

Storys of (not) Vaccinating:

Impact of Narrative Messages and different Types of Benefits on Vaccination Intentions

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Abstract

Previous studies have shown that narratives are effective in promoting vaccination intentions. Furthermore, focusing on social benefits was also found to be more effective than focusing on individual benefits. This study investigates the use of a combination of narratives and social benefits in promoting human papillomavirus vaccination. In a 2x2 experiment, participants were provided with one of four different messages about the Human Papillomavirus (HPV). The messages were either in a narrative or non-narrative format and focused on social benefits or individual benefits. It was predicted that narratives and social benefits would lead to higher vaccination intentions than their counterparts. The study included 161 participants from Germany and the Netherlands. Results revealed no difference in vaccination intentions between the four conditions. However, the majority of participants knew of the vaccine before the study, and vaccination intentions were generally high. Because of these ceiling effects, it is hard to generalize the results. Nonetheless, this study gave some important insight into a relevant demographic group. Furthermore, it identified an important field of research and provided important considerations for future studies.

Keywords: HPV vaccination, narrative persuasion, social benefit, individual benefit

Introduction

Every year, two to three million lives are saved by vaccinations (WHO, 2018). Vaccines are a safe and effective means against infectious diseases, as they reduce the likelihood of infection and the chance of spreading the disease to others (Anderson & May, 1985). Nonetheless, vaccine hesitancy is growing across the world and is considered one of the greatest threats to public health (Pullan & Dey, 2021). Therefore, governments and global health authorities are challenged with the crucial task of promoting vaccine acceptance among the public. However, interventions trying to focus on facts and debunk vaccine-related myths have proven to be either unproductive or counterproductive (Hornsey et al., 2018). Because of this, other intervention strategies need to be explored. One promising strategy that led to success in the past is the usage of narratives to counteract narratives used by vaccine enemies (Shelby & Ernst, 2013). However, studies on a narrative approach toward vaccine promotion have yielded mixed results, and there are still many uncertainties.

Narrative Approach to Vaccine Promotion

A narrative is defined as a “representation of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic being addressed” (Kreuter et al., 2007). The opposite is non-narrative communication that supports a claim through evidence and reason. Both approaches can carry the same message, but narratives will do so by presenting a story about characters, events and consequences, while non-narratives will present factual arguments about the matter (Kreuter et al., 2007). A narrative approach to vaccine promotion has many advantages. Narratives are representations of social experience and social information (Kreuter et al., 2007). Humans face this kind of information from infancy on and can process it easily. People communicate with each other and learn largely through narratives, which makes them a comfortable way of giving and retrieving information (Kreuter et al., 2007; Laura et al., 2019). Therefore, narratives can facilitate attention, comprehension and recall of information. Furthermore, there is less counterarguing if people are immersed in a narrative (Kreuter et al., 2007). One reason for this is that the mental capacities of the reader are occupied with imagining the narrative. Another reason is that narratives are less easily disregarded, as they are more concrete and show the lived experience of others (Cherniak, Nisbett, & Ross, 1983; Nisbett, & Ross, 1980). People often generalize from narrative examples even if they are atypical (Hamill et al., 1980; Strange &

Leung, 1999) this leads to many people basing their opinions on a few sample cases (Haase et al., 2020; Shelby & Ernst, 2013) rather than on statistical evidence. Furthermore, narratives are a rather subtle form of persuasion (Dal Cin et al., 2004). People may not be forewarned of the persuasive intent of the message and therefore “may not marshal their cognitive resources to defend against a potentially counter attitudinal message” (Kreuter et al., 2007, p. 224).

Additionally, narratives make people focus on the events of the message and evoke emotional reactions that distract them from forming counterarguments (Kim, 2020). Lastly, Cunningham & Boom (2013) proposed additional benefits of narrative persuasion. Namely, that personal experiences and interactions are memorable as well as relatable and that narratives are universal and transcend educational levels. Furthermore, narratives can be made culturally relevant and adapted to different contexts.

