

Unvaccinated Against One's Will: How Weak-Ties Reddit Communities Affirm and Encourage Pro-Vaccination Choices in the Face of Strong-Ties Conflict

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In 2019, the World Health Organization highlighted vaccine hesitancy as a global health threat. Reddit is a key source of vaccine information. Unlike research depicting social media as sources of health misinformation, this study focused on individuals seeking and sharing pro-vaccine viewpoints on Reddit for validation and empowerment to make vaccination choices. Through the Strength of Weak Ties Theory, the study explored 1) how individuals engaged in vaccine-related subreddits to manage conflicts with strong-ties connections, and 2) how weak-ties commenters responded to original posters.

A keyword search on “vaccines” and “relationships” uncovered recent posts about navigating strong-ties conflicts on vaccines. Thematic analysis showed themes like contradicting

values, empowerment, validation, walking away, and medical recommendations. The study reveals complex relational dynamics in perceived controversial health choices like vaccination, facilitated by social media connecting weak-ties users to inform and validate vaccine decisions—a personal choice which impacts society through community immunity. The study discusses vaccine information sharing on Reddit and the potential impact of the Strength of Weak Ties Theory for health decision-making on social media, especially related to social bridging capital.

Keywords: social media, Strength of Weak Ties Theory, Reddit, community, immunity, vaccination, health, decision making

The power of social media communities in encouraging and influencing vaccination decisions — which, collectively, can impact public health — was recently revealed by then-18-year-old Ethan Lindenberger in a testimony before the U.S. Senate Committee on Health, Education, Labor and Pensions. Lindenberger, was raised by an anti-vaccine mother, and grew up in an anti-vaccine home and was not vaccinated, which countered his personal vaccine beliefs and wishes. Thus, he

visited Reddit to gain advice about the process of getting vaccinated as soon as he became of age; the thread received 1,000 comments and garnered media attention, ultimately resulting in Lindenberger becoming fully vaccinated (Doubek, 2019). Lindenberger testified before the U.S. Congress in March of 2019 that the support he received on Reddit was the impetus behind his decision to become vaccinated. According to Lindenberger, teenagers report lurking on Reddit to learn more about vaccines and to find encouragement to get vaccinated with or without their parents' knowledge or consent.

Individuals' health decisions are heavily influenced by online connections (Bradshaw, 2019; Christakis & Fowler, 2007). Specifically, Grant and colleagues (2015) called for exploration of the influence of Web 2.0 community-building features on people seeking vaccine information. A meta-analysis revealed that exploration of social media may be helpful for investigating the concepts of informational and emotional support for active, rather than passive, users (Liu et al., 2017). Likewise, Rodriguez (2016) emphasized the importance of understanding the concepts of narrative persuasion and conflation of expertise, which often influences individuals who oppose vaccination. Prior to the onset of the COVID-19 pandemic, the World Health Organization declared vaccine hesitancy as a top 10 threat to global health in 2019 (Alvira, 2020). About 20 percent of pro-vaccine parents have stated that, due to their own fears and preferences, they will not follow the vaccine schedule recommended by the Centers for Disease Control and Prevention (CDC), which includes vaccines readily available and recommended for years, (Reich, 2016). Paradoxically, one reason for vaccine hesitancy in the U.S. is the widespread success of vaccination programs eliminating vaccine preventable diseases (Ventola, 2016). This results in a "Western lens" perception of both a decreased perception of disease risk and an increased focus on vaccine side effects (Bradshaw et al., 2022; Reich, 2016). Resurgences of disease outbreaks are spreading. In 2000, Measles was declared eliminated in the U.S. but in 2019, the disease was confirmed in 31 states. This was the highest number of cases in the U.S. since 1992 (CDC, 2020).

Through immersion in online discourse relevant to vaccination and vaccination hesitancy, researchers can become familiar with the anecdotes, concerns, and narratives that may be influential and revealed more fully than in face-to-face conversations (Rodriguez, 2016). This research is critical because even after having a readily available

COVID-19 vaccine, 15% of Americans still choose to delay or decline the vaccine due to non-medical reasons (Monte, 2021).

Markedly, Reddit has emerged as an important platform to study in health communication. Record et al. (2018) identified that users uniquely trust Reddit and find it to be more credible than other social media platforms (e.g., Facebook), which have become more politicized. Nearly one-third of users enact, exchange, and evaluate health-related information sought on Reddit, and additional research could explore diffusion of health information on Reddit and the perceived motivations that users have for engagement with such content (Record et al., 2018). Although Reddit, like most social media communities, does not require peer-reviewed references or incorporate content validity checks, academic researchers have found it to contain “useful and scientifically sound content... with likely many users with medical professional backgrounds, despite the lack of oversight from recognized health authorities” (Record et al., 2018, p. 391). Along these lines, the largely pro-vaccine response on Reddit is interesting as the Internet has been cited as a forum for vaccine misinformation (Center for Countering Digital Hate, 2020).

