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<td>2.</td>
<td>inner harmony – at peace with myself</td>
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<tr>
<td>3.</td>
<td>social power – control over others, dominance</td>
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<tr>
<td>4.</td>
<td>pleasure – gratification of desires</td>
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<td>5.</td>
<td>freedom – freedom of action and thought</td>
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<td>6.</td>
<td>a spiritual life – emphasis on spiritual not material matters</td>
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<td>7.</td>
<td>sense of belonging – feeling that others care about me</td>
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<td>8.</td>
<td>social order – stability of society</td>
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<td>9.</td>
<td>an exciting life – stimulating experiences</td>
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<td>10.</td>
<td>meaning in life – a purpose in life</td>
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<tr>
<td>11.</td>
<td>politeness – courtesy, good manners</td>
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<td>12.</td>
<td>wealth – material possessions, money</td>
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<tr>
<td>13.</td>
<td>national security – protection of my nation from enemies</td>
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<td>14.</td>
<td>self-respect – belief in one’s own worth</td>
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<td>15.</td>
<td>reciprocation of favors – avoidance of indebtedness</td>
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<td>16.</td>
<td>creativity – uniqueness, imagination</td>
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<td>17.</td>
<td>a world at peace – free of war and conflict</td>
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<td>18.</td>
<td>respect for tradition – preservation of time-honored customs</td>
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<tr>
<td>19.</td>
<td>mature love – deep emotional and spiritual intimacy</td>
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<td>20.</td>
<td>self-discipline – self-restraint, resistance to temptation</td>
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<td>21.</td>
<td>detachment – from worldly concerns</td>
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<td>22.</td>
<td>family security – safety for loved ones</td>
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<td>23.</td>
<td>social recognition – respect, approval by others</td>
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<td>24.</td>
<td>unity with nature – fitting into nature</td>
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<tr>
<td>25.</td>
<td>a varied life – filled with challenge, novelty, and change</td>
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<tr>
<td>26.</td>
<td>wisdom – a mature understanding of life</td>
<td></td>
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</tbody>
</table>
As a guiding principle in my life ______ is:

<table>
<thead>
<tr>
<th></th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
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<td></td>
<td></td>
<td></td>
<td>Very Important</td>
<td>Of Supreme Importance</td>
<td></td>
</tr>
</tbody>
</table>

27. **Authority** – the right to lead or command
28. **True friendship** – close, supportive friends
29. **A world of beauty** – beauty of nature and the arts
30. **Social justice** – correcting injustice, care for the weak
31. **Independent** – self-reliant, self-sufficient
32. **Moderate** – avoiding extremes of feeling and action
33. **Loyal** – faithful to my friends, group
34. **Ambitious** – hardworking, aspiring
35. **Broad-minded** – tolerant of different ideas and beliefs
36. **Humble** – modest, self-effacing
37. **Daring** – seeking adventure, risk
38. **Protecting the environment** – preserving nature
39. **Influential** – having an impact on people and events
40. **Honoring of parents and elders** – showing respect
41. **Choosing own goals** – selecting own purposes
42. **Healthy** – not being sick physically or mentally
43. **Capable** – competent, effective, efficient
44. **Accepting my portion in life** – admitting to life’s circumstances
45. **Honest** – genuine, sincere
46. **Preserving my public image** – protecting my “face”
47. **Obedient** – dutiful, meeting obligations
48. **Intelligent** – logical, thinking
49. **Helpful** – working for the welfare of others
50. **Enjoying life** – enjoying food, sex, leisure, etc
51. **Devout** – holding to religious faith and belief
52. **Responsible** – dependable, reliable
53. **Curious** – interested in everything, exploring
54. **Forgiving** – willing to pardon others
55. **Successful** – achieving goals
56. **Clean** – neat, tidy
Seasonal activity

Each year, about 5-20% of the U.S. population is infected by seasonal influenza. So what do these numbers mean? The 2010 U.S. Census counted 308,745,538 people living in our country meaning that approximately 15,437,277 (5%) to 61,749,107 (20%) people get the flu each year. On average there are 220,000 hospitalizations and about 23,600 die from the seasonal flu each year, with most of these deaths being in the elderly and children. In terms of the number who die from flu complications, consider that less than 1% of those who become infected, die.

So what are the symptoms of flu? You can probably name many of them - fever, cough, sore throat, body aches, headaches, fatigue, runny or stuffy nose, and maybe vomiting or diarrhea. Most experts believe that flu viruses are spread mainly by droplets made when people with flu cough, sneeze or talk and the ill can spread it to others up to about 6 feet away. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. A person might also get flu by touching a surface or object that has flu virus on it and then touching their own mouth or nose, but this is not as common.

Many of us are unaware that we can be contagious to others from the day before we feel sick to up to 5-7 days after we begin to show symptoms. Children, severely ill persons, and those with weakened immune systems may shed virus for longer than 7 days.

So what can you do? Simply, vaccination is the best protection against getting the flu. A seasonal vaccine is distributed routinely every year. The Centers for Disease Control and Prevention recommend that everyone 6 months of age and older get vaccinated against the flu.

Do you usually get the flu vaccine? Base your answer on your own actions in years past.

Yes
No

Will you get the flu vaccine this flu season (2012)?

Yes
No

Is there anything that might make it more likely that you would get your vaccine?

Yes
No

If you said 'Yes,' would you please elaborate? _________________________________

Do you have any other thoughts about getting the seasonal flu vaccine that you feel is important?

______________________________
Background Information

Over the next series of screens you will learn about flu outbreaks of varying intensities happening around the world. To help you understand the situation better, a few terms will be defined first.

**What is a pandemic?**
A pandemic is a global disease outbreak and is determined by spread of disease, not its ability to cause death. An influenza pandemic occurs when a new influenza A virus emerges for which there is little or no immunity in the human population, begins to cause serious illness and then spreads easily person-to-person worldwide. Pandemic influenza (pan flu) has the same set of symptoms as seasonal influenza but vomiting and diarrhea are more likely with pan flu.

**How is a pandemic different from an epidemic?**
A disease epidemic occurs when there are more cases of a specific disease than normal in a given locality. A pandemic is a worldwide epidemic of a disease.

**How serious a threat is this really?**
You may be wondering if this is a situation we may actually face or is it merely a product of fiction? Well, in the past 100 years we have had 4 pandemics. The most recent was just about a year ago, from 2009-2010. So yes, this is a realistic scenario. Though the 2009-2010 pandemic was mild and not much worse than seasonal flu activity, it can be very bad. The worse one we have experienced in the 20th century occurred from 1918-1919 and killed about 20 million people worldwide. Pandemics of this extreme severity have occurred all throughout history and we all will likely live to see a "big one" in our lifetime. If you think our technology keeps us safe from a pandemic of this sort, think again. In fact, our technology may make us more vulnerable in the early going. Why is that? Remember that for a few days before you get sick, you can shed the virus meaning you can infect others. Since we can travel around the world in about 24 hours, many people can be infected and spreading the virus themselves before we know there is an issue. In 1919, it took weeks to get around the world!
1. Please briefly describe the emotions that the thought of your own death during a pandemic arouses in you.

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2. Jot down, as specifically as you can, what you think would happen to you as you were physically dying from a novel strain of the flu bug.

______________________________________________________________________________

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______________________________________________________________________________
Instructions for the Participant (please read it all and make sure you understand)

You will now be provided information about a pandemic influenza outbreak happening around the world. This information will be given across nine updates. The first update will be from July, a few days after the World Health Organization declared a pandemic. Other updates will follow but only a month will be indicated. Some reports will be days after the previous one while others will be weeks after, but their frequency is of no consequence. These updates will take you from the initial events in July to about the time the vaccine is available in sufficient quantities. Each update will include the following:

- First, the **GLOBAL UPDATE** provides the latest information on the number of cases and deaths worldwide and any news worth noting. It should be reviewed each update as all information changes on it.
- Second is the **U.S. UPDATE** which gives information about mitigation strategies being used; how well hospitals and morgues are handling the situation; first responder staffing; if the federal government is functioning normally; the impact of the pandemic on public and private grade schools as well as colleges and universities; and finally the impact on stores, restaurants, public parks, and playground. Any changes from update to update are indicated in red. If an entry is NOT in red, it did not change since the previous update. If in red, you will want to review it. This is done to save you some time in having to process the large amount of information given to you.
- Third is a **U.S. Map** showing the spread of the virus across the U.S. The map is color coded to indicate the degree to which the virus has spread within each state.
- Fourth is information about the number of **U.S. Deaths**.
- Fifth is a **WA Map** which shows spread of the virus across the state of Washington. Note that the star on the map indicates your location in the state and the dots show the spread of the virus in the state. A legend is provided to indicate how many people are affected at each location.

You will be shown all 9 updates at once as the scenario is our best guess as to what the next pandemic will be like and is based on our knowledge of previous pandemics. Note that the researcher handling your session will give you this information on five 8”x14” sheets. There will be 1-2 updates per sheet.

