# The Shifts in Social Representation of Vaccines after the Dengvaxia Incident

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## CHAPTER I: INTRODUCTION

There are few other scientific developments that have had a large impact on human health and well-being as vaccines with so many being developed for the prevention of dozens of diseases (Schuchat, 2011). According to the World Health Organization, vaccines offer a way to make the body's immune system act on pathogens at a faster rate to prevent the diseases they cause (World Health Organization, 2019). Not only have they had a large impact on health and well-being, however, but by preventing diseases, vaccines have been estimated to have saved billions of dollars for both medical and societal costs (Schuchat, 2011). Despite its importance, in the Philippines the trust in vaccines has declined after the Dengvaxia incident (Fatima & Syed, 2018). The controversy surrounding the Dengvaxia incident arises from its use on 800,000 school children, as individuals who were never infected with dengue were discovered to be at risk for a severe form of the disease it was meant to prevent compared to if they had not received the vaccine (World Health Organization, 2017). Among the 800,000 children vaccinated, it was estimated that around 10% of them, or 80,000 children were at risk of developing severe dengue (Fatima & Syed, 2018). With the announcements of Dengvaxia's developer, Sanofi, of these findings, the controversy and recall of Dengvaxia has brought fear to the community as it was heavily covered in the media as a risk which has led to the refusal of parents to vaccinate their children, this phenomenon being termed as "vaccine hesitancy" (Fatima & Syed, 2018).

Due to the controversy surrounding the Dengvaxia vaccine incident, the various side effects have given rise to negative views towards vaccines, even towards vaccines not involved in the controversy (Fatima & Syed, 2018). Moreover, diseases that could be prevented by vaccination are back on the rise, and there has been a decrease in herd immunity for communities. Overall, the trust in vaccines had declined significantly from 93% in 2015

to 32% in 2018. (Limos, 2019). Following this, the once polio-free country found a resurgence of this vaccine-preventable disease with a case of vaccine-derived polio virus Type 2 being reported in Lanao del Sur on September 2019 (Casaljay, 2019). Given these issues today, this paper argues that there is a need to understand how people perceive vaccines. By knowing how people perceive vaccines, perhaps interventions methods can be developed to tackle this problem by going with the grain of people's cognition which is needed to make intervention methods more successful (Rossen, Hurlstone, & Lawrence, 2016).

Going with the grain of cognition, however, requires that one not only recognize how people remember information and people's emotional responses, but it also requires understanding the influence of a group and a group's deeply held beliefs (Rossen, Hurlstone, & Lawrence, 2016). This is because at its heart, there is a social aspect to the development of vaccine perceptions. Specifically, there is a social construction which forms shared knowledge among people that can take place (Hara & Sanfilippo, 2016). Taking this into account, this paper would thus move towards a social constructivist understanding of vaccines as opposed to the common tendency to treat vaccinations as individual decision-making tasks (Betsch, Böhm, & Korn, 2013). Looking at the context of the vaccine hesitancy issue in the Philippines, this paper argues that the representation of vaccines has developed over time within a sociocultural context as people voiced their opinions and discussed these with one another.

We argue that since the nature of the issue, however, is a socially fluid one, this study will aim to view the situation through the social representation theory that highlights the change in views of a group as a collective. This would involve a mapping of the process that formed this common sense of aversion among the people, seeing its progression through

phases, and allowing a better possible understanding universally about the views on vaccines. By understanding the situation in this manner through the social representation theory, this paper aims to cover the gap in literature in understanding what the social representations of vaccines are through time which will serve as possible basis to develop intervention methods in light of today's struggles in vaccination and diseases that goes with the grain of cognition.

**Review of Related Literature**

Given the recency of the Dengvaxia controversy in the Philippines that had a huge impact on vaccines, few accessible articles have been written to study the situation in this country's context. Thus, there has been a lack of understanding of the vaccination situation here in the Philippines following this incident. As stated, following the Dengvaxia controversy and the Dengvaxia's sale being suspended, the fear also affected the acceptance of vaccines for other vaccine preventable diseases resulting in "vaccine hesitancy" (Fatima & Syed, 2018).

Vaccine hesitancy is "the delay in acceptance or refusal of vaccination despite availability of vaccination services", and is complex as well as context specific (MacDonald, 2015). Given this, it is recognized that vaccine hesitancy is one of the important causes of suboptimal vaccine uptake (Thomson, Robinson, & Vallée-Tourangeau, 2016). Thus, with vaccine hesitancy as one of the important causes of suboptimal vaccine uptake, identifying its determinants is a crucial step to understanding and addressing this problem (Thomson, Robinson, & Vallée-Tourangeau, 2016).

With this, the current review of related literature would thus tackle the determinants of vaccine hesitancy as described in various studies. Thus far, the determinants of vaccine hesitancy is commonly split into three determinants: organizational, individual, and contextual (Dubé, Vivion, & MacDonald, 2015; Larson, et al., 2014). Organizational

determinants refer to the accessibility and quality of vaccination services (Dubé, Vivion, & MacDonald, 2015). Individual determinants refer to characteristics, attitudes, beliefs, and knowledge (Dubé, Vivion, & MacDonald, 2015. Lastly, contextual determinants refer to the media, communication, and other historical, political, and sociocultural influences (Dubé, Vivion, and MacDonald, 2015). In going over the studies relating to these determinants, this paper would argue that the various studies looking at the first two determinants of organizational and individual determinants in isolation lack a crucial aspect of the vaccine situation in the Philippines that only the contextual determinants can provide. This aspect is the social aspect of the vaccine hesitancy situation in the Philippines. Thus, building on the identified literature which takes into account the social aspect of the situation and looking at the gaps in this literature, this study would make its argument for the usage of the proposed framework in this study - the social representation theory.