The prevalence of *pro-vaccine* information on Reddit is due to social and community norms associated with Reddit, which has strict community guidelines that are designed to prevent the spread of health misinformation. Along the lines of Moore and Abetz (2019), the current study drew from user-generated Reddit threads as a data source to conduct a qualitative thematic analysis in a naturalistic and anonymous context, which provides insights that differ from those gleaned in interviews and focus groups, due to an absence of social desirability bias from respondents—one benefit to studying social media communication. The purpose of the current study was to examine the original posts and the associated comments in subreddit threads, smaller more specialized communities on the Reddit platform, focused on the nexus between social media, vaccine decision making, and relationships. Researchers first examined how *original posters (OPs)* have utilized Reddit to gain advice and support in favor of vaccination in the context of their interpersonal relationships. Then, researchers explored how *commenters* on vaccine and relationship subreddits responded to OPs’ vaccine-related inquiries on social media.

LITERATURE REVIEW

Why Study Vaccine Communication on Reddit?

Reddit contains elements of a discussion board, social media platform, and messaging service all wrapped into one. From 2019-2021 Reddit experienced a 30% growth in monthly active users, only behind TikTok and Pinterest (Statista, 2021). Reddit connects individuals and, in some cases, medical providers, to discuss, engage, and distribute evidence-based health information (Buntinx-Krieget al., 2017). Anonymous discussion boards with “throwaway usernames” allow for more personal revelations, which provide a rich data source in health communication research (Moore & Abetz, 2019; Wexler, 2018).

Social networks have also been studied in how they influence specific health behaviors. Online support networks may benefit individuals 1) struggling to maintain long-term health behavior changes, 2) experiencing stigmatized health issues, or 3) lacking traditional face-to-face support resources (Wright, 2016). Advice is solicited through individuals disclosing their problems and requesting information or opinions, often targeting like-minded individuals (Sillence, 2013). According to Tanis (2008), people who use social forums for inclusion or information gathering are better able to cope socially and with their health issues. Another benefit of online community participation is information utility, which can influence perceptions of patient empowerment (Johnston et al., 2013). These forums can help users connect with each other and establish relationships by validating community norms and generating a sense of belonging (Giles & Newbold, 2013). Investment in reciprocal relationships, such as those found on social media, can cultivate emotional, practical, and informational benefits (Xu & Weiwu, 2021).

By entering social media communities, Zeigler et al. (2014) posited that researchers can understand learning as it is happening in peer-controlled environments. With the flow of science and health communication broadening from its traditional unidirectional transmission from elites to the public to include lay audiences as co-creators of knowledge through user-generated social media content (e.g., Reddit threads), preliminary evidence of reverse intermedia agenda setting has been revealed. Topics such as the vaccine-autism controversy are at the forefront of social media communication and are more prevalently focused on this topic than traditional online news content (Jang et al., 2019).

Data suggest that Reddit users who are specifically seeking health-related information on the platform are more likely to enact that information in their lives, while perceived credibility of the found information did not predict one's likelihood to try the health suggestions found on Reddit (Record et al., 2018). Thus, health information obtained on Reddit could have an impact not only on individuals but on society, as community immunity (commonly referred to as herd immunity), can be obtained when "enough people have been vaccinated against a disease and have developed protective antibodies against future infection" (Mayo Clinic, 2023).

Strength of Weak Ties Theory

In contrast to strong ties, or the individuals in one's dominant social network, such as friends and family, weak ties are acquaintances or those that one might encounter online in a specific context or for a specific purpose. "Weak ties provide people with access to information and resources beyond those available in their own social circle" (Granovetter, 1983, p. 209). Pool (1980) stated that even though individuals find strong ties more useful, they may be constrained to weak ties if they comprise the majority of their networks. Haythornthwaite (2002) posited that new communication media that create opportunities for unconnected individuals to communicate creates an opportunity for weak ties to develop and strengthen. Notably, Putnam (2000) distinguished between two types of social capital: bonding and bridging. Strong ties, like family and friends, provide emotional support or bonding social capital, whereas weak ties, like acquaintances may be sources of informational support, or bridging social capital (Putnam, 2000).

Researchers have linked health literacy with bridging social capital (Kranich, 2021), as weak-ties connections may be better equipped to provide skills and expertise to navigate the online health information environment. The current study explored how social networks may be used to fill the gaps when pro-vaccine social support is absent within one's strong-ties networks. Individuals with health concerns turn to weak-tie support networks due to problems in their traditional strong-tie networks (Wright & Miller, 2010).