The effects of narratives are also explained by different psychological models. According to the health belief model (HBM), the protection motivation theory (PTM) and the extended parallel process model (EPPM), people's likelihood to act is mainly influenced by the threat appraisal and the coping appraisal (Becker, 1974; Becker et al., 1977; Witte & Allen, 2000; Maddux & Rogers, 1983; Rogers, 1975). If the threat is perceived as dangerous and people believe to be able to cope with the threat they are likely to act. The HBM further divides the threat appraisal into perceived severity and susceptibility of the disease and the coping appraisal into perceived benefits and costs of vaccinating (Becker, 1974; Becker et al., 1977). The EPPM also distinguishes between severity and susceptibility but splits the coping appraisal into self-efficacy and response efficacy. Self- and response efficacy can, however, be equated with perceived costs and benefits, as they focus on the same things. Because narratives on the consequences of not vaccinating are more vivid and can be less easily disregarded than factual messages (Cherniak, Nisbett, & Ross, 1983; Nisbett, & Ross, 1980), they should lead to higher perceived severity, susceptibility, costs and vaccination benefits. This in turn increases the likelihood of vaccination. Furthermore, according to the EPPM, the emotions of fear and hope play an important role in people's behaviour (Witte, 1994). Fear is a powerful motivator of behavioural change and could increase intentions to adopt recommended behaviour (Witte & Allen, 2000). A study by Liu et al. (2021) found that narrative messages did indeed lead to heightened fear by increasing the perceived susceptibility and severity. However, increased fear does not directly translate into increased vaccination intentions, the person also has to believe to

be able to deal with the situation (Witte, 1994). If a person does not believe to be able to deal with a situation, that causes a defensive reaction, leading to no behavioural change. Therefore, a message must create a high efficacy appraisal that is linked to the feeling of hope (Liu et al., 2021). As people generally base their opinion on a few sample cases (Haase et al., 2020; Shelby & Ernst, 2013), narratives might be able to make the effectiveness of the vaccine (response efficacy) and the ease of getting the vaccine (self-efficacy) more believable, overall increasing the perceived efficacy. This should then lead to stronger feelings of hope, ultimately increasing vaccination intentions (Liu et al., 2021). For these reasons, narration has a lot of potential in medical communication (Kreuter et al., 2007) and, according to McCall et al. (2021), should play a larger role in vaccine promotion.

Despite the advantages of narratives, mixed results were found when applying a narrative approach to vaccine promotion in practice. Studies from the USA, China and Japan on HPV, COVID-19 and fictional diseases found that using narrative persuasion leads to higher risk perception (Haase et al., 2020; Liu et al., 2021; Ye et al., 2021) and higher vaccination intent (Haase et al., 2020; M. Kim et al., 2018; Liu et al., 2021; Okuhara et al., 2018; Ye et al., 2021) when compared to statistical information without a narrative. A study on female college students also found an increase in knowledge about the vaccine when using narratives (M. Kim et al., 2018). However, a different study on female college students from America found no benefit in using narratives (Nan et al., 2017). Furthermore, two studies on adults and parents from America and Hong Kong focusing on influenza and measles-mumps-rubella vaccinations showed that narratives were effective in leading to higher threat perception and reducing false beliefs but did not result in higher vaccination intentions (Jiang, 2021; Nyhan et al., 2014). Overall, narratives seem to be a useful tool, but more research is necessary to get a better understanding of which variables influence the effectiveness of narrative interventions (McCall et al., 2021).

Individual vs. Social Benefit in Vaccine promotion

As of this point, almost every study on narrative vaccine promotion has focused on the individual benefit of vaccination. However, in a study by Betsch et al. (2013), information emphasizing social benefit (herd immunity) led to higher vaccination intentions than information emphasizing individual benefit. Other non-narrative interventions, also found the communication of social benefit to be effective in increasing vaccination intentions (Betsch et al., 2013; Lazić et al., 2021; Mo et al., 2021) and overcoming low vaccine confidence (Liao et al., 2022). Focussing

on societal benefits could be effective because vaccination has typically been framed as an individual choice (Liao et al., 2022). Therefore, following the health belief model (Becker & H., 1974; Becker et al., 1977), people weigh the perceived costs and risks of vaccinating against the perceived risk of the disease. If the benefits of vaccinating outweigh its risks, people decide to vaccinate. But if the risk of the disease is perceived as smaller than the risk of vaccinating, people decide against vaccination. However, emphasizing the societal benefit of vaccinations may shift the focus from individual benefits to the social welfare of vaccinations (Liao et al., 2022), reducing the concern over individual risks and promoting prosocial vaccinations (Betsch et al., 2017; Korn et al., 2018). This is in line with the 5C model created by Betsch et al. (2018), which proposes that people do not only take individual risks and benefits into account when making vaccination decisions but also focus on collective responsibility. Other research found that when making vaccination decisions, people take into account the amount of good they can do for others (Shim et al., 2012; Vietri et al., 2012). Additionally, a study by Freeman et al. (2021) found that willingness to vaccinate is closely bound to the recognition of the collective importance, which is why they claim that highlighting societal benefits may be especially effective in promoting vaccine uptake. Therefore, if the social benefit is emphasized in a message, people are not only focused on their own benefit but also on the benefits to others (Freeman et al., 2021). This should increase the overall perceived benefit and effectiveness of vaccines. According to the EPPM, an increase in perceived effectiveness of the vaccine leads to increased response efficacy (Witte, 1994) and therefore also to higher vaccination intentions. Furthermore, focusing on society may shift people's focus away from the individual, thus reducing the concern over individual risks (Liao et al., 2022). Because people are less concerned about the individual risks of vaccination, getting the vaccine should seem more doable, resulting in an increase in self-efficacy. Higher self-efficacy in turn is linked to a stronger feeling of hope, which leads to increased vaccination intentions (Liu et al., 2021).

