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SPEECH ACT ANALYSIS: DISCUSSION ON COVID-19 VACCINE SIDE EFFECTS IN A FORUM

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ABSTRACT

Vaccines have been an important topic in recent years due to the prevalence of COVID-19. Discussions were mainly conducted online during this period, which makes COVID-19 discussion forums a great place to start examining the discourse surrounding this topic. The objective of this study is to examine the speech act strategies performed by participants in an online forum on their perception of COVID-19 vaccine side effects and how they promote or influence others with their viewpoints. The study extracted 7 pages or 105 posts, from a forum called Veda (Vestibular [inner-ear and brain balance] Disorder Association) as the data. Participants of different beliefs in the forum shared their thoughts upon taking the vaccine through the forum's "Covid-19 Vaccine Side Effects" tab. Using Searle's Speech Act Theory, the study first identified the types of speech acts performed. Then, each of the posts were categorised into three groups (pro, anti and vaccine-hesitant groups) based on the content and previous posts made by the same participant. Findings revealed that assertives (46.9%) were the most prominent speech act, amongst all three groups. The pro and anti groups who had a firmer position on vaccination used more assertives as compared to vaccine-hesitant groups who used slightly more directives to request answers or clarifications. Declaration (1.9%) speech acts were used the least frequently since participants did not possess a special institutional role to bring about changes in real-life other than possibly influencing the perceptions of other participants.

Keywords: *speech act theory, online forum, COVID-19, vaccines, computer-mediated communication, synchronous discussions*

INTRODUCTION

Since the beginning of the COVID-19 pandemic, discussions on vaccination have been at an all-time high. This is most evident online, especially in forums and social media. These platforms do not only help people socialise but are also used for educational purposes, including medical and scientific information (Ladyanna & Almos, 2020). What sets online forums apart is their ability to facilitate short or long discussions that eventually develop into threads to ease users who are interested in keeping track (Chaka, 2020). This provides an ideal environment for topics with controversial opinions. With so many differing opinions on COVID-19 vaccination, it's important to investigate how pro, anti and vaccine-hesitant groups present or promote their beliefs in online forums. Examining the speech act strategies of the posts will help us map out how the different groups structure their opinions or statements on the topic. Understanding this will give us an idea about how certain groups influence the people around themaffecting public opinions on vaccination. This study will answer the following research questions:

1. What speech act strategies are used in COVID-19 vaccine discussion forums?
2. How do pro, anti and vaccine-hesitant groups perform speech acts to promote their viewpoints in a vaccine discussion forum?

However, the study is not without limitations. Due to the topic's novelty at the time of the study, not many online forums have discussion threads on COVID-19 vaccines. Additionally, the current study chose seven pages out of the 905 pages available on the forum due to time constraints.

LITERATURE REVIEW

Much research has been done on speech acts in online forums, but very little on vaccine discussions and certainly fewer regarding COVID-19 vaccines. Several recent studies examining forums focused on requests, which is unsurprising, considering that forums are used for sharing and obtaining information. For instance, Rosari (2020) looked at how the speech act of request was performed in 107 posts in an online forum on Top Law School (TLS) and found that they were presented using declaratives, interrogatives and imperatives. Shboul (2020) also examined the request strategies of 292 posts made by males and females in two online religious forums using Searle's (1979) and Blum-Kulka and Olshtain's (1984) framework. This was also examined in Shanthi et al.'s (2019) study, where participants used speech acts like questioning, explaining and suggesting in Malaysian web forums. Whether requests are also common in COVID-19 discussions will be examined further in the paper. Meanwhile, studies that investigated conversations on vaccines looked at speech acts in a Facebook discussion using the illocutionary acts proposed by Leech (1983). It was found that the discussions contained a majority of 76.47% of hate speech, followed by 32.21% (incitement), while only 1.18% of the data was used for praising (Claudia & Wijayanto, 2020). In addition, Zakir et al. (2021) found that although the target group of the study weren't affected by hate speech, it can still incite violent developments in the real world. As such, online forums offer an interesting data set to investigate speech acts surrounding controversial topics. In another study, Bonnici and Ma (2021) examined Facebook comments left by a pro, anti and vaccine-hesitant groups using Austin's (1975) Speech Act Theory. They found that anti-vaxxers performed a majority of 40% locutionary acts, while both anti and pro-vaxxers performed 40% of illocutionary acts, leaving only 20% of perlocutionary acts by vaccine-hesitant groups. Since vaccine-hesitant groups did not have an argument to present, they frequently sought information or evaluated arguments from either side (Bonnici & Ma, 2021). Contrastingly, other studies found a distinct correlation between speech acts and their influence on the recipients' perceptions. For example, Agwuocha's (2021) study analysed COVID-19-related information shared on Twitter using Austin's (1975) Speech Act Theory and Culpeper's (1996) impoliteness theory and found a certain degree of unrest in the community from the replies. Similarly, Bonnici and Ma (2021) explained that there was a tendency to focus on negative comments, straying further from the group's main objective, which was to facilitate discussions on COVID-19 vaccines. Furthermore, unlike face-to-face conversations, online forums allow participants to participate in multiple conversations or threads at a time. Chaka (2020) defined this as polylogues in their study, which involves discussions by either one or many participants spanning across multiple threads. Online forums allow asynchronous discussions and schisms (when a discussion splits in two directions and requires a participant to shift their focus), whichcan affect a participant more than if the discussion was held in person (Chaka, 2020). Taking this into account, the study found that greeting and performative speech acts like advising and informing as some of the most performed speech acts in polylogal discussions. As seen above, although many studies focused on speech act strategies on online forums, COVID-19 vaccine is a topic that remains unclear. Understanding conversations on this topic can reveal the public's perceptions and what drives their opinions in this critical time.

