

TITLE - Narratives, information and manifestations of resistance to persuasion
in online discussions of HPV vaccination

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Abstract

There are both theoretical accounts and empirical evidence for the fact that, in health communication, narratives (story telling) may have a persuasive advantage when compared with information (the provision of facts). The dominant explanation for this potential advantage is that narratives inhibit people's resistance to persuasion, particularly in the form of counterarguing. Evidence in this area to date has most often been gathered through lab or field experiments. In the current study we took a novel approach, gathering our data from naturally-occurring, non-experimental and organically evolving online interactions about vaccinations. We focus on five threads from the parenting forum *Mumsnet Talk* that centred on indecision about the HPV vaccination. Our analysis revealed narratives and information were used by posters in similar quantities as a means of providing vaccination-related advice. We also found similar frequencies of direct engagement with both narratives and information. However, our findings showed that narratives resulted in a significantly higher proportion of posts exhibiting supportive engagement, whereas information resulted in posts exhibiting a significantly higher proportion of challenges, including counterarguing and other manifestations of posters' resistance to persuasion. The proportions of supportive versus challenging engagement also varied depending on the topic and vaccine stance of narratives. Notwithstanding contextual explanations for these patterns, our findings, based on this original approach of using naturalistic data, provide a novel kind of evidence for the potential of narratives to inhibit counterarguing in authentic health-related discourse.

Keywords: *information, HPV, narrative, online communication, counterarguing, resistance to persuasion, vaccination.*

Narratives (story telling) and information (the provision of facts) are often contrasted as rhetorical tools in terms of their differing influence on outcomes like people's attitudes, intentions and behavior. This has been studied in persuasive contexts in general (e.g., Bálint & Bilandzic, 2017; Bilandzic & Buselle, 2012) and in health-related communication in particular (e.g., Murphy et al., 2013). Studies in health-care contexts include communication about vaccination against the human papillomavirus (HPV) (e.g., Betsch et al., 2011), which is the focus of the current study.

HPV is typically transmitted through sexual contact and can cause several conditions, ranging from genital warts to several types of cancer, including cervical cancer. HPV vaccination is central to the World Health Organisation's strategy to eliminate cervical cancer, and has been introduced in over a hundred countries (Falcaro et al. 2021). In the UK, a vaccination programme involving GlaxoSmithKline's bivalent Cervarix vaccine (which protects against two HPV strains) was launched in 2008 for girls aged 12–13. In 2012, Cervarix was replaced with Merck's quadrivalent vaccine Gardasil (which protects against four HPV strains), and in 2018 the vaccination programme was extended to boys aged 12–13. In 2022, a new version of the Gardasil vaccine was introduced, which protects against nine HPV strains. HPV vaccination has been found to reduce the rates of cervical cancer by up to 87% (Falcaro et al., 2021). As of August 2022, 280 million HPV vaccinations had been administered worldwide, including 10 million in the UK (UKHSA, 2022). However, in 2018 vaccine coverage within target populations was estimated at 69% in high-income countries and 12.2% globally (Spayne & Hesketh, 2021). Hesitancy around HPV vaccination has been attributed to a variety of factors, including efficacy concerns and reports of vaccine harms, particularly for Gardasil (Larson, 2020). Another factor is the perceived link between HPV infection and sexual activity. Parents may delay vaccination if they see it as not yet relevant

for their own children, or if they fear that it will encourage them to become sexually active (Hendry et al., 2013).

Previous research has investigated whether narratives have greater persuasive effects than non-narrative information (typically, the provision of facts or statistics), on the grounds that the cognitive and emotional effects of being transported into a narrative story-world and identifying with individuals in that narrative may lower peoples' awareness of and potential resistance to persuasive intent, and particularly inhibit counterarguing. There is some empirical evidence supporting this, for example, a review of experimental research by de Graaf et al. (2016). Other (meta-analytic) work by Shen et al. (2015) also suggested a small positive effect for the persuasive power of narratives provided in audio and video modes, although not for print. Various studies have pointed to how different characteristics of narratives are moderating factors for persuasion, including how immersive they are (e.g., Ratcliff & Sun, 2020).

The present study focuses on engagement with narratives versus information in online discussions of the HPV vaccinations in order to investigate the potential for narratives to reduce counterarguing and other manifestations of resistance to persuasion in unelicited interactions. Our data is drawn from the online parenting website Mumsnet, which was founded in 2000 with the aim to “[m]ake parents’ lives easier by pooling knowledge, advice and support” (Mumsnet, 2023a). Mumsnet reports over 8 million user posts and 1.2 billion page-views per year, and 8 million unique visitors per month (Mumsnet, 2023b). Mumsnet includes a community forum section, Mumsnet Talk, which, at the time of writing, hosted 230 topics, including *General Health* and *Children’s Health*. Interactions on Mumsnet Talk are associated with an open, straight-talking and occasionally combative communicative style (Pedersen & Smithson, 2013; Taylor, 2015). Difficult or controversial topics such as post-natal depression (Jaworska, 2018), maternal regret (Matley, 2020) and vaccinations

(Coltman-Patel et al., 2022) are discussed along with more routine matters such as childcare, recipes, housing, and so on. While conflict can characterise computer-mediated communication generally (Graham & Hardaker, 2017) and online discussions of vaccinations specifically (Martin et al., 2020), community forums such as Mumsnet Talk also operate as virtual support systems (Jaworska, 2018; Madge & O'Connor, 2006).

With regard to Mumsnet and vaccinations, it is well-documented that parenting websites and social media generally are used as spaces for discussion and sources of information and advice about (childhood) vaccinations (Betti et al., 2021; Plastina, 2022; Skea et al. 2008; Wilson & Wiysonge, 2020). Campbell et al. (2017) found that, out of 626 parents in England who searched the Internet for vaccination-related information, 29% specifically accessed Mumsnet. This was less than for NHS Direct/Choices (36%) but more than Facebook and Twitter (13%) (Campbell et al., 2017).