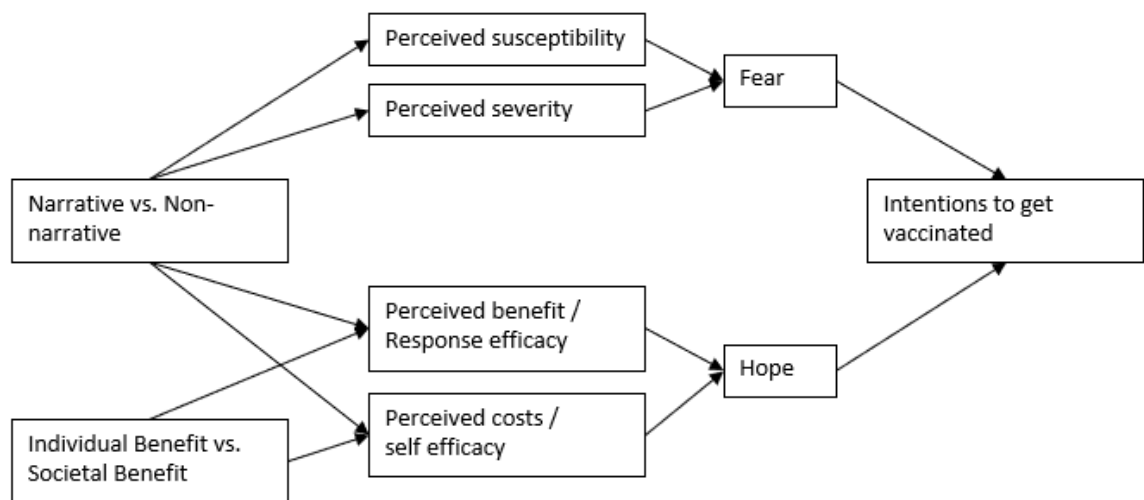
The current Study

When it comes to using narrative messages for vaccine promotion, there are still many gaps in our knowledge. It is not known how messages should be designed to elicit the greatest vaccination intentions and which mechanisms make vaccination messages effective. Furthermore, it has not been researched yet whether a focus on social benefits can be combined with narrative messages to make them more effective. To close these gaps in our knowledge, this study will

analyse the effectiveness of a narrative approach on HPV vaccination intentions compared to a message without a narrative. Additionally, the effect of focusing on the social benefit of vaccination is being compared to the effect of focusing on the individual benefit of vaccination. To get a better understanding of how these variables influence vaccination intentions, the health belief model is going to be combined with the extended parallel processing model and the protection motivation theory. Based on the findings described earlier, Figure 1 shows the conceptual basis of this study.

Figure 1

Theoretical Model



Based on this theoretical model several hypotheses are derived, that will be tested in this study:

Hypothesis 1: Narratives will result in higher vaccination intentions compared to non-narratives.

Hypothesis 2: Messages focusing on social benefit will result in higher vaccination intentions compared to messages focusing on individual benefit.

Hypothesis 3: Narratives will result in higher susceptibility, severity and benefits as well as lower perceived costs compared to non-narratives.

Hypothesis 4: Messages focusing on social benefit will result in higher perceived benefits and lower perceived costs compared to messages focusing on individual benefit.

Hypothesis 5: Susceptibility and severity will correlate positively with fear.

Hypothesis 6: Higher perceived benefits and lower perceived costs will correlate positively with hope.

Hypothesis 7: Fear and hope will correlate positively with vaccination intentions.