For health issues, weak-ties networks in online support communities provide users with experiential information from others with the same illness, information disclosure with reduced stigma and rejection, and senses of belonging (Zigron & Bronstein, 2019) as

well as social support (Eddington, 2020). Liu et al. (2020) found that weak ties communities on social media positively impacted individuals whose strong ties networks have been disrupted or even removed. Xu and Weiwu (2021) identified that they tend to keep these diverse communication interactions limited to gaining novel information, as interacting with weak ties is not as emotionally pleasant as interacting with strong ties, and thus they do not need continued interactions after the benefit has been obtained. Therefore, through the foundational lens of the Strength of Weak Ties Theory, the current study qualitatively examined the social dynamics between Reddit users and weak-ties commenters by analyzing threads in two Reddit communities, or “subreddits,” topically related to relationships and vaccines, as articulated in the following research questions:

RQ1: What pro-vaccine information did OPs seek from the weak ties network of an online Reddit community in relation to their interpersonal strong-ties relationships?

RQ2: What strategic approaches did weak-ties respondents recommend or advocate for in the comments in response to Reddit posts about vaccines and relationships?

METHODS

Procedure

Along the lines of an exemplar study which analyzed Reddit discussions about e-cigarettes and mental illness (Sharma et al., 2017), researchers took a similar approach to systematically searching Reddit for salient keywords including “vaccines” and “relationships” This led the researcher to the two largest subreddits related to the two topics in March 2019. The “vaccines” subreddit had 2,400 subscribers, and the “relationships” subreddit had 2.4 million subscribers at the time of data collection. Following the methodology of Sharma et al. (2017), posts were sorted using the “relevance” and “all time” functions to retrieve the most relevant posts containing the keyword “vaccines”. To further reduce large sample size, posts were screened for recency by limiting the date range to within two years of data collection. To ensure threads were relevant, the lead researcher read titles and content of the original posts in the threads. Posts were included for analysis if the OP of the initial thread discussed vaccinations and how

vaccines impacted any kind of relationship, (even indirectly) from January 2017 to April 2019. The sample did not include COVID-19 vaccines, which did not exist yet at the time of data collection pre-pandemic. The relationship subreddit had 21 relevant posts from 2017 to 2019, while the vaccines subreddit was much more active, revealing 82 posts from March 12, 2019, to April 12, 2019. For feasibility, in the case of the vaccine subreddit, researchers followed the method of (Sowles et al., 2018), using four weeks of topic-specific discussion threads as a representative sample. Posts were excluded if they simply linked to external articles, videos, or memes without context or comments. Ultimately, 61 relevant threads from the vaccine subreddit community remained. When combined with the relationships subreddit (N = 21, 25.6% total posts), the total sample size was 82 original threads, with 2,131 comments.

Analysis

Inductive qualitative analysis focuses on understanding meaning and processes rather than outcomes (Maxwell, 2013). Relevant primary posts and the ensuing discussions were imported into Microsoft Word for data coding, management, and analysis, and coding was completed using a Google Form. The resulting coded data was exported and downloaded into a Microsoft Excel spreadsheet for analysis. Coding employed a simultaneous and iterative thematic analysis approach using the constant comparative method (Glaser & Strauss, 1967; Strauss & Corbin, 1998). Analysis occurred from the start of data collection through writing the reports (Strauss & Corbin, 1998), a process critical to verification and trustworthiness. Specifically, three coders trained in qualitative analysis first open coded 10% of the sample and met to discuss emerging themes. The remaining posts were divided randomly among the coders. Coding concluded once thematic saturation (Cresswell & Poth, 2018) was reached and then report writing began.

RESULTS

Demographics and Background Information about Redditors and their Posts

Approximately 76% of posts were published in 2019, the same year that Lindenberger testified before Congress about the power of the Reddit platform to promote vaccination self-efficacy, with the remaining posts published in the two previous years.

Only seven percent of OPs explicitly stated that they were male, 27% reported being female, and the remaining 66% did not specify their gender in the Reddit post. Just over a quarter of the sample ($n = 21$) stated they identified as teenagers (ages 13-18), 28% of OPs specified they were ages 19-29 ($n = 23$), and four posters identified their ages ranged from 30 to 40. The remaining OPs ($n = 34$) did not explicitly state their ages. The number of comments on any single post ranged from 0 to 242.

In answering RQ1, which examined the pro-vaccine information that users appeared to seek from the weak ties network of an online Reddit community in their original posts, two overarching themes were revealed: 1) contradicting values and 2) a need for empowerment, which included seeking anonymous medical or legal advice pertaining to vaccines.

Navigating Relational Conflict Due to Contradicting Values

A total of 67% of all original posts ($n = 55$) mentioned the need for the OP to navigate relational conflict, which usually involved reconciling contradicting sets of values related to vaccines. Conflicts ranged from marital conflicts about whether to vaccinate children or future children (22% of posts) to differing beliefs within a spouse's family of origin and what in-laws believe regarding vaccination. This was salient for posters navigating the impending arrival of a new baby and requesting that potential visitors get vaccinated prior to meeting the baby. Participant 57 began her post with the "too long didn't read" disclaimer (TL:DR):

"Boyfriend's parents are refusing to get vaccinated for our newborn. So, we refuse to let them around the baby for 6 weeks unless they are immunised, the issue is I'm being made to feel selfish."