Background

Narratives, Information and (Resistance to) Persuasion

Narratives are hypothesized to be persuasive because of the cognitive and emotional involvement that can ensue from being drawn into a story and engaging with its characters. There are a number of different models of the particular cognitive processes by which this takes place (e.g., Bilandzic & Buselle, 2012; Krauser & Rucker, 2020; Moyer-Gusé & Nabi, 2010). Transportation or immersion into a story-world can involve a sense of being present in the world of the story, as observer or participant (Green, 2006; Green & Brock 2000), and engagement with characters can take different forms. Moyer-Gusé and Nabi (2010, pp. 29–30) distinguish between: (a) *perceived similarity*, i.e., “a viewer’s judgment about the extent to which he or she and a character share common attributes, characteristics, beliefs, and/or values”; (b) *identification* i.e., “an emotional and cognitive process whereby a viewer imagines himself or herself as a particular character” resulting in a loss of self-awareness and

taking on “the feelings, perspectives, and goals of that character”; and (c) *parasocial interaction*, i.e., “the bond that develops between a viewer and a liked character,” so that someone may feel that they have a relationship with, for example, fictional characters or celebrities.

Narratologists make a relevant distinction between “narrative empathy,” which involves the perspective-taking and vicarious experiences associated with Moyer-Gusé and Nabi’s (2010) identification (Cohen, 2001; Fernandez-Quintanilla, 2020; Keen, 2006, 2013; Zillmann, 2006), and narrative “sympathy,” i.e., caring for characters predicaments without identifying or empathising with them (Coplan, 2004; Keen, 2013).

These distinctive components of narrative processing have been argued to facilitate persuasion by distracting attention from persuasive intent and suppressing “resistance” to persuasion, which is the focus of the current study (Bilandzic & Buselle, 2012; Krause & Rucker, 2020). Resistance, in this context, has been defined as “a reaction against change or a motivation to oppose persuasive appeals” (Green, 2006, p. S168). In the model proposed by Moyer-Gusé and Nabi (2010), it can take three forms: (a) *reactance*, i.e., a negative cognitive and/or emotional reaction to the perception of a perceived attempt at persuasion; (b) *counterarguing*, i.e., the generation of thoughts that dispute or are inconsistent with the persuasive argument” (Slater & Rouner, 2002, p. 180); and, (c) in the context of health communication specifically, “perceived invulnerability to a health risk” (Moyer-Gusé & Nabi 2010, p. 33). Also relevant to our study is Ratcliff and Sun’s (2020) (d) *message derogation* as a form of resistance to persuasion, i.e., a hostile response to a message without engaging with its content (e.g., describing the message as “boring” or “disgusting”). Narratives then, have been researched as a way to convey public health messaging alongside or instead of more traditional material such as statistical information. Very simply put, might people express less resistance to being persuaded by a personal story about the horrors of cervical

cancer than by impersonal statistical information favoring vaccines? This, of course, is an empirical question.

Experimental work on health communication

Various empirical studies have claimed to find evidence showing a persuasive advantage for narratives in health communication. For example, in a study involving men who have sex with men, de Wit et al. (2008) found that risk perceptions associated with the hepatitis B virus and intentions to be vaccinated against it were highest among participants who received narrative evidence rather than statistical evidence, assertions of increased risk and no information about risk. Murphy et al. (2013) found that a fictional narrative about cervical cancer affected the knowledge, attitudes and behavioural intentions of an ethnically diverse group of U.S. women to a greater extent than the provision of information. With specific reference to resistance to persuasion, Ratcliff and Sun (2020) conducted a two-part meta-analysis focusing mostly on studies in the domain of health communication. They found evidence that narratives elicited less resistance than non-narrative messages, and that there was a negative correlation between narrative engagement and resistance.

While most studies measure potential persuasive effects immediately after exposure, a meta-analysis by Oschatz and Marker (2020) found evidence that narratives could have a greater impact than non-narrative messages on attitudes, intentions and behaviours in the longer term (up to six months). However, the picture that emerges from the literature is mixed. Nan et al. (2017), for example, found no evidence of a persuasive advantage for narratives versus information in reactions to a public service advertisement promoting the HPV vaccine. Rather, Nan et al. (2015) found that “hybrid” messages, containing both narrative and statistical descriptions of HPV, had greater impact on risk perceptions than messages containing either narrative or statistics alone.

Overall, the experimental literature does not show a clearcut contrast between narratives and non-narrative messages as persuasive devices, but rather suggests, as Bilandzic and Buselle (2012, p. 203) put it, “when and under what conditions narrative messages are appropriate and what makes them more and less effective.” A meta-analysis by Zebregs et al. (2015) considered studies within and beyond health communication, and found that the difference between statistics and narratives varied depending on the outcome variable. When examining beliefs and attitudes as outcome variables, statistics were more effective than narratives. However, when examining intentions, narratives were found to be more influential than information.

A number of characteristics of narratives have been found to influence whether and to what extent narratives might be persuasive. In a meta-analysis that focused specifically on health communication, Shen et al. (2015) found a significant impact on persuasion for narratives in audio and video modes, but not for print narratives. In addition to mode, there is greater evidence of a persuasive advantage of narratives for genres where the persuasive intent is backgrounded (e.g., TV shows) versus genres with an explicit behaviour-changing goal (e.g., public service announcements) (Bilandzic & Buselle, 2012; Ratcliff & Sun, 2020). Regarding the focus of the persuasive message, there is evidence for a persuasive advantage of narratives where the message focuses on the *prevention* and *detection* of diseases (e.g., vaccination, cancer screening), but not where the focus is the cessation of addictive behaviours (de Graaf et al., 2016; Shen et al., 2015). There is also evidence that highly emotional narratives about vaccine harms have greater persuasive effects than narratives low in emotionality (Betsch et al., 2011; see also de Graaf et al., 2016). In addition, some studies have found differences between narratives of different lengths (Dahlstrom et al., 2017; Ratcliff & Sun, 2020).