After reviewing the information in all the updates, you will indicate at which point you would acquire a vaccine. It may be that the information given in Update 4 was enough to cause you to obtain a vaccine. If this is so, you would select Update 4 on your computer screen. You can also decide not to obtain a vaccine at all and if this is your wish, select 'I have decided to not obtain a vaccine.' Whatever and/or whenever you decide, you will be asked why you decided that way and please be honest. Your responses are confidential.

Once you finish this task, you will return the updates for your scenario to the researcher and continue with the experiment. Not that you will do this same task 3 times total (so two more after this one). The other scenarios are similar to this one, but the intensity of the pandemic will vary across scenarios.

Remember, there are a very limited number of vaccines that have been produced so far and there will not be sufficient quantities so that everyone can get one until late fall. Despite that, the good news is that the vaccine has been shown to be 97% effective against the H1N1 virus and is safe for adults aged 18 years and older.

A brief comprehension check will follow these instructions. Please let the experimenter know if you have any questions before completing it.

Thank you.
Comprehension Checks

Please answer the following true-false questions about the information you just read in the Instructions. It is important you understand what will follow so read carefully.

The answers will be provided after you Continue but you must attempt all 6 now.

- At the time of the first update, there ARE sufficient quantities of vaccine for all citizens. FALSE - there are not and will not be until late fall.
- The vaccine is very effective against H1N1 and is safe for adults. TRUE
- Changes on the U.S. update are indicated in red. Therefore, information not in red did not change and it is not necessary to read it again if you remember what it said previously. TRUE
- You will see two maps (U.S. and WA) and be given information on the death toll in the U.S. as of that update. TRUE
- The star on the state map shows your position in the state for the purposes of the study. TRUE
- It is not necessary to review the Global update each time. FALSE - It changes each time so look at it for information on the number of cases and deaths worldwide and any news worth noting.

NEXT PAGE

The answers are as follows. Please review them before continuing.

1. At the time of the first update, there ARE sufficient quantities of vaccine for all citizens. FALSE - there are not and will not be until late fall.
2. The vaccine is very effective against H1N1 and is safe for adults. TRUE
3. Changes on the U.S. update are indicated in red. Therefore, information not in red did not change and it is not necessary to read it again if you remember what it said previously. TRUE
4. You will see two maps (U.S. and WA) and be given information on the death toll in the U.S. as of that update. TRUE
5. The star on the state map shows your position in the state for the purposes of the study. TRUE
6. It is not necessary to review the Global update each time. FALSE - It changes each time so look at it for information on the number of cases and deaths worldwide and any news worth noting.
Mild pandemic

In late April the U.S. government reported the first confirmed cases of Swine Influenza A/H1N1. All 7 confirmed cases had mild Influenza-Like Illness (ILI), with only one requiring brief hospitalization. No deaths were reported. Likewise, Mexico reported 18 laboratory confirmed of Swine Influenza A/H1N1 and no deaths.

By mid May, the U.S. reported 1,205 laboratory confirmed human cases of infection, including 63 deaths. Mexico reported 62 laboratory confirmed human cases, including 3 deaths. Canada reported 25 laboratory confirmed human cases, including 1 death. Costa Rica reported 8 laboratory confirmed human cases, including 1 death. In addition to these countries, another 30 countries are reporting cases of their own, though none of them has had any more than 10 cases so far.

Less than a month later, 76 countries reported 1,981 cases of influenza A(H1N1) infection, including 99 deaths. Two weeks after this, in late June, this novel strain of influenza spread to more than 110 countries and there have been 2,645 cases and 132 deaths. Given that the virus has spread so fast, the World Health Organization today declared that a pandemic has broken out.

With a pandemic officially declared, the Centers for Disease Control and Prevention have forecasted the impact of the pandemic on the U.S. over the coming months. They have determined the following:

The pandemic severity for the U.S. is MILD and 62,500 deaths are projected.

How does this compare to other types of pandemics or seasonal flu?

<table>
<thead>
<tr>
<th>Virus Type:</th>
<th>On average, it kills this many people:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal Influenza</td>
<td>23,600</td>
</tr>
<tr>
<td><strong>Mild Pandemic</strong></td>
<td><strong>62,500</strong></td>
</tr>
<tr>
<td>Moderate Pandemic</td>
<td>625,000</td>
</tr>
<tr>
<td>Severe Pandemic</td>
<td>1,875,000</td>
</tr>
</tbody>
</table>

For perspective, the population of the U.S. in 2010 was 308,745,538. This means that in a mild pandemic, 1 in every 5,000 people would get sick and die. The likelihood that you would know one of those people would be pretty slim.
Manipulation Check - Mild

Please answer the following question:

Based on the scenario you just read, how bad do you think this pan flu outbreak will be?

Rating Scale - 10 point scale

Not Really Bad

X

X

Bad

X

X

Very Bad

X

X

Extremely Bad
### Global Update

The World Health Organization (WHO) reports the following:

<table>
<thead>
<tr>
<th></th>
<th>Update 1: July</th>
<th>Update 2: July</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO Phase</td>
<td>Phase 6: Pandemic Period</td>
<td>Phase 6: Pandemic Period</td>
</tr>
<tr>
<td># Countries Reporting cases of H1N1</td>
<td>123</td>
<td>130</td>
</tr>
<tr>
<td># of worldwide cases</td>
<td>3,600</td>
<td>12,100</td>
</tr>
<tr>
<td># of deaths</td>
<td>180</td>
<td>605</td>
</tr>
</tbody>
</table>

### U.S. Update

<table>
<thead>
<tr>
<th>Mitigation Strategies Employed</th>
<th>Update 1: July</th>
<th>Update 2: July</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital Status</td>
<td>Meeting Demands Adequately</td>
<td>Meeting Demands Adequately</td>
</tr>
<tr>
<td>Mortuary Status</td>
<td>Meeting Demands Adequately</td>
<td>Meeting Demands Adequately</td>
</tr>
<tr>
<td>First Responder Staffing</td>
<td>Operating without Problems, All Services Provided</td>
<td>Operating without Problems, All Services Provided</td>
</tr>
<tr>
<td>Federal Government</td>
<td>Operating without Problems</td>
<td>Operating without Problems</td>
</tr>
<tr>
<td>Public and Private Schools</td>
<td>Closed for the Summer</td>
<td>Closed for the Summer</td>
</tr>
<tr>
<td>Colleges and Universities</td>
<td>Open for Summer Session</td>
<td>Open for Summer Session</td>
</tr>
<tr>
<td>Stores and Restaurants</td>
<td>Open as Usual</td>
<td>Open as Usual</td>
</tr>
<tr>
<td>Public Parks and Playgrounds</td>
<td>Open as Usual</td>
<td>Open as Usual</td>
</tr>
</tbody>
</table>

### U.S. Map

The map to the right shows current H1N1 Pan Flu activity in the U.S.

### U.S. Deaths

Current U.S. deaths as of this update

<table>
<thead>
<tr>
<th></th>
<th>Update 1: July</th>
<th>Update 2: July</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>121</td>
<td>409</td>
</tr>
</tbody>
</table>

### WA Map

The map to the right shows the current spread of H1N1 in the state of Washington.
## Global Update

The World Health Organization (WHO) reports:

<table>
<thead>
<tr>
<th></th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHO Phase</strong></td>
<td>Phase 6: Pandemic Period</td>
<td>Phase 6: Pandemic Period</td>
</tr>
<tr>
<td><strong># Countries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reporting cases of H1N1</td>
<td>135</td>
<td>148</td>
</tr>
<tr>
<td><strong># of worldwide cases</strong></td>
<td>40,100</td>
<td>190,140</td>
</tr>
<tr>
<td><strong># of deaths</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,005</td>
<td>9,507</td>
</tr>
</tbody>
</table>

## U.S. Update

<table>
<thead>
<tr>
<th></th>
<th>Mitigation Strategies Employed</th>
<th>Mitigation Strategies Employed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital Status</strong></td>
<td>Meeting Demands Adequately</td>
<td>Slight Strain</td>
</tr>
<tr>
<td><strong>Mortuary Status</strong></td>
<td>Meeting Demands Adequately</td>
<td>Slight Strain - Sufficient body bags and caskets on hand, Minor scheduling conflicts for funerals</td>
</tr>
<tr>
<td><strong>First Responder Staffing</strong></td>
<td>Operating without Problems, All Services Provided</td>
<td>Operating without Problems, All Services Provided</td>
</tr>
<tr>
<td><strong>Federal Government</strong></td>
<td>Operating without Problems</td>
<td>Operating without Problems</td>
</tr>
<tr>
<td><strong>Public and Private Schools</strong></td>
<td>Closed for the Summer</td>
<td>Closed for the Summer</td>
</tr>
<tr>
<td><strong>Colleges and Universities</strong></td>
<td>Open for Summer Session</td>
<td>Open for Summer Session</td>
</tr>
<tr>
<td><strong>Stores and Restaurants</strong></td>
<td>Open as Usual</td>
<td>Open as Usual</td>
</tr>
<tr>
<td><strong>Public Parks and Playgrounds</strong></td>
<td>Open as Usual</td>
<td>Open as Usual</td>
</tr>
</tbody>
</table>

## U.S. Map

The map to the right shows current H1N1 Pan Flu activity in the U.S.