**Organizational Determinants**. As mentioned above, organizational determinants involve the accessibility and quality of vaccination services (Dubé, Vivion, & MacDonald, 2015). Central to these organizational determinants are the costs associated with this, whether it be financial, time, general accessibility, and others (Larson, et al., 2014). These costs can serve as barriers to the accessibility and quality of these services as given by service providers to citizens.

Financial costs are frequently mentioned as potential barriers to vaccination services (Kempe, et al., 2009). In that study, it was found that doctors have a difficult time administering new vaccines due to difficulty in obtaining adequate supplies, lack of adequate reimbursement for vaccination, up-front costs in their practice to purchase the vaccines, and lack of coverage from insurance companies for the vaccines (Kempe, et al., 2009). Thus, financial costs were identified to be associated with the failure to use vaccines routinely

(Kempe, et al., 2009). These financial costs, however, not only affect the doctors but the people availing of the vaccination services as well. In a survey on the perceived barriers to vaccination status, cost of vaccines was the most commonly cited barrier, with 49% being affected by this, among other barriers (Danis, et al., 2010).

Aside from financial costs, the general accessibility of these services itself serves as a barrier to the provision of vaccination services (Danis, et al., 2010). In this study, it was found that long distances to vaccine delivery points, whether real or perceived, served as a barrier to the administration of these services (Danis, et al., 2010). Moreover, this factor was found to significantly predict both undervaccination as well as delayed vaccination (Danis, et al., 2010).

The organizational determinants shed light on the impact that the accessibility of vaccination services have on vaccine hesitancy. Lacking accessibility to vaccines due to high costs and long distances to vaccine delivery points leads to vaccine hesitancy among people. While these studies offer important information as to the impact of vaccination services on people, limiting the situation of vaccines to organizational determinants leads to quite a deterministic view of the vaccine situation with external factors such as quality of services leading to vaccine hesitancy among people. This is a limited view as behavior, in this case vaccine hesitancy as delay or refusal of vaccination, is not caused in a simple and deterministic way (Burr, 2002). Thus, vaccine hesitancy must be understood beyond just its organizational determinants.

**Individual Determinants.** Individual determinants of vaccine hesitancy deal with the characteristics, beliefs, attitudes, and knowledge of individuals (Dubé, Vivion, MacDonald, 2015). Depending on these, a person could be inclined to exhibit vaccine hesitancy or not.

In studies on certain personality factors or characteristics, it was shown that people with certain characteristics were more likely to delay vaccination or anti-vaccination attitudes (Callaghan, et al., 2019; Hornsey, Harris, & Fielding, 2018). These personality factors or characteristics are conspiratorial thinking, sensitivity to needles (Callaghan, et al., 2019), reactance, and individualistic/hierarchical worldviews (Hornsey, Harris, & Fielding, 2018). It was found that people measured to be high in these would tend to delay vaccination or hold anti-vaccination attitudes (Callaghan, et al., 2019; Hornsey, Harris, & Fielding, 2018).

Other than personality factors and characteristics of people, there are also beliefs and other psychological antecedents that are related to the decision of an individual to vaccinate. In a study on certain beliefs that people cite as the reason for their refusal to vaccinate, these beliefs include religious beliefs, personal beliefs or philosophical reasons, safety concerns with regards to the vaccines, and a desire for more knowledge from healthcare providers (McKee & Bohannon, 2016). Looking at religious reasons, specifically, it was found that these were different from the others as these are tied to core beliefs of parents making it difficult to change the views of these individuals on vaccinations (McKee & Bohannon, 2016). In another study, five psychological antecedents were provided for vaccination (Betsch, et al., 2018). These antecedents are confidence in vaccines, complacency in perceiving diseases, constraints that serve as barriers, calculation as one engages in information search, and a sense of collective responsibility to others (Betsch, et al., 2018).

These personality factors, beliefs, and psychological antecedents can result in a person reaching certain positions or attitudes towards vaccines that corresponds to certain behavior. There are four attitudes identified when it comes to vaccines (Byström, et al., 2014). There are the conformers who end up vaccinating on time (Byström, et al., 2014). There are the pragmatists and attentive delayers who are both concerned with the safety of

vaccines and think that babies are too young to be vaccinated which leads to both delaying the vaccination (Byström, et al., 2014). For the pragmatist, the decision to vaccinate is due to a lack of time, ability, and self-efficacy to deal with diseases (Byström, et al., 2014). For the attentive delayer, their decision to vaccinate comes after waiting for a child to mature (Byström, et al., 2014). The last attitude when it comes to vaccines are those who are promoters of natural immunity as opposed to acquired immunity of vaccines (Byström, et al., 2014). These see diseases as a part of life and see non-vaccination as an informed, responsible decision from concerns with long-term side effects (Byström, et al., 2014). Thus, they refuse to vaccinate at all (Byström, et al., 2014). Moreover, on a more general level, a study found that the intention to vaccinate can predict whether a person would follow through on the intention to vaccinate (Harris, Maurer, & Lurie, 2009). Of the 276 people showed an intention to vaccinate, 158 of them or around more than half pushed through with the vaccination during the end of the vaccination season (Harris, Maurer, Lurie, 2009).