Some characteristics of narratives are particularly relevant to the potential for perceptions of similarity and identification with characters. First-person narratives (de Graaf et al., 2016; Nan et al., 2015, 2017) and narratives with a single protagonist (Ratcliff and Sun, 2020) have been found to have greater persuasive potential than third-person narratives and narratives involving multiple characters. This is likely because it is easier to identify with the narrator/protagonist of a first-person narrative and with a single main character (cf. Keen, 2013). Further, the evidence suggests greater persuasive effects of narratives when audiences share characteristics such as ethnicity with characters, which may enable greater perceptions of similarity, identification and transportation into the story world (Murphy et al., 2013). This is consistent with the findings of studies such as Hilton et al. (2007), which provides evidence from focus groups conducted in Scotland that parents trusted other parents' stories about experiences with the MMR vaccine more than information and reassurances from other sources, such as politicians and health professionals. With regard to HPV vaccination and cervical cancer specifically, a study involving unvaccinated U.S. women found greater persuasive effects for narratives where an unvaccinated protagonist survives the cancer and had previously encountered "social barriers" to HPV vaccination, i.e., the perceived association between HPV infection and sexual promiscuity (Krakow et al., 2017).

In studies that aim to capture degrees of resistance to persuasion, counterarguing has been operationalised in two main ways (Bilandzic & Buselle, 2012; Ratcliffe & Sun 2020): coding open-text responses to thought-listing tasks for statements that contradict the relevant persuasive message (e.g., Kopfman et al., 1998; Niederdeppe et al., 2011); and eliciting degrees of agreement with statements such as "I sometimes found myself thinking of ways I disagreed with what was being presented" (Moyer-Gus & Nabi, 2010, p. 36). Our study aims to make a contribution by studying manifestations of resistance to persuasion, and of support for persuasive messages, in naturalistic data.

Contribution and Research Questions

The potential of narratives to achieve persuasive effects by reducing resistance to persuasion is relevant to a diverse range of health communication contexts, including public health campaigns and interactions between healthcare professionals and patients and/or caregivers (Cawkell & Oshinsky, 2016). However, the vast majority of the existing health communication literature on narrative and resistance to persuasion relies primarily on experimental data (e.g., Ratcliff & Sun, 2020). These studies are, for the most part, carefully designed and executed. However, supplementing and triangulating experimentally obtained data with naturalistically occurring data would obviously enhance both validity and generalizability of findings to date.

In the current study, we investigated narratives and information provided in naturally-occurring and organically evolving online interactions. Specifically, we compared personal narratives to the provision of generic information in terms of the types of engagement in the responses that followed. We examined engagement in terms of whether responses were supportive or challenging (as operationalized below) in relation to the posts they were responding to. In this way we were able to capture spontaneous occurrences of expressions of resistance to persuasion (challenging engagement) and also expressions of a favourable attitude towards narratives or information (supportive engagement). While our approach cannot capture persuasive effects in terms of direct impact on attitudes, intentions or behaviour, naturalistic data are highly relevant to the question of whether and under what conditions narratives may suppress resistance to persuasion, which is currently the dominant explanation for the persuasive potential of narratives (e.g., Bilandzic & Buselle 2012). Furthermore, it can provide initial insights into what narratives are actually told in naturally occurring persuasive contexts.

The dataset used in the current study is small scale since our study was designed as a proof-of-concept exploratory test of our new approach to data collection. Our data were obtained from five different threads on Mumsnet Talk, where contributors (known as “posters”) respond to requests for advice from an “original poster” (who posed the question that begins the thread). In the five unique threads, the original posters are undecided about whether to consent to their child receiving the HPV vaccine in a UK school. This leads them to ask for advice on Mumsnet Talk. We analyzed the five threads to answer the following research questions:

- RQ1. How often are original posts about vaccine indecision answered by subsequent posts providing narratives versus information ?
- RQ2. How often do subsequent posts engage with narratives versus information?
- RQ3. Do subsequent posts differ in terms of whether they are supportive or challenging of narratives versus information?
- RQ4. Does engagement with narratives differ based on the nature of the narrative?

Materials and Methods

Data

We searched a previously created 31-million-word corpus of Mumsnet Talk discussions of vaccinations (Coltman-Patel et al., 2022) for original posts that included “hpv” or “human papillomavirus.”¹ This generated 130 original posts, 25 of which were found to involve indecision about whether to vaccinate a child against HPV or delay/refuse vaccination. Five of these threads, from three different Mumsnet Talk topics, were additionally found to include a later contribution from the original poster announcing that

¹ The ethical issues involved in analysing online forum interactions are complex (Mackenzie, 2017). Mumsnet posts are in the public domain and contributors can use pseudonyms as usernames. We did not therefore seek individual consent for our study. However, as Mumsnet owns all material posted on the site, we sought and obtained their permission to carry out the research. We also removed original usernames and any identifying information. The study was approved by the Research Ethics Committee at Lancaster University.

they had made a decision based on replies they had received. These announcements were used as cut-off points for data collection, so that we could focus on a manageable number of instances of narratives and information provided in the context of an undecided original poster. In all five cases, a daughter was involved and vaccination was to take place at school as part of the UK vaccination programme (Falcaro et al., 2021). Our dataset, then, consists of 520 posts from the combined five threads that preceded the announcement of a decision (see Table 1). Figure 1 provides an example of an original post taken from the data in the current study. As the example shows, original posts typically themselves include both personal narrative (“I’ve just had a consent form for dd to have the new HPV vaccine at school”) and information that the writer has gathered about the vaccine (“From what I’ve read, the vaccine hasn’t been tested for that long, has not been tested on girls under 15 ...”).