## U.S. Deaths

Current U.S. deaths as of this update:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,355</td>
</tr>
<tr>
<td></td>
<td>6,426</td>
</tr>
</tbody>
</table>

## WA Map

The map to the right shows the current spread of H1N1 in the state of Washington

Legend:
- Less than 10 confirmed cases
- 11 - 100 confirmed cases
- 101 - 500 confirmed cases
- Greater than 500 confirmed cases
## Global Update

The World Health Organization (WHO) reports the following:

<table>
<thead>
<tr>
<th></th>
<th>Update 5: September</th>
<th>Update 6: September</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO Phase</td>
<td>Phase 6: Pandemic Period</td>
<td>Phase 6: Pandemic Period</td>
</tr>
<tr>
<td># Countries Reporting H1N1</td>
<td>158</td>
<td>175</td>
</tr>
<tr>
<td># worldwide cases</td>
<td>296,520</td>
<td>563,320</td>
</tr>
<tr>
<td># of deaths</td>
<td>14,826</td>
<td>28,166</td>
</tr>
</tbody>
</table>

## U.S. Update

**Mitigation Strategies Employed**

- **Isolation recommended**
- **Isolation recommended**

**Hospital Status**

- **Slight Strain**
- **Moderate Strain, Medical Surge plans put into place at many hospitals**

**Mortuary Status**

- **Slight Strain - Sufficient body bags and caskets on hand, Minor scheduling conflicts for funerals**
- **Slight Strain - Sufficient body bags and caskets on hand, Scheduling conflicts for funerals**

**First Responder Staffing**

- **Operating without Problems, All Services Provided**
- **Operating without Problems, All Services Provided**

**Federal Government**

- **Operating without Problems**
- **Operating with Minor Problems**

**Public and Private Schools**

- **Open as Usual**
- **Open as Usual, Sick students and teachers asked to stay home**

** Colleges and Universities**

- **Open as Usual**
- **Open as Usual, Sick students and faculty asked to stay home**

**Stores and Restaurants**

- **Open as Usual**
- **Open as Usual**

**Public Parks and Playgrounds**

- **Open as Usual**
- **Open as Usual**

## U.S. Map

The map to the right shows current H1N1 Pan Flu activity in the U.S.

## U.S. Deaths

| Current | 10,021 | 19,037 |

## WA Map

The map to the right shows the current spread of H1N1 in the state of Washington as of this update.
<table>
<thead>
<tr>
<th>Global Update</th>
<th>WHO Phase</th>
<th>Update 7: September</th>
<th>Update 8: October</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase 6: Pandemic Period</td>
<td>Phase 6: Pandemic Period</td>
<td></td>
</tr>
<tr>
<td># Countries Reporting H1N1</td>
<td>193</td>
<td>204</td>
<td></td>
</tr>
<tr>
<td># worldwide cases</td>
<td>1,061,880</td>
<td>1,436,940</td>
<td></td>
</tr>
<tr>
<td># of deaths</td>
<td>53,094</td>
<td>71,847</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. Update</th>
<th>Mitigation Strategies Employed</th>
<th>Isolation recommended</th>
<th>Isolation recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Status</td>
<td>Moderate Strain, Medical Surge plans put into place at many hospitals</td>
<td>Moderate Strain, Medical Surge plans put into place at many hospitals</td>
<td></td>
</tr>
<tr>
<td>Mortuary Status</td>
<td>Moderate Strain - Body bags and caskets on back order in some areas, Scheduling conflicts for funerals</td>
<td>Moderate Strain - Body bags and caskets on back order in some areas, Scheduling conflicts for funerals</td>
<td></td>
</tr>
<tr>
<td>First Responder Staffing</td>
<td>Operating with Minor Problems, All Services Provided</td>
<td>Operating with Minor Problems, All Services Provided</td>
<td></td>
</tr>
<tr>
<td>Federal Government</td>
<td>Operating with Minor Problems</td>
<td>Operating with Minor Problems</td>
<td></td>
</tr>
<tr>
<td>Public and Private Schools</td>
<td>Open as Usual, Sick students and teachers asked to stay home</td>
<td>Open as Usual, Sick students and teachers asked to stay home</td>
<td></td>
</tr>
<tr>
<td>Colleges and Universities</td>
<td>Open as Usual, Sick students and teachers asked to stay home</td>
<td>Open as Usual, Sick students and faculty asked to stay home</td>
<td></td>
</tr>
<tr>
<td>Stores and Restaurants</td>
<td>Open as Usual</td>
<td>Open as Usual</td>
<td></td>
</tr>
<tr>
<td>Public Parks and Playgrounds</td>
<td>Open as Usual</td>
<td>Open as Usual</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. Map</th>
<th>The map to the right shows current H1N1 Pan Flu activity in the U.S.</th>
</tr>
</thead>
</table>

| U.S. Deaths | Current | 35,886 | 48,561 |

<table>
<thead>
<tr>
<th>WA Map</th>
<th>The map to the right shows the current spread of H1N1 in the state of Washington as of this update</th>
</tr>
</thead>
</table>

Legend:  
- Less than 10 confirmed cases  
- 11 – 100 confirmed cases  
- 101 – 500 confirmed cases  
- Greater than 500 confirmed cases
The World Health Organization (WHO) reports the following:

**WHO Phase**
- Phase 6: Pandemic Period

<table>
<thead>
<tr>
<th># Countries Reporting cases of H1N1</th>
<th>214</th>
</tr>
</thead>
<tbody>
<tr>
<td># of worldwide cases</td>
<td>1,705,280</td>
</tr>
<tr>
<td># of deaths</td>
<td>85,214</td>
</tr>
</tbody>
</table>

**Mitigation Strategies Employed**
- **Hospital Status**: Moderate Strain, Medical Surge plans put into place at many hospitals
- **Mortuary Status**: Moderate Strain - Body bags and caskets on back order in some areas, Scheduling conflicts for funerals
- **First Responder Staffing**: Operating with Minor Problems, All Services Provided
- **Federal Government**: Operating with Minor Problems
- **Public and Private Schools**: Open as Usual, Sick students and teachers asked to stay home
- **Colleges and Universities**: Open as Usual, Sick students and faculty asked to stay home
- **Stores and Restaurants**: Open as Usual
- **Public Parks and Playgrounds**: Open as Usual

**U.S. Map**
The map to the right shows current H1N1 Pan Flu activity in the U.S. as of this update

**U.S. Deaths**
Current U.S. deaths as of this update: 57,596

**WA Map**
The map to the right shows the current spread of H1N1 in the state of Washington as of this update

---

196
Based on the information in front of you for the Mild pandemic the world is experiencing, at which update would you obtain your vaccine?

- Update 1
- Update 2
- Update 3
- Update 4
- Update 5
- Update 6
- Update 7
- Update 8
- Update 9
- I have decided to not obtain a vaccine.

Press Continue

______________________________________________________________________________

Next Page: If the participant DOES obtain a vaccine on or before the 9th update:

You decided to obtain a vaccine during this scenario (either at update 9 or earlier). Why did you make this decision? ________________

What factors influenced your decision? ________________

______________________________________________________________________________
Or: If the participant DOES NOT obtain a vaccine on or before the 9th update:

You decided not to obtain a vaccine. The H1N1 pandemic virus continues to spread throughout the United States and around the world. Fortunately, vaccine manufacturers have now produced vaccine in sufficient quantities that everyone may obtain one if they desire.

The CDC recommends all obtain the vaccine as soon as possible, but notes your decision to NOT obtain one sooner.

Why did you not obtain a vaccine sooner? ______________________________________

Note that if you have a reason but prefer not to share it with the researchers, please type "I prefer not to state" or something similar in the box below. The question requires something be typed to proceed and that will allow you to continue on.

Will you obtain one now? YES NO

Why or why not? ______________________________

Note that if you have a reason but prefer not to share it with the researchers, please type "I prefer not to state" or something similar in the box below. The question requires something be typed to proceed and that will allow you to continue on.

Thank you.

Continue to the next section of the study.
Location Salience Question - Mild

Recall the scenario you had just read about and the decision you made about when you would obtain your vaccine (i.e. the update you decided upon, if any). Across all the WA maps you looked at, you were told your location in the state was at the star as marked on the map below.

But what if your location was closer to one of the major cities in the state as shown below.

With the new location in mind, look at the 9 updates in your current scenario again and tell us how this would affect the decision you initially made?

I would now obtain a vaccine EARLIER than I did before.
I would obtain a vaccine at the same update as I did earlier (my decision is unaffected).
I would now obtain the vaccine LATER than I did before.
Based on how you answered the previous question, please state at which specific update you would obtain your vaccine:

Update 1
Update 2
Update 3
Update 4
Update 5
Update 6
Update 7
Update 8
Update 9
I have decided to not obtain a vaccine.