Thus, the individual determinants show how certain personality factors, beliefs, and other psychological antecedents can lead an individual to certain attitudes. Moreover, these attitudes held by these individuals lead them to certain behaviors in relation to vaccination. Overall, this shows the tendency for vaccination to be treated as an individual decision making task (Betsch, Böhm, & Korn, 2013). In viewing vaccination as an individual decision-making task, it thus makes it easy to come up with the development of simple interventions to be applied to individuals. In the study on the capability of intention to vaccinate in predicting following through with vaccination, the study thus suggested that doctors directly ask for the intention of patients to vaccinate to determine whether the patient might push through with vaccination (Harris, Maurer, Lurie, 2009). By identifying the four types of attitudes that correspond to certain behaviors, interventions can be tailored-made

upon identification of the attitude of parents for higher vaccination coverage (Byström, et al., 2014).

The problem, however, on these studies tackling the individual determinants is that it assumes and follows the trend in theories that attitudes and behaviors are related with attitudes partly determining behavior (Ajzen & Fishbein, 1977). Limiting the view of vaccines to these studies on personality factors, beliefs, and attitudes which affect behavior is not favorable as social behaviors cannot be adequately understood by an appeal to what are presumed to be stable characteristics such as personality and attitudes (Burr, 2002). The behavior of people vary too often from situation to situation (Burr, 2002). Moreover, with the usage of attitudes linking to behaviors, this assumes that there is a self-contained, pre-existing, and rational individual who plans behavior when one's conduct is in fact socially situated as one actively engages with ambiguous situations and making sense of it in the social world (Burr, 2002). Given these limitations of the studies on individual determinants on vaccine hesitancy, it is important to take into account and study the contextual determinants of vaccine hesitancy.

**Contextual determinants.** Contextual determinants refer to historical, political and sociocultural influences, as well as the communication and media environment (Dubé, Vivion, & MacDonald, 2015). To start with the contextual determinants, it is thus important to look at the historical influence itself that preceded the rise of vaccine hesitancy, the Dengvaxia controversy, and its effects on the people.

With the Dengvaxia controversy which made parents fear vaccinations, it was found through a qualitative study that parents who participated in the Dengvaxia program showed regret for their participation, lost trust in public health institutions, and felt that the communications between local health systems was inadequate (Valido, Laksanawati, &

Utarini, 2018). This comes as worrying because health communication is vital with regards to the uptake of vaccines, especially that coming from healthcare providers (Gilkey, et al., 2016). Moreover, with the general loss of trust, the Philippines reacted with both public and political outcry which was followed by biased media hype as social media was dominated by fake news that was aimed towards vilifying those in authority (Larson, Hartigan-Go, & de Figueiredo, 2018). Given the historical influence that set the context of the vaccine hesitancy situation in the Philippines and where it led to, it is thus important to look into communication and the media environment, especially social media.

Social media has become quite central in health communication today as with its high penetration rate, social media can dispense health information to numerous people with a variety of socioeconomic status and health conditions (Lu, Liu, & Wang, 2016). Despite its newfound role in health communication, social media has now posed a threat to professional authorities in health communication under this platform (Lee & Sundar, 2013).

In social media, there are three types of authority that can characterize social media health messages: document, affiliation, and bandwagon (Lu, Liu, & Wang, 2016). Document authority points to information presentation that highlights professional sources in its citations (Fritch & Cromwell, 2001). Affiliation authority refers to the credentials and qualifications that institutional authorities can affiliate with (Fritch & Cromwell, 2001). Lastly, bandwagon refers to the authority that messages receive when many others believe it is correct as well (Lee & Sundar, 2013). With these types of authority, social media was said to enhance the effects of bandwagon authority while diminishing the power of professional authority (Lu, Liu, & Wang, 2016).

Social media, however, doesn't just undermine the authority of professionals in health communication. Knowledge sharing between ordinary citizens, as opposed to from health

professionals to citizens, flourish with widely accessible platforms such as Facebook, and others (Hara & Sanfilippo, 2016). With this, not only do ordinary citizens tend not to rely on experts to gain scientific knowledge, they also seek to share knowledge and participate in knowledge co-construction in online communities leading to a social construction of knowledge of a community of ordinary citizens (Hara & Sanfilippo, 2016). Thus, this provides an avenue for people to make sense of contested scientific knowledge together as an online community (Hara & Sanfilippo, 2016).

In studying the contextual determinants of vaccine hesitancy, this shows how there is a social construction of shared knowledge or assumptions that takes place in the media environment, specifically social media, between ordinary citizens. In socially constructing shared assumptions of the world, this allows the people in society to make sense of their experiences, to communicate effectively, and to coordinate activities (Burr, 2002). This way of viewing the situation makes room for one's conduct to be seen as situated socially in a social world where one actively makes sense of ambiguous situations to guide their conduct as stated (Burr, 2002).

**Gap in literature.** Through this review of related literature, this study would thus move towards building on the available literature that supports the sociocultural and socially fluid nature of the situation in the Philippines. It is not enough to merely view the vaccine hesitancy situation in the Philippines as merely due to organizations who provide services and act as external factors that determine one's behavior. Neither is it enough to merely view the vaccine hesitancy situation in the context of individuals living isolated from one another and studied through the perspective of personality factors, beliefs, and psychological antecedents for attitude that lead to behavior. The vaccine hesitancy situation in the

Philippines is situated in the social world as the Dengvaxia incident sparked public outcry that was brought to social media.

Following this, the review of related literature identified the mechanisms in which social media works in order to allow a social construction of shared assumptions among ordinary citizens. While studies have thus identified these mechanisms, there is a lack of literature that identifies what are the shared assumptions, that is the social representations, which were socially constructed or represented by ordinary citizens on vaccines and how these were reached in the context of the Philippines relating to the Dengvaxia incident.