METHODOLOGY

Theoretical Framework

Searle's Speech Act Theory (1979) has become an important theory in the past few decades, influencing ideas and theories in human and cognitive sciences (Nordquist, 2020). Building on Austin's (1962) speech act theory, Searle united the three main aspects of speech acts: utterance, meaning, and action (Saragi et al., 2019). Austin (1962) initially distinguished speech acts as locutionary act, illocutionary act and perlocutionary act. Austin's category of speech act was criticised and revised by many other scholars, including Searle (1979). As an extension, Searle (1979) further categorised illocutionary acts into assertives, commissives, directives, expressives and declarations.

When describing how things are in the world, speakers achieve the assertive points; when committing themselves to act about something, the commissive point is applied; when speakers attempt to get hearers to do something, they apply the directive point; speakers achieve the declaratory point when they act in the world at the time of speaking just by stating that they do; when they express their attitudes about objects and world facts they achieve the expressive point (Vanderkeven & Kubo, 2002). Furthermore, discussions on online forums come with more explicit information that are otherwise absent in face-to-face conversations. Utterances made in face-to-face conversations may not be as direct or explicit since there could be the use of facial expressions and body language that may alter the meaning. Therefore, Searle's (1979) theory is particularly useful in studying the perceptions and subsequent actions the participants from an online forum could potentially take. To illustrate, Table 1 shows a summary of Searle's theory.

Table 1 Speech Act Theory (Searle, 1979)

Speech act	Content	Examples
Assertives	State what the speaker believes to be the case or express the speaker's belief.	Asserting, claiming, concluding, reporting…
Commissives	Commit the speaker to future actions, also express what the speaker intends and can be performed by the speaker alone or as a group member.	Promises, threats, refusals, pledges…
Directives	Aim at making the hearer do something or express what the speaker wants.	Advice, commands, orders, requests…
Expressives	State what the speaker feels or express the psychological states of the speaker.	Pleasure, pain, likes, dislikes…
Declarations	Words and expressions that change the world by their very utterance. However, the speaker needs to have a special institutional role in a specific context in order to perform a declaration aptly.	I declare… I nominate… I resign…

Sampling

The current research data are from an online forum named Veda (Vestibular [inner-ear and brain balance] Disorder Association) Forum. This forum has 905 pages and 13575 posts in total at the time of data collection. This forum has a strong influence among the limited number of forums which are COVID-19 vaccines related. This is largely due to a large number of visits (18 million) on the forum since 2012 and many of the 7,635 registered participants in the forum contribute to the discussions. As such, this forum provides a good data source for the purpose of the study. Taking "Covid-19 Vaccine Side Effects" as a topic, the forum participants actively shared their thoughts and experiences under their usernames. The researchers collected the posts from 7 pages using simple random sampling, and a total of 105 posts were extracted for this study. No permission was needed as the posts were posted publicly on a forum. However, usernames and profile pictures are omitted to protect the identity and privacy of the participants involved. Participants who only posted once within the selected data or if their attitudes towards vaccination were not explicitly conveyed were excluded from the three groups.

Data Analysis

Using a qualitative method, the study designed the following analytical steps. First, the data were coded according to the categories of Speech Act Theory (Searle, 1979). This was followed by referring to the first research question, which was answered at this point by counting the percentage of the overall speech acts. In the final step, the second research question was addressed by counting the number of each speech act used by pro, anti and vaccine-hesitant groups. This was done by comparing all of the posts made by the same participant using thematic analysis, the data were categorised further into pro, anti and hesitant according to the attitude they have displayed in the posts towards vaccines. Participants who only posted once or twice and did not explicitly state their views on vaccination were labelled 'undetermined' and were excluded in the second part of the data analysis.

RESULTS

Occurence of Speech Act Strategies throughout the Forum

The first research question investigates the speech act strategies used in COVID-19 vaccine discussion

forums. Table 2 illustrates the breakdown of speech act strategies in the data collected. The table shows that assertives are the most prevalent speech act that occurred 173 times in the data. The second and third speech acts are directives and expressives, which occurred less frequently than assertives, with an occurrence of 90 and 87, respectively. The fourth one is commissives, which occurred 23 times, followed by declarations, which only occurred 7 times.

Table 2 Breakdown of Speech Act Strategies

Speech Acts	Occurrence
Assertive	173
Directive	90
Expressive	87
Commissive	12
Declaration	7

A pie chart is provided below to give an overview of the results from Table 2. From the pie chart, we can see that assertives take almost half of the overall pie. Expressives and directives also have a significant role in the overall data. However, the occurrence of commissives and declarations are quite low compared to other speech acts, with a percentage of only 5.2% in total.

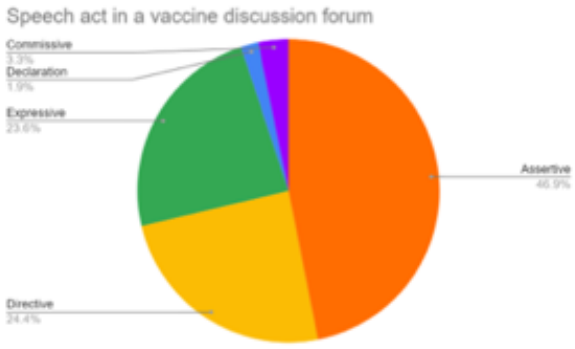


Figure 1 Breakdown of Speech Act Strategies

The selected data below demonstrates some of the speech acts found in the data to reflect the percentages found in Figure 1. Examples will be given per section, starting with 5.1.1 Assertive (46.9), 5.1.2 Directive (24.4%), 5.1.3 Expressive (23.6%), 5.1.4 Commissive (3.3%) and 5.1.5 Declaration (1.9%). This section of the analysis will be used to answer the first research question, which investigates the types of speech acts found in the forum. The reason for separating this section from the pro, anti, and vaccine hesitant group sections is because this section reveals the speech act patterns found across the forum, which can give us an idea of the typical strategies used and the atmosphere in a COVID-19 vaccine discussion forum.