Please explain your reasoning:

_________________________________________________________________

Thank you. Proceed to the next part of the study. The experimenter will collect your updates from the current scenario in a bit.
Directions:

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you.

Before voting I thoroughly investigate the qualification of all the candidates.
I never hesitate to go out of my way to help someone in trouble.
It is sometimes hard for me to go on with my work if I am not encouraged.
I have never intensely disliked anyone.
On occasion I have had doubts about my ability to succeed in life.
I sometimes feel resentful when I don't get my way.
I am always careful about my manner of dress.
My table manners at home are as good as when I eat out in a restaurant.
If I could get into a movie without paying and be sure I was not seen, I would probably do it.
On a few occasions, I have given up doing something because I thought too little of my ability.
I like to gossip at times.
There have been times when I felt like rebelling against people in authority even though I knew they were right.
No matter who I'm talking to, I'm always a good listener.
I can remember "playing sick" to get out of something.
There have been occasions when I took advantage of someone.
I'm always willing to admit it when I make a mistake.
I always try to practice what I preach.
I don't find it particularly difficult to get along with loud-mouthed, obnoxious people.
I sometimes try to get even, rather than forgive and forget.
When I don't know something I don't at all mind admitting it.
I am always courteous, even to people who are disagreeable.
At times I have really insisted on having things my own way.

There have been occasions when I felt like smashing things.

I would never think of letting someone else be punished for my wrongdoings.

I never resent being asked to return a favor.

I have never been irked when people expressed ideas very different from my own.

I never make a long trip without checking the safety of my car.

There have been times when I was quite jealous of the good fortune of others.

I have almost never felt the urge to tell someone off.

I am sometimes irritated by people who ask favors of me.

I have never felt that I was punished without a cause.

I sometimes think when people have a misfortune they only got what they deserved.

I have never deliberately said something that hurt someone's feelings.
Moderate pandemic

Now consider if the previous scenario you read about occurred like this:

In late April the U.S. government reported the first confirmed cases of Swine Influenza A/H1N1. All 35 confirmed cases had mild Influenza-Like Illness (ILI), with only 6 requiring brief hospitalization. No deaths were reported. Likewise, Mexico reported 88 laboratory confirmed of Swine Influenza A/H1N1 and no deaths.

By mid May, the U.S. reported 6,025 laboratory confirmed human cases of infection, including 316 deaths. Mexico reported 311 laboratory confirmed human cases, including 15 deaths. Canada reported 129 laboratory confirmed human cases, including 7 deaths. Costa Rica reported 40 laboratory confirmed human cases, including 4 deaths. In addition to these countries, another 30 countries are reporting cases of their own, though none of them has had any more than 10 cases so far.

Less than a month later, 76 countries reported 9,907 cases of influenza A(H1N1) infection, including 495 deaths. Two weeks after this, in late June, this novel strain of influenza spread to more than 110 countries and there have been 26,450 cases and 1,320 deaths. Given that the virus has spread so fast, the World Health Organization today declared that a pandemic has broken out.

With a pandemic officially declared, the Centers for Disease Control and Prevention have forecasted the impact of the pandemic on the U.S. over the coming months. They have determined the following:

The pandemic severity for the U.S. is MODERATE and 625,000 deaths are projected.

How does this compare to other types of pandemics or seasonal flu?

<table>
<thead>
<tr>
<th>Virus Type</th>
<th>On average, it kills this many people:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal Influenza</td>
<td>23,600</td>
</tr>
<tr>
<td>Mild Pandemic</td>
<td>62,500</td>
</tr>
<tr>
<td>Moderate Pandemic</td>
<td>625,000</td>
</tr>
<tr>
<td>Severe Pandemic</td>
<td>1,875,000</td>
</tr>
</tbody>
</table>

For perspective, the population of the U.S. in 2010 was 308,745,538. This means that in a moderate pandemic, 1 in every 500 people would get sick and die. The likelihood that you would know one of those people would be pretty good.
Manipulation Check - Moderate

Please answer the following question:

Based on the scenario you just read, how bad do you think this pan flu outbreak will be?

Rating Scale - 10 point scale

Not Really Bad
  X
  X
  Bad
  X
  X
  Very Bad
     X
     X
     Extremely Bad
## Global Update

The World Health Organization (WHO) reports the following:

<table>
<thead>
<tr>
<th></th>
<th>Update 1: July</th>
<th>Update 2: July</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO Phase</td>
<td>Phase 6: Pandemic Period</td>
<td>Phase 6: Pandemic Period</td>
</tr>
<tr>
<td># Countries Reporting cases of H1N1</td>
<td>123</td>
<td>130</td>
</tr>
<tr>
<td># of worldwide cases</td>
<td>36,000</td>
<td>121,000</td>
</tr>
<tr>
<td># of deaths</td>
<td>1,800</td>
<td>6,050</td>
</tr>
</tbody>
</table>

## U.S. Update

<table>
<thead>
<tr>
<th>Mitigation Strategies Employed</th>
<th>Isolation recommended; Quarantine considered</th>
<th>Isolation recommended; Quarantine considered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Status</td>
<td>Meeting Demands Adequately</td>
<td>Meeting Demands; Slight Strain</td>
</tr>
<tr>
<td>Mortuary Status</td>
<td>Meeting Demands Adequately</td>
<td>Meeting Demands; Slight Strain</td>
</tr>
<tr>
<td>First Responder Staffing</td>
<td>Operating without Problems, All Services Provided</td>
<td>Operating without Problems, All Services Provided</td>
</tr>
<tr>
<td>Federal Government</td>
<td>Operating without Problems</td>
<td>Operating without Problems</td>
</tr>
<tr>
<td>Public and Private Schools</td>
<td>Closed for the Summer</td>
<td>Closed for the Summer</td>
</tr>
<tr>
<td>Colleges and Universities</td>
<td>Open for Summer Session</td>
<td>Open for Summer Session</td>
</tr>
<tr>
<td>Stores and Restaurants</td>
<td>Open as Usual</td>
<td>Open as Usual</td>
</tr>
<tr>
<td>Public Parks and Playgrounds</td>
<td>Open as Usual</td>
<td>Open as Usual</td>
</tr>
</tbody>
</table>

### U.S. Map

The map to the right shows current H1N1 Pan Flu activity in the U.S.

### U.S. Deaths

Current U.S. deaths as of this update

<table>
<thead>
<tr>
<th></th>
<th>1,217</th>
<th>4,089</th>
</tr>
</thead>
</table>

### WA Map

The map to the right shows the current spread of H1N1 in the state of Washington.

Legend:
- Orange: Less than 10 confirmed cases
- Yellow: 11 - 100 confirmed cases
- Green: 101 - 500 confirmed cases
- Red: Greater than 500 confirmed cases
- Brown: 101 - 100 confirmed cases
- Green: Greater than 500 confirmed cases
### Global Update

The World Health Organization (WHO) reports:

<table>
<thead>
<tr>
<th>WHO Phase</th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 6: Pandemic Period</td>
<td>Phase 6: Pandemic Period</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Countries Reporting cases of H1N1</th>
<th>135</th>
<th>148</th>
</tr>
</thead>
<tbody>
<tr>
<td># of worldwide cases</td>
<td>401,000</td>
<td>1,901,400</td>
</tr>
<tr>
<td># of deaths</td>
<td>20,050</td>
<td>95,070</td>
</tr>
</tbody>
</table>

### U.S. Update

#### Mitigation Strategies Employed
- Isolation recommended; Quarantine considered
- Isolation recommended; Quarantine considered
- Meeting Demands; Moderate Strain - Surge Plans in Place
- Meeting Demands; Moderate Strain - Surge Plans in Place
- Meeting Demands; Slight Strain
- Meeting Demands; Slight Strain
- Short Staffed Due to Illness
- Short Staffed Due to Illness
- Operating without Problems
- Operating with Minimal Problems

<table>
<thead>
<tr>
<th>Hospital Status</th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Demands; Moderate Strain - Surge Plans in Place</td>
<td>Meeting Demands; Moderate Strain - Surge Plans in Place</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mortuary Status</th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Demands; Slight Strain</td>
<td>Meeting Demands; Slight Strain</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>First Responder Staffing</th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Staffed Due to Illness</td>
<td>Short Staffed Due to Illness</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Federal Government</th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating without Problems</td>
<td>Operating with Minimal Problems</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public and Private Schools</th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed for the Summer</td>
<td>Closed for the Summer</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Colleges and Universities</th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed for Rest of Summer</td>
<td>Closed for Rest of Summer</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stores and Restaurants</th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open as Usual</td>
<td>Social Distancing Recommended</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Parks and Playgrounds</th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open as Usual</td>
<td>Social Distancing Recommended</td>
<td></td>
</tr>
</tbody>
</table>

### U.S. Map

The map to the right shows current H1N1 Pan Flu activity in the U.S.