Given this gap in the related literature, this study thus moves away from identifying determinants and more towards studying situation itself and how people collectively make sense of their experiences and the social world through social representations of vaccines in the Philippines relating to the Dengvaxia incident and how these social representations changed through time. With this topic, the study thus proposes the usage of the framework of social representation theory.

**Theoretical Framework**

Given the nature of both the topic and the literature, a qualitative approach would be most fitting to explore the phenomenon of vaccine hesitancy. Previous studies that were conducted on vaccine hesitancy have already used a qualitative lens, but have treated it as primarily determined by attitudes towards vaccines, using a more positivist social cognitive framework. This perspective, although valid, is not the solitary method to view vaccine hesitancy; being a social phenomenon, it may be sensible to also subject it to a lens that is less individualist in nature. To introduce a new perspective to vaccine hesitancy, it will be treated as a more socially influenced behavior. Rather than the attitudes of individuals towards vaccines, a socially established construction of vaccines may play a role in vaccine

hesitancy. Given that a rise in vaccine hesitancy has been observed in the last few years, it may be that vaccines have taken on a different meaning than they have been previously - their construction across the minds of people has changed. For these reasons, social representation theory, which is social constructivist in nature, will be used to study vaccines and vaccine hesitancy (Creswell, 2014).

**Framework for Social Representation Theory.** Social representation theory posits that meanings are collectively assigned (Wagner, Duveen, Farr, Jovchelovitch, Lorenzi-Cioldi, Marková, Rose, 1999). It proposes that all social phenomena must be viewed with consideration of related "macro social conditions" (Wagner, et al., 1999). Some examples of these conditions are culture, history, media, dialogue, and the like (Howarth, 2006). Social representations function to make sense of and establish a common perception of what are termed as "social objects", yielding order in understanding them, shared attitudes towards them, and common behavior in response to them (Wagner, et al, 1999). People within groups that share and construct social representations are able to communicate with one another about the respective social objects in a smooth manner, as a result of the consistency in the way people are able to relate to those objects (Wagner, et al, 1999); they often do so in the form of verbal dialogue, but now also through texting and social media. Put simply, a social representation is a collective understanding built by a group which informs behavior and discussion (Howarth, 2006). In the case of this study, the social object would be vaccines, whose representation is to be studied as it is constructed by and through the events following the Dengvaxia incident; for this study, the incident is termed as the pivotal event due to its nature as the catalyst for the shift in social representation of vaccines. Vaccine hesitancy is the behavior resulting from the social representation, evidenced in the lowering of vaccination rates in the Philippines.

The representation of an object that a group holds are particular to that group; the qualities of a group inevitably color the way that they ascribe significance to something (Wagner et al., 1999). One of the implications of this is that different groups may have different social representations for a single object. Some people may have had a different experience with the object, while others may possess a culture that would predispose them to view the object in a certain way. In the study, there may be Filipinos that view vaccines as a risk, while others view vaccines as a way to eliminate risk; these perceptions directly oppose one another and yet they both describe vaccines. This occurs as a result of the different characteristics and experiences of the groups, specifically the aforementioned social conditions of the group (Wagner, et al., 1999). People will also tend to prefer homogeneity; they will be more likely to subscribe to people or sources that support their social representation of objects (Wagner et al., 1999). Filipinos that view vaccines as hazardous will tend to favor and internalize information that supports this notion, even in the face of contradicting evidence. They may agree with sentiments that coincide with theirs by writing a comment that affirms their stand, or they might argue against opposing opinions.

**Symbolic Coping.** Social representations may be formed in response to unfamiliar or foreign events; in order to make sense of these strange and potentially threatening phenomena, a process of "symbolic coping" can occur on the level of the group (Wagner, et al., 1999). Through discussion, an image of the social object is eventually formed and held to be the social representation; for vaccines, the study hopes to view discussion online in response to news about the Dengvaxia incident.

The process begins with "anchoring", which involves naming and attachment of qualities to the object in question. The significance of anchoring lies in giving people the ability to have discussions about the phenomenon. It is understood in reference to known

terms and representations in order to facilitate this discussion, which elaborates the object further (Wagner, et al., 1999). For instance, vaccines may be initially understood in relation to vitamins, which broadly function to prevent or decrease the likelihood of illness; this interim understanding would allow people to talk about vaccines in a digestible manner, furthering their impressions and solidifying the group interpretation of vaccines.

Following anchoring, there is further dialogue within the group that eventually leads to objectification. At the objectification stage, the group is able to assimilate and construct a specific concept that articulates the nature of the phenomenon as the group has come to as a result of the prior dialogue. This is when people form opinions that they are satisfied with in response to the information they have received and opinions they have heard; the Filipinos that have decided to stably construct vaccines as a menace after reading through comments about Dengvaxia have successfully gone through this stage. Objectification often comes in the form of some metaphor that is able to encapsulate the phenomenon, highlighting its key traits as agreed upon by the group. In this study, vaccines may be seen as a hostile sword that people subject themselves to by undergoing vaccination, rather than as a benevolent shield to protect them from infections.