Table 1 illustrates the distinct characteristics of the five threads, showing, for example, the wide range in the number of replies to the original post (from 17 to 209), the time lapse between when the posts were made (2008 to 2017, but all predating the Covid-19 pandemic), the fact that the two threads that result in a decision not to vaccinate have the lowest numbers of replies prior to the announcement of a decision (17 and 25) and the fact that the Talk topics in which they occurred were different, including the more combative *Am I being unreasonable?* (Coltman-Patel et al. 2022) along with the more supportive *Special Needs*. However, notwithstanding these differences, the goal of this study was to demonstrate that a naturalistic dataset could be used to answer the research questions and supplement findings in experimental research with regard to evidence of resistance to persuasion. Thus, the cumulative total of the 520 posts across the five threads were used to investigate patterns in the quantity and quality of the posts (supportive vs. challenging) that engaged with narrative versus information provided in others’ posts, as well as with different types of narratives.

Table 1*Overview of Five Mumsnet Threads*

Thread identifier	Year	Title of Original Post	Mumsnet Talk topic	N of posts prior to decision	Decision: Vaccinate?
T1	2008	New vaccine for girls	SN [<i>Special Needs</i>] children	17	No
T2	2010	Hpv vaccine	General health	25	No
T3	2011	To change my mind and tell the school I don't want dd [<i>dear daughter</i>] to have cervical cancer jab?	AIBU? [<i>Am I being unreasonable?</i>]	207	Yes
T4	2013	HPV Gardasil	General health	62	Yes
T5	2017	AIBU to withdraw consent for hpv vaccine	AIBU? [<i>Am I being unreasonable?</i>]	209	Yes

Figure 1

Example of an Undecided Original Post Asking for Input on HPV Vaccination.

Hi all. I've just had a consent form for dd to have the new HPV vaccine at school. My first instinct is to opt out (and dh agrees) as I've become very cynical about what the government and drugs manufacturers say and about vaccines in general.

The trouble is, I'm guessing dd will probably be the only girl in her class who doesn't have it and I'm starting to wonder if I'm being ridiculous. Am I protecting her or letting her down? From what I've read, the vaccine hasn't been tested for that long, hasn't been tested on girls under 15, and it isn't even known how long the effects are likely to last. Dd is a very 'young' 12 yo and I can't help thinking she has plenty of time to have the jabs. Maybe in a couple of years more will be known about possible side-effects or dangers and we will feel more confident. Any thoughts?

I've posted here because I don't want to be attacked for being socially irresponsible/stupid etc for having doubts and I know you lot will have more understanding about my fears.

Coding

The 520 posts were coded for (a) instances of narrative (RQ1); (b) instances of information (RQ1); (c) instances of direct engagement with narrative or information (RQ2); (d) type of engagement with narrative versus information, i.e., supportive or challenging (RQ3); and (e) different types of narratives (RQ4).

Narratives

An instance of narrative was operationalized as the telling of one or more actions or events involving *personal experiences* of vaccination, HPV infection, HPV-related health concerns and illness, and other related topics (Abbott, 2002; Labov, 1972). Narrated experiences were regarded as personal if they involved the author of the post and/or a family member or a friend. These personal narratives represented the vast majority of instances of

narratives in our data and were mostly told in the first person e.g., (NB: All examples are reproduced with original spellings and graphological choices):

My DD [*dear daughter*] and I discussed it [*HPV vaccination*] at length and she decided to get it done. She had been off sick with apendicitis when all the others had it. She decided to get it done and made doctors appointment herself to have it.

Information

An instance of information was operationalized as the provision of *generic and potentially verifiable facts* concerning vaccination, HPV infection, HPV-related illness, e.g., the following response to a question about the success rate of the Gardasil vaccine:

70% on one strain and 90% on another and 100% on strain 16 & 18, the latest studies show. They estimate that 3,400 lives (at least) will be saved a year in the UK.

An individual post could in principle contain one or more narratives and/or one or more instances of information, or no instances of either (posts can consist of questions, expressions of personal opinion, and so on).

Direct engagement

A post was coded as containing direct engagement with another post if the poster exploited the functionality available to Mumsnet users to: (a) respond to another user by means of the “reply” function; (b) respond to one or more others by including their usernames; (c) quote from another user’s post before providing their own comment. In each case it was then determined whether the content that was engaged with was an instance of narrative, an instance of information, or neither. Instances of engagement with narratives or information were further coded as to the type of the engagement: supportive, challenging, or neutral. The type was coded as supportive if posts included expressions of approval, agreement, and/or positive or favourable evaluations or emotional reactions, e.g.:

I quite agree USERNAME I shall try and get DS [*Dear Son*] done too.

The attitude was coded as challenging if posts included expressions of counterarguing, disapproval, disagreement, and/or negative or unfavourable evaluations or emotional reactions, e.g.:

WTF? [*What the fuck?*] A smear is a test that CAN but does not always pick up precancerous cells. It does not prevent cancer. It never has, it never will.

Where the attitude could not be determined, instances of engagement were coded as neutral.

Types of narratives

Narratives were further coded for their main Plot Focus (e.g., Vaccine Uptake, Illness, etc.) and Vaccine Stance (pro-vaccination, hesitant or anti-vaccination). Table 3 provides examples for each type of narrative. With regard to Plot Focus, the Results section focuses specifically on Illness narratives and Sex narratives, based on our findings regarding patterns of engagement. The former type of narrative concern personal experiences of different kinds of HPV-related illness, including HPV infection, genital warts, pre-cancerous changes of the cervix, and cervical cancer. The latter concern the narrator's or other people's sex lives, including the age when they became sexually active and the number of sexual partners they had over time.

Reliability

The coding scheme was developed by the team working together after discussing the operationalization of categories with examples provided for all categories. For all types and levels of coding, one co-author coded the entire dataset (520 posts) and another co-author coded a random sample of the data (100 posts or 19%). Using Cohen's Kappa measure, agreement between the two coders on presence of information was .81 before coding socialization and .83 after coding socialization. Agreement between the two coders on personal narratives in a post was .76 before discussion. After discussions there was 100% agreement. At this stage, 66 stretches of text were coded as a narrative by both coders.