Individuals posted on Reddit to air their feelings about having different vaccine beliefs from their significant other and/or their partner's family and alluded to emotional turmoil and tumultuous family dynamics. For individuals who were considering having children, vaccination appeared divisive. For some, this was deemed to be a "game changer." Participant 44 articulated: "Just found out my boyfriend isn't and won't get vaccinated. Wondering what other potentially game-changing topics need to be addressed before we get married." Pro-vaccine OPs aired their frustrations, seeking advice from others who had dealt with similar situations on how to get relatives or close friends to

listen to their pro-vaccination beliefs or to respectfully agree to disagree. For example, Participant 52 wrote:

“They’re obsessed, and I don’t know what to do to repair the rift growing between us. I feel exhausted having to see my mum and sister because I know I’m going to get dragged into this argument AGAIN no matter how much I try and avoid it... I have NEVER started the vaccine argument, yet it comes up WITHOUT FAIL every time I see my mum and frequently when I see my sister.”

Redditors reported feeling tired of the constant arguing and perceiving the need to defend their pro-vaccine stances to strong ties who opposed vaccines.

“Husband and his family are convinced vaccines are a terrible thing and don't want my child vaccinated. I never realized how strongly they were against it whereas I am strongly pro-vaccine. It's causing me a lot of upset and I don't know how to handle it all.” (Participant 47)

In addition to navigating familial conflicts among adults, a total of 28% ($n = 23$) of all OPs navigating relational conflict were teenagers (or young adults), like Lindenberger, who wanted to get vaccinated, against the wishes of a parent. Some OPs’ parents opposed certain vaccines while others opposed all vaccines. Depending on the geographic location of the OP, legal requirements for vaccination without parental consent differed. In the United States, the legal age of consent was presented as age 18 but the age of consent in the UK was 16. Some individuals meeting the age of consent were still on their parents’ health insurance plans and expressed fear regarding insurance companies informing their parents of secret vaccinations. Most OPs requested support, advice, and empathy for having “anti-vaxxer” parents. Still, OPs seemed afraid that their parents could get in trouble for child neglect when they “really were good parents” in other ways. For instance, Participant 29 wrote:

“I am not vaccinated. My parents have always been against it, and they refused to vaccinate me when I was born. I was fine with it because they always told me that vaccines were bad, and I never really questioned it - until recently. I did some research and all the facts that my parents have told me turned out to be false. Now I’d like to get vaccinated, but I don’t know how to proceed. Mostly I don’t want my parents to get in trouble... Is there a possibility?”

OPs hoped to get vaccinated without their parents' knowledge and/or wanted resources to help persuade their parents to change their viewpoints:

“My parents didn't vaccinate us because of their beliefs (They're Catholic), and it was also common among my extended family. I need advice on how to convince my mother to vaccinate her kids. Please link any quality research and compelling arguments I don't want to take an aggressive approach with my mother, but a more informative one.” (Participant 4)

Redditors seemed to want advice on what to do and hoped to learn from others' experiences by requesting links to compelling resources or eliciting strategies that had worked for commenters in similar situations. Most original posts were structured to obtain feedback and ended in questions or pleas for help in the form of information, resources, or suggestions for navigating relational situations with individuals in their strong-ties network.

A Need for Empowerment

A total of 29% ($n = 24$) of original posts were seeking factual or medical information about vaccines so that OPs could equip themselves with knowledge. Many of these were technical questions about the vaccine schedule and timing, as well as interactions among various vaccines. Some OPs could not remember if they had received certain vaccines, whereas others wanted more education about the effects of vaccines on the body, how vaccines work, or ammunition to counter anti-vaccine arguments. Participant 32 articulated:

“I'm going to my first doctor's appointment as an adult for the first time, and I finally have legal control over my body. Therefore, I have decided to get vaccinated, but I'm not sure how it works.”

Teenage participants shared they wanted to get vaccinated “for the safety of myself and others” (Participant 15). They utilized the platform to inquire about which vaccines are most important to get first and which might have more side effects. While some OPs wanted information on particular vaccines (e.g., MMR), 68% of posts ($n = 56$) were about vaccines in general. Participants described starting this information seeking process by consulting a member of their strong ties network but visiting Reddit instead due to a lack

of sufficient information or flat-out refusal to help by the strong-ties connection. As Participant 29 wrote:

“I have been researching the college I'll be attending (Drexel University) and the vaccinations they require...My school system's Health classes barely talked about them at all. I am taking this into my own hands and trying to do my research. I talked to my school nurse, but she told me she could not get involved in ‘family matters’...”