Assertives (46.9%)

According to Searle (1979), assertives are only performed if users believe what they are saying is true. It is used to express an individual's belief. This includes utterances or sentences used to assert, claim, conclude or report. Figures 2 and 3 show several examples of assertives performed within a post by different participants.

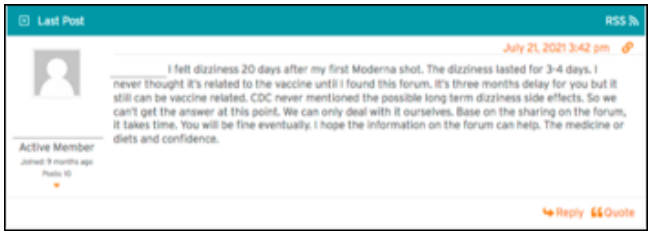


Figure 2 Example of Assertive

In the first comment analysed within the scope of the data, the participant performed several assertives. The participant reported that "I felt dizziness 20 days after my first Moderna shot" in reply to the previous statement or request for more information on the side effects after receiving the Moderna vaccine. Then, continuing with an assumption, saying, "Itis three months delay for you, but it still can be vaccine-related". This is despite the participants not having met in person, signifying this sentence to be more of an assumption rather than an assertion. The following assertive of the post suggested, when the participant said, "We can only deal with it ourselves. Based on the sharing on the forum, it takes time. You will be fine eventually". The participant suggested that the previous poster deal with whatever side effects on

their own with an assertive as there is no concrete information on vaccine side effects at the moment.

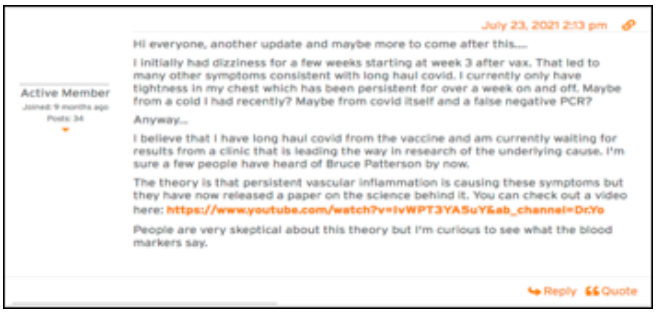


Figure 3 Example of Assertive

Figure 3 shows the use of multiple assertives starting from "another update and maybe more to come after this…." to inform readers of the forum that this post was going to document the participant's experience following their COVID-19 vaccination and that there might be more updates following this post, indirectly urging readers who are interested in following their posts closely for more updates. The post continued with, "I initially had dizziness for a few weeks starting at week 3 after vax", which was a form of reporting used to let readers know of their symptoms upon vaccination. The sentences "Maybe from a cold I had recently? Maybe from covid itself and a false negative PCR?" seemed to imply a form of assumption used as a possible explanation for the participant's vaccination side effects. The two sentences, phrased as questions, can be considered an assumption under assertives as the participant put forth two possible explanations, assuming that the cause for the side effects could be one or the other. The sentence "I believe that I have long haul covid from the vaccine and am currently waiting for results from a clinic that is leading the way in research of the underlying cause" showed the use of predicting, also under assertives. By starting the sentence with "I believe", the participant was not entirely sure that what he was predicting was true, but evidence gathered by the participant seemed to point to that direction, which the participant is currently led to believe, making this a form of assertive. The following sentence, "I'm sure a few people have heard of Bruce Patterson by now", is a form of assertive used to insist on certain information to others. Through the use of "I'm sure, " the participant assumes that most readers would be aware of the person named Bruce Patterson and insisted that this person had a sort of influence in conversations surrounding the topic of "long haul covid" to a certain degree. "The theory is that persistent vascular inflammation is causing these symptoms, but they have now released a paper on the science behind it" is a form of informing. The participant informed their readers that "persistent vascular inflammation" could be the explanation to long-lasting vaccination side effects and backed this up with a published paper. The final assertive of the post is, "People are very sceptical about this theory, but I'm curious to see what the blood markers say". The first part of the sentence is used to inform readers that the theory mentioned in the previous sentence was not entirely foolproof; however, the participant mentioned in the second part of the sentence that they were "curious to see what the blood markers say", which was a form of admitting, showing that despite the questions surrounding the theory, they were still curious to see if there would be sufficient evidence supporting the theory.

Directive (24.4%)

Directives are used to express a participant's intention and to commit them to future action. This includes sentences used to promise, threaten, request, demand and beg. Figures 4 and 5 show some examples of directives used in forum posts.



Figure 4 Example of Directive

As shown in Figure 4, the participant posted a reply while performing several directives. The post started with the participant asking, "for how long *does spike protein toxicity* will last?" in reply to a previous post on what spike protein toxicity does. The post ended with requests for information in "do you have any more information?why did it last for so long?!". Since the previous two sentences already emphasised the participant's need for more information, this sentence was used to provoke replies from other participants.

