Influence of the Internet on children’s vaccination:
Applying intercultural theories to analyze parental decision-making

By

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A Thesis Submitted to the Faculty of Social and Applied Sciences
in Partial Fulfilment of the Requirements for the Degree of

Master of Arts in Professional Communication

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August 2016

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Abstract

Immunization is one of the greatest medical breakthroughs of modern history, reducing dozens of deadly diseases to preventable ones – even eradicating some entirely - yet parents are choosing to forgo vaccination for their children. Many of these parents are educated and affluent, with timely access to information on immunization's risks and benefits. How they use this information – to inform decision making on vaccination – is the subject of this research. Data for this study was gathered through semi-structured interviews with a small sample of six parents who researched vaccination on the Internet. Transcriptions were coded using discourse analysis and analysis applied Gudykunst’s theory of anxiety uncertainty management. Research reveals parents seek information to support preconceived bias toward vaccination as well as reduce anxiety and uncertainty on decision making. This research adds to the understanding of how online information influences parental decision-making in regards to immunization of their children.

*Keywords*: immunization, influence, internet, intercultural communication, discourse analysis, decision making
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Influence of the Internet on children’s vaccination: Applying intercultural theories to analyze parental decision-making

Unvaccinated or under-vaccinated populations still exist even after immunization has saved more lives in the last half-century than any other medical advancement, according to the Public Health Agency of Canada (B.C. Centre for Disease Control, 2014). Media and scholarly reports tell stories of outbreaks of measles at Disneyland (Serna, 2015); clusters of whooping cough in the Fraser Valley in British Columbia, Canada (Alphonso, 2012); and mumps in New York (Barskey et al., 2012) – all of which can be traced back to unvaccinated or under-vaccinated populations. Parents no longer accept vaccination for their children without question; rather they are taking the initiative to research and understand the risks inherent in vaccination, often through channels that do not involve their health-care provider but involve the Internet, social media and networks of friends and relatives (Austvoll-Dahlgren & Helseth, 2010; Kata, 2012). With prevalent access to information on the Internet regarding childhood vaccination, how does the World Wide Web influence parents’ decisions to vaccinate their children?

Information on the Internet is constantly changing and updating, providing patients with access to the most timely research results available compared to printed brochures or encyclopedia. Health authorities are investing in online publications. Unfortunately, inaccurate information is just as accessible. While up to 72 per cent of U.S. citizens trust health information they find on the Internet, just 25 per cent of consumers evaluate the source and status of that information (Betsch, et al., 2012). Easy access to inaccurate information raises questions about how parents are able to critically evaluate and incorporate that information in their decision-making process whether to vaccinate their children. Scholarship asking parents how they use the
information they find on the Internet to inform their opinions and decisions whether to vaccinate their children is scarce. This qualitative analysis of interviews with parents aims to answer the question: how do parents use information they gather from the Internet to inform their opinions and decisions whether to vaccinate their children?

For many parents, their decision to vaccinate their children is an evolving process (Glanz et al., 2013). Vaccination, or immunization, provides protection by introducing a small amount of the disease into the body, which responds by creating antibodies that destroy the disease and provide ongoing immunity (B.C. Centre for Disease Control, 2014). The factors having influence on parents’ decisions are often complex and inter-related (Dube et al., 2015). Some parents think of the public health service that vaccines provide by creating herd immunity, in which vaccinated populations reduce the spread of disease and protect those who cannot be vaccinated from infection (B.C. Centre for Disease Control, 2014); other parents simply factor the effect on their own children (Dube et al., 2013; Saada, Lieu, Morain, Zikmund-Fisher & Wittenberg, 2015). Social networks, defined as those found on the Internet and social media, to stories and experiences from families and friends influence parents’ decisions (McMurray et al., 2004, Yaqub, Castle-Clark, Seredalis & Chataway, 2014). Despite distrust of the institutions for which health-care providers work, such as government and pharmaceutical companies, doctors and nurses still hold sway in health care decisions for parents and children (Glanz et al., 2013; McMurray et al., 2004; Saada et al., 2015). But that influence is eroding as patients embrace their role as post-modern patients, defined as more involved in their own health-care decisions and those of their children, using alternative sources of information, such as that found on the
Internet, and relying on social networks to inform their health-care choices (Kata, 2012; Yaqub et al., 2014).

Previous scholarship documented a variety of experiences, beliefs and opinions among parents regarding vaccination for their children (Dube et al., 2015; Saada et al., 2014). Informing these decisions are health-care providers, family and social networks, including the Internet and social media (Austvoll-Dahlgren & Helseth, 2010; Kata, 2012; McMurray et al., 2004; Yaqub et al., 2014). Parents believe vaccination is important to build up immune resistance to disease and trust their health-care provider to make the best recommendations for their children (Dube et al., 2015). However, they also question the partiality of doctors and nurses to provide unbiased information on the safety and efficacy of vaccines (McMurray et al., 2004). Some parents believe in the social good through herd immunity that fully vaccinated populations provide (Saada et al., 2014), while others consider the issue based solely on the effect on their own children (Dube et al., 2015). Parents also second-guess their decision, if they vaccinated or chose not to (Dube et al., 2015). All of these factors are then synthesized into a decision by parents whether to vaccinate their children.

**Literature review**

The reasons why parents turn to the Internet is well documented (Babaoff & D’Auria, 2015; Sobo, Huhn, Sannwald & Thurman, 2016; Walsh, Hamilton, White & Hyde, 2015). Influenced by experiences in the family and social networks, and wary of the authenticity of information provided by health-care practitioners and pharmaceutical companies, parents are turning to the Internet to help inform their choices. But with the volume of information on the Internet, how parents use the information they find is open for discussion. Babaoff and D’Auria
(2015) note that parents with legitimate concerns around vaccination are challenged to
differentiate between science and anecdote, right and wrong, and the various “experts” on all
sides of the debate. Sobo et al. (2016) found that parents were aware of these biases and sought
to remedy it by collecting multiple viewpoints to, combined with their own experiences, help
formulate some sort of well-rounded opinion. Parents believe that studies on the Internet are up
to date, easy to access and carry the ability to review sources (Walsh, et al., 2015). The
researchers also note that parents were often overwhelmed by the volume of information on the
Internet as well as the lack of resources to answer questions about whether any of that
information is legitimate (Walsh, et al., 2015). Shoup and colleagues (2015) were tasked with
designing a social media-based tool to help inform parents about vaccination. During focus
groups and interviews, parents revealed they wanted information describing the risks and
benefits of vaccination, transparency of information, and ethnic and racial diversity. Parents are
quite clear when discussing with researchers and health-care providers what pieces of
information they are searching for when informing themselves on childhood vaccinations.
Studies have mainly focused on whether parents use the Internet for vaccination research, which
they do for multiple health-care issues, and why they do so. A gap in the research exists on how
online information is used to make a decision on childhood immunization.

The documentation of parent responses to immunization has been organized by
researchers into a spectrum of vaccine acceptance to refusal (Dube et al., 2015; McMurray et al.,
2004; Yaqub et al., 2014). When placing parents’ experiences on the spectrum of vaccine
acceptance to refusal, researchers often choose three categories when discussing parents’
attitudes toward vaccination: vaccine-favourable, vaccine-refusal and vaccine-hesitant (Dube et
al., 2015; Glanz et al., 2013; McMurray et al., 2004). Like the labels imply, favorable parents readily follow the recommended dosing schedule, while refusers reject any vaccination attempt on their children. Refusing parents, however, do not take their decision lightly and as Dube et al. (2015) found, mothers who refused vaccines were not thoughtless, irrational or lacking in knowledge. Like vaccine-favourable parents, refusing parents were confident that their decisions were in the best interest of the child. Vaccine-hesitant parents are more complex and range from accepting all vaccinations with questions to refusing one or more vaccines. Their decision making was an evolving process, which could change to refusal at any moment (Dube et al., 2015; Glanz et al., 2013). These three categories were consistent throughout much of the literature surveyed (Dube et al., 2015; Glanz et al., 2013; McMurray et al., 2004).