### U.S. Deaths

Current U.S. deaths as of this update

<table>
<thead>
<tr>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td>13,552</td>
<td>64,258</td>
</tr>
</tbody>
</table>

### WA Map

The map to the right shows the current spread of H1N1 in the state of Washington

Legend:
- Less than 10 confirmed cases
- 11 - 100 confirmed cases
- 101 - 500 confirmed cases
- Greater than 500 confirmed cases
- Less than 10 confirmed cases
- 11 - 100 confirmed cases
- 101 - 500 confirmed cases
- Greater than 500 confirmed cases
### Global Update

The World Health Organization (WHO) reports the following:

<table>
<thead>
<tr>
<th>WHO Phase</th>
<th>Phase 6: Pandemic Period</th>
<th>Phase 6: Pandemic Period</th>
</tr>
</thead>
<tbody>
<tr>
<td># Countries Reporting H1N1</td>
<td>158</td>
<td>175</td>
</tr>
<tr>
<td># worldwide cases</td>
<td>2,965,200</td>
<td>5,633,200</td>
</tr>
<tr>
<td># of deaths</td>
<td>148,260</td>
<td>281,660</td>
</tr>
</tbody>
</table>

### U.S. Update

<table>
<thead>
<tr>
<th>Mitigation Strategies Employed</th>
<th>Isolation recommended; Quarantine considered</th>
<th>Isolation recommended; Quarantine considered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Status</td>
<td>Meeting Demands; Severe Strain - Surge Plans in Place</td>
<td>Meeting Demands; Severe Strain - Surge Plans in Place</td>
</tr>
<tr>
<td>Mortuary Status</td>
<td>Meeting Demands; Moderate Strain - Surge Plans in Place</td>
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</tr>
<tr>
<td>First Responder Staffing</td>
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</tr>
<tr>
<td>Public and Private Schools</td>
<td>Closed for 2 Weeks; School Opening Delayed</td>
<td>Closed for an Additional 2 Weeks; School Opening Delayed</td>
</tr>
<tr>
<td>Colleges and Universities</td>
<td>Fall Semester Delayed</td>
<td>Fall Semester Delayed - 2 Additional Weeks</td>
</tr>
<tr>
<td>Stores and Restaurants</td>
<td>Social Distancing Recommended</td>
<td>Social Distancing Required; Closed by Federal Proclamation</td>
</tr>
<tr>
<td>Public Parks and Playgrounds</td>
<td>Social Distancing Recommended</td>
<td>Social Distancing Required; Closed by Federal Proclamation</td>
</tr>
</tbody>
</table>

### U.S. Map

The map to the right shows current H1N1 Pan Flu activity in the U.S.

### U.S. Deaths

| Current | 100,209 | 190,374 |

### WA Map

The map to the right shows the current spread of H1N1 in the state of Washington as of this update.
## Global Update
The World Health Organization (WHO) reports the following:

<table>
<thead>
<tr>
<th>WHO Phase</th>
<th>Phase 6: Pandemic Period</th>
<th>Phase 6: Pandemic Period</th>
</tr>
</thead>
<tbody>
<tr>
<td># Countries Reporting H1N1</td>
<td>193</td>
<td>204</td>
</tr>
<tr>
<td># worldwide cases</td>
<td>10,618,800</td>
<td>14,369,400</td>
</tr>
<tr>
<td># of deaths</td>
<td>530,940</td>
<td>718,470</td>
</tr>
</tbody>
</table>

## U.S. Update

<table>
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<td>Social Distancing Required; Closed by Federal Proclamation</td>
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## U.S. Map
The map to the right shows current H1N1 Pan Flu activity in the U.S.

## U.S. Deaths
| Current | 358,862 | 485,614 |

## WA Map
The map to the right shows the current spread of H1N1 in the state of Washington as of this update.

Legend:
- Less than 10 confirmed cases
- 11 - 100 confirmed cases
- 101 - 500 confirmed cases
- Greater than 500 confirmed cases
The World Health Organization (WHO) reports the following:

<table>
<thead>
<tr>
<th>WHO Phase</th>
<th>Phase 6: Pandemic Period</th>
</tr>
</thead>
<tbody>
<tr>
<td># Countries Reporting cases of H1N1</td>
<td>214</td>
</tr>
<tr>
<td># of worldwide cases</td>
<td>17,052,800</td>
</tr>
<tr>
<td># of deaths</td>
<td>852,640</td>
</tr>
</tbody>
</table>

**U.S. Update**

<table>
<thead>
<tr>
<th>Mitigation Strategies Employed</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Hospital Status</td>
<td>Meeting Demands; Severe Strain - Surge Plans Exceeded</td>
</tr>
<tr>
<td>Mortuary Status</td>
<td>Meeting Demands; Severe Strain - Surge Plans Exceeded</td>
</tr>
<tr>
<td>First Responder Staffing</td>
<td>Short Staffed Due to Illness</td>
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<tr>
<td>Public Parks and Playgrounds</td>
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</tr>
</tbody>
</table>

**U.S. Map**

The map to the right shows current H1N1 Pan Flu activity in the U.S. as of this update.

**U.S. Deaths**

Current U.S. deaths as of this update: 576,299

**WA Map**

The map to the right shows the current spread of H1N1 in the state of Washington as of this update.
Based on the information in front of you for the Moderate pandemic the world is experiencing, at which update would you obtain your vaccine?

- Update 1
- Update 2
- Update 3
- Update 4
- Update 5
- Update 6
- Update 7
- Update 8
- Update 9
- I have decided to not obtain a vaccine.

Press Continue

Next Page: If the participant DOES obtain a vaccine on or before the 9th update:

If you decided to obtain a vaccine during this scenario (whether at update 9 or earlier) why did you make this decision? What factors influenced your decision? ___________________

__________________________________________________________
Or: If the participant DOES NOT obtain a vaccine on or before the 9th update:

You decided not to obtain a vaccine. The H1N1 pandemic virus continues to spread throughout the United States and around the world. Fortunately, vaccine manufacturers have now produced vaccine in sufficient quantities that everyone may obtain one if they desire.

The CDC recommends all obtain the vaccine as soon as possible, but notes your decision to NOT obtain one sooner.

Why did you not obtain a vaccine sooner? __________________________________________

Note that if you have a reason but prefer not to share it with the researchers, please type "I prefer not to state" or something similar in the box below. The question requires something be typed to proceed and that will allow you to continue on.

Will you obtain one now?  YES  NO

Why or why not? __________________________________________

Note that if you have a reason but prefer not to share it with the researchers, please type "I prefer not to state" or something similar in the box below. The question requires something be typed to proceed and that will allow you to continue on.

Thank you.

Continue to the next section of the study.
Location Salience Question - Moderate

Recall the scenario you had just read about and the decision you made about when you would obtain your vaccine (i.e. the update you decided upon, if any). Across all the WA maps you looked at, you were told your location in the state was at the star as marked on the map below.

But what if your location was closer to one of the major cities in the state as shown below.

With the new location in mind, look at the 9 updates in your current scenario again and tell us how this would affect the decision you initially made?

I would now obtain a vaccine EARLIER than I did before.
I would obtain a vaccine at the same update as I did earlier (my decision is unaffected).
I would now obtain the vaccine LATER than I did before.
Based on how you answered the previous question, please state at which specific update you would obtain your vaccine:

Update 1
Update 2
Update 3
Update 4
Update 5
Update 6
Update 7
Update 8
Update 9
I have decided to not obtain a vaccine.

Please explain your reasoning:

_________________________________________________________________

Thank you. Proceed to the next part of the study. The experimenter will collect your updates from the current scenario in a bit.
To what degree to you agree or disagree with each of the following questions.

Scale:
I strongly disagree
I tend to disagree
I'm not sure
I tend to agree
I strongly agree

I enjoy reading about my religion.
I go to church because it helps me to make friends.
It doesn't much matter what I believe so long as I am good.
It is important to me to spend time in private thought and prayer.
I have often had a strong sense of God's presence.
I pray mainly to gain relief and protection.
I try hard to live all my life according to my religious beliefs.
What religion offers me most is comfort in times of trouble and sorrow.
Prayer is for peace and happiness.
Although I am religious, I don't let it affect my daily life.
I go to church mostly to spend time with my friends.
My whole approach to life is based on my religion.
I go to church mainly because I enjoy seeing people I know there.
Although I believe in my religion, many other things are important in life.
Severe pandemic

This is the final scenario you will be presented with. It is like the others, but its intensity is different. Please review all information.

In late April the U.S. government reported the first confirmed cases of Swine Influenza A/H1N1. All 210 confirmed cases had mild Influenza-Like Illness (ILI), with only 11 requiring brief hospitalization. No deaths were reported. Likewise, Mexico reported 57 laboratory confirmed of Swine Influenza A/H1N1 and no deaths.