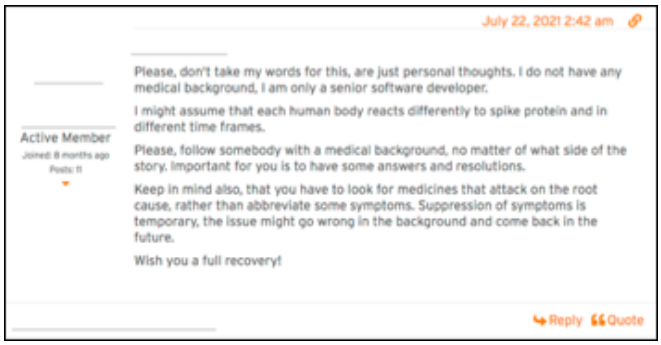


Figure 5 Example of Directive

Figure 5 shows the use of multiple directives. The post began with, "Please, don't take my words for this, these are just personal thoughts. I do not have any medical background, I am only a senior software developer", which is a form of purging. The participant wanted to share their thoughts on why certain people may have different side effects to the vaccine but emphasised that they do not have "any medical background", in turn, urging the person the participant was replying to and other readers not to take their word for it, but still consider what they had to say at the same time. The third paragraph, "Please, follow somebody with a medical background, no matter of what side of the story. Important for you is to have some answers and resolutions", is a form of purging. By saying 'please', attention was brought to the following sentence to urge readers to only listen to qualified medical professionals instead of just anyone on the Internet. The following sentence, "Keep in mind also that you have to look for medicines that attack the root cause, rather than abbreviate some symptoms", is a form of directive used to remind or urge. This can be seen with the use of the phrase 'Keep in mind', which signified that it was assumed that readers already have the information the participant was about to give out, and the information conveyed subsequently was used to remind readers to look for the right medicine for the root cause of the side effects, rather than just addressing certain symptoms. The final sentence, "Wish you a full recovery!" is a form of praying. This sentence is considered a directive as the participant expressed their wish for another person to recover soon. The sentence did its job of conveying what the speaker wanted for the hearer.

Expressive (23.6%)

The expressive speech act is used to express the participant's psychological state or feeling to another individual or group of people. This includes sentences used to boast, complain, praise and greet. Figures 6 and 7 demonstrate some of the forum posts using the expressive speech act.



Figure 6 Example of Expressive

In Figure 6, the participant used a series of expressives. The first was 'Good one', supposedly used to compliment an idea or statement written by a participant in another post. This is followed by 'State the obvious doc! Like duh', which can be seen as a form of boasting, as the participant expressed that the doctor's answer didn't satisfy them and that they already knew the information the doctor provided. 'Will continue to read and pray and dis doctors as humans with greed and God complexes. It's the age we live in' showed the use of complaining and deploring. This sentence is laced with sarcasm since the word 'pray' is more often used to hope for something positive, but in this case, it's for 'humans with greed and God complexes', which shows that the participant deplores the situation they are in currently, but am not sure what else to do but to keep watching. Through the complaint 'it's the age we live in', we see once more how the participant is unsure of what else to do but to accept whatever's to happen but still clearly unhappy with the arrangement.

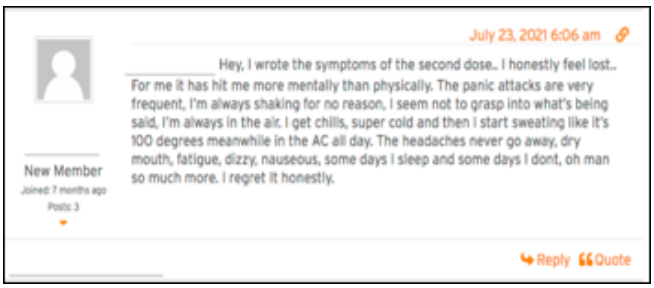


Figure 7 Example of Expressive

Figure 7 shows the number of expressives performed by the participant. The post began with a greeting, "Hey". A large number of the posts found within the scope of the data began with a greeting, with some addressed to a specific person or to readers of the forum in general. In this post, the greeting "Hey" was addressed to another participant. The following sentences, "I honestly feel lost…For me it has hit me more mentally than physically", were expressives used to lament. The participant displayed great sorrow and fear after completing her second vaccination. The sentences successfully conveyed the participant's feelings and psychological state through 'I honestly feel' and 'For me'. A large chunk of the post, "The panic attacks are very frequent, I'm always shaking for no reason, I seem not to grasp into what's being said, I'm always in the air. I get chills, super cold and then I start sweating like it's 100 degrees meanwhile in the AC all day. The headaches never go away, dry mouth, fatigue, dizzy, nauseous, some days I sleep and some days I dont, oh man so much more" were used to complain. The participant shared their harrowing experience with the side effects in detail by saying that they had suffered from 'panic attacks, chills, headaches and several other symptoms. Following the previous sentence, "For me it has hit me more mentally than physically", these complaints fully justified the sentence used for lamenting earlier on in the post. The post ended with "I regret it honestly", which is a form of lamenting once again. This sentence showed the participant's regret for going through such side effects after vaccination.

Commissive (3.3%)

Commissive speech acts are used to express what a participant wants and attempt to make readers do something based on the speech act performed. This includes advice, commands, orders or even requests. Examples of commisive speech acts found across the forum are provided in Figures 8 and 9.

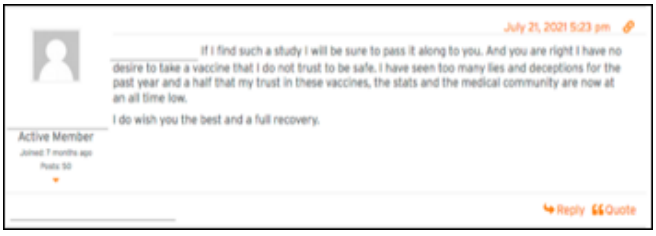


Figure 8 Example of Commissive

Figure 8 shows one instance of commissive in 'If I find such a study I will be sure to pass it along to you'. This is in reply to a request to the participant regarding sending over a study on ivermectin with a post-COVID group. Here, by saying, 'I will be sure to pass it along to you', the participant promises to send over the mentioned study if they manage to find it. Most posts made using commissives were made to promise, just like the example in Figure 8.