The literature shows that social networks, like those found on social media, as well as friends and family, have a strong influence on parents’ decision to vaccinate their children. Influence here is defined as the factors which parents draw upon, such as opinions told to them through social networks, information and direction given by health-care providers, and information that comes to them through media, such as newspapers, social media platforms and television. Yaqub et al.’s (2014) research found that friends, family and colleagues appeared often among the reasons for vaccination, likely due to their perceived trustworthiness – more so than institutions such as government, health authorities or pharmaceutical corporations. Rather than focus solely on science, parents attach significance to anecdotes and life events from their social networks and incorporate family history, religion and their child’s maturity, allergies and sleep patterns into decision making (Yaqub et al., 2014). McMurray et al. (2004) found this with parents who were vaccine-hesitant or refused vaccine altogether because they had seen children
with autism through family, friends and work and perceived this disability as far worse than measles, mumps or rubella. However, those anecdotal stories worked the opposite way as well, as parents who had seen the effects of measles, mumps and rubella from their social networks were more likely to vaccinate (McMurray et al., 2004) to avoid the risk of their children contracting these diseases. These positive and negative discussions and conversations with friends and family are enough to sway vaccine-hesitant parents either way (Dube et al., 2015), showing how much of an impact social networks can have on decision making. Decision making is an attempt to understand, recognize or make sense of the situation (Lipshitz & Strauss, 1997). In this process, parents uncertain about vaccination for their children will seek out communication on information through their social networks, health-care providers and the Internet, in a type of cybernetic network in which positive and negative information is fed back to parents, who in turn feel the need to acquire yet more information.

Anecdotal stories are what parents often hear from their social networks and research shows that although narrative stories of first- and third-person accounts are a significant influence on decision making, it is not always with the most sought-after outcome. Winterbottom, Bekker, Conner and Mooney (2008) concluded that narrative information does affect an individual’s decision-making process and outcome, in health-care and other decisions, although it is unclear what part of the process is affected. Often, narrative stories increase the perceived risk of adverse events, particularly if the information is vivid and the message and/or messenger is credible (Winterbottom et al., 2008). Betsch et al. (2012) found that the greater number of narratives people read the higher the perception of risk was. Because of this, health-care providers are hesitant to include narrative stories in their advice to parents. Unfortunately,
online debates about vaccination are filled with personal, anecdotal stories of patients and parents who vividly describe the perceived adverse effects of vaccination. These narrative and anecdotal stories pose a significant influence on parental choice on childhood vaccination.

Another major area of influence on parental decision making in vaccination is health-care providers. Although parents have varying levels of trust in their health-care providers, doctors and nurses are still sought out for advice on vaccination (Dube et al., 2015; Glanz et al., 2013; Saada et al., 2015). One of the main predictors of acceptance for vaccines is a recommendation from a health-care professional (Dube et al., 2015). Glanz et al. (2013) found clear distinctions in trust among patients and physicians, with parents trusting advice from their doctor overall, but doubting the reliability and knowledge of their physician when it comes to vaccines. Vaccine-favourable parents saw their physician as trustworthy, respectful and expressed confidence in them (Saada et al., 2015). However, vaccine-hesitant or refuser parents reported feeling judged, pressured or bullied by their pediatrician (Saada et al., 2015). Information provided by physicians was further diminished in value if the doctor was condescending or dismissive of attempts by parents to discuss the benefits and risks of vaccination (McMurray et al., 2004). Despite these doubts or concerns about the advice from their doctors and nurses, vaccine-hesitant parents have reluctantly vaccinated their children due to pressure from health-care providers (Dube et al., 2015). Although parents have a high level of trust in their health-care providers, and rely on doctors and nurses to be a major source of information on vaccines for parents, the influence of health-care providers is eroded when they fail to engage in discussion with parents over vaccine efficacy.
When parents feel health-care providers lack impartiality when advising on vaccination, they seek out avenues to value-free, or non-biased, information. Dube et al. (2015) found that not only was public health and governmental information perceived as too favourable, but information from anti-vaccination groups was also seen as too critical. Mothers reported turning to complementary or alternative medicine (CAM) to provide context because these practitioners were seen as having nothing to gain from discussing vaccinations (Dube et al., 2015). They did note, however, that many quantitative studies linked CAM use and non-vaccination. Parents in McMurray et al.'s (2004) study indicated they wanted more balanced information, suggesting a third party provide information to parents and let them decide on their own time. Where the information is coming from influences how parents trust its authenticity, as Yaqub et al. (2014) found that distrust of doctors, government and pharmaceutical companies was a reason for vaccine-hesitancy. They also note this critical thinking around influence helps explain why vaccine-hesitant attitudes are often found in well-educated people. While parents value the input and knowledge from health-care providers, they still want information free of health authority and government bias and to find this, they often turn to the Internet, an online network that provides easy access to information from multiple sources.

In previous studies, parents described navigating a plethora of beliefs, practices, ideas and values widely shared among the health-care community, including health-care providers, websites, public health authorities, media and their social networks (Babaoff & D’Auria, 2015; Walsh et al., 2015; Yaqub et al., 2014). Practices, ideas, beliefs and values are what constitutes a culture (Ulrey & Amason, 2001). The common system of encoding and decoding of messages, verbal and non-verbal behaviour, and expressing and interpreting messages are all part of
communication among a culture (Ulrey & Amason, 2001). In a sense, when parents delve into research into vaccination they are attempting to navigate a foreign culture, which brings with it the increase in anxiety and uncertainty (Gudykunst, 2005) – often because they do not understand the language or cultural norms. Parents struggle to understand the difference between scientific fact and opinion (Babaoff & D’Auria, 2015); whether information is legitimate (Walsh et al., 2015); and who to trust among governments, pharmaceutical corporations and health-care providers (Yaqub et al., 2014). As such, an intercultural communication theory could be employed to explain the motivation and behaviour of parents, as well as the challenges they face, when searching for vaccination information on the Internet. Ulrey and Amason (2011) showed that stress and anxiety of health-care providers is linked to intercultural communication with their patients and that the stress and anxiety can be reduced if health-care providers are more culturally sensitive to their patients. Applying Gudykunst’s (2005) theory of anxiety uncertainty management, which suggests that successful intercultural communication relies on the ability of the person navigating the new culture to keep anxiety and uncertainty within thresholds that allow for mindfulness, to the experiences of parents searching the Internet for vaccination information would suggest how successfully parents are navigating this information culture.

An emerging yet potentially significant impact on what influences parents Internet search for immunization is what researchers are calling a “filter bubble.” Every time someone conducts a search on the Internet it leaves a digital trail that reveals information on the person’s politics, level of education, dietary preferences and more (Pariser, 2011). Companies use this information to design advertising that appeals directly to each person’s interests, based on their search history, which in turn changes the way people experience and search the web. This filter
bubble alters the answers people receive when they ask questions on the World Wide Web as their previous interests are sent back to them in search-engine returns. Systems like these traps users in an unchanging environment, reducing creativity and learning ability, and strengthening beliefs (Nguyen, Hui, Harper, Terveen & Konstan, 2014). While a filter bubble has the ability to narrow information choices for parents, an overload of information, what Clay Shirky (2008) calls a “filter failure,” can also be an influence. A filter failure suggests not that too much information is available, but rather the strategies for deciding which information is relevant have not evolved. General media filters and disseminates scientific and non-scientific information in equal measure; high-quality, evidence-based information competes against lower-quality information, making identification of useful resources challenging (Klerings, Weinhandl & Thaler, 2015). The filter bubble then feeds into this, returning search results based on the searcher’s previous interests and search topics. Parents might think an Internet search is a neutral access point returning value-free information, but filter bubbles and filter failures indicate that might be an incorrect assumption.