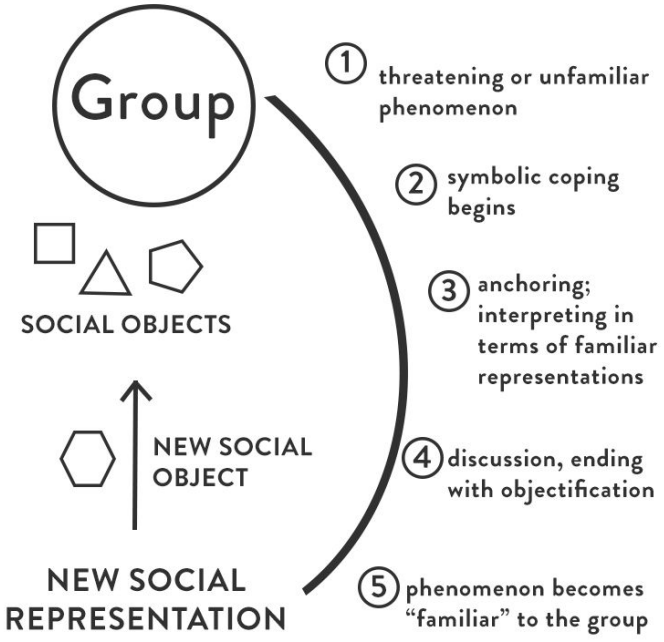


**Figure 1.**

Social Representation Formation

Adapted from (Wagner, et al., 2019)

To reiterate an earlier point, the final product of objectification is dependent on the group constructing it; the qualities, circumstances, experiences, and more that are particular to a group influence the manner in which an object is represented (Wagner, et al., 1999). People that have a background in the sciences and understand vaccine action would be highly unlikely to see it as a hostile sword. However, Filipinos that are less informed and have a history of easily subscribing to the influence of mass media might be more readily convinced that vaccines are not a shield they should be arming themselves with. It is important then to note that a social representation is not necessarily consistent with empirical fact; rather, it is hinged more on the experiences and the consensus of the majority (Wagner, et al., 1999), as seen in how some Filipinos have come to fear vaccines as risks when they have clearly been highly effective in preventing disease in the past.

To build on the previous example, many people think of vaccines as a shield for your body against infection. However, in truth, vaccines are more like a teacher that teaches a student how to solve a math problem before a test; when the exam comes, the student is able to answer the problem quickly and without any difficulty, as a result of prior exposure to the problem (Center for Disease Control and Prevention, 2018). Although the image of a shield is supplementary for the purpose of vaccination, it is not an ideal image to describe what has actually taken place when one receives a vaccination. This illustrates that there is plurality in understanding social objects, which is seen in the discussion among Filipinos about vaccines and their effects.

Furthering that point, it is possible the social representation that a group holds for a social object to change as a result of key events or other factors. Building on the premise that group attributes and history affect the way it would fashion its social representations, a

significant change in the group or an occurrence that impacted a group could also impact socially represented objects. For instance, vaccines might have been a routine part of childrearing, but after experiencing Dengvaxia, in which vaccines played an antagonistic role, its meaning might have changed from something standard to something bearing risk. This is precisely what the study will argue as the shift in the Philippine social representation of vaccines in the wake of the Dengvaxia incident, in which its misuse caused severe dengue in some patients (CNN Philippines, 2018). The Dengvaxia incident will be termed as the pivotal event, which sparked the shifts in the social representation of vaccines in the Philippines. In the wake of this event, vaccines were suddenly constructed anew as an unfamiliar phenomenon, starting the process for the formation of a new social representation. Discussion leads to new interpretations or perceptions, resulting in the objectification of vaccines with new representations. Following the Dengvaxia incident, subsequent news that surfaced would again cause vaccines to be held as a strange phenomenon; these further points of interest will be termed peak moments for the purpose of the study, during which the social representation of the vaccines will be noted. Thus the social representation of vaccines ebbs and flows as discussion about their nature ensues; the course of vaccine social representation shifting will be illustrated by the study.

Social representations may be described based on both the observable behavior of the groups in question, as well as dialogue about the social object (Wagner, et al., 1999). Taking these into account, it will be presented that the behavior in question is vaccine hesitancy; the dialogue has yet to be observed in order to articulate a description of the social representations that vaccines have taken on after the Dengvaxia incident. Social media comments will be held as a key source of that dialogue in order to trace the construction of vaccines. In building a timeline on the shifts in the social representation of vaccines, the

study hopes to shed light on how Filipinos have understood vaccines, which might hopefully lead to appropriate interventions from authorized healthcare institutions.

### Research Problem

In trying to study the construction of people's social representation of vaccines before and after the Dengvaxia incident, this thesis will utilize a qualitative lens with the social representation theory to answer the question "What are the shifts in the social representations of vaccines that can be seen in the study of the Dengvaxia incident and its development?"

## CHAPTER 2: METHODS

The research design for this study is qualitative, using the framework of social representation theory. This particular framework was used to understand the social constructs of a collective formed through the impact of various events; the Dengvaxia incident is termed as the pivotal event in this study, being the catalyst of shifts in the social representation of vaccines. The study would focus on the discussions brought about by peak moments that affected the representations of vaccines that people have. There is a need to understand why there are shifts in vaccine perceptions as a collective, and how this shift happened at the peak moments as reflected in social discourse. It is by tracing these discussions that the study aims to discover how groups slowly formed and further developed their representations of vaccines, which are crucial to understanding vaccine hesitancy in the country today. In doing so, perhaps vaccine hesitancy, and possibly vaccine perceptions as a whole may be better grasped by using the social representation theory framework.

### Data Sources

**Participants.** Using social representation theory, the collective of interest is the general public of Filipinos that are discussing about vaccines or the Dengvaxia incident. The

demographic will consist of the general Filipino public on social media who comment on news links posted on social media. It will be systematically searched for through Facebook for key events shared online that contain plenty of discussion through multiple comments. As the study will be focusing on the general Filipino public, there will be no exclusion criteria by gender, education, age, or socio-economic status. It will, however, exclude people in positions that are intrinsically motivated to play certain roles in the discussion, such as medical experts or government officials. Therefore, people identified with such roles will not be included in the criteria for respondents.