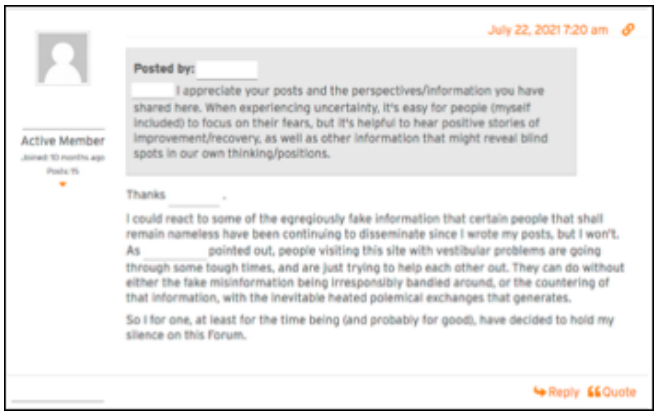


Figure 9 Example of Commissive

Unlike most commissives found in the data thus far, Figure 9 shows a different use of commissives. In reply to another post, the participant performed a commissive used to threaten "I could react to some of the egregiously fake information that certain people that shall remain nameless have been continuing to disseminate since I wrote my posts". This agreed with a previous statement on how many posts in the forum were only focused on the negative side effects of vaccination. It is important to note that the participant's threat was not directed to a specific individual despite the post being a reply to the previous statement. The sentence served as a warning to readers of the forum regarding the spread of fake information and that the participant had the means of retrieving the names of those who participated in spreading fake information previously.

Declaration (1.9%)

Declaration speech acts are used to change the state of the world or a participant's surroundings. According to Searle (1979), the participant must have 'a special institutional role' in that context in order to perform a declaration. This includes sentences used to declare

and nominate. Examples of declarations are rare in the analysed data and Figure 10 shows one of the few examples of a declaration speech act found.



Figure 10 Example of Declaration

Figure 10 comes from the same post as Figure 9, but a different portion of the post will be analysed. Figure 10 shows only one instance of declaration, which is in 'So I for one, at least for the time being (and probably for good), have decided to hold my silence on this Forum'. Here, the participant declared that they have decided to hold their silence regarding the topic of vaccine side effects since people keep disseminating false information, hindering people who visit the forum from finding helpful information. Due to that, the participant openly declared that they would not comment further on the topic for everyone's benefit in the current post. Although the participant did not have 'a special institutional role' per se in this context, the participant provided a sound argument and declared that they would stop posting afterwards, which solidified their position as a valuable participant who challenged the beliefs of many others in the forum. Readers may choose to ignore or agree with the participant's view on the false information spreading around the forum and his choice to remain silent, but the participant's post would serve as a reminder of the importance of posting responsibly, which may or may not affect the posts made by other participants afterwards. Therefore, this sentence is congruent with the definition of the declaration adopted by this study.

Speech Act Strategies Used by Pro, Anti and Vaccine Hesitant Groups

The second research question aimed to examine how pro, anti and vaccine-hesitant groups perform speech acts to promote their viewpoints in a vaccine discussion forum. Building on the previous section analysing speech act patterns found in the forum, this section investigates the posts made by each group in more detail to make generalisations on the type of strategies typically used, especially when participants are on different ends of the spectrum. The results obtained from the data are presented in Figure 11, labelled according to the five different speech acts along with the groups who performed them.

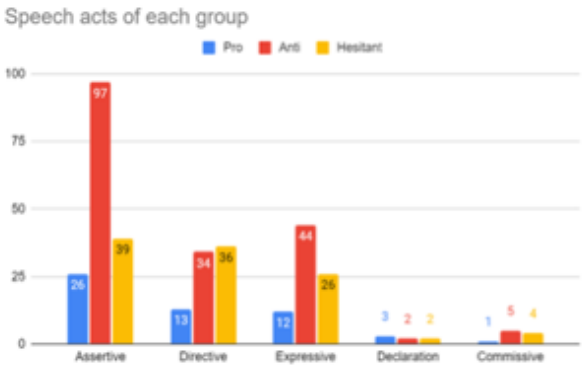


Figure 11 Speech Acts of Each Group

Data from this chart can be compared with the data in Figure 1, which shows a slight difference in the use of speech acts. The pro-vaxxer group used assertives most, followed by directives and expressives. The declarations and commissives are the least used speech acts by the vaccine-pro group. This result is almost consistent with Figure 1 except for the last two speech acts; that is, the least used speech act of the pro-vaxxer group is commissives instead of declarations. The anti-vaxxer group is the dominant one among the three groups. As seen in Figure 11, the anti-vaxxer group reported significantly more assertives than the other two groups; meanwhile, the assertives are also the most prevalent speech acts used by the anti-vaxxer group. Expressives and directives contribute to the second and third frequency of occurrence of the anti-group. This is consistent with Figure 1, where declarations were the least used speech act right behind commissives. From the chart above, we can see that the hesitant group used a close number of assertives and directives, which are also the first and second most frequent speech acts of the hesitant group. Same with the anti-group, declarations of the hesitant group were the least frequent speech act which is two less times than commissives. Overall, we see all groups contributing the most to assertives, and all groups least use the declarations and commissives. However, not all members of the forum clearly displayed their opinions on vaccination despite discussing it. So, when we can't determine their attitude, or there are too few posts to establish their views, we have labelled them

as 'undetermined'. One interesting finding that we found in the study was that some members seem to 'switch sides' as the discussion went on; one member started off with hesitant tendencies and settled on anti towards the end. Examples of the posts made by each group are presented below, beginning with the pro-vaxxer group, then the anti-vaxxer group, and finally, the vaccine-hesitant group. The posts will be analysed sentence by sentence using the five speech acts.