By mid May, the U.S. reported 6,315 laboratory confirmed human cases of infection, including 1,878 deaths. Mexico reported 1,964 laboratory confirmed human cases, including 610 deaths. Canada reported 255 laboratory confirmed human cases, including 7 deaths. Costa Rica reported 24 laboratory confirmed human cases, including 3 deaths. In addition to these countries, another 30 countries are reporting cases of their own, though none of them has had any more than 30 cases so far.

Less than a month later, 76 countries reported 57,434 cases of influenza A(H1N1) infection, including 2,921 deaths. Two weeks after this, in late June, this novel strain of influenza spread to more than 110 countries and there have been 79,350 cases and 3,960 deaths. Given that the virus has spread so fast, the World Health Organization today declared that a pandemic has broken out.

With a pandemic officially declared, the Centers for Disease Control and Prevention have forecasted the impact of the pandemic on the U.S. over the coming months. They have determined the following:

**The pandemic severity for the U.S. is SEVERE and 1,875,000 deaths are projected.**

How does this compare to other types of pandemics or seasonal flu?

<table>
<thead>
<tr>
<th>Virus Type</th>
<th>On average, it kills this many people:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal Influenza</td>
<td>23,600</td>
</tr>
<tr>
<td>Mild Pandemic</td>
<td>62,500</td>
</tr>
<tr>
<td>Moderate Pandemic</td>
<td>625,000</td>
</tr>
<tr>
<td>Severe Pandemic</td>
<td>1,875,000</td>
</tr>
</tbody>
</table>

For perspective, the population of the U.S. in 2010 was 308,745,538. This means that in a severe pandemic, 1 in every 165 people would get sick and die. There is a very strong chance you would know one of these people and they could even be related to you.
Manipulation Check - Severe

Please answer the following question:

Based on the scenario you just read, how bad do you think this pan flu outbreak will be?

Rating Scale - 10 point scale

Not Really Bad

X

X

Bad

X

X

Very Bad

X

X

Extremely Bad
### Severe Pandemic Period

<table>
<thead>
<tr>
<th>WHO Phase 6: Pandemic Period</th>
<th>Update 1: July</th>
<th>Update 2: July</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global Update</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The World Health Organization (WHO) reports the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td># Countries Reporting cases of H1N1</td>
<td>123</td>
<td>130</td>
</tr>
<tr>
<td># of worldwide cases</td>
<td>108,000</td>
<td>363,000</td>
</tr>
<tr>
<td># of deaths</td>
<td>5,400</td>
<td>18,150</td>
</tr>
<tr>
<td><strong>U.S. Update</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitigation Strategies Employed</td>
<td>Isolation recommended; Quarantine recommended</td>
<td>Isolation recommended; Quarantine recommended</td>
</tr>
<tr>
<td>Hospital Status</td>
<td>Experiencing Higher than Normal Demand; Medical Surge Plans in Effect</td>
<td>Experiencing Higher than Normal Demand; Medical Surge Plans in Effect</td>
</tr>
<tr>
<td>Mortuary Status</td>
<td>Experiencing Somewhat Higher than Normal Demand</td>
<td>Experiencing Somewhat Higher than Normal Demand</td>
</tr>
<tr>
<td>First Responder Staffing</td>
<td>Operating without Problems; All Services Provided; Taking Proper Precautions</td>
<td>Operating without Problems; All Services Provided; Taking Proper Precautions</td>
</tr>
<tr>
<td>Federal Government</td>
<td>Operating without Problems; Taking Proper Precautions; Sick Recommended to Stay Home</td>
<td>Operating without Problems; Taking Proper Precautions; Sick Recommended to Stay Home</td>
</tr>
<tr>
<td>Public and Private Schools</td>
<td>Closed for the Summer</td>
<td>Closed for the Summer</td>
</tr>
<tr>
<td>Colleges and Universities</td>
<td>Summer Classes Cancelled as a Precaution; Web Based Classes Permitted to Resume</td>
<td>Summer Classes Cancelled as a Precaution; Web Based Classes Permitted to Resume</td>
</tr>
<tr>
<td>Stores and Restaurants</td>
<td>Adult Social Distancing Recommended</td>
<td>Adult Social Distancing Recommended</td>
</tr>
<tr>
<td>Public Parks and Playgrounds</td>
<td>Social Distancing Recommended</td>
<td>Social Distancing Recommended</td>
</tr>
<tr>
<td><strong>U.S. Map</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The map to the right shows current H1N1 Pand Flu activity in the U.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>U.S. Deaths</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current U.S. deaths as of this update</td>
<td>3,650</td>
<td>12,268</td>
</tr>
<tr>
<td><strong>WA Map</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The map to the right shows the current spread of H1N1 in the state of Washington</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Severe

**WHO Phase 6: Pandemic Period**

<table>
<thead>
<tr>
<th>Global Update</th>
<th>WHO Update 3: August</th>
<th>WHO Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td># Countries Reporting cases</td>
<td>135</td>
<td>148</td>
</tr>
<tr>
<td># of worldwide cases</td>
<td>1,203,000</td>
<td>5,704,200</td>
</tr>
<tr>
<td># of deaths</td>
<td>60,150</td>
<td>285,210</td>
</tr>
</tbody>
</table>

**WHO Reports:**

**Special Statement**

Beginning at Update 4: Please note that several countries had been under reporting their cases and deaths to avoid public panic but the virus is so widespread now that the governments can no longer hide it.

### U.S. Update

#### Mitigation Strategies Employed

<table>
<thead>
<tr>
<th>Hospital Status</th>
<th>Isolation recommended; Quarantine recommended</th>
<th>Isolation recommended; Quarantine recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortuary Status</td>
<td>Experiencing Higher than Normal Demand; Medical Surge Plans in Effect</td>
<td>Experiencing Much Higher than Normal Demand; Medical Surge Plans in Effect</td>
</tr>
<tr>
<td>First Responder Staffing</td>
<td>First Responder Illness Rates Increasing; Non-Essential Services Experiencing Some Disruption</td>
<td>First Responder Illness Rates Increasing; Non-Essential Services Experiencing Disruption</td>
</tr>
<tr>
<td>Federal Government</td>
<td>Operating with Some Disruptions; Sick Told to Stay Home</td>
<td>Operating with Disruptions; Sick Told to Stay Home</td>
</tr>
<tr>
<td>Public and Private Schools</td>
<td>Closed for the Summer</td>
<td>Closed for the Summer</td>
</tr>
<tr>
<td>Colleges and Universities</td>
<td>Closed for the Summer</td>
<td>Closed for the Summer</td>
</tr>
<tr>
<td>Stores and Restaurants</td>
<td>Adult Social Distancing Recommended</td>
<td>Adult Social Distancing Recommended; Employees of Businesses Told to Stay Home</td>
</tr>
<tr>
<td>Public Parks and Playgrounds</td>
<td>Social Distancing Recommended</td>
<td>Social Distancing Recommended</td>
</tr>
</tbody>
</table>

### U.S. Map

The map to the right shows current H1N1 Pan Flu activity in the U.S.

### U.S. Deaths

<table>
<thead>
<tr>
<th></th>
<th>Update 3: August</th>
<th>Update 4: August</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40,655</td>
<td>192,773</td>
</tr>
</tbody>
</table>

### WA Map

The map to the right shows the current spread of H1N1 in the state of Washington
### WHO Phase 6: Pandemic Period

**Global Update**

The World Health Organization (WHO) reports the following:

<table>
<thead>
<tr>
<th></th>
<th>Update 5: September</th>
<th>Update 6: September</th>
</tr>
</thead>
<tbody>
<tr>
<td># Countries Reporting H1N1</td>
<td>158</td>
<td>175</td>
</tr>
<tr>
<td># worldwide cases</td>
<td>8,895,600</td>
<td>16,899,600</td>
</tr>
<tr>
<td># of deaths</td>
<td>444,780</td>
<td>844,980</td>
</tr>
</tbody>
</table>

**Special Statement**

Beginning at Update 5: Several countries are using mass graves while others are burning bodies in the streets. To date, social unrest is at a minimum.

Beginning at Update 6: Civil unrest in some countries; governments are helpless.