Much of the research on what parents search on the Internet in regards to vaccination focuses on the content found at websites hosting vaccination information, but little in the way of how parents synthesize that information and its effect on their decision-making process. Kata (2010) documented the strategies employed by websites advocating against vaccination, and in a follow-up study (2012) documented search results for key terms such as “vaccine” and “immunization” and evaluated the proportion of anti-vaccination sites as well as the claims made. In neither study, however, were parents asked what, if any, of these websites provided the information they used in decision making. Austvoll-Dahlgren and Helseth (2010) acknowledged
the vast amount of information on the Internet available to parents, and parents’ frustration at the jargon and technical language included in many of the sites, but not how that information informed their decision, if at all. The literature shows that parents read anecdotal stories and emotion-based information; that they attempt to find scientific studies; that they are aware of potential bias from corporations, government or health-care providers financially supporting vaccination research. This study aims to build on current research into vaccination information on the Internet and provide insight into how parents utilize information they find on the Internet to inform their decision whether to vaccinate their children.

**Data collection**

The primary aim of the research was to generate data that gave insight into people’s experiences and understand the decision-making process, so semi-structured interviews were used. The study focused on the experiences of select, individual parents, their choices, influences and decisions, rather than parent populations as a whole. A group format, while allowing for a greater range of experience among participants, was too public a venue for parents to discuss such personal issues (DiCocco-Bloom & Crabtree, 2006), which was why one-on-one interviews were scheduled. The semi-structured interviews were conducted in January 2016 over the phone and/or in person, and recorded for accuracy and review. The duration of each interview ranged from 20 minutes to 40 minutes (See Appendix A).

As my primary aim was to gather insight, I chose a small sample of six parents to interview. Although Crouch and MacKenzie (2006) argue that just one subject can yield significant insights in a research project, I initially chose six due to the time and resources I had available. The researchers also argue that it is more important for research to be intensive and
persuasive than extensive and convincing through enumeration, adding that a small number of respondents is a way in which analytic and inductive studies are best done. Support for a small sample size with rigorous investigation also comes from Marshall (1996), who said that the appropriate sample size is one that adequately answers the research question, adding that the sample size will become obvious as the study progresses and can be adjusted by initially using a flexible, pragmatic approach. As my research progressed, I started to notice themes emerging after the third and fourth interviews, so that by the time I completed the fifth and sixth, it was clear that this snapshot of mothers’ experiences was not going to produce additional insight, which Marshall, Cardon, Poddar and Fontenot (2013) argue is the point at which too many interviews start to become counterproductive. Because of this, I decided my sample of six mothers was sufficient to answer my research question.

The subjects for this study were gathered through chain-referral sampling, or snowballing, defined by Cohen and Arieli (2011) as “… a technique for finding research subjects where one subject gives the researcher the name of another, who in turn provides the name of a third and so on” (p. 424). Snowballing is an effective method to gather subjects, particularly in conflict environments, hidden or inaccessible populations, all of which could apply to potential subjects who were vaccine-hesitant or refused vaccination outright. Included among the six parents were those who made a decision on vaccination and used the Internet to inform that choice.

Sixteen questions were drafted based on a naturalistic decision-making framework that outlined the basic steps an individual would commonly use to formulate a decision based on a variety of options. Lipshitz and Strauss (1997) say the decision-making process begins with an
attempt to understand, recognize or make sense of the situation. If the person is able, he or she
settles on an option and mentally simulates that option to evaluate its probability. If the person
cannot make sense, he or she will try to reduce or forestall the decision by seeking additional
information. If additional information is not forthcoming, the person moves to assumption-based
reasoning to formulate two or more secondary options. The person then weighs the benefits and
drawbacks of each. If the person is still unable to make a decision, he or she will suppress,
forestall or generate an alternative to the original options presented. The questions were ordered
so that they followed this naturalistic decision-making process.

In this study, discourse analysis was used as part of the methodology in data gathering.
In health care, discourse analysis has the potential to reveal valuable insights into social and
political contexts by delving below the surface of text and talk to consider meaning produced by
the subject (Lupton, 1992). The interviews were uploaded and transcribed by the researcher
using the subjects’ answers and significant pauses. Non-verbal cues and noises were not included
as per accepted denaturized transcription process. Several copies of each interview transcription
were printed and then coded for discourse analysis based on Fairclough’s framework (Jorgensen
& Philips, 2002). Fairclough’s (1996) framework for discourse analysis was chosen because
social structures, based on the review of vaccination literature, are major influences on parental
decision making. Fairclough argues that texts cannot be understood in isolation and because of
this, his framework for discourse analysis incorporates social structures. It was crucial to have a
mechanism within the discourse analysis framework to capture the influence of the parents’
social networks if the interviews revealed it to be significant to their decision-making process.
Placing the texts within the broader social structures and networks of society was why Fairclough’s framework was chosen.

Fairclough’s framework breaks discourse analysis into three parts: discursive practice, text, and social practice. Discursive practice includes outside influences, such as partners, parents, siblings, friends, colleagues, peers and health-care providers, as well as other discourses, such as pamphlets, books, websites, social media, newspapers, television, celebrity and education. Each of these categories was given its own colour code, save for colleagues and peers, which were grouped together, as were pamphlets, books and newspapers grouped as printed materials. The second coding involved text, which coded for ethos, such as identity, responsibility and anxiety; metaphors, such as choice and outcomes; wording, which considered parents’ word choice being emotional or scientific; and finally grammar, which included transivity and modality. Transivity refers to the passivity of statements and how they are connected to a subject. For example, ‘50 nurses were laid off’ is passive compared to ‘Hospital administration laid off 50 nurses,’ which attaches the action to a subject. Similarly, modality refers to ownership of a statement by the person speaking. For example, ‘it is cold’ is more authoritative than ‘I think it is cold.’ The final coding involved social practice and specifically coded for statements that maintained social order, such as concepts of herd immunity, greater good, protecting vulnerable populations, and following instructions. Conversely, coding was also done for concepts that upended the social order, such as references to individuality, independent research, sourcing and funding. This framework was used to analyze each interview transcript.

Each text was reviewed at least four times, using the colour scheme to code for each category as outlined in the framework. The colour coding highlighted high volumes of influence
but I was careful not to discount the impact of other significant influences that were in smaller
volume than others. Notes were kept as themes emerged, which I continued to review of each
text to find similar instances. From this inductive process, common themes emerged.

**Ethical protocols and approval**

To mitigate the potential risks, interview subjects were informed of the focus of the research and its purpose and asked to sign a consent form indicating they understood the scope of the project (See Appendix B). Included on the form were standard ethical guidelines, which outlined that subjects’ identities will be kept confidential and their answers non-identifiable, and that they could withdraw from the study at any time without giving a reason and that their data would be destroyed. Subjects’ personal information was stored as per the Canadian Panel on Research Ethics guidelines for privacy and confidentiality (Government of Canada, 2010), which included data consisting of sound files, transcriptions and consent forms stored on the researcher’s password-protected computer with back-up copies on a flash drive in the researcher’s home office. Data will be kept on file for two years in the unlikely event of challenges to validity. Ethical approval was granted by the Ethics Review Board at Royal Roads University.

**Findings**

The six chosen subjects were all female, ranging in age from early 30s to mid-40s, and came from similar socio-economic backgrounds. All had high levels of literacy, with high-school diplomas and at least some college-level education. Their professional experiences ranged from consultant to educator and business owner. Diversity was found in marital status, as three subjects were married, two were in common-law relationships and the sixth was separated.
Household income was at least $100,000 annually. Children ranged in age from toddlers to teenagers. Four mothers were vaccine acceptors and chose the full traditional vaccination schedule, one was vaccine-hesitant and delayed vaccination and the sixth would be considered a vaccine-refuser for choosing a homeopathic vaccination option rather than the traditional schedule.