Pro-vaxxer Group



Figure 12 Example of a Comment Made by a Pro-vaxxer

Figure 12 is an example of one of the many posts made by those considered to be a pro-vaxxer based on previous posts and has continued to show pro tendencies throughout the overall posts written by the same participant. In reply to a previous post, the participant informed that 'We got the Pfizer one day apart' to inform the previous poster that theywere in the same situation to provide the context before explaining further. "I'm so glad to hear you're back to normal!" is an expressive used to congratulate, showing that the participant is happy that they've recovered. This can be seen with the word 'I'm so glad'. The sentences following this one, "I just got my second shot last Monday, and so far I'm doing OK. I only felt off the first day and then had a couple of mild "sensations" that lasted very briefly", is a form of reporting to let others know of their own experience taking the vaccine and the side effects following it. The sentence "I just got my second shot last Monday, and so far I'm doing OK" also implied pro tendencies since the person did not hesitate to receive the second shot and did not discourage others from taking it as well by adding that they're feeling fine after getting vaccinated. The post ended with, "I'm not surprised…until the 12-week mark" which is a form of commisive used to promise. This can be seen with the use of 'will continue to monitor', which can imply that the participant will either promise to continue monitoring until the 12-week mark, which is the period recommended by their doctor to watch out for side effects, or a promise to the previous poster and other readers of the forum to update their condition after the 12-week mark.

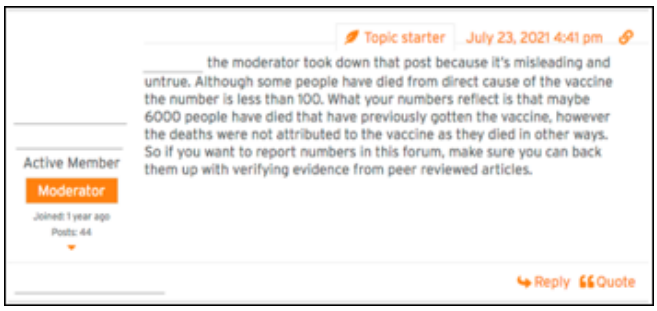


Figure 13 Example of a Comment Made by a Pro-vaxxer

Figure 13 is another example of a post made by a participant with pro tendencies. In reply to a post about people dying from getting vaccinated, the participant replied by starting the post off with an assertive, "the moderator took down that post because it's misleading and untrue". Through asserting, the participant made their position clear that they believe the post containing information of a person dying from the vaccine was 'misleading and untrue'. This assertion was backed up with evidence as the participant reported, "Although some people have died from the direct cause of the vaccine, the number is less than 100". This sentence was written to highlight a point in another post. However, explaining that there's more to the data than what was suggested by the previous participant. The participant continued by using yet another assertive to disclaim in, "What your numbers reflect is that maybe 6000 people have died that have previously gotten the vaccine, however, the deaths were not attributed to the vaccine as they died in other ways". Here, the participant discredited the previous poster by highlighting that people should not take reports and data at face value but rather looking at the bigger picture to understand the situation better. The post ended with a directive used to demand and warn "So if you want to report numbers in this forum, make sure you can back them up with verifying evidence from peer-reviewed articles". The final sentence of the post warned participants to share only verified information from reliable sources should they choose to post in a forum. Since the post was addressed to a specific individual, itcould have been used to demand only verified information from the previous poster should they choose to retaliate. The sentence "the moderator took down that post because it's misleading and untrue" and "so if you want to report

numbers in this forum, make sure you can back them up with verifying evidence from peer-reviewed articles" both displayed pro tendencies since the participant did not hesitate to assert that the post made regarding vaccine-related deaths was 'misleading and untrue' and demanded verified information on this topic from only 'peer-reviewed articles'.

Anti-vaxxer group



Figure 14 Example of a Comment Made by an Anti-vaxxer

Figure 14 shows a post by someone who seemed to regret taking the vaccine. The participant started with an assertion to confess, saying, "This vaccine is not a joke… I feel so stupid to have not researched about these horrible side effects before taking the jab". This sentence shows that the person was reluctant and ashamed to share that they regretted not having done enough research on the vaccines before taking them. This is followed by "if I had visited this forum I would have never taken this crap…I hate to live like a walking zombie" and "Its been like 10 weeks now and still couldn't see any light at the end…One of the worst mistake I have ever done in my life is taking this vaccine", which is a form of expressive functioning to complain by reinforcing the fact that they truly regret their decision to get vaccinated. "I read that single shot of the Az vaccine has about 5x10*10 viral vectors" is an assertive used to inform and give context, so that they can proceed with the next sentence, which is the directive "The question is which cells do they infect inside our body?" used to ask if anyone has any information on whether taking the vaccine would cause some of their cells to be infected. The following sentence, "It could be any cell, it can go to any organ and infect it and produce viral spike protein and the poor infected cell would be destroyed by our own immunity cells…" is another form of assertion used to suggest their own opinions on the issue. This can be seen with 'It could be' and 'it can go to any organ and infect it'. Rather than phrasing it as a question, it seemed the participant believed this to be true by using an assertive. This is followed by, "So why long haulers? may be our body has not been able to create enough antibodies against the spike protein and maybe our cell mediated immune response is activated and it is taking weeks to clear all those infected cells, but again which cells are infected is a million dollar question…" is a series of assertives used to suggest. Although the sentences were phrased as though the participant was unsure of the information they were sharing, the details shared in this paragraph were new information previously not mentioned by the participant themselves or by any other participants of the forum, yet a detailed explanation was given for the question posed by the participant themselves. This indicates that the participant meant for the sentence to be a suggestion in the form of an assertive. The post ended with "How long do we have to face this nonsense? When are we going to be ourselves again? when does this medical fraternity going to accept and address our issues?" which is a form of directive used to demand. This sentence is used as a question, but is unlike the previous sentence, "The question is which cells do they infect inside our body?" as the last few sentences were all questions directed at the same person not involved in the current discussion on the forum, showing that the participant is very frustrated and demanded answers for the situation they were put in. The first few sentences already showed that this person had anti-tendencies with phrases like "I feel so stupid to have not researched about these horrible side effects before taking the jab, "if I had visited this forum, I would have never taken this crap", "one of the worst mistakes I have ever done in my life is taking this vaccine". Not only did they share their experience taking the vaccine, but they also discouraged other people from taking it by showing regret and providing information against it.