The rationale for focusing on the general Filipino public is that the study is concerned with the issue of vaccine hesitancy in the Philippines, specifically that being faced by the general Filipino public in facing vaccine decisions for the health of both them and their family. Relating to the case of vaccines, the general public would have different experiences and concerns compared to that of medical experts and government officials who are concerned more on vaccines on a wider scale. Medical experts and doctors most would likely be concerned with giving vaccines as well as convincing people to whether or not to take vaccines. Government officials are likely concerned with studying vaccines to see whether or not to implement their use. These would lead both to different contributions to the discourse as well as different social representations given the different experiences and concerns. Thus, this study which aims to look at the representation of the general Filipino public as they face vaccine decisions for their own health will limit the demographic for comments gathered to the general Filipino public. Therefore, any government officials, political figures, and medical professionals would be excluded.

**Setting.** The main characteristic in identifying peak moments that are to be studied is being a key point of discussion after the Dengvaxia incident, the pivotal event of the study. Peak moments will be selected through a process involving three basic steps.

First, Google Trends would be used to determine when internet searches for the keyword "Dengvaxia" peaked; in doing so, time frames can be narrowed down for periods of interest to determine peak events of dengvaxia discussion. Second, the time frames would be cross-referenced with timelines of news platforms, namely ABS-CBN, GMA, Philippine Daily Inquirer, Philippine Star, and Rappler. These events that coincide with the time frames in the first step will be used as support in narrowing further the durations of peak discussion regarding dengvaxia or vaccines. Thus, the search of posts will be limited within the sphere of the peak moment. Moreover, it would be assumed that the keywords contained the idea of dengvaxia, vaccines, or dengue in searching for these post of news. Third and finally, posts about the peak moments on the Facebook pages of the three news platforms will be used as settings in which their comments sections may be scanned for text; the post would have to have at least 100 comments in order to be considered valid in that discussion among people was present.

**Texts.** The texts being used for this qualitative study mainly consist of Facebook comments for recording the social discussions regarding vaccines and Dengvaxia controversy. Comments on Facebook were selected as data as social media platforms are orientated in a way that information shared there is shared with not just the people one knows, but also people they do not know (Majchrzak, et al., 2013). This allows information to reach the general Filipino public with the comments section facilitating discussion between these people. Thus, social media may be a venue to search for information where the

comments section comes as a social experience in which opinions and information are freely exchanged and discussion is continually facilitated.

The comments would be chosen on the basis that they contain some opinion about vaccines or Dengvaxia. The "Most Relevant" option for viewing Facebook comments would be used in order to display the comments with the most interactions, such as reacts and replies. There will be a minimum of 30 comments used in the total set of comments for the post, and it will undergo thematic analysis to further organize the comments. It is through identifying social objects, and interpreting the meaning of its representation within the discussion that themes can emerge from the patterns. It is through this that comments will be narrowed down based on the emerging themes, until the overall discussion can be organised, and it will then be used to map the corresponding parts in the social representation theory. The social representation will then be used to analyse the emerging themes based on the organization of thematic analysis.

**Reflexivity.** In order to ensure reflexivity of the research, the methodology will decrease the bias in collection and analysis of data from the researcher. This will be ensured by minimizing the amount of chances the researcher can affect the data or be affected by the data. It can be seen in the determination of data source setting, and how peak moments will be determined through a cross reference of news timeline, google trend search, and amount of comments to depict a moment of maximum relevant discussion. It is through multiple ways of determining key moments of discussion that it can allow a researcher to accurately depict the data source.

Furthermore, in the selection of comments, all comments in the vaccine related post will be organised through thematic analysis. This limits the researcher by ensuring that relevant themes will be gathered from all the data, compared to randomly selecting comments

based on the perceived value of the researcher. In the process of thematic analysis, to ensure there is no bias in determining emerging themes and patterns, there will be three researchers that will organise separately then discuss the relevant themes found in the selection of comments for data analysis. The data analysis will then follow the framework of social representation theory, and this decreases bias as there is a foundation for the researcher in how it should be analysed based on the progression of social representation theory.

Moreover, the possibility of the researcher being affected by the subject of study can be negligible as the collection of data sources will be from online social media platforms. Thus, it can be said that there is a distance from the researcher and subject of study, this allowing possibly for a natural observation of discussion with minimal amount of interaction that could cause a bias in the study.

**Validity.** The methodology of using the social representation theory is fitting in answering the research question as it is about answering what are the shifts in the collective representations of vaccines. This theory is suitable as the phenomenon in question is innately social, and is about the change of collective perceptions that can possibly influence behavior, resulting in vaccine hesitancy.

The use of online discourse has been seen to be a valuable source of data in terms of realistic discussion in previous psychological research (Jowett, 2015). Therefore, it can serve as a reflection of the dialogue which yields social representation formation. By taking comments, then organizing them into common themes, the main ideas of the discussion can be ascertained. Thus, social representation can be illustrated.

The method of using timelines based on the news, google trends, and amount of comments is a suitable approach in tracing the process of social representation formation.

Therefore, this study finds it appropriate as it is focused on the shift of perceptions in moments of maximum discussion.