Analysis of the data gathered from parental interviews revealed four major ways in which these parents use information gathered on the Internet to inform their decisions whether to vaccinate their children. Often parents in this study are seeking information to validate their own biases; to validate sources by researching anecdotal stories told to them by friends, family, coworkers or the media; to reduce anxiety; and to manage uncertainty by exploring alternate views and questioning authority. These four themes are presented in detail below.

**Bias validation**

Bond, Carlson, Meloy, Russo and Tanner’s (2005) research into decision making holds that in the process of evaluating a single option, which most parents saw as a choice to vaccinate or not, individuals maintain coherence to their initial evaluation by biasing their interpretation of new information. Although parents in this study sought information from all sides regarding vaccination, most admitted beginning their search with a clear bias and none changed from that initial decision. These six parents described that when coming up against information that opposed their views, they sought more information until they were satisfied the opposing view was not relevant. This behaviour shows that “information supporting a desired conclusion is absorbed non-critically while opposing information is treated with ‘motivated skepticism’” (Bond et al., 2005, p. 3). Although the parents in this study described evaluating and researching
both sides, they often continued their research when faced with information that did not align with their initial views. One parent said, “When I came across anti-vaccination studies, I tried to look at scientific reasoning and digging into those points. My instinct was to read more, like ‘prove it to me’.”

The same pattern was documented with the parents in this study who were searching for a non-traditional alternative to vaccines. In this case, parents began researching through a search portal specifically looking for alternatives to traditional vaccination and sought information that supported a ‘natural’ or ‘different choice’ than the medical system recommends. One parent stated, “I didn’t feel like the medical professionals would tell me anything other than what they wanted me to do, which was vaccinate traditionally.” The parent found information that supported that homeopathic vaccination was an effective alternative to traditional vaccination. This was what the parent went to the Internet intending to find and she searched until she found the desired result.

Both of these themes have the potential to be influenced by the filter bubbles and the filter failure mentioned in the literature review. A parent searching for non-traditional immunization options might find more information than other parents simply because her previous search history indicates it as a topic that already interests her. Although parents see search portals as neutral ground among health-care providers, social networks and the media, they might not be; these recommender systems have the potential to exert a greater influence on users’ choices than peers and experts (Nguyen, Hui, Harper, Terveen & Konstan, 2014). In addition, recommender systems expose users to narrower content over time (Nguyen et al., 2014) and that content is not differentiated in quality (Klerings, Weinhandl & Thaler, 2015). Although
parents sought information that supported their initial bias, their previous search history might influence the material returned to them and reflect their previous choices in search results.

Parents also described faith in the medical system and the efficacy of vaccines as part of their initial evaluation and that did not change after doing Internet research. The parents studied said despite looking specifically for anti-vaccination studies, nothing they found was enough to sway their initial opinion. Parents searched the Internet to gather studies that supported their belief that vaccination was effective and safe, describing their research as a ‘secondary source’ of information. For example, one parent states:

I look at vaccinations kind of like having home insurance – you’re probably not going to need it but if you need it, it can be really important to have. I don’t think that I ever felt really strongly about not vaccinating.

Another parent supports this as well:

I just assumed that vaccinations and vaccinating your child was something that you did. I assumed it was something everybody did and everybody should do. The information on [Health Canada website] obviously supported my initial thoughts that you should get vaccinated.

After researching alternative information to their initial feelings – which all parents in this study did – all six mothers were unable to find information from the Internet that was persuasive enough to abandon their initial evaluation of vaccination.

**Source validation**

The parents interviewed said they often turn to the Internet to search for scientific studies to evaluate the validity of anecdotal stories told to them through their social networks.
The parents in this study said their goal with Internet research was to find sources that would provide evidence-based information on the benefits and risks of vaccination. Parents were not searching for more emotional stories based on experience, but rather unbiased sources of information that would present fact over anecdotes. A parent states:

I wasn’t affected by anything anecdotal. I was more concerned with numbers, statistics, direct comparisons and checking sources. Who did what, how old was the research? Was it really apples to apples? Who funded it? I was looking for credentials, organizations.

The professionalism of a website attracted parents. When searching, they looked for things like professional design, trust seals and recognizable organizations, like Health Canada or the World Health Organization. Parents avoided websites that looked ‘bloggish,’ or were filled with spelling mistakes and anecdotal stories. Message forums and blogs were rejected almost outright, with so-called ‘mommy blogs’ not only rejected but also held with contempt.

Professionalism of a website told parents that the information they were viewing was supported by trusted organizations. One parent explained:

The professional website did make a difference. I was turned off by something that looked bloggish. Anything that’s too opinion-based I tried to avoid. I didn’t go to any parent forums or anything like that. I went to places that had done research or were quoting researching or were offering the program and led me to people I could talk to.

Wolfe and Sharp (2005) asked whether parents viewing the plethora of anti-vaccination websites would be able to differentiate between anecdotal stories and scientific studies. My research says these six parents can and do. The mothers who were interviewed said they looked
at the study’s sample size and funding, taking into account possible motives behind support for such research. Pharmaceutical companies were held in the same sphere of trust as bloggers and forums. Parents were concerned about knowing about funding by pharmaceutical companies of scientific vaccination studies, questioning the bias of those organizations and whether the company had competing vaccines for sale. A parent stated: “I wanted to know who was conducting the research. Anyone can write a website or even a survey … but I wanted to know who was funding it and if there were any solutions what they might be.” Parents were also looking for credibility on a website. They preferred sites hosted by medical organizations or mainstream media with sources that were readily accessible and that they could verify with secondary research. They often visited websites that they had previously established as trustworthy, such as news sites like CBC News or the Washington Post, which were often viewed and relied upon for other topics as valid. Parents also felt as though medical and mainstream news sites were held to a higher standard of trust than blogs or parent forums. Parents in this study are aware of the differences between anecdotes and scientific studies, and actively seek the latter. Despite knowing these differences, however, the anecdotal stories still cause parents to question their decision. One parent said:

> When you read stories about children with various ailments extending from certain treatments, or even autism. I know that autism isn’t one of the effects, but when you read all those stories it does have a detrimental, a shaking effect on your conviction.

**Anxiety reduction**

In addition to researching anecdotal stories for some scientific basis in fact, parents in this study are also going to the Internet to help calm their anxiety over the decisions they are
making for their children. Sitting at the computer is a time when parents can gather their thoughts, concerns and fears and set about easing that anxiety by researching trusted sites for information that will support the decision they are leaning toward. More information, however, isn’t always better. Parents in this study described discovering more such anecdotal and even scientific information that went against their initial decision and although they were satisfied with the decision they made – and have happy, healthy children – the additional information did not always soothe the anxiety that parents feel. One parent stated:

I wasn’t aware there were so many vaccinations and they put so many at once in a young little system so I was actually a little bit alarmed after I became more aware of what they were doing. It didn’t change the outcome but I was a little bit more wary.

Parents pointed to contradictions in the information they found on the Internet as a source of anxiety, such as differing guidelines on nutrition and feeding schedules for infants, circumcision and the efficacy of the annual flu shot. A parent said, “It’s probably better to just go for it than not. I had to shut off one part of my brain and say I think this probably is the best decision and we’ll wait and see.” Parents report health-care providers do not always rectify these contradictions, as one parent recounted that her general physician delayed the vaccination schedule for his children and removed the chicken pox vaccine altogether, explaining the virus was causing issues with shingles disease in adults. The contradictions between Internet information and health-care guidelines exacerbate parental anxiety. One parent said, “The people who doubt vaccination and the schedule that B.C. is on I think are easy to find.”