Agreement for type of narrative regarding these 66 cases was .78 for Plot Focus and .82 for Vaccine Stance. Identification of instances of direct engagement was a mechanical process (described above), which resulted in 120 instances. Agreement between the two coders as to the type of engagement (supportive, challenging, unclear) in a random sample of 45 instances was 0.82 (see Table 2 for an overview).

Table 2

Interrater Reliability Analysis

		Cohen's	N items
		Kappa	double coded
<i>Is there information in this post? (Yes/No)</i>	Pre-socialization	.813	100
	Post-socialization	.830	100
<i>Is there narrative in this post? (Yes/No)</i>		.802	100
With the narratives...	<i>What is the plot focus?</i> (10 unique foci)	.854	66
	<i>What is the vaccine stance?</i> (Pro, anti, hesitant, unclear)	.824	66
	<i>Within a reply to a narrative, what is the engagement type? (Supporting, challenging, neutral)</i>		
	Replying to a narrative	.856	21
	Replying to information	.820	24

Table 3*Coding of Types of Narratives with Examples*

Aspect of variation	Possible values	Examples
Plot focus	Illness (including HPV infection, abnormal smears, cancer)	<i>one of my dear friends had cervical cancer last year and she has 6 children thankfully she's made a full recovery now but there will be follow ups and there's always that fear of it coming back I don't know how she managed to cope so well and how her family coped because her friends (me included) were devastated and every FB update we were praying for good news.</i>
	Vaccine uptake	<i>For what its worth I had the HPV vaccine in the catch up program and the only side effect was my arm ached for a couple of days.</i>
	Vaccine delay/refusal	<i>I discussed it with my 2 dd's & we decided they would wait & get it later before/when they start being sexually active.</i>
	Vaccine side effects	<i>my DD has POTS which is one of the conditions potentially linked to the HPV jab. She fits exactly into the profile of girls in the Danish study (sporty, high achiever). She's been horrifically ill at times over the past 6 years.</i>
	Sex	<i>And as she [unvaccinated sister] was not sexually active til 19, and has only had 2 partners, and there is no history of cervical cancer in her family, my niece will probably be fine anyway.</i>

Other *I was badgered by the NHS to have a smear test when I was under the age of 25 and still a virgin.*

Vaccine stance	Pro-vaccination	<i>I practiced safe sex, had all the usual tests before going on the pill with ex partners and them the same. I still contracted the HPV virus and I've had abnormal smear tests for the past 5 years. Your daughter could only have one partner her whole life but if that partner is carrying HPV then at some point she's going to become at risk to it. If you can reduce that risk then imo it's worth her being vaccinated.</i>
	Hesitant	<i>My DD hasn't had it, we talked about the pros and cons and she decided she didn't want to have it. I have said that if she even begins to think about becoming sexually active, she will need to have the jab, but (hopefully) that won't be for at least another couple of years.</i>
	Anti-vaccination	<i>Should also mention that I've had abnormal cells lasered twice (not done properly the first time!) and I still wouldn't want the HPV vaccine for me or future DDs.</i>
	Unclear	<i>I didn't sign the form for dd to have her injection. She informed me that she was going to give her own consent.</i>

Results

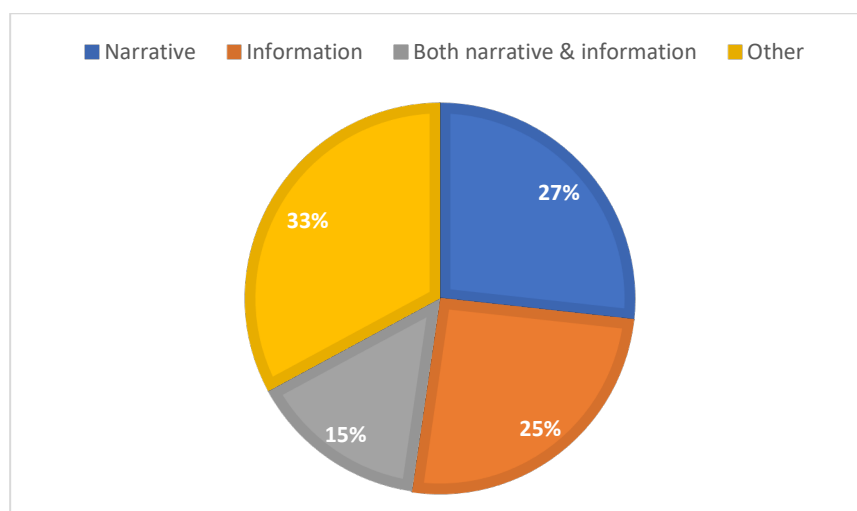
To answer RQ1 (*How often are original posts about vaccine indecision answered by subsequent posts providing narratives versus information?*), we calculated the total number of occurrences of narrative and information in the data, and their distribution across the 520 posts.

Narratives and information were found to occur in similar frequencies in the data, with 294 instances of narrative and 305 instances of information. More specifically, 214 subsequent posts (41.2%) contain at least one narrative, and 204 (39.2%) contain at least one instance of information.

As illustrated in Figure 2, approximately 15% of subsequent posts ($n = 77$, 14.8%) contain *both* narrative and information. Just over a quarter ($n = 139$, 26.7%) of subsequent posts contain narratives only, and another quarter ($n = 133$, 25.6%) contain information only. The rest of the posts, approximately a third ($n = 171$, 32.8%) of the dataset, contain neither narrative nor information. This latter category consists of questions, expressions of opinions, and so on, as in “How can cervical cancer be caught from boys?” and “YABU” [*You are Being Unreasonable*].

Figure 2

Distribution of Narratives and Information Across 520 Posts



To answer RQ2 (*How often do subsequent posts engage with narratives versus information?*), instances of engagement with narratives and information were totalled, with 62 instances of engagement with narratives and 58 instances of engagement with information. In total, 39 unique narratives were engaged with, compared with 55 unique instances of information being engaged with (respectively, 13.2% vs. 17.7% of the total occurrences of narratives/information). In other words, engagement was fairly similar in frequency of response to narratives versus information.