Some OPs later came back to the platform to express gratitude for the recommendations and vaccine-related advice. As Participant 42 wrote, “I'm usually a lurker on Reddit, but you folks really helped me in my research into the world of vaccines.” Reddit was seen as a platform to empower individuals to make the vaccine decisions they perceived to be right for themselves and/or their families.

In RQ2, the unit of analysis was the *comment thread*, as a whole, beneath each post. Each comment thread was analyzed for the general strategic approaches that commenters recommended OPs to enact. Three overarching themes emerged: 1) affirmation, validation, and shared experiences; 2) encouragement to let it go or walk away from strong-ties relationships; and finally, 3) education and medical recommendations.

Affirmation, Validation, and Shared Experiences

Of the total comment threads analyzed, 55% ($n = 45$) of original posts had comments which contained references to shared experiences. From simple heart emojis to words of encouragement, support and validation for the OP's perspective and desired pro-vaccine choice were predominant. As a commenter wrote below Post 12, “There is enough research to show that ‘antivaxx’ is ridiculous. You are doing the right thing by getting your child vaccinated. Lay down the law and stick to your boundaries.”

Respondents in these posts who had “been there” advocated for OPs to “stick by their guns,” to set emotional and physical boundaries, to stand up for vaccines as needed, and ultimately validated vaccine uptake as the “right thing to do.” Many commenters seemed to relate to original posts, expressing that they were currently in or had been in the “exact same situation” with vaccine-related familial discord. In these cases, respondents typically advocated for the OP to take a similar stance as them in dealing

with their own situation, for example, not letting a relative see the new baby if they do not want to abide by the OP's vaccination preferences. The premise behind these responses was “what worked for me will also work for you!”

Commenters ascribed positive characteristics to pro-vaccine OPs such as “a good daughter” or “responsible mother.” In response to Post 14, one commenter wrote:

“It sounds to me that you work very hard to be a very good, obedient daughter. Just a few minutes on r/relationships and you'll find lots of other stories about parents being irrational and taking offense about reasonable decisions their adult children have made. And you'll find lots of people who have absolutely ruined their lives trying to prevent their parents from getting upset over things they have no right to get upset over—gay men marrying women, people going into careers they never liked, etc. There's always a point where you need to make your own decisions, and you've reached that point. If it's not vaccines, it's going to be something else...”

Reassurances that OPs were not alone, that they were taking the correct course of action were prevalent and OPs often responded with gratitude and wrote that they felt encouraged by the external validation received via Reddit. Participant 57, who had written about her partner's family not getting vaccinated and her subsequent decision not to let them around her new baby, wrote to commenters:

"...Thank you so much. I think reading these replies has made me feel 100% more confident in this decision! I have to stop letting them manipulate me! Definitely not a healthy environment for a baby!"

The OPs who responded to comments expressed appreciation for the perspectives provided by commenters and appeared to be encouraged that they were not alone, realizing that others – even weak-ties strangers on Reddit—could relate to their vaccine-related relationship predicaments.

Encouragement to Let it Go or Walk Away

Comment threads under 26% of posts ($n = 21$) referred to walking away or simply letting the vaccine debate go; they framed the issue as “us vs. them.” For example, in Thread 52, a commenter wrote: “First of all you are not 'pro-vax', you are normal. They are 'anti-vax'...they are the outliers, don't let them label you.” Commenters reiterated that vaccines are accepted by most society; therefore, OPs wanting to vaccinate against the

wishes of their relatives were mainstream. Along these lines, commenters advised OPs to first understand what they were dealing with and to accept that this difference of opinion with their strong-ties connections is not one that is easily resolved and can – and perhaps should – have deep consequences to relationships with those who believe differently about vaccines.

Commenters were advocates of the stance “you can’t change their minds anyway, so why bother” when dealing with individuals who oppose vaccinations. In response to Participant 49, a commenter wrote: “It probably isn't useful to do anything but drop it. I understand where you are coming from, but you are so unlikely to get any satisfaction in this situation that it is just not worth it.”

Many comments were strongly worded, encouraging OPs to abandon romantic relationships and friendships if the difference of opinion remained. Participant 62 sought advice in her original post about how to address vaccines with a new acquaintance with whom she wanted to become closer friends, but the acquaintance believes that vaccines cause autism. Commenters adamantly advised against both engaging in the vaccine dialogue and pursuing the friendship, as in the following comment. “It's not worth the pain. An idiot will only drag you down to their level and beat you with experience.”

On many threads, commenters adopted a milder tone with the idea of “agreeing to disagree” but maintained the idea of dropping the subject indefinitely for the sake of the relationship— with the caveat “if it is worth continuing,” between individuals with contrasting vaccine views. For example, a commenter advised Participant 68: “Actually walk away when it's discussed. If everyone is discussing it, get your coat, walk out the door and drive away. Repeat as necessary.”