Materials and Methods

Participants

Participants were collected through different social media channels as well as through the SONA system of the University of Twente. The survey was active from 30.03.2022 to 20.04.2022. In total, 180 people participated in the experiment, of which 19 had to be excluded due to not answering enough questions, resulting in a total of 161 valid responses. Participants were between 17 and 75 years old ($M = 24.1$, $SD = 10.3$). With 66.5%, the majority of participants were female, 31.7% were male and 1.8% were non-binary or preferred to not state their gender. Most participants lived in Germany (52.8%) and the Netherlands (42.9%) only 4.4% lived outside of these countries. When it comes to education, 77.0% of participants completed high school 10.6% completed a college or professional degree, 6.2% a bachelor's degree, 3.1% a master's degree and 3.1% did not complete any degree yet. Moreover, 67.1% had already heard of HPV, 26.1% had not heard of it and 6.8% were not sure. Furthermore, 31.1% were already vaccinated against HPV, 44.2% were not vaccinated and 24.2% were not sure. The exact demographic characteristics for every condition can be found in table 1.

To check whether the randomization was successful, multiple ANOVAs were performed that checked for significant differences in age, gender, country, education, knowledge of HPV and vaccination status against HPV between the groups. The randomization was successful, as there were no significant differences between the conditions in any of these variables. It is, however, relevant that gender was close to showing significant differences.

Table 1*Demographic Characteristics of Participants*

	Condition 1		Condition 2		Condition 3		Condition 4	
	n	%	n	%	n	%	n	%
Gender								
Male	19	46	9	22	9	24	14	34
Female	21	51	31	76	28	74	27	66
Other	1	2	1	2	1	3	0	0
Country								
Germany	20	49	25	61	19	50	21	51
Netherlands	18	44	14	34	19	50	18	44
Other	3	7	2	5	0	0	2	5
Education								
Less than highschool	2	5	2	5	0	0	1	2
Highschool	30	73	32	78	30	79	32	78
College/professional degree	3	7	4	10	3	8	7	17
Bachelor's degree	4	10	2	5	3	8	1	2
Master's degree	2	5	1	2	2	5	0	0
Already heard of HPV								
Yes	30	73	28	68	25	66	25	61
No	9	22	11	27	7	18	15	37
Don't know	2	5	2	5	6	16	1	2
Vaccinated								
Yes	16	39	10	24	14	37	10	24
No	15	37	24	59	15	39	18	44
Don't know	10	24	7	17	9	24	13	32

Design and Procedure

An online experiment using a 2x2 (message presentation: narrative vs non-narrative) x (highlighted benefit: individual vs social) design was conducted. The experiment was created in Qualtrics and approved by the ethics committee. After agreeing to the consent form, participants had to fill in the demographics, which include age, gender, country of residence and education. Participants were then randomly assigned to one of four conditions. They received a message which was either in a narrative or non-narrative format and highlighted either individual or social benefit. After reading the message, participants were asked to answer a series of questions. These variables include vaccination intent, emotions, health beliefs, prior knowledge of HPV,

manipulation checks and whether participants were vaccinated against HPV. Thereafter, participants were debriefed and thanked for their participation.

Message Stimuli

The messages were presented in a newspaper format. Every message first provided the reader with some general information about the Humane Papillomavirus (HPV). In the narrative conditions, this information was followed by a personal narrative of either a person who had HPV and talked about individual consequences (adopted from Okuhara et al. (2018)) or a nurse speaking about the consequences of HPV for society. In the non-narrative conditions, people received the same information on individual or social consequences that were conveyed in the narratives but in an objective way without a personal message. All messages were designed to convey the same information and have similar lengths. The message stimuli can be found in Appendix A.

Measures

Vaccination Intentions

The measurement of the intent to get an HPV vaccine is adapted from Gerend and Shepherd (2007) and consists of five questions. Two questions measured whether participants had already heard of HPV and whether they were already vaccinated against it. The other three measured both short-term as well as long-term vaccination intentions. Each question was rated on a five-point Likert scale. These questions were “How willing would you be to receive the HPV vaccine within the next month?”, “How willing would you be to receive the HPV vaccine within the next year?” and “I believe the HPV vaccine is important to have?”. Higher scores indicated that participants were more likely to get the vaccine. To create the scale the items were averaged and the scale yielded a good reliability ($\alpha = .88$). The complete questionnaire can be found in Appendix A.

Health Beliefs

Five-point Likert scales adapted from Liu et al. (2021) were used to measure the four health beliefs. Three items assessed the perceived susceptibility by measuring the perceived likelihood of getting HPV (eg. It is likely that I will contract HPV) ($\alpha = .68$). Furthermore, three items assessed the perceived severity by measuring the perceived consequences of HPV (eg. I believe that HPV can cause severe health problems for me) ($\alpha = .75$). Another three items assessed the perceived benefits and response efficacy by asking how much protection the vaccine

will grant to oneself and others (eg. The HPV vaccine is effective in preventing HPV) ($\alpha = .71$). Lastly, five items assessed the perceived costs and self-efficacy by measuring if participants thought they had the time, money and skills to get vaccinated as well as the risks associated with the vaccine (eg. I have the time to get the HPV vaccine) ($\alpha = .70$).