To answer RQ3 (*Do subsequent posts differ in terms of whether they are supportive or challenging of narratives vs. information?*), we considered the frequency of supportive versus challenging engagement with narratives versus information. As shown in Table 4, the proportion of *supportive* engagement was significantly higher for narratives (27 out of 62 engagements, 43.6%) than for information (12 out of 58 engagements, 22.0%). Conversely, the proportion of *challenging* engagement was significantly higher for information (40 out of 58 engagements, 67.8%) than for narrative (19 out of 62 engagements, 30.6%). A Chi-square test using Yates' continuity correction showed a statistically significant difference between the types of engagement (supportive, challenging or neutral) with narratives versus information (χ^2 17.68 (2), $p < 0.001$).

Table 4

Engagement with Narratives Versus Information

Engagement	<i>N</i> Narratives (%)	<i>N</i> Information (%)
Supportive	27 (43.6%)	12 (22.0%)
Challenging	19 (30.6%)	40 (67.8%)
Neutral	16 (25.8%)	6 (10.2%)
Totals	62 (100%)	58 (100%)

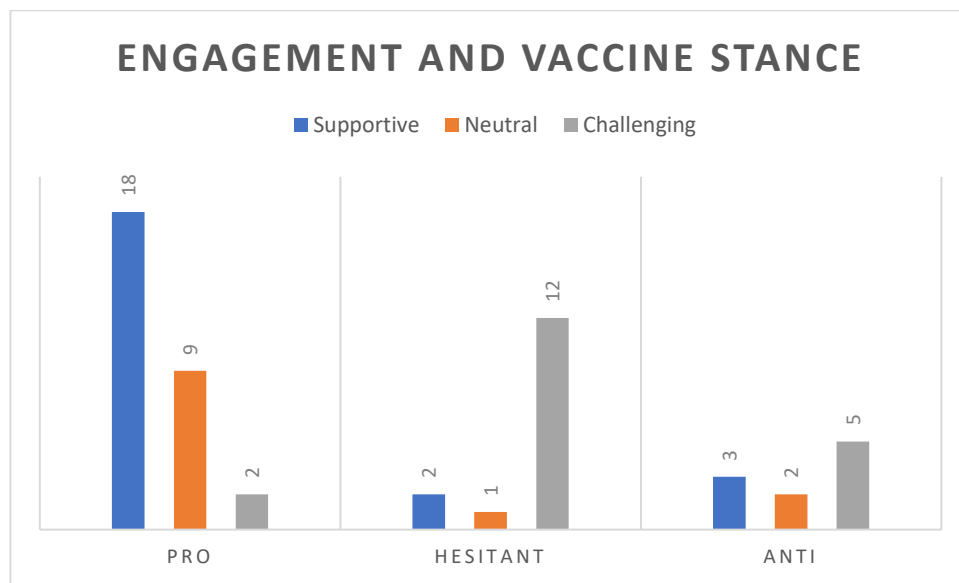
Finally, to answer RQ4 (*Does engagement with narratives differ based on the nature of the narrative?*), we first assessed the frequencies of supportive versus challenging engagement with respect to the Vaccination Stance and Plot Focus of narratives. Next, we considered the variety of responses that constituted supportive or challenging engagement for the types of narratives that elicited predominantly supportive versus predominantly challenging engagement. Table S1 in the Supplementary materials additionally provides a complete overview of the frequencies of narratives by Plot Focus and Vaccine Stance.

Our data on instances of engagement with different types of narratives are sparse. However, we present the numbers here in order to offer some tentative observations to be tested in future research. As shown in Table 5 and Figure 3, pro-vaccination narratives in our data were followed by more supportive engagement than challenging engagement (18 versus 2 instances, 62% versus 7% of engagement with pro-vaccination narratives). In contrast, hesitant/anti-vaccination narratives were followed by more challenging engagement than supportive engagement (17 versus 5 instances, 20% versus 68% of engagement with hesitant/anti-vaccination narratives).

Table 5

Type of Engagement and Vaccine Stance

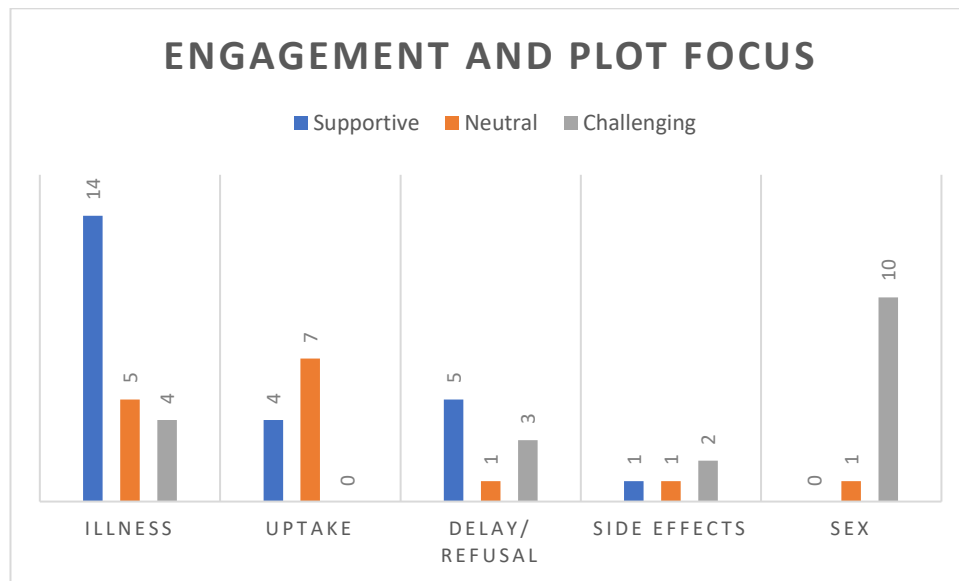
Type of engagement	Vaccine Stance of engaged-with narratives, <i>N</i> (%)			
	Pro	Hesitant	Anti	Unclear
Supportive	18 (62.0%)	2 (13.4%)	3 (30.0%)	4 (44.4%)
Neutral	9 (31.0%)	1 (6.6%)	2 (20%)	4 (44.4%)
Challenging	2 (7.0%)	12 (80.0%)	5 (50%)	1 (11.2%)
Totals	29 (100%)	15 (100%)	10 (100%)	9 (100%)