Uncertainty management
The anxiety that parents feel is partially due to the responsibility on their shoulders for their children. Although the mothers in this study might feel strongly the desire to vaccinate, they feel responsibility to seek out and learn about anti-vaccination arguments to assure themselves that they did their due diligence to research alternatives. Parents are looking for new studies and new information that speaks to the continued efficacy and safety of vaccination, as well as alternatives that might be available to them. Depending on each child’s health-care issues, from allergies to compromised immune system, parents are searching for information for their child’s unique needs. Can that child who was born several weeks early be vaccinated on schedule? Is it better to have all vaccines at once or spread them out over a longer period of time? Researching these questions is a way that parents reassure themselves that they are making the best decision possible for their children. One parent stated:

It’s a hard enough decision as a parent because you’re making a decision for another human being who can’t tell you what they think or what they want for themselves. We did our best to research and think about the pros and cons and do what we thought was best for our family.

As post-modern patients with a desire to be involved in all aspects of health-care delivery and decision-making, parents in this study question authority and hold health-care professionals accountable to ensure that parents receive the best, most up-to-date information possible. The mothers described an inherent bias in health-care professionals to push the messaging and the outcomes prescribed by their health authority. Parents in this study described feeling little objectivity coming from the health-care system and as such take it upon themselves to find balance, or at the very least find independent information to support directives from
health-care providers. One parent said, “No disrespect to the folks who work at Island Health, but part of their job is to push vaccination. For us, it was just about making sure we got to make the right choice for our family.”

Parents are provided with official information sheets from public health nurses prior to every round of vaccination and available to answer any questions. While parents appreciate this, they recognize that public health units are run by the health authority, which has a vested interest in having populations vaccinated. Parents use Internet research to counter this, searching for new studies about vaccination targeted to each child’s needs as well as the philosophy of the family. Health-care providers have some influence on where parents start research, for example recommending trusted websites, but all at some point described conducting a general Internet search. Some parents specifically search for vaccine alternatives, knowing that health-care providers in the traditional sense will not condone or advocate for a holistic approach to full vaccination.

**Analysis**

To understand these themes emerging from the results of the interviews, the theory of Anxiety Uncertainty Management (AUM) was employed. Gudykunst (2005) developed his anxiety uncertainty management theory to help explain interaction among strangers from different countries. Anxiety is affective, an emotion, while uncertainty is cognitive (Griffin & McClish, 2011). For example, despite research and understanding of the efficacy, safety and risk to vaccination, parents still feel anxiety over their decisions when they read anecdotal accounts of other families’ negative experiences. Anxiety and uncertainty must fall between upper and lower thresholds of individuals for effective communication to happen – a place Gudykunst
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termed ‘mindfulness.’ Below the threshold for uncertainty, such as too much confidence, and the person has no interest in communication happening. Too much anxiety and the person will focus on the source of that anxiety and avoid it at all costs. Between these extremes falls mindfulness, in which individuals make conscious choices to participate in and accomplish effective communication in new cultures. Becoming more mindful of other cultures helps reduce anxiety and uncertainty among strangers and allows effective communication to happen. A ‘mindless’ individual uses broad categories and stereotypes to predict behaviour, but as mindfulness increases, those categories become more accurate and the individual is open to more information, eventually able to more accurately identify the receiver’s frame of interpretation. The research revealed parents striving to operate in a mindful state, as their due diligence in researching their children’s health choices did not end when the decision was made, but continued as new information, such as new scientific studies, are published. Mindfulness requires the individual to take an active role in their quest for effective communication.

Gudykunst’s (2005) theory was developed and is often used to explain intercultural communication. By applying the theory between the two groups – parents versus the information they gather – it reveals the process of gathering information and the anxiety management, and parents’ attempts to reduce anxiety by increasing mindfulness. AUM’s usage in this context is effective in understanding how parents, as strangers operating in the unfamiliar health-care culture, establishes effective communication with the host group, consisting of the information found on the Internet, their social networks and health-care providers. AUM captures the anxiety and uncertainty expressed by parents, and the mindfulness aspect of the theory provides insight into why parents are using Internet information to reduce anxiety and manage uncertainty. When
people are mindful, they have greater control over their communication behaviours. In a situation like childhood vaccination, where parents are expressing a lack of certainty around decision making and a high amount of anxiety, mindfulness helps parents make sense from the information and choices provided.

Gudykunst used nine themes in his anxiety uncertainty management theory and under these themes were grouped 47 axioms which detail how an individual’s communications needs either increases or decreases his or her anxiety and uncertainty, as well as how individuals can move into mindfulness in these situations. Not all themes and axioms pertain to each instance of communication and this paper focuses on those most relevant to the results presented, including foundational interaction, which establish parents’ self-confidence and identity; motivational interaction, which describes how and why parents choose to interact with the information group; stranger interaction, which helps show how parents manage anxiety and uncertainty to levels which keep mindful communication open; and anxiety uncertainty interaction, which shows how parents navigate and interact with the new culture of vaccine information. This analysis uses a cultural communications theory to help understand how parents use vaccination information they find on the Internet.

**Foundational interaction**

Gudykunst’s (2005) theory begins with our identity of self, and the self-concepts he outlined play a foundational role in how parents manage the uncertainty and anxiety experienced while researching vaccination information. All parents interviewed were well-educated professionals with above-average household incomes; self-esteem is generally high, and personal identity is secure. Gudykunst posits that individuals will try to bolster their self-esteem if either
their personal identities or their social identities are threatened. While parents in this study, for
the most part, were secure in their personal and social identities, some described challenges to
predicting intergroup behaviour, which affected self-esteem and their ability to manage anxiety.

Parents described how information related to vaccination came in through their offline
social networks, from parents, siblings, friends and caregivers and how they were able, or
unable, to predict their own behaviour and the reactions of others. The information offered was
often anecdotal stories about serious illness resulting from vaccination, either from a lack of
immunization or from side effects. For the most part, parents were able to manage the anxiety
and uncertainty arising from those stories by searching for more information to support or refute
those consequences. In one instance, a parent was heavily influenced by their alternative
caregiver, who was ardently anti-vaccination. The caregiver was described as highly respected,
even loved, and the parent described learning of this person’s viewpoint as shaking her beliefs to
her core. With her anxiety elevated, she turned to her partner, whom she described as ‘the
smartest guy in the world,’ and whom she also described as being swayed by the anti-vaccination
rhetoric they were hearing from their social networks. Unable to predict intergroup behaviour,
such as that of her alternative caregiver and her partner, her self-esteem was lowered and she was
unable to manage her anxiety effectively. At this time, she followed her social network and
refused to have her children vaccinated. Later, when her children were in the school system and
vaccination booster shots came up, her anxiety level rose again as she was unable to allow her
children to participate, having not had the initial vaccination in their youth. She predicted that
health services would ‘judge’ or ‘shun’ her when contacted to have her children vaccinated as
teens. That was not the case, in the end – her higher level of anxiety interfered with her ability to
predict the behaviour of health services. To put this in an AUM perspective, the parent was unable to predict the behaviour of the other group of vaccine information, after her self-concept and self-confidence were disrupted from her inability to predict the behaviour of the other group.

Other parents navigated more confidently through pressure from their social networks due to their self-concept. For one parent, being a patient in the health-care system was part of her personal identity, so her self-esteem in that cultural group was greater than other parents described. She recounted being bombarded with questions from friends and family over her intention to have herself and her infant vaccinated against a particularly virulent influenza. Her anxiety remained manageable, however, because of her confidence in her ability to predict the behaviour of health-care providers, which recommended vaccination for her and her child. When her child fell ill after the vaccination, she observed unmanageable anxiety levels in her social network, particularly among her child’s grandparents, due to their pressure to have the child vaccinated. The parent, however, was able to recognize her child’s illness was not due to the vaccine and remained at a level of anxiety that allowed her to continue to predict the behaviour in her intergroup interactions. This parent’s high-level of self-esteem and confidence in her personal and social identity allowed her to accurately predict the behaviour of another cultural group. This confidence and self-esteem is the basis for effectively – and mindfully – engaging the host information group.