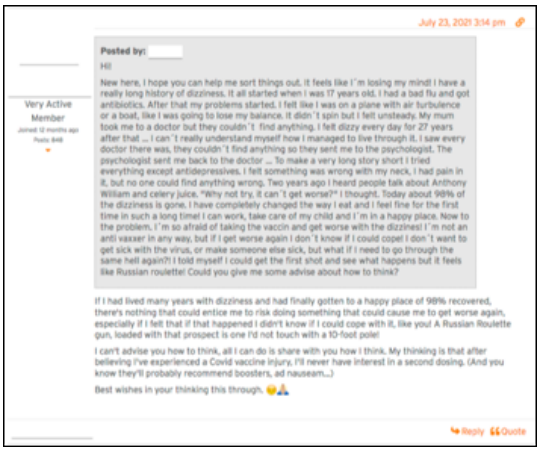


Figure 15 Example of a Comment Made by an Anti-vaxxer

Figure 15 is another post made by someone with anti-tendencies. As a reply to a previous post, the post started with, "If I had lived many years with dizziness and had finally gotten to a happy place of 98% recovered, there's nothing that could entice me to risk doing something that could cause me to get worse again, especially if I felt if that happened, I didn't know if I could cope with it, like you!" which is a form of commissive used to swear. This can be seen with the use of 'there's nothing that would entice me', which demonstrated the participant's firm decision not to get vaccinated to avoid worsening their condition. The following sentence, "A Russian Roulette gun, loaded with that prospect is one I'd not touch with a 10-foot pole!" is a form of assertive used as statement. This sentence is more of a metaphor to back up the previous sentence as an explanation and should not be taken literally. The following paragraph, "I can't advise you how to think, all I can do is share with you how I think", is a form of assertive used to inform. Through this sentence, it is understood that the participant only informs other readers of the forum of their experience with vaccination and does not want to impose on others to think the same way. This is followed by a confession in the form of an assertive in, "My thinking is that after believing I've experienced a Covid vaccine injury, I'll never have interest in a second dosing". Here, the participant confessed that they did not intend to get vaccinated for a second time after experiencing the side effects from the first dose. A bracketed sentence followed, "(And you know they'll probably recommend boosters, ad nauseam…)", which is a form of assertive used to guess. This can be seen with the use of the word 'they'll probably' and 'ad nauseam', as the participant mentioned that they have seen this being done many times and were guessing that the call to receive additional doses could happen yet again in the future based on past experiences. This fits the definition of assertives in this study, as can be seen from the final sentence where the participant expressed that they truly believed what they said would happen in the future. The post ended with "Best wishes in your thinking this through", which is a form of directive used to pray for another individual. This is evident with the use of 'Best wishes'. This post is one of many posts made by the same participant. However, it is clear from this post itself that the participant had anti-tendencies. This is obvious from "there's nothing that could entice me to risk doing something that could cause me to get worse again" as explained previously, the participant used a commissive swearing that they would not take the vaccine to avoid risking worsening their condition after vaccination. "I'll never have interest in a second dosing" also showed that the participant had taken the first dose of the vaccine but was beginning to regret their decision and would never take another.

Vaccine-hesitant group

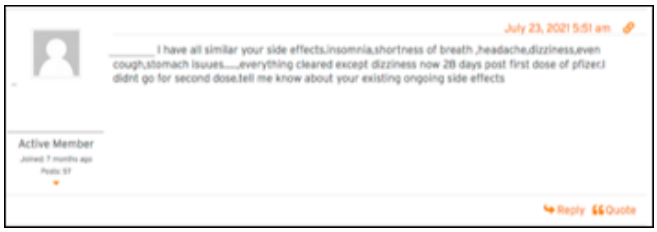


Figure 16 Example of a Comment Made by a Vaccine-hesitant Participant

Vaccine-hesitant groups are harder to determine, as shown in Figure 16. These groups may not have a clear argument and tend to lean towards a certain side without showing obvious pro or anti tendencies. This participant is an interesting case, as it was determined that this participant belonged to the hesitant group due to their continuous effort in seeking information, but they did not quite decide on which side to choose until later on in the analysis, which will be shown in Figure 17. In Figure 16, "I have all similar your side effects. Insomnia, shortness of breath, headache, dizziness, even cough, stomach issues….., everything cleared except dizziness now 28 days post first dose of Pfizer. I didn't go for the second dose," were all assertives used to report the side effects they're experiencing and their vaccination status to a previous post. The post ended with a directive used to request information in the sentence "tell me to know about your existing ongoing side effects". The fact that the participant shared the numerous side effects upon taking the first dose and recovering from them but not advocating for other people not to take the vaccine showed that they were not entirely against vaccinating. However, the sentence "I didn't go for second dose" could be an indication that they were worried about the same side effects after taking another shot, which prompted the participant to request more information from people who got vaccinated about their side effects, which could possibly sway the participant to stay in either side of the group.



Figure 17 Example of a Comment Made by a Vaccine-hesitant Participant

Here we see the same participant's post in a later section. "The Thing is that I didnt have any vestibular problem before this vaccine", is several expressives used to complain as the person was frustrated that key information about the vaccines were not shared, and that they didn't find out until it was too late. "They just want to inform that we vaccinated a high percentage rate of people. they dont care our side effects.I dont trust cdc or official channels any more. They are mixed with politic!" is a form of assertive used to blame. These sentences were used to blame key figures of the vaccination programme and to make someone take responsibility for people who got serious side effects from the vaccine. At this point of the analysis, this participant started to show anti tendencies by complaining and blaming, as opposed to previous posts where they only requestedfor information.