Despite acknowledging a widespread need to combat vaccine misinformation, most commenters expressed it worthwhile to save your breath and not even bother trying to persuade anti-vaxxers to form a different opinion. A commenter responded to Post 15 with the following suggestion:

“Don't comment, don't engage, don't try to correct. If you think you're on the verge of laying down the truth hammer, take a little time and distance to cool off again. Hide her posts from your social media feeds so that you aren't constantly reminded what a vacuum of critical thinking looks like.”

The consensus remained that pro-vaccine advocates could not win the debate, so why bother trying, whether the OP maintained a close relationship with the strong-ties connection or not.

Education and Medical Recommendations

A total of 23% of comment threads ($n = 19$) dealt with medical recommendations. Commenters responded to OPs' inquiries about various aspects of vaccination, such as which vaccines an individual might need to prioritize if they had never been vaccinated at all or how to best get caught up on the schedule if he/she was behind. Commenters responded to direct questions with advice (e.g., here is a quick list of vaccines on the schedule). However, they also referred the OPs to see a physician as opposed to seeking medical advice on Reddit. As a commenter advised Participant 9:

“These are really questions you should be asking a medical professional, not Reddit. You're smart to recognize the source of your worries and try to dispel it. No one will laugh at you for asking these questions. Your doctor should be happy to explain how these vaccines work and what you can expect. I'd avoid going down the Internet rabbit hole.”

Commenters seemed to try to strike a balance between providing helpful advice and acknowledging the limitations to the help that they, as anonymous Internet strangers, could provide to the OP. Instead, they repeatedly referred the OP back to individuals in their strong-ties networks such as a doctor, school nurse, lawyer, or supportive friend or relative who might take up the pro-vaccine cause on behalf of OPs who were minors and too young to consent to vaccines without parental permission.

Commenters and OPs did engage in robust discussions about ways that parents could potentially find out that a teenager became vaccinated such as the privacy laws surrounding medical records and the amount, detail, and context of private health information that could potentially be revealed on insurance billing statements or medical Explanations of Benefits (EOBs) alongside suggestions to circumvent this disclosure.

DISCUSSION

The current study examined how OPs utilized Reddit to seek pro-vaccine information and advice as well as the strategic approaches recommended by weak ties

commenters. With original posts, individuals sought advice on navigating relational conflicts with strong-ties connections who have opposing vaccine values and expressed a need for empowerment. In response, weak ties connections provided shared experiences and validation, and some medical recommendations. However, just over a quarter of comment threads ($n = 21$) focused on encouraging OPs to let the issue go or to walk away from strong ties relationships. Notably, while the units of analysis in this study focused on threads related to traditional, longstanding vaccines/regular vaccine schedules, these findings are echoed in current discourse about the COVID-19 vaccine. For instance, a survey of 1,000 Americans revealed one in seven people have ended friendships over differing vaccine stances (Breen, 2021).

That being said, it may not always be feasible to walk away from strong-ties relationships, and a more helpful response may have provided strategies to resolve tensions between conflicting values, especially given power dynamics (e.g., children and teens wanting to get vaccinated against their parents' will). This resonates with prior research, which found that pro-vaccine individuals seem less likely to want to share their perspectives online or engage in vaccine dialogue with members of their strong-ties networks, who, theoretically, should most value their perspectives and be most likely to listen to their points of view (Krämer et al., 2021). For instance, Bradshaw (2023) found that pro-vaccine mothers preferred to “stay out of it” rather than spread accurate information about vaccines on Facebook, which might spark a conflict with their in-network peers. “Staying out of it” may be seen as a more viable alternative to being faced with a situation where they were forced to “just walk away.”

Similarly, Reddit has enabled vaccine advocates, such as Ethan Lindenberger, to advise teenagers in similar positions, who find themselves unvaccinated against their will. For instance, he has become a major advocate for the COVID-19 vaccine, telling teenagers via *NBC News*: “Teens faced with this have to weigh things like ‘I know vaccines are lifesaving, but I don’t want to become homeless,’” he said. “So, I tell them if you can’t have that loving conversation with your parents and you’re of age, weigh those consequences seriously...Don’t get yourself kicked out or seriously in trouble ... but, if you’re able to have that conversation, please get your shots as soon as possible,” he said” (Gostanian & Siemaszko, 2021). In the current study, Redditors revealed this fine balancing act that

Lindenberger addresses: complying with the rules instated by their parents to avoid punishment and following their own personal convictions.