**Motivational interaction**

As AUM theory suggests, parents were motivated by a fulfilment of needs – those needs being that of acquiring information on vaccination that supports their preconceived biases. But the theory also suggests parents also have needs for predictability, inclusion and to sustain their
sense of self while immersed in the opposing culture of information. As noted, sustaining self-concept helps reduce anxiety to a manageable level. Without that, parents are facing the possibility of abandoning their previously held beliefs and values toward choice, science and their trust in their health-care providers, not to mention themselves. For these reasons, parents are motivated to find information that supports their previously held concepts of vaccination: that it is a safe, effective way to protect their children; that it will harm them and must be avoided; or that there are holistic alternatives available that are just as effective as traditional immunization. Despite extreme pressure from health-care providers and to some extent her social network, one parent followed her goal to inoculate her children homeopathically. She did not talk to friends or family because she did not want their opinions, and did not discuss her views with medical professionals because she felt they would not tell her anything other than to vaccinate traditionally. She was motivated to search the Internet to fulfil the need to find evidence that supported her choice to vaccinate homeopathically, or at the very least, a different choice than traditional vaccines. Having her children vaccinated, yet with a non-traditional method, meant that she believed her family would still be included in herd immunity, and thereby upholding societal goals, while retaining her sense of self, which was to choose a more natural option than traditional medicine. Another parent described the need to find information on vaccination pertaining directly to her nearly two-month premature child, which not only provided inoculation but also accounted for the child’s small birth weight and delayed development. This parent wanted her family to be included in the herd immunity and traditional immunization, yet was motivated to ensure that her child’s specific needs were still met. Although she also undertook
research with a clear bias to vaccinate her child, she still had to research and navigate through an information culture that was at times foreign to find a solution that met her needs.

The need for group inclusion increases anxiety among those trying to navigate among a new culture and that need is a strong motivation to continue trying to fit in. Delving into the search for information at first made parents anxious as they struggled to understand the group’s language. Most parents described beginning their initial search in a place they felt comfortable, with trusted sources, such as newspapers or peer-reviewed journals, or a search engine. Inevitably, however, they came upon ‘mommy blogs’ or information forums which contained anecdotal stories consisting of mostly negative reactions to vaccination, or the consequences of not vaccinating and the suffering of children who catch diseases such as measles and pertussis. Parents recognized this was a different culture than what they were searching and with an increasing anxiety level, many simply avoided those websites to help reduce their anxiety levels. One parent recalled logging on to ‘mommy blogs’ and describing the prevalence of ‘pox parties,’ in which healthy children are invited to play with a child infected with chicken pox with the goal of the healthy children to become infected. She also described a website where parents can order a lollipop that a child infected with chicken pox has licked, again with the goal to infect a healthy child with the illness. She came across these websites and blogs through a web portal suggested to her by her local health authority. Despite her lack of interest in engaging in these sites, or understanding the culture behind them, her anxiety level increased as she was exposed to the anecdotal stories and although she described her viewpoint as ‘rock solid,’ the stories managed to shake her conviction, so she avoided them, as did most parents, assuming what they would find if they visited those sites. While one parent’s anxiety increased, another’s did not, but it did
not cause her to engage with anecdotal stories. One parent, who described participation in a website’s social network, said if she wanted a stranger’s opinion on health-care decisions, a parenting forum is where she would look. Her lack of anxiety because she simply did not care about a stranger’s opinion also saw her avoid social forums like blogs. As noted, when anxiety or uncertainty fall below or rise above a threshold, mindfulness is nearly impossible. In this case, parents focused on the source of these websites and avoided this culture altogether.

Parents who are motivated to confirm their biases are also increasing their confidence in their ability to predict what information they will find on vaccination, according to the AUM theory. By increasing their confidence in their ability to predict the information they find to support their views, parents are also decreasing their anxiety. As the information they seek readily confirms what they already believe, their confidence in their decision increases and their anxiety over making the choice decreases. One parent recounted that when she was confronted with information that went against her previously held beliefs, she would delve into that idea or concept and search for information until it was disproven, or she found contrary information that helped bolster her initial beliefs and allowed her to eliminate the information that caused her anxiety. Gudykunst’s seventh axiom is inversely proportional between an increase in confidence to predict stranger’s behaviour and a decrease in anxiety in anticipating the same. This applies directly to parents as the more confident they are in anticipating what information they will find on the Internet – and that it will support their beliefs – the less anxious they are that they will be confronted with information they do not understand, or does not reconcile with their bias. Although the research is focused on information parents glean from the Internet, nearly all highlighted the importance of public health-care providers in answering questions and allaying
fears from vaccination side effects. Part of the reasoning behind this could be the confidence that parents felt in the information that they anticipated health-care providers would tell them. Some parents even acknowledged knowing that health-care workers have the goal to push immunization but that level of predictability gave parents confidence when discussing vaccination about the kind of response they would receive. Conversely, parents who chose non-traditional methods of vaccination also anticipated a reaction from their health-care provider, albeit negative, which was unfortunately accurate. While parents who supported traditional immunization had their anxiety reduced and their confidence increased by health-care providers, those who supported non-traditional methods reported feeling increased anxiety at the prospect of future medical appointments, due to their confidence in accurately gauging a negative reaction.

**Stranger interaction**

Based on the anxiety uncertainty model, parents in this study are motivated to interact with the unfamiliar group of vaccination information. As part of their own research, they are forced to interact with this group of strangers, which includes health-care providers, mommy bloggers, friends and family, who hold the information they seek. As they begin to understand the information group, they are more able to offer alternative explanations for the behaviour and accurately predict how they act and react. Gudykunst (2005) states that when attitudes are rigid and divisive, people tend to be intolerant of the host’s viewpoints. Rigid attitudes usually follow people who prefer clear answers to questions rather than ambiguity. Although parents were relatively convinced of their own standpoint, they were willing to be open-minded to new information, which is why they turned to the Internet to research the anecdotal stories they were
told. Once they were motivated to interact, parents reacted rather open-mindedly to this group of strangers.

Rigid attitudes and negative expectations of the strange group will cause strangers to avoid new information about the new group with whom they interact, according to the AUM theory. A rigid attitude also lowers our ability to predict the group’s behaviour accurately. Stated more positively, a flexible attitude increases our ability to accurately predict the group’s behaviour as we collect new information about the group. This latter aspect is how parents reacted, for the most part. They turned to the Internet to research the anecdotal stories they were told, despite their initial skepticism of the information. Their search started where they were familiar and comfortable, such as trusted news sites and government-sponsored health websites. They looked for transparency and websites with information that could be verified by other sources. Parents’ certainty, combined with lower anxiety, on the content and understanding of what they would find on the websites that they trusted allowed them to confidently interact with this vaccination information. Although the blogs, personal websites and studies from pharmaceutical companies were not the first choice among parents for information, parents did come across them and after navigating through familiar territory, felt confident enough to not only read and interact with these sites, but also to evaluate the information contained in them. As one parent said, although a study was paid for by a drug company, she did not discount it outright; rather she was able to evaluate the study size, its methodology and its findings with the caveat that the company had a financial stake in the outcome. Although anxiety and uncertainty among parents was high as they approached Internet research, their flexible attitude allowed them to interact with self-confidence among the group of information holders.
The anecdotal stories that parents researched were rarely without context, which showed that parents were able to evaluate not only the information presented, but the issues surrounding it as well, such as education level (in the cases of bloggers), study design and motive. Low-context strangers generally take information at face value, which is typical of an individualistic culture. These parents, however, were able to evaluate information in a high-context process, which allowed them to create meaning in context and bring their own knowledge and experiences into the equation. It is more common in collectivist cultures, where individuals evaluate the good of the community, which explains why many of the parents interviewed were concerned with how their decision would affect herd immunity and whether by not vaccinating they were putting others at risk. Parents drew on their education level and life experience to help combine the anecdotal stories they heard from friends and family with their Internet research. This context helped them think about the information and the people providing it, how they responded to it and how they behaved toward the information and effectively helped lower anxiety and uncertainty to a manageable level to allow parents to interact successfully with the information group.