**Data Collection Procedures**

This study would use social media as a source of data for the social representation of vaccines. In this study, social media serves as a valuable source of information as in the Philippines, the country ranks at the top for time spent on social media worldwide (We are Social & Hootsuite, 2018). Moreover, social media penetration in the country according to its population sits at 63%. Especially with regards to health, the high penetration rate of the social media platform allows health information to spread to people of different socioeconomic status and health conditions (Liu, Lu, & Wang, 2016). This shows that social media can be a fruitful field for the generation of data for this study using the representation of vaccines of the general online Filipino population.

Given the focus on social media, the study would take Dengvaxia-related posts on the Facebook pages of news platforms as an indication that there were peak moments over the duration of the event that may have resulted in a change in the social representation of vaccines. Facebook was chosen due to the fact that it is the most widely used social media platform in the Philippines (House of IT, 2018). The online news pages on Facebook will be ABS-CBN, GMA, and Inquirer due to their popularity. The Dengvaxia incident caused a massive change in the perceptions of vaccines and showed that events such as these are crucial to the shift in social representations. These crucial incidents, termed as peak moments, would be identified as events that gave rise to significant online discussion. In order to identify these peak moments, Google Trends will first be viewed to identify time frames during which internet searches of the keyword “Dengvaxia” peaked. Events which occurred around the time of the spike in internet searches may be taken as possible peak moments.This

is done in order to ascertain periods in which interest in the pivotal event peaked. Following this, the time frames would be matched to timelines following the pivotal event that can already found on news platforms. A timeline of events concerning the dengvaxia incident will be formed in order to reference it with peak moments of discussion for the dengue vaccine. It will then be mapped in comparison the amount of discussion through comments with the timeline of events, this allows for determination of peak moments. Finally, Facebook posts about the peak moments on the respective Facebook pages of the news platforms will be viewed and scanned for data.

In particular, the comments on the posts about these peak moments will be taken as data. Provided that the Facebook post has at least 100 comments, it will be considered as valid in facilitating significant discussion. This would be useful as it was found that measuring comments can serve to predict the popularity of an online article (Tatar, et al., 2011). Thus for this study, the number of comments would serve as an indicator that something crucial happened which stirred the general online Filipino public to attention and leading to discussion.

Upon identifying these peak moments, the researchers would thus collect the exchange of opinions and information on the comments section to see how the general online Filipino public reached their collective representation of vaccines. As previously stated, known political figures and people who comment and identify themselves as medical experts would be removed from the pool of comments collected. This would be useful as with the prevalence of online knowledge sharing, citizens would tend towards looking for shared knowledge and also co-constructing knowledge in online communities instead of relying on medical experts and others to do this for them (Hara & Sanfilippo, 2016). Comments taken would be chosen based on the following criteria: first, needing to have some opinion on

vaccines or Dengvaxia. Thus, by gathering social media comments on vaccine-related news links, the researchers would be able to determine the flow of information and opinions during peak moments that shape the general online Filipino people's social representation of vaccines.

**Ethical Protocol.** In the process of establishing ethical treatment for the participants, even in the context of online social media data gathering, there is a need for procedures that ensure there is no misuse of subject or possible harm towards them.

As the study is specific in using a social media platform, it is relevant that in collecting data there should be an understanding of the term and conditions of the platform. It will allow basis for how data can be gathered within the parameters facebook, and how third party are limited in accessing public data in the platform. Furthermore, there is a need of approval of guidelines by an ethical research board acknowledged by the University, in order to ensure there is a consensus that the approach in data collecting is considered as harmless and ethical towards the subjects.

There is a need for an equivalent of informed consent towards subjects, and this can be based on the process of identifying public and private data sources. Therefore this would mean the subject is aware to an extent that they can be observed by a third party, and that the subject has allowed their social media data to be public. Thus closed groups or people with private security settings in their posts cannot be considered to be possible data sources.

With regards to data privacy, the names of the commenters as well as the people tagged in these comments would not be published so as not to infringe on their privacy. There will be a use of codes in identifying subjects, this will allow a seperate sheet for the identity of the data sources, which prevents any possible tracking through the published work.

Moreover, to ensure confidentiality, the information gathered after data collection will be deleted in the following months to prevent a way of tracking subjects from the data sources. In order to further prevent any harm to the participants, there will be a use of paraphrasing in regards to the discussion of subjects as the data is public and can be easily searched for.

It is then based on ensuring to an extent the informed consent, anonymity, confidentiality, and preventing any harm towards subjects that it can allow for an ethical treatment of the participants. Thus, it is through these procedures that it will prevent ethical concernings towards the methodology of the research.

**Data Analysis Procedures**

The study will utilize Social Representation Theory to build a timeline of how the social representation of vaccines changed as time passed, with respect to the aforementioned peak moments in the representation of vaccines on social media. As vaccines have become an unfamiliar or threatening phenomenon as seen in the rise of vaccine hesitancy in the Philippines following the Dengvaxia incident (Fatima & Syed, 2018), it has been seen as appropriate to view the understanding of vaccines as it is constructed on a social level. Social Representation Theory, which postulates that meanings are constructed on a collective level (Wagner, et al., 1999), would be appropriate to analyze how the interpretations of vaccines have changed as a result of social elements.

Together with behavior, the most important factor in the formation of a social representation is the discussion about the phenomenon in question; as the social object begins to be understood, conversation between people builds the social representation gradually (Wagner, et al., 1999). Online discussion has emerged as a relatively new phenomenon, currently peaking in the current era of social media; in the field of psychological research, internet discourse can be observed as a “naturalistic” form of conversation (Jowett, 2015). As

a public and relatively uninhibited form of dialogue, online discussion would exhibit the perceptions and understanding of the people about vaccines, as well as how they have been coming to terms with the unfamiliarity of vaccines as social objects, without subjecting the data to observer effect. Therefore, the Facebook comments sections of news articles may be taken as discussion contributing to the establishment of the social representation of vaccines.