As pro-vaccine commenters noted on Reddit, there is a growing perception that engaging in vaccine dialogue, which has only become more polarized since the emergence of the COVID-19 pandemic, is a pointless and futile exercise. In the current study, less than 20% of comment threads recommended standing up to a loved one who disagrees with vaccination. This polarization is also present in social media communities and in dialogue between commenters. Notably, despite Reddit moderator promises and platform policies to encourage vaccine communications that support public health consensus, in 2021, a proliferation of anti-vaccine subreddits and COVID-19 misinformation circulated on Reddit, leading the moderators of large subreddits to collectively send a letter challenging this. The CEO responded saying these anti-vaccine subreddits were not violating site policies. In protest, the moderators from the original letter shut down their subreddits. Following these interactions, in September 2021, Reddit removed one of the biggest anti-vaccine subreddits and marked 54 others with warnings, removing them from search results (Tiffany, 2021). The first rule of Reddit's content policies, which protects from bullying, hate speech, and violence threats has been interpreted to prohibit the spread of "falsifiable health information that encourages or poses a significant risk of physical harm to the reader" (Tiffany, 2021). The platform's reinforcement of its own policies in this case by removing one platform and issuing 54 additional warnings may contribute to users' willingness to visit Reddit for accurate health information and to trust and more readily enact Redditors' vaccine recommendations (Record et al., 2018).

Theoretical Implications

As Konstantinou et al. (2021) observed, vaccine attitudes and behaviors can be socially contagious based on whether one's social network perceives vaccines positively or negatively. Strong-ties network connections, including family and friends, are the most influential relationships throughout the course of an individual's life span (Konstantinou et al., 2021), and have been identified to be valued sources of information and support (Krämer et al., 2021). Wzrus et al. (2013) found pubescent adolescents begin developing emotional and behavioral autonomy and simultaneously desire larger, diverse social networks. By increasing connections with non-relatives and peers, teenagers, like

Lindenberger, who comprised one quarter of the OPs in the current study, may better satisfy their informational goals (Wzrus et al., 2013), through additional sources of bridging capital (Putnam, 2000). Younger OPs in the current study were advised to get vaccinated without their parents' consent via various 'loopholes,' or recommendations to get vaccinated as soon as legally allowed and hide it from their parents. Weak-ties connections outside of an individual's strong-ties network may be better equipped to provide skills and expertise to navigate online health information, with increased health literacy linked to bridging social capital (Kranich, 2021). Granovetter (1983) posited that the strength of bridging ties was based on the ability of an individual to gain novel information from those outside their network center. Research has found that age-related network changes, such as information seeking from weak-ties connections, are linked to major life events, such as puberty (Wzrus et al., 2013). This explains how and why teenagers, who are reaching the age of consent to make one's own medical choices, may then turn to Reddit for sources of bridging capital via weak-ties connections.

As identified in previous research and echoed in the current study, weak-ties connections can supplement or supplant the strong-ties network's advice, particularly in cases when strong ties support is weak or absent (Liu et al., 2020; Pool, 1980; Rains & Keating, 2011; Wright & Miller, 2010). In the present study, the findings regarding individuals seeking weak-tie support to make decisions regarding vaccination align with the results from Wright et al. (2010), especially when the individuals feel stigmatized or in opposition to others in their strong-tie networks.

Interestingly, in the current study, OPs visited Reddit to consult anonymous weak ties strangers about the OPs' own strong ties connections to discuss the potential of setting boundaries from or even ending strong-ties relationships (e.g., spouses, parents, siblings). Dialogue around this relational conflict in one's strong ties network played out where individuals consulted weak-ties posters about how to navigate relational conflict with some of their closest connections. In contrast to Krämer et al. (2021), whose recent research dismissed the strength of the weak ties theory in the context of Facebook, the current study found this theory to be highly relevant for Reddit, a platform that skews much younger demographically. We posit that individuals may have different priorities and health information seeking needs at different junctures in their lives, which could

partly account for this difference. Of the 48 OPs who directly shared their age, 92% of posters were younger than 30, and just under half of those identified in the age range of 13-18. Therefore, this study showcases the need for physician education of teenagers (25% of the sample) about vaccination, particularly those who are nearing or at the age of independent consent for vaccines.

From a marketing and communications standpoint, teenagers from anti-vaccine homes, who sought to get vaccinated once reaching the age of consent could potentially be used as influencers to encourage others to do the same. A recent article revealed teenagers have been successfully encouraging one another to get the COVID-19 vaccine, even though a poll by the Kaiser Family Foundation's Vaccine Monitor in April 2021 revealed nearly a quarter of parents surveyed would not allow their children, ages 12-15, to be vaccinated, and 18% more would only do so if schools mandated the vaccine. However, once minors reach the age of informed vaccine consent, which varies by state (Daly, 2021), they may be able to become fully vaccinated without their parents' knowledge or buy-in – if they attain sufficient encouragement, external validation, and affirmation from weak-ties sources. Similarly, pharmaceutical companies could consider an advertising strategy that targets teenagers as they reach the age of consent rather than simply to parents. Advertisements such as the Merck "Did You Know" HPV commercials are how teens learn about the vaccine, though research by Grantham et al. (2011) indicated medical professionals and mothers were still primary sources of influence on decisions regarding vaccine uptake or refusal. In fact, many of the commercials are aimed at parents of HPV vaccine-aged teens (McGinley, 2016), though more recent ads for the vaccine do speak directly to the teens and twenty-something individuals themselves (Andreou, 2018).