Figure 3*Type of Engagement and Vaccine Stance*

As shown in Table 6 and Figure 4, illness narratives were followed by considerably more supportive than challenging engagement (14 versus 4 instances, or 60.9% versus 17.4% of engagements with Illness narratives). In contrast, Sex narratives were followed overwhelmingly by challenging engagement (10 instances, or 91% of engagements with Sex narratives, with no supportive engagement).

Table 6*Type of Engagement and Plot Focus*

Attitude of engagement	Plot focus of engaged-with narratives, N (%)					
	Illness	Vaccine uptake	Vaccine delay/refusal	Vaccine side effects	Sex	Other
Supportive	14 (60.9%)	4 (36.4%)	5 (55.6%)	1 (25.0%)	0	3 (60%)
Neutral	5 (21.7%)	7 (63.6%)	1 (11.1%)	1 (25.0%)	1 (9.0%)	1 (20%)
Challenging	4 (17.4%)	0	3 (33.3%)	2 (50%)	10 (91.0%)	1 (20%)
Totals	23 (100%)	11 (100%)	9 (100%)	4 (100%)	11	5 (100%)

Figure 4*Type of Engagement and Plot Focus*

Interestingly, the Illness narratives that received supportive engagement were cautionary tales in which an unvaccinated protagonist's HPV-related illnesses was recounted as evidence of the importance of vaccination. Four of these narratives were followed by multiple instances of supportive engagement. For example, a single lengthy and highly personal narrative about cervical cancer was followed by three instances of supportive engagement and was mentioned by the original poster in Thread 3 as what changed their mind in favour of vaccination (Semino et al., forthcoming).

Table 7 provides a qualitative overview of different forms of supportive engagement with Illness narratives. We argue that these examples illustrate how Illness narratives tended to elicit gratitude and advice for the poster who told the story (examples 1 and 2) as well as sympathy (example 3). Supportive engagement can also take the form of explicit commentary on the persuasive potential of a narrative (example 4).

Table 7*Types of Supportive Engagement for Illness Narratives*

Types of supportive engagement	Examples
1. Gratitude that story was told	<i>thank you for sharing your story</i>
2. Advice for the benefit of narrator	<i>I do hope this isn't your GP putting you off like this? You need to demand to see a specialist.</i>
3. Concern, empathy, sympathy for narrator's/participants' predicament	<i>sorry for the pain you have suffered</i>
4. Affirmation of persuasive potential of a narrative	<i>if any post should change anti-vac views it will be yours.</i>

Conversely, challenging engagement with Sex narratives clustered around three hesitant/anti-vaccination narratives that linked HPV-related illness and the need for vaccination to womens' sex lives. Specifically, these narratives suggested that women who became sexually active relatively late and had few sexual partners, or just one partner, were not at risk of HPV infection and therefore did not need the vaccine. This perception of invulnerability to a health risk (Moyer-Gusé & Nabi, 2010) was associated with a judgmental attitude towards women who needed the vaccine as protection against HPV infection. As shown by the examples provided in Table 8, challenging engagement took a variety of forms. The first three examples involve different kinds of counterarguing, either by questioning or objecting to a claim made or implied by a narrative (examples 1 and 2), or by offering one's own narrative as a counterexample (example 3). Example 2 also involves reactance, as manifested in the use of profanity ("fuck off"). Example 4 contains a more explicit reference to reactance ("makes me want to scream") as well as what Ratcliff and Sun (2020) refer to as "message derogation" ("this sort of ignorance"). In example 5, "oh my" signals reactance. While the rest of example 5 is not captured by existing models of resistance to persuasion, we characterize it here as "narrator derogation." More specifically, responses disagreed with the

suggestion/conclusion that HPV infection is linked to sexual promiscuity, and/or negatively evaluated the narrator or narrative for making that suggestion/conclusion. This aspect of HPV infection was clearly contentious in our data and at various points became the focus of intense debate.

Table 8

Forms of Challenging Engagement with Sex Narratives

Types of challenging engagement	Examples
1. Objecting to the point made via a narrative	<i>In what way does that protect her? You can catch HPV from any sexual partner at any age, and having no history of cervical cancer in the family is no protection.</i>
2. Objecting to the implication of a narrative	<i>Seriously? What's the insinuation here? If you get it you've only got your own "bad girl" behaviour to blame? fuck off</i>
3. Providing a counter-narrative from one's own experience	<i>My mum was a virgin until she married my dad at 27, so was he. She never smoked, led a healthy life, barely drank and certainly never cheated on my dad. She died of cervical cancer.</i>
4. Expressing a negative evaluation of/emotional reaction to the point of a narrative	<i>It's this sort of ignorance that makes me want to scream.</i>
5. Expressing a negative evaluation of the narrator	<i>Oh my, you've told the WHO this and they've changed their recommendations to just vaccinate "girls who are going to be sexually active young because we totally know who those are going to be</i>

at age 11/12". You're a cancer researcher are you? Published these astonishing findings? Oh you're BETTER than a cancer researcher because you KNEW SOME PEOPLE. Thought so.

Discussion

The premise that narrative reduces counterarguing and other kinds of resistance to persuasion is “the most prevalent explanation for a narrative’s persuasive potential” (Bilandzic & Buselle, 2012, p. 205), and for a possible advantage of narratives, under some conditions, over non-narrative forms of persuasion (Ratcliff & Sun, 2020).