Figure 18 shows another example of a participant seeming to be hesitant. The post started with an assertive used to inform "I posted a while back but thought I would write again". This post was not addressed to anyone specific, so this can be seen as an act of informing readers of the forum.



Figure 18 Example of a Comment Made by a Vaccine-hesitant Participant

The following sentence, "Any encouragement or or advice would be appreciated" is a form of directive used to request. 'Any encouragement' and 'would be appreciated' showed that the participant was requesting some sort of information or help from anyone who could offer them. The final sentence of the paragraph, "I am feeling a bit discouraged", is a form of expressive used to complain. This sentence shared the current mental state of the participant. The following few sentences "I had the Astra Zenica shot and about 6 and a half weeks ago the Pfizer vaccine. I was advised the mix and match would be Ok! I had no health issues before the vaccine. Healthy and active. Since the last vaccine, I have had the following symptoms. A pressure in my head…sometimes better, sometimes worse…days vary! I had dizziness and unbalanced feelings but that seems to have gotten better" is a form of assertive used to report the participant's experience with the vaccine side effects. The following paragraph ", The one symptom that seems to be most challenging right now is the feeling of flight or fight…rushes and feeling like I have just downed 10 cups of coffee. It comes and goes and some days better or worse. My body feels like it is vibrating! Thankfully I can still function but it is really strange and I am not used to it! Like high anxiety!" consist of a number of expressive used to complain. This is different from the paragraph beforeas the participant made this paragraph more personal by writing 'seems to be most challenging', 'like I have just downed 10 cups of coffee', 'Like high anxiety!'. These phrases expressed the side effects in more detail, including how they felt when experiencing them, making these sentences expressives. The following sentence, "Has anyone experienced this?" is a form of directive used to ask. 'Has anyone' prompted readers with the same experience to reply. "I have read some posts that said it took 12 weeks for some of these symptoms to go away" is an assertive used to inform. This sentence showed that the participant had acquired this information elsewhere and wished readers to be informed of this as they read the post and decided whether they would reply or not. The post ended with "I would like to get some feedback from others about this. Any recommendations and words of advice would be appreciated!" is a form of directive used to request. As mentioned at the beginning of the post, the participant had asked for more information on whether other people experienced the same side effects upon vaccination. The post ended with the same request, which showed that the participant genuinely needed help from those who could provide it. The participant did not exhibit obvious anti-tendencies since the sentence "I had the

Astra Zenica shot and about 6 and a half weeks ago the Pfizer vaccine. I was advised the mix and match would be OK!" demonstrated that the participant took the vaccine and did not show regret or discouraged others from getting vaccinated. However, several sentences like "Any encouragement or advice would be appreciated. I am feeling a bit discouraged!", "The one symptom that seems to be most challenging right now is the feeling of flight or fight…rushes and feeling like I have just downed 10 cups of coffee. It comes and goes and some days better or worse. My body feels like it is vibrating! Thankfully I can still function but it is really strange and I am not used to it! Like high anxiety!" and "Has anyone else experienced this? I have read some posts that said it took 12 weeks for some of these symptoms to go away. I would like to get some feedback from others about this" it showed that the participant was slightly doubtful in believing that they made the right choice in getting vaccinated, especially since most of the sentences functioned as expressives used to complain and directives used to request for more information.

DISCUSSION

This study demonstrated that assertives (46.9%) are the most prevalent speech act in a vaccine discussion forum, followed by directives (24.4%), expressives (23.6%), commissives (3.3%), and declarations (1.9%). Assertive speech acts were used in all pages of the forum, as suggested by Shanthi et al. (2019), whom they found that explaining and suggesting (assertives) were used most extensively in forums, while commissives and declarations were rare even among the 7 pages analysed.

According to Searle (1979), assertives are used when speakers commit to something and accept it as their belief. They can be either true or false as long as the speaker believes the statement (Acheoah, 2017). Most of the participants had a strong opinion when it came to their opinion on COVID-19 vaccinations, which could be the main cause of why assertives were ranked the highest. This is true among pros and anti-vaxxers but less prevalent among vaccine-hesitant participants. However, declarations are usually spoken by an individual with a special institution role, directly bringing about real-life consequences (Searle, 1979). Utterances using the declaration speech act are able to change the world (e.g. I declare…), which participants in the forum are not equipped to do. They are merely voicing their opinions (which could potentially alter another person's perception) and are not able to change or control what happens in reality. Another important finding is that speech acts are associated with the standpoints of speakers. The results of this study show that if a participant has a clear position (pro or anti) towards vaccines, they tend to use more assertive speech acts to illustrate their viewpoints. In contrast, if a participant is hesitant or unsure about a certain topic, the number of assertives were significantly lesser, and the occurrence was even similar to the number of directives used. It is also interesting to note that the hesitant group used the most directives. This result may be explained by the fact that the hesitant participants tend to ask for help (e.g., request, ask) in the forum to seek clarification. These results further support the idea of Bonnici and Ma (2021) since their study also found that the hesitant group did not have a clear standpoint and only sought information and evaluated arguments from both sides. However, requests were found less frequently in the pro and anti-groups, unlike past studies (Rosari 2020; Shboul 2020), where the requests were found more abundantly across the forums. However, these two groups do share certain similarities with Chaka's (2020) study, where advising and informing were found commonly in polylogal discussions. Greetings were also found, although less common than what was proposed by Chaka (2020).

CONCLUSION

Despite these promising results, questions remain. There is abundant room for further research in determining whether the speech acts are associated with speakers' standpoints in discussions other than COVID-19 vaccines. Future studies could also look at the same study from a different perspective as our data showed potential in being analysed in other theories like impoliteness, persuasion, and stance-taking.

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