Furthermore, while timely COVID-19 vaccination uptake is important, health experts must not neglect to provide access to and awareness about other vaccines, the rates of which have been delayed or declining rapidly during the pandemic. In the U.S., the American Medical Association identified that pediatric vaccine rates were significantly lower for all ages during lockdowns from March to September 2020, and even after outpatient care safely reopened, barriers to vaccination remained. When vaccine doses are missed or substantially delayed in early infancy, it can lead to lasting repercussions and increased exposure to infectious diseases (Berg, 2021). Therefore, health communication

efforts should focus on promoting timely uptake of standard childhood vaccines in addition to COVID-19 vaccine uptake.

Limitations and Future Research

While our study presents several important findings, we encountered a number of limitations in the execution of the study. The first was reviewing data obtained via Reddit. This qualitative data is not generalizable and may not reflect actual vaccine behavior, since data triangulation was not implemented to discover if the individuals' actual vaccine status reflected their expressed stance on social media. Additionally, their comments on Reddit, written under an anonymous throwaway username, may be different than what these same users would express if their names were tied to their comments. This could be considered both a limitation (lack of verification of accuracy) and, simultaneously, a strength (participants may write more accurately "anonymously" and were not concerned with social desirability bias).

Finally, while this study was conducted prior to the COVID-19 pandemic and thus does not include the COVID-19 vaccine, the authors do not consider this a true limitation, as vaccine discussions on social media have been robust and consistent for some time. A *World Economic Forum Report* published back in 2013 warned that hyperconnected social platforms can spark "digital wildfires," perpetuating the spread of viral health misinformation, which is particularly problematic in a world where past successes in public health make it easy to forget ongoing threats including "emerging pandemics." During the COVID-19 pandemic, users consulted Reddit for vaccine information, with 1.6 million users having participated in "coronavirus" and "COVID" subreddits as of March 15, 2020 (Marzieh & Florea, 2020). Ellingson and Sotirin's (2020) data engagement model suggests data are made rather than found and dynamic rather than static. Thus, viewing this pre-COVID-19 data through the lens of the COVID-19 pandemic era provides additional perspective that could apply to vaccine discourse on social networks.

A follow-up study could use the current work as a baseline and return to Reddit to pull new threads from these same communities and compare the conversations unfolding now to the findings presented here. For instance, Brady et al. (2022) examined gendered pro-vaccine memes on Reddit, finding that this social media content "informed a trajectory of modern vaccine hesitancy and responses leading up to COVID-19" (p. 616). Future work

could survey Redditors about their uses and gratifications related to vaccine discourse on the platform. Future research could also potentially investigate the impact of network features, diversity of communication, and need for social support, specifically related to vaccines on communities such as Reddit and measure the potential impact of these health communication exchanges via social media.

In conclusion, the current study highlights the complicated relational dynamics in perceived controversial health communication choices, such as vaccination, and illustrates how social media enables this discourse, connecting otherwise-unconnected weak-ties users to inform and validate vaccine decisions, a “personal” choice which greatly impact society via community immunity. Echoing prior research, health promotion efforts should consider optimizing Reddit for health behavior interventions (Record et al., 2018) such as promoting vaccine uptake. Reddit communities can be explored to uncover specific aspects of vaccine dialogue and decision making that users find to be most contentious within their strong-ties networks to highlight which issues should be framed as most salient in vaccine educational materials and campaigns. Campaigns might choose to focus on providing factual information about a catch-up vaccine schedule geared toward teenagers from anti-vaccine households or provide support to these individuals as well as to their parents. Similarly, public interest communicators trying to promote increased vaccine uptake could use Reddit to reach their key publics.

The current study illustrates that weak-ties networks, such as Reddit, are highly consulted by pro-vaccine users both to ask questions and to seek and provide health information and advice. These discussion threads are robust and appear to serve as a key tool to navigate relational conflict within one's strong ties network related to vaccination. Individuals will most likely continue to seek health advice on Reddit, as it is perceived to be the most credible social platform for scientific information (Marzieh & Florea, 2020) and provides a perception of safety through anonymity. As Redditors appeared to rely on support from weak-ties Reddit connections to counteract the advice of unsupportive or absent strong-ties network connections, Reddit may encourage health decisions that align with scientific consensus and positively impact public health, even within communities where strong-ties connections are strongly opposed to vaccination (e.g., rural, conservative

communities). Thus, social media may impact society through facilitating weak-ties communities, which circumvent geographic boundaries and strong-ties' social norms.

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