### U.S. Update

<table>
<thead>
<tr>
<th>Mitigation Strategies Employed</th>
<th>Isolation recommended; Quarantine recommended</th>
<th>Isolation recommended; Quarantine recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Status</td>
<td>Experiencing Much Higher than Normal Demand; Medical Surge Plans in Effect</td>
<td>Experiencing Much Higher than Normal Demand; Medical Surge Plans in Effect</td>
</tr>
<tr>
<td>Mortuary Status</td>
<td>Experiencing Higher than Normal Demand; Mortuary Surge Plans in Effect</td>
<td>Experiencing Much Higher than Normal Demand; Mortuary Surge Plans in Effect</td>
</tr>
<tr>
<td>First Responder Staffing</td>
<td>First Responder Illness Rates Increasing; Non-Essential Services Experiencing Disruption</td>
<td>First Responder Illness Rates Increasing; Non-Essential Services Experiencing Disruption</td>
</tr>
<tr>
<td>Federal Government</td>
<td>Operating with Disruptions; Sick Told to Stay Home</td>
<td>Operating with Disruptions; Sick Told to Stay Home</td>
</tr>
<tr>
<td>Public and Private Schools</td>
<td>Closed for at least 4 weeks; delay to the start of the school year</td>
<td>Closed for at least 4 weeks; delay to the start of the school year</td>
</tr>
<tr>
<td>Colleges and Universities</td>
<td>Closed for at least 4 weeks; delay to the start of the fall semester</td>
<td>Closed for at least 4 weeks; delay to the start of the fall semester</td>
</tr>
<tr>
<td>Stores and Restaurants</td>
<td>Adult Social Distancing Recommended; Employees of Businesses Told to Stay Home</td>
<td>Adult Social Distancing Recommended; Employees of Businesses Told to Stay Home</td>
</tr>
<tr>
<td>Public Parks and Playgrounds</td>
<td>Closed until further notice by order of local health departments</td>
<td>Closed until further notice by order of local health departments</td>
</tr>
</tbody>
</table>

### U.S. Map

The map to the right shows current H1N1 Pan Flu activity in the U.S.

### U.S. Deaths

<table>
<thead>
<tr>
<th></th>
<th>Current</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>300,627</td>
<td>571,122</td>
</tr>
</tbody>
</table>

### WA Map

The map to the right shows the current spread of H1N1 in the state of Washington as of this update.

**Legend:**
- Less than 10 confirmed cases
- 11 – 50 confirmed cases
- 51 – 250 confirmed cases
- Greater than 250 confirmed cases
### WHO Phase 6: Pandemic Period

#### Global Update

<table>
<thead>
<tr>
<th>WHO reports the following:</th>
<th>Update 7: September</th>
<th>Update 8: October</th>
</tr>
</thead>
<tbody>
<tr>
<td># Countries Reporting H1N1</td>
<td>193</td>
<td>204</td>
</tr>
<tr>
<td># worldwide cases</td>
<td>31,856,400</td>
<td>43,108,200</td>
</tr>
<tr>
<td># of deaths</td>
<td>1,592,820 (one million exceeded)</td>
<td>2,155,410 (two million exceeded)</td>
</tr>
</tbody>
</table>

#### U.S. Update

<table>
<thead>
<tr>
<th>Mitigation Strategies Employed</th>
<th>Isolation and Quarantine no longer recommended/required due to extreme spread of the virus</th>
<th>Isolation and Quarantine no longer recommended/required due to extreme spread of the virus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Status</td>
<td>Experiencing Much Higher than Normal Demand; Medical Surge Plans in Effect</td>
<td>Medical Surge Plans Exceeded; Medical Reserve Corps has been activated in many cities and states; Illness rates among hospital staff severe; Many experiencing PTSD</td>
</tr>
<tr>
<td>Mortuary Status</td>
<td>Experiencing Much Higher than Normal Demand; Mortuary Surge Plans in Effect</td>
<td>Experiencing Much Higher than Normal Demand; Mortuary Surge Plans in Effect</td>
</tr>
<tr>
<td>First Responder Staffing</td>
<td>First Responder Illness Rates Increasing; Non-Essential Services Discontinued; Essential Services Affected</td>
<td>First Responder Illness Rates Increasing; Non-Essential Services Discontinued; Essential Services Affected</td>
</tr>
<tr>
<td>Federal Government</td>
<td>Operating with Disruptions; Sick Told to Stay Home; Senate out of Session</td>
<td>Operating with Disruptions; Sick Told to Stay Home; Senate out of Session</td>
</tr>
<tr>
<td>Public and Private Schools</td>
<td>Closed for at least 4 weeks; delay to the start of the school year</td>
<td>Closed for at least 4 additional weeks; delay to the start of the school year</td>
</tr>
<tr>
<td>Colleges and Universities</td>
<td>Closed for at least 4 weeks; delay to the start of the fall semester</td>
<td>Fall Semester Cancelled; December Graduation Postponed until the spring; Tuition reimbursed to students</td>
</tr>
<tr>
<td>Stores and Restaurants</td>
<td>Adult Social Distancing Recommended; Sick Employees of Businesses Told to Stay Home</td>
<td>Sick Employees of Businesses Told to Stay Home; Many businesses unable to open their doors - Financial impact great</td>
</tr>
<tr>
<td>Public Parks and Playgrounds</td>
<td>Closed until further notice by order of local health departments</td>
<td>Closed until further notice by order of local health departments</td>
</tr>
</tbody>
</table>

#### Special Statement

Beginning at Update 8: Garbage is not being collected in many areas due to worker illness; the same for mail delivery.

### U.S. Map

The map to the right shows current H1N1 Pan Flu activity in the U.S.

### U.S. Deaths

<table>
<thead>
<tr>
<th></th>
<th>Current</th>
<th>1,076,587</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Deaths</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Current U.S. deaths exceed one million

### WA Map

The map to the right shows the current spread of H1N1 in the state of Washington as of this update.
<table>
<thead>
<tr>
<th>Severe</th>
<th>WHO Phase 6: Pandemic Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Update</td>
<td>WHO reports the following:</td>
</tr>
<tr>
<td># Countries Reporting cases of H1N1</td>
<td>214</td>
</tr>
<tr>
<td># of worldwide cases</td>
<td>51,158,400</td>
</tr>
<tr>
<td># of deaths</td>
<td>2,557,920</td>
</tr>
<tr>
<td>U.S. Update</td>
<td>Mitigation Strategies Employed</td>
</tr>
<tr>
<td>Hospital Status</td>
<td>Medical Surge Plans Exceeded; Medical Reserve Corps has been activated in many cities and states; Illness rates among hospital staff severe; Many experiencing PTSD</td>
</tr>
<tr>
<td>Mortuary Status</td>
<td>Experiencing Much Higher than Normal Demand; Mortuary Surge Plans Exceeded; There are an insufficient number of body bags and funerals are not being held. Temporary internment procedures are underway in many states.</td>
</tr>
<tr>
<td>First Responder Staffing</td>
<td>First Responder Illness Rates Increasing; Non-Essential Services Discontinued; Essential Services Affected</td>
</tr>
<tr>
<td>Federal Government</td>
<td>Operating with Severe Disruptions; Sick Told to Stay Home; Congress out of Session; 2 Supreme Court justices have become ill and died</td>
</tr>
<tr>
<td>Public and Private Schools</td>
<td>Closed for at least 4 additional weeks; delay to the start of the school year</td>
</tr>
<tr>
<td>Colleges and Universities</td>
<td>Fall Semester Cancelled; December Graduation Postponed until the spring; Tuition reimbursed to students</td>
</tr>
<tr>
<td>Stores and Restaurants</td>
<td>Sick Employees of Businesses Told to Stay Home; Many businesses unable to open their doors - Financial impact great</td>
</tr>
<tr>
<td>Public Parks and Playgrounds</td>
<td>Closed until further notice by order of local health departments</td>
</tr>
</tbody>
</table>
| Special Statement | • Garbage is still not being collected in many areas due to worker illness; the same for mail delivery
• Most U.S. citizens know someone personally who has died from the H1N1 pan flu virus |
| U.S. Map | The map to the right shows current H1N1 Pan Flu activity in the U.S. as of this update |
| U.S. Deaths | Current U.S. deaths | 1,728,898 |
| WA Map | The map to the right shows the current spread of H1N1 in the state of Washington as of this update |
Based on the information in front of you for the Severe pandemic the world is experiencing, at which update would you obtain your vaccine?

- Update 1
- Update 2
- Update 3
- Update 4
- Update 5
- Update 6
- Update 7
- Update 8
- Update 9
- I have decided to not obtain a vaccine.

Press Continue

Next Page: If the participant DOES obtain a vaccine on or before the 9th update:

If you decided to obtain a vaccine during this scenario (whether at update 9 or earlier) why did you make this decision? What factors influenced your decision? ____________________
Or: **If the participant DOES NOT obtain a vaccine on or before the 9th update:**

You decided not to obtain a vaccine. The H1N1 pandemic virus continues to spread throughout the United States and around the world. Fortunately, vaccine manufacturers have now produced vaccine in sufficient quantities that everyone may obtain one if they desire.

The CDC recommends all obtain the vaccine as soon as possible, but notes your decision to NOT obtain one sooner.

Why did you not obtain a vaccine sooner? __________________________________________

*Note that if you have a reason but prefer not to share it with the researchers, please type "I prefer not to state" or something similar in the box below. The question requires something be typed to proceed and that will allow you to continue on.*

Will you obtain one now? **YES**  **NO**

Why or why not? __________________________________________

*Note that if you have a reason but prefer not to share it with the researchers, please type "I prefer not to state" or something similar in the box below. The question requires something be typed to proceed and that will allow you to continue on.*

Thank you.

Continue to the next section of the study.
Recall the scenario you had just read about and the decision you made about when you would obtain your vaccine (i.e. the update you decided upon, if any). Across all the WA maps you looked at, you were told your location in the state was at the star as marked on the map below.