All the comments chosen will first and foremost have something to do with vaccines or Dengvaxia; the reason for this is that the social object must be consistent across all the data points. This is paramount in interpreting the data as one conversation; they must be talking about the same thing. In viewing comments, the goal would be to capture the discussion that results in the formation of the social representation. The comments would be subjected to thematic analysis in order to identify commonalities in the perceptions of the people engaging in the discussion. The comments will then be organized in terms of common themes; these common themes found in the comments are the points of discussion that illustrate the social representation of vaccines at each peak moment as people undergo the process of symbolic coping, which the aforementioned process of making sense of unfamiliar phenomena which leads to social representation formation. These common themes will be taken and assessed in terms of what stage of symbolic coping they are in, namely viewing an unfamiliar or threatening phenomenon, anchoring, discussion, objectification, and familiarity. With each peak moment, a micro social representation will be illustrated. After doing so, one timeline per news platform may be created showing an overall shift in the macro social representation of vaccines as a result of the Dengvaxia incident and subsequent peak moments. Timelines of each news platform will be compared in order to view consistencies and differences in the macro social representations that occur in the settings of their posts. At the end of the

comparison, the social representations of vaccines will be evaluated in terms of its possible effects on vaccine hesitancy, based on the timelines formed.

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**Appendix**

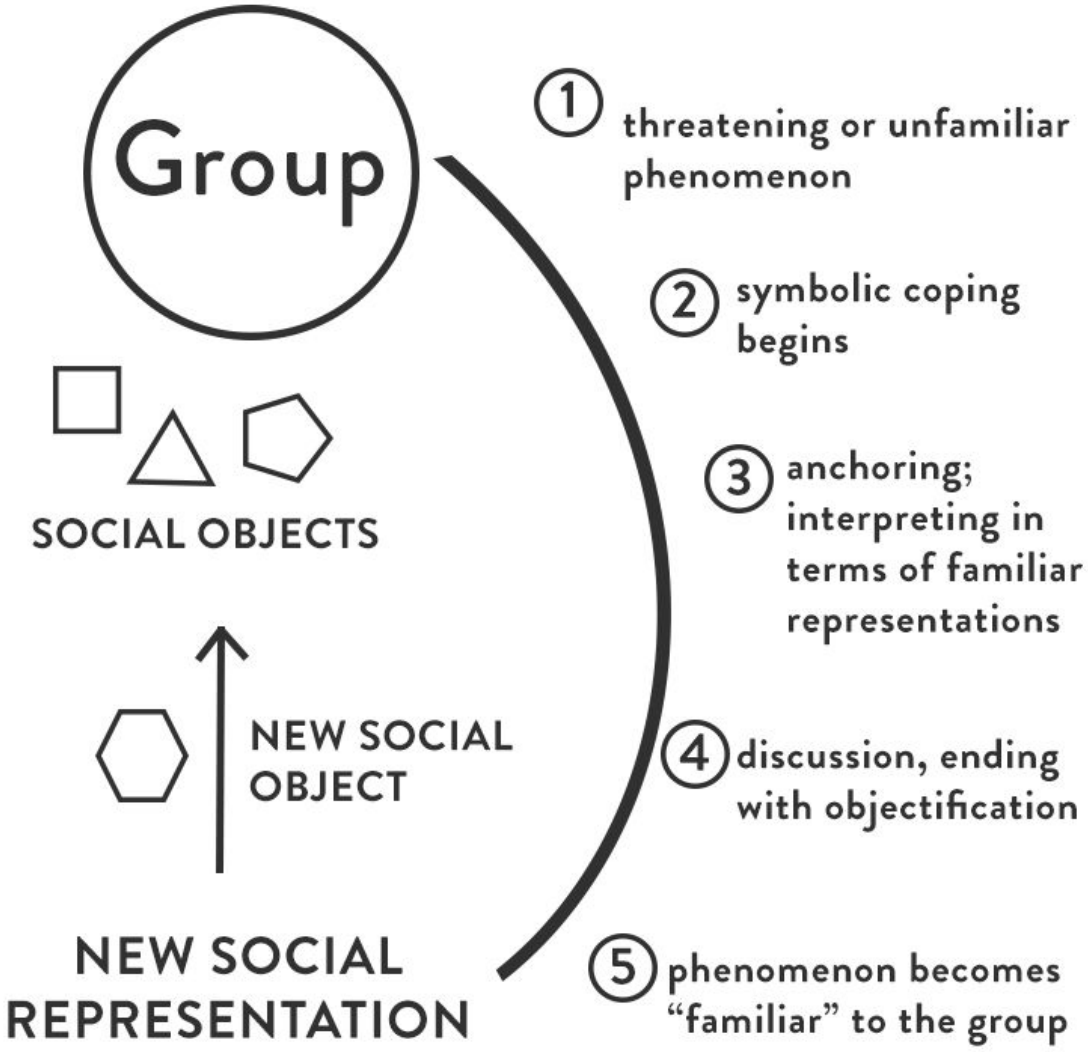


*Figure 1.* Social Representation Formation

Adapted from Wagner, W., Duveen, G., Farr, R., Jovchelovitch, S., Lorenzi-Cioldi, F., Marková, I., & Rose, D. (1999). Theory and Method of Social Representations. *Asian Journal Of Social Psychology, 2*(1), 95-125. doi: 10.1111/1467-839x.00028