Parents’ ability to adapt was also a factor in their willingness to interact with members of the information group, particularly health-care providers. The more people are able to adapt to a host culture, the more confident they are in doing so and more successful they are in predicting the behaviour of other groups. In this case, after doing their research, parents in this study said they felt more confident in their ability to interact with their health-care providers. They were able to ask more informed questions, evaluate and even challenge health-care providers about immunization. In most cases, parents were concerned over the efficacy of the flu shot. After
research, they were better able to understand how the flu shot was developed and discuss its efficacy, using terminology – or jargon – in which doctors and nurses often speak. Their research made them more confident to not only ask questions, but also ask informed questions which would give them the answers they sought. One exception to this was a parent researching homeopathic immunization. Her understanding of homeopathy, and her knowledge of the group of health-care providers, allowed her to predict accurately – and unfortunately – a negative, condescending reaction to her questions and choices on homeopathic immunization. She kept her views to herself, choosing not to interact with the group, even though she felt confident that the reaction she anticipated was accurate. The rest of the parents were willing to adapt, now that they were familiar with the information group and able to predict its reaction to their interactions.

**Anxiety uncertainty interaction**

The first two themes identified in the research showed how parents establish self-concept and are motivated to interact with the host group, along with how they react to the new information culture once immersed in it. The final two themes – anxiety reduction and uncertainty management – show how they move into mindfulness and become successful at navigating the new culture. Anxiety uncertainty management theory says that to interact effectively, strangers must be able to understand the perspectives of the host group (Gudykunst, 2005). That is, parents must develop mindful ways of learning about health-care providers, bloggers, scientific studies and a host of other sources of information on vaccination. Once they understand the new culture, they can begin to mindfully navigate its layers to discover the information they seek.
It is not clear if parents are actively aware that by researching immunization on the Internet they are reducing their anxiety and thereby allowing themselves to be less evaluative of those who hold the information they want. Through research, parents are able to reduce their anxiety, which puts them below the maximum threshold and allows them to continue to function within the new group. The more parents learn, the more positive their interactions with the host culture becomes. Knowing the language of the new culture helps manage anxiety and reduce uncertainty because it helps parents understand the perspective of health-care providers and other sources of information. For example, the parents who could discuss in medical terms with their doctor the concerns over vaccination reported more positive experiences. One doctor told a parent not to do Internet research, fearing she would read websites such as WebMD, until the doctor understood that the parent and her husband were academics and mostly researched using peer-reviewed scientific studies. She was also able to discuss the specific needs of her premature child and whether to delay vaccination until a corrected age was reached. She reported feeling confident and reassured from her medical team, who gave her options on vaccination to help reduce her anxiety. Another parent described being flagged as a ‘vaccine-refuser’ until she was able to relay her medical history and increased risk for vaccination side effects to her health-care provider. Once that was understood, anxiety and uncertainty was reduced and health-care providers were no longer suspicious of her motives. In both these examples, the more the parents knew or learned about vaccination, the more positive the host culture perceived – and went along with – their intentions. Learning more about vaccinations and the health system allows parents to reduce their anxiety, increase certainty and be mindful of their interactions in regards to both.
Often as part of anxiety reduction, people will simply remove themselves from a stressful situation. Parents cannot do this; they are forced to make a decision whether to vaccinate their children, which means if they cannot change their environment, they must change their thinking. They cannot stop people from giving them anecdotal stories, but they can research them online. They might not understand the technical terms or how vaccines work but that is also something they can research online. If the contradictory nature of information on safety and efficacy of vaccines increases anxiety, amassing more information behind the outcome they want helps reduce that anxiety to a manageable level. It is through research that the mothers in this study also reduce the uncertainty and anxiety of making a health decision for another person – their children. The Internet provides data on specific needs, from allergies to compromised immune systems, allowing parents to change their thinking about vaccination to reduce anxiety. When anxiety and uncertainty are high, parents cannot walk away from a decision; rather they can gather more information, understand more about the medical health culture they are attempting to navigate and they do this through the Internet.

An optimal level of anxiety is one that will allow parents to feel comfortable interacting with the information group but will not allow parents to become complacent in their interactions. In this instance, anxiety and uncertainty are not negative, so long as they fall within a manageable threshold. Even when anxiety and uncertainty fall below or rise above these optimum levels, all is not lost – parents who are mindful can bring those levels back to manageable levels. Their Internet research helps with this balance. Gudykunst’s (2005) axioms show that any increase in knowledge or ability to describe another group’s behaviour or culture will decrease anxiety and uncertainty levels. The Internet research into vaccination allows
parents to confirm what they already know, research information they are told, reduce their anxiety and ensure that they are making the best decision for their children. Through this, their anxiety and uncertainty levels are kept to a manageable level and being mindful of these feelings will keep parents motivated to continue researching, learning and navigating all aspects of the group which holds information on vaccination.

**Limitations and future research**

A small sample size and rich data combined to make this topic worthy of future research. The study was limited in its sample size of six participants drawn from chain-referral sampling. The small sample size makes it impossible to generalize to the broader population, but it did provide significant insight into the decision-making process, and information gathering process, of these parents included in the study. The participants were all middle class, female with two or fewer children. All had graduated high school and had some post-secondary education with two at graduate level. While this left the sample fairly homogenous, it did provide a rich collection of data for this particular type of parent. Further research could focus on fathers’ experiences as well as parents from lower socio-economic backgrounds, with less education, for comparison to evaluate whether they had similar experiences when (and if) researching vaccination and how they were treated compared to their wealthier, more privileged counterparts. Applying Gudykunst’s (2005) theory of Anxiety Uncertainty Management to this group might yield different results, based on the participants’ economically challenged frame of reference. Historically, anti-vaccination movements have begun within the working class (Beck, 1960). It is just one question that could possibly be pursued through further research.
Another question to ask is how Gudykunst’s model could be applied to the host culture – in this case those who hold the vaccination information, such as health-care providers. This study applied Gudykunst’s theory of Anxiety Uncertainty Management to a group of parents navigating vaccination information on the Internet with the goal to understand how that information was then used to inform decision making. While the study revealed significant insights into decision making and information collection and evaluation, it was one sided. Only parents were included in data collection. As Gudykunst (2005) also turned his theory around to consider the point of view of the new culture’s behaviour toward the stranger, so should future research turn the lens of AUM theory on to health-care providers, bloggers, news sites, government health websites and others involved in disseminating vaccination information. Parents are attempting to understand new language, terms and ideas in vaccination information; it would be helpful from a public health perspective whether that effort is recognized, appreciated or rewarded from the host culture. Health-care providers, such as primary physicians and public health nurses, can recognize anxiety and uncertainty levels in parents and help bring them below a threshold where parents can become mindful of the information available to them. Gudykunst’s (2005) theory was designed to be applied; it should be applied as suggested, to help all sides in the vaccination debate lower their anxiety, uncertainty and become mindful of each other’s cultural needs.