But what if your location was closer to one of the major cities in the state as shown below.

With the new location in mind, look at the 9 updates in your current scenario again and tell us how this would affect the decision you initially made?

I would now obtain a vaccine EARLIER than I did before.
I would obtain a vaccine at the same update as I did earlier (my decision is unaffected).
I would now obtain the vaccine LATER than I did before.
Based on how you answered the previous question, please state at which specific update you would obtain your vaccine:

Update 1
Update 2
Update 3
Update 4
Update 5
Update 6
Update 7
Update 8
Update 9
I have decided to not obtain a vaccine.

Please explain your reasoning:

_________________________________________________________________

Thank you. Proceed to the next part of the study. The experimenter will collect your updates from the current scenario in a bit.
**Directions:** Using the following scale, please indicate how important each statement is as a guiding principle in YOUR life. Please place your response in the space provided to the right of each statement. *If you are opposed to the statement, please put a 0.*

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opposed</strong></td>
<td><strong>Not at all Important</strong></td>
<td><strong>Slightly Important</strong></td>
<td><strong>Somewhat Important</strong></td>
<td><strong>Rather Important</strong></td>
<td><strong>Extremely Important</strong></td>
</tr>
</tbody>
</table>

1. Family security, safety for loved ones.
2. A world at peace, free of war and conflict.
3. Protecting the environment, preserving nature.
4. Honoring parents and elders, showing respect.
5. Social justice, correcting injustice, care for the weak.
7. Unity with nature, fitting into nature.
8. Influential, having an impact on people and events.
9. Respecting the earth, harmony with other species.
10. Equality, equal opportunity for all.
11. Wealth, material possessions, money.
12. Authority, the right to lead or command.
15. Curious, interested in everything, exploring.
ILLNESS CHECK

Q63  Have you had the flu recently (within the past 2-3 weeks)?

- Yes
- No

Q64  How many of your family/friends/acquaintances have had the flu in the past 2-3 weeks? There is no need for an exact number, just estimate. If none, state that.
**INFORMATION SALIENCE**

**Q58**

*Please rank from 1-5, where 1 is least important and 5 is most important, the general importance of the following pieces of information in your decision to obtain or not obtain a vaccine.*

<table>
<thead>
<tr>
<th>Information</th>
<th>1 - Least Important</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 - Most Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Update - information about number of cases and deaths worldwide</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>U.S. Update - Current Status - (i.e. medical and mortuary surge, school closures, etc.)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>U.S. Map - showing spread of the virus in the U.S.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Information concerning current death toll in the U.S.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>State (WA) map</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

*If there is another factor, list it here and explain why you find it to be important.*
This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during the past few weeks. Use the following scale to record your answers:

<table>
<thead>
<tr>
<th>1 very slightly or not at all</th>
<th>2 a little</th>
<th>3 moderately</th>
<th>4 quite a bit</th>
<th>5 extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>_____ cheerful</td>
<td>_____ sad</td>
<td>_____ active</td>
<td>_____ angry at self</td>
<td></td>
</tr>
<tr>
<td>_____ disgusted</td>
<td>_____ calm</td>
<td>_____ guilty</td>
<td>_____ enthusiastic</td>
<td></td>
</tr>
<tr>
<td>_____ attentive</td>
<td>_____ afraid</td>
<td>_____ joyful</td>
<td>_____ downhearted</td>
<td></td>
</tr>
<tr>
<td>_____ bashful</td>
<td>_____ ted</td>
<td>_____ nervous</td>
<td>_____ sheepish</td>
<td></td>
</tr>
<tr>
<td>_____ sluggish</td>
<td>_____ amazed</td>
<td>_____ lonely</td>
<td>_____ distressed</td>
<td></td>
</tr>
<tr>
<td>_____ daring</td>
<td>_____ shaky</td>
<td>_____ sleepy</td>
<td>_____ blameworthy</td>
<td></td>
</tr>
<tr>
<td>_____ surprised</td>
<td>_____ happy</td>
<td>_____ excited</td>
<td>_____ determined</td>
<td></td>
</tr>
<tr>
<td>_____ strong</td>
<td>_____ timid</td>
<td>_____ hostile</td>
<td>_____ frightened</td>
<td></td>
</tr>
<tr>
<td>_____ scornful</td>
<td>_____ alone</td>
<td>_____ proud</td>
<td>_____ astonished</td>
<td></td>
</tr>
<tr>
<td>_____ relaxed</td>
<td>_____ alert</td>
<td>_____ jittery</td>
<td>_____ interested</td>
<td></td>
</tr>
<tr>
<td>_____ irritable</td>
<td>_____ upset</td>
<td>_____ lively</td>
<td>_____ loathing</td>
<td></td>
</tr>
<tr>
<td>_____ delighted</td>
<td>_____ angry</td>
<td>_____ ashamed</td>
<td>_____ confident</td>
<td></td>
</tr>
<tr>
<td>_____ inspired</td>
<td>_____ bold</td>
<td>_____ at ease</td>
<td>_____ energetic</td>
<td></td>
</tr>
<tr>
<td>_____ fearless</td>
<td>_____ blue</td>
<td>_____ scared</td>
<td>_____ concentrating</td>
<td></td>
</tr>
<tr>
<td>_____ disgusted</td>
<td>_____ shy</td>
<td>_____ drowsy</td>
<td>_____ dissatisfied</td>
<td></td>
</tr>
<tr>
<td>with self</td>
<td></td>
<td></td>
<td>with self</td>
<td></td>
</tr>
</tbody>
</table>
As a participant in this study, you were asked to make a series of decisions on whether or not you would obtain vaccines for yourself and maybe your family, or were asked to make decisions on how to best allocate a limited number of vaccines to pre-determined priority groups. Whatever the task, the scenario asked you to do these tasks during pandemics of different severities. Simply, a pandemic is a worldwide outbreak of a new virus.

The goal of the study was to see what factors affected this decision making process. In short, we were interested in social value orientation, or a person's unique way of distributing resources between self and others, and whether individuals who are proself or prosocial make different decisions. Secondly, it was hypothesized that the severity of the pandemic may affect the decision making process such that more severe pandemics will lead participants to be more likely to obtain vaccines or they may affect how the vaccines were allocated. Finally, the updates showed the spread of the virus across the U.S. but also throughout the state of Washington. It was hypothesized that individuals would obtain vaccines when the virus was closer in proximity to their location. The combination of these three factors could also be important such that proselfs may be more likely to obtain vaccines in more severe pandemics and even before the flu has reached the county where they were located.

We appreciate your participation in our study. Please do not discuss the content of the research with other people who may sign up for the project, as this may impact our findings. If you have a further interest in this research or you want to know how the results turn out, please contact Dr. Craig Parks at parkscd@wsu.edu or in 209 Johnson Tower. Thank you very much for your participation!

So how do seasonal flu and pandemic flu differ from one another? Below is a table which compares the two. It is provided for your information.

<table>
<thead>
<tr>
<th></th>
<th>Seasonal Flu</th>
<th>Pandemic Flu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outbreaks</td>
<td>Outbreaks follow predictable seasonal patterns; occurs annually, usually in winter, in temperate climates</td>
<td>Occurs rarely (three times in 20th Century)</td>
</tr>
<tr>
<td>Immunity</td>
<td>Usually some immunity built up from previous exposure</td>
<td>No previous exposure; little or no pre-existing immunity</td>
</tr>
<tr>
<td>Complications</td>
<td>Healthy adults usually not at risk for serious complications; the very young, the elderly and those with certain underlying health conditions at increased risk for serious complications</td>
<td>Healthy people may be at increased risk for serious complications</td>
</tr>
<tr>
<td>Health systems</td>
<td>Health systems can usually meet public and patient needs</td>
<td>Health systems may be overwhelmed</td>
</tr>
<tr>
<td>Vaccine availability</td>
<td>Vaccine developed based on known flu strains and available for annual flu season</td>
<td>Vaccine probably would not be available in the early stages of a pandemic</td>
</tr>
<tr>
<td>Antivirals</td>
<td>Adequate supplies of antivirals are usually available</td>
<td>Effective antivirals may be in limited supply</td>
</tr>
<tr>
<td>Deaths</td>
<td>Average U.S. deaths approximately 23,600/yr</td>
<td>Number of deaths could be quite high (forecast models put the number as high as a few million)</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Symptoms: fever, cough, runny nose, muscle pain. Deaths often caused by complications, such as pneumonia.</td>
<td>Symptoms may be more severe and complications more frequent</td>
</tr>
<tr>
<td>Impact on society</td>
<td>Generally causes modest impact on society (e.g., some school closing, encouragement of people who are sick to stay home)</td>
<td>May cause major impact on society (e.g. widespread restrictions on travel, closings of schools and businesses, cancellation of large public gatherings)</td>
</tr>
<tr>
<td>Impact on economy</td>
<td>Manageable impact on domestic and world economy</td>
<td>Potential for severe impact on domestic and world economy</td>
</tr>
</tbody>
</table>