We designed the current study to both answer our research questions and as a first-line exploratory test of the potential for using naturalistically occurring narratives and information in organically evolving data. Our results show the potential of this methodological innovation, contributing a novel approach to the existing experimental literature on narratives versus information as persuasive strategies in health communication. In answer to our research questions, the analysis of our data supports prior findings of the potential for narratives to reduce manifestations of resistance to persuasion, and additionally show that narratives elicit a higher frequency of supportive responses (Bilandzic & Buselle, 2012; De Wit et al., 2008; Murphy et al., 2013; Ratcliff & Sun, 2020; Shen et al., 2015,).

Although there is currently no baseline data on the frequencies of narratives and information in online health-related advice, our data suggests that both play an important role in how people in authentic setting actually respond to and engage with questions based on positions of vaccine hesitancy or indecision online. The 520 posts analyzed contained similar instances of narratives and information, sometimes in isolation and sometimes blended, with only a third of posts containing neither narratives nor information.

Our study focused specifically on the types of engagement that followed narratives and information. While we did not find significant differences in overall quantities of engagement with responses to narratives versus information, the nature of responses did differ significantly. Less than a third of posts directly engaging with narratives were challenging, while over two thirds of posts engaging with information were challenging. Conversely, responses engaging supportively with narratives were twice as frequent as responses engaging supportively with information.

In other words, based on the proportion of supportive versus challenging engagement in our data, narratives are less likely than information to result in challenges. By challenges, we mean resistance in the form of counterarguments or other critical reactions, including reactance, message derogation and what we have termed narrator derogation. Previous studies have shown this to be the case in experimental settings (Ratcliff & Sun, 2020), but we have provided what we believe to be the first data from naturally occurring online interactions, triangulating experimental findings on resistance to persuasion from non-naturalistic data collected and reported in earlier studies.

An additional contribution of the current study was to explore variation in the type of engagement with narratives depending on the characteristics of the narratives (de Graaf et al., 2016; Ratcliff & Sun, 2020; Shen et al., 2015). Specifically, we saw differences in type of engagement based on Plot Focus and Vaccine Stance. The clearest patterns involved pro-vaccination Illness narratives, which were overwhelmingly followed by supportive engagement, together with hesitant/anti-vaccination Sex narratives linking the need for HPV vaccination to women's sexual behaviour, which were overwhelmingly followed by challenging engagement.

With regard to Illness narratives, our findings reflect the appreciation, validation and emotional involvement that result from reading posts describing personal hardship, and

support previous findings regarding the persuasive potential of narratives of vaccine-preventable illness (e.g., Krakow et al., 2017). The content of supportive responses to Illness narratives are consistent with the claim in the literature, noted earlier, that narratives facilitate cognitive and emotional involvement with the predicament of narrators and characters, manifested in expressions of gratitude, advice and sympathy. With regard to Sex narratives, our findings highlight the relevance and sensitivity of the connection between perceptions of HPV and attitudes towards womens' sex lives, which can be a factor in parents' decisions about the timing of vaccination for their own child (Hendry et al., 2013). A qualitative approach to the content of challenging responses to Sex narratives begins to reveal a broader variety of manifestations of resistance to persuasion than can be elicited in experimental settings (Ratcliffe & Sun, 2020), i.e.: different forms of counterarguing (counter-narratives as well as questioning/objecting to claims made or implied in a narrative); reactance expressed through exclamations and profanity; and the derogation of not just persuasive messages but also of narrators of stories interpreted as attempts at persuasion.

Given the importance of online parenting forums and Mumsnet specifically as authentic settings and sources of vaccine-related information (Campbell et al., 2017), our study has provided evidence that personal story-telling has an important role in providing pro-vaccination advice, and that, depending on the nature of the story that is told, some narratives are rarely explicitly challenged.

Limitations and Future Work

Our analysis of naturally-occurring interactions focuses on engagement with narratives and information as evidence of potential resistance to persuasion. Our definition of engagement involved: (a) using the reply function, (b) using usernames, and/or (c) using quotations. This resulted in clear, operationalizable data, but underestimates the extent to which contributors to the five threads may have responded to instances of narrative or

information but not used the reply, usernames and/or quotations function. Future work could usefully operationalise engagement so as to include a broader range of responses.

Anonymous online communication has been reported to be distinctly confrontational (Graham & Hardaker, 2017), specifically when vaccinations are being discussed (Martin et al., 2020). Moreover, some topics in Mumsnet's Talk section have been associated with a particularly combative style of interaction, (e.g., Pedersen & Smithson, 2013), including the AIBU section in which, as noted above, two of our threads appeared (Coltman-Patel et al., 2022). The relatively low proportion of challenging engagement following the narratives we studied may be noteworthy and calls for future work that will examine engagement and combative intent and its relation to the section in which the thread appears.

One explanation for why the narratives we studied may have elicited fewer challenges is that our narratives are presented and understood by Mumsnet users as drawing from authentic lived experience, which is generally agreed and understood to involve considerable personal disclosure, especially in relation to illness. In that context, and especially when problems or hardship are being narrated, direct challenges may be perceived as face-threatening, insensitive, rude or unnecessarily combative (cf. the linguistic notions of "face" and "rapport management"; Brown & Levinson, 1987; Spencer-Oatey, 2008). This is also a potential explanation for why personal narratives may be less likely to be challenged.

In our follow-up work to this study, already in progress, we explore whether there are qualitative differences in the nature of challenging and supportive responses to narratives versus information, and we expand our investigation to the full set of different types of narratives in our data. The exploratory approach we applied to a small dataset in the current study needs to be replicated and extended to larger quantities of naturally-occurring data, on different topics from Mumsnet Talk, and on vaccinations, as well as other topics, in data from other online platforms. On Reddit, for example, the nesting of responses will allow clearer

tracing of engagement than in the current study. This will lead to better understanding of how people use and respond to narratives versus information in authentic discourse contexts, and will result in a more substantial body of research to complement experimental work on narratives versus information as strategies for persuasion.

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