Recommendations

Although the sample size in this study was small and as such not generalizable to the broader public, the analysis highlights potential opportunities for health-care providers to investigate further when forming policy around how communication with parents regarding
childhood vaccination happens. This study shows parents interviewed are using information they find on the Internet to inform their decisions whether to vaccinate their children. Although they attempt to search for fact-based, scientifically proven information, they are exposed to anecdotal stories and opinion-riddled blog posts which increases their anxiety and uncertainty over decision-making. Because of this, health-care providers should not shy away from providing potential risk and negative effects of vaccination when they are discussing immunization with parents. The wealth of information on the Internet provides parents with a variety of anecdotes, scientific studies and opinion-based narratives which affect parents’ state of mind. In other words, they are already exposed to the potential risk and side effects in vaccination, often from sources with poor information at best and an anti-vaccination agenda at worst. Hearing the low possibility of risk or side effects from vaccination from health-care providers allows parents to lower anxiety and manage uncertainty by authentically communicating with their nurse or physician their concerns. Physicians and nurses should not be concerned about increasing anxiety among parents by discussing risk in vaccination; rather, parents are already exposed to misinformation on risk and side effects. By discussing risk in a controlled environment, health-care providers are more likely to reduce anxiety and uncertainty, allowing parents to make an informed decision whether to vaccinate their children.

Health-care providers also have the opportunity to incorporate media literacy into discussion on vaccination with parents to help them understand the difference between science-based and opinion-based information found on the Internet. In this study, the mothers interviewed were all well-educated and able to discern the quality of different sources of information on the Internet. They expressed a high level of media literacy, which other parents
might not have. While media literacy is an increasingly important topic that should be taught as part of the public school curriculum, it might be beneficial to health agencies to provide some general media literacy training and understanding among their clients inquiring about childhood vaccination. Parents’ ability to understand the difference between an opinion on a blog and an opinion on a medical or scientific website is crucial to their use of information gleaned from the Internet. In addition to talking about risk in vaccination, health-care providers can also take a few moments to discuss the quality of information available on the Internet and where to find high-quality health information. In some instances in this study, the mothers described their doctors providing a website for them to further research their questions; this is an opportunity to ensure that all parents are provided with the same high-quality information.

**Conclusion**

Questions of vaccine efficacy and safety have pushed parents to research immunization online. This study shows that parents use Internet information in four ways to inform their choice whether to vaccinate their children: to validate their bias and support preconceived views; to validate sources by researching anecdotal stories they hear from social networks; to reduce anxiety; and to reduce uncertainty to ensure their choice is an informed one. Data was collected through semi-structured interviews with mothers and analyzed using Fairclough’s (1996) framework for discourse analysis, which considered social context of the data. Results were further analyzed through Gudykunst’s (2005) anxiety uncertainty management theory. Parents are using the Internet to manage anxiety and uncertainty they feel from navigating an information group that is foreign to them. By beginning with researching what they know – validating their inherent bias – they establish their self-concept, which motivates them to interact
with the new group, which consists of all those who hold the information they seek. From there, they react to the strangers, gathering information to understand the culture and be able to predict with accuracy how the group will react. Researching online helps parents manage anxiety and uncertainty, which keeps parents interested and engaged, with high-self esteem that gives them the confidence to make a decision about whether to vaccinate their children.
References


Decision Processes. Retrieved from:
https://faculty.fuqua.duke.edu/~kurtc/bio/Bond%20et%20al%202007.pdf


INFLUENCE OF THE INTERNET


trust around MMR vaccination decisions. *British Journal of General Practice, 54*, 520-525.


Appendix A

Interview preamble

Thank you for participating in my research into parental use of online information in decision-making for childhood vaccinations. Our interview will consist of a series of 16 questions asking about your information-gathering process prior to deciding whether to vaccinate your children. You are free to decline to answer any question, or seek clarity on the questions asked. Please keep general questions on my project until the end of the interview, when I will be happy to answer any questions about the research. The interview will take no longer than 90 minutes.

Your personal identity will be kept confidential. You can withdraw from the project at any time.

Please sign consent form provided.

Demographic information

Name; age; marital status; No. of children; ages of children; income level; education level; profession.

Questions

1. Please describe your initial understanding of the vaccination program and your options regarding the choices to vaccinate your children.

2. What was your initial evaluation of vaccines and vaccination?

3. When did you start considering your choices regarding childhood vaccination?

4. Did you turn to the Internet to research the issue? If so, at what point in the decision-making process? If not, skip to Q7.
5. What reasons did you have for seeking information on the Internet, as opposed to other sources?

6. Where did you begin searching? A search portal (Google), link sent to you by a friend or website found on social media, etc.?

7. Did you seek information to support your initial feelings? Or to find out opposing views?

8. What did you think of information that went against your initial feelings? What impact did opposing information have on your decision-making?

9. What aspects, if any, did you consider when evaluating websites: professional design; trust seals (medical associations); disclosure statements; ownership; personalization; emotional stories? Plan to leave this open-ended, but use examples for clarity.

10. What factors made you trust or distrust a website?

11. Did you find social support through any of these websites for researching vaccination information? For clarity, support networks like Facebook mom groups.

12. Did you talk to your doctor about information you found? What was his or her response?

13. After further research, how did your understanding of vaccination and its risk factors change from your initial understanding?

14. Did you see an option that made sense? If not, were you able to generate another option? For clarity, what did the parent do if no options seemed acceptable?

15. Did you feel you could retract your decision later?

16. Are you content with your decision? Find out if parent vaccinated.
Wrap up

Thank you very much for your time and participation in my research project. Should you have questions, please find my contact information, as well as that of my research supervisor and Royal Roads University, on the copy of your consent form.
Appendix B

Consent form

Influence of the Internet in parental decision-making on childhood vaccination:

Analyzing how information informs choice

Researcher: Melissa Fryer
Royal Roads University

Dr. Zhenyi Li, project advisor

For verification: Virginia McKendry
Master of Arts in Professional Communication program head

Purpose

My intention to study parents and their experiences when making vaccination decisions for their children will require exploration of their attitudes, beliefs and perceptions through semi-structured interviews.

Method

This form is a request for you to participate in this research project by agreeing to one or more semi-structured interviews of approximately 90 minutes or less in duration. Questions will focus on your decision-making process whether to vaccinate your children and how information you researched on the Internet influenced your decision. You are free not to participate and have the right to withdraw at any time without prejudice to pre-existing entitlements and your decision to participate will have no effect upon medical care or services you receive. Recalling your experiences might cause you potential harm, if those experiences were traumatic or painful.
However, you will benefit by participating in a research project that aims to understand vaccination decision-making.

**Collection of information**

Interviews will be recorded digitally and supplemented with researcher’s notes during the interview. Interviews will be transcribed and saved on researcher’s computer as well as a flash drive for backup. Data, including interview sound files and transcriptions, will be kept on my personal computer, which is password protected, with back-up copies on a flash drive stored in my home office. My computer and notebooks will also be stored in my home office, unless transported to interview or secondary work site. Personal information will be stored with sound files and transcription files for organizational purposes, but will not be included in my final report. Pseudonyms or codes will be used in final report, if necessary. Data will be kept on file for two years to allow for revisions to the final paper as well as for any challenge to validity that might arise. Data will only be shared with other researchers if further consent is granted from interview subjects. Subjects’ identities will be kept confidential and their answers non-identifiable. No personal information will be sent to their health-care providers or the local health authority. Subjects who withdraw from the study will have their personal information and any interviews destroyed.

I intend to use the information obtained as part of my master’s thesis, a requirement for graduation. Upon completion, I will send all participants a copy of the accepted report.

I declare no conflict of interest in conducting this research.
If you complete this form, it is assumed that consent has been given. Please retain a copy of this form for your records. If you have any questions before proceeding, I would be happy to answer them.

_______________________                                                             ________________________
PARTICIPANT                                                                                 DATE