Emotions

Fear and hope were measured with a 5-point scale adapted from Liu et al. (2021). Participants were asked, “How much do you feel the following emotions after reading the message?”. Fear was measured with “afraid” and “fearful” and hope was measured with “hopeful”. Both measures were averaged to create the fear scale, and the scale had good reliability ($= .70$).

Manipulation Checks

Four manipulation checks were conducted to assess the effectiveness and accuracy of the message design. First, participants had to rate whether the message was narrative or non-narrative. This was assessed with the question “was the text written in a personal (i.e. use of I or We) or objective style (entirely based on facts)?” adapted from the study of Ye et al. (2021). Following that, participants were asked to rate whether the message focused on individual or social benefits. This was assessed with the questions “The article focused on individual risks” and “The article focused on societal risks”. Additionally, participants had to answer two control questions by rating how long they perceived the text to be and how interesting the text was. Every question was rated on a five-point Likert scale.

Analysis

Before the analysis was carried out, the dataset was prepared by excluding participants that did not meet the set criteria and recoding the necessary variables. After this, descriptive statistics of the demographic variables were computed to get an overview of the characteristics of the sample. Thereafter, multiple ANOVAs were conducted to check for demographic differences between the conditions. Additionally, every variable was examined in terms of its distribution.

Then the effectiveness of the manipulation was analyzed. To do this, three two-way ANOVAs were conducted to check for significant differences in perceived narrativeness and perceived individual as well as social benefit between the conditions. Furthermore, a one-way ANOVA was used to test for differences in perceived length and interestingness of the messages in the four conditions.

To test the first and second hypotheses a two-way ANOVA was used to check for the effect of narrative style and type of benefit on vaccination intentions. After that, two-way ANOVAs were used to analyze the effect that narrative style and type of benefit had on the four health beliefs (susceptibility, severity, costs and benefits) to answer hypotheses three and four. Then Pearson and Spearman's correlations were used to assess the relationship of severity and susceptibility with fear, as well as costs and benefits with hope. Furthermore, the correlation of fear and hope with vaccination intentions was calculated. These things were done to answer hypotheses five, six and seven.

Results

Effectiveness of Manipulation

Before analyzing the results the effectiveness of the manipulation was checked. Participants that read the narrative messages rated the message as significantly less objective than the non-narrative messages ($F(1) = 210.21, p < .001$). No significant difference in objectivity could be found for the type of benefit ($F(1) = 1.54, p = .22$) and the interaction effect ($F(1) = 3.19, p = .08$). Furthermore the messages that focused on individual benefit were perceived to focus significantly more on individual benefit ($F(1) = 8.97, p = .001$). No significant differences for the focus on individual benefit could be found between the narrative conditions ($F(1) = 1.88, p = .17$) and for the interaction effect ($F(1) = 3.45, p = .07$). Additionally, a significant difference in perceived focus on societal benefits was found between the conditions that focused on different kinds of benefits ($F(1) = 11.74, p = .001$) but not between the narrative conditions ($F(1) = 3.35, p = .07$) and the interaction effect ($F(1) = 0.14, p = .71$). Therefore, the manipulation was successful. Furthermore, no significant differences in perceived message length were found between conditions, $F(3, 157) = 0.66, p = .58$. Finally, there was a non-significant difference between the conditions in terms of how interesting the message was, $F(3, 157) = 1.38, p = .25$.

General impression of the results

Overall, as shown in table 2, vaccination intentions were similar in all four conditions ($M = 3.76, SD = 1.09$). The majority of participants had positive vaccination intentions. This can be seen especially when looking at how important participants rated the HPV vaccine. In Figure 2, it can be seen that only five participants disagreed with the statement "I believe the HPV vaccine to be important" strongly or somewhat and that everyone else had either neutral or positive opinions about the importance of HPV. It is also interesting to note that 67% of participants had already

heard of HPV before the study, 7% were not sure and 26% had not heard about it. Furthermore, 31% were already vaccinated against HPV, 24% were not sure and 45% were not vaccinated. When it comes to the health beliefs, it can be seen that severity ($M = 3.99$, $SD = 0.81$), benefits ($M = 4.03$, $SD = 0.74$) and costs ($M = 4.13$, $SD = 0.61$) all showed similar scores in the four conditions. Only susceptibility ($M = 2.95$, $SD = 0.86$) showed a significantly lower score. Fear ($M = 2.26$, $SD = 0.87$) and hope ($M = 2.21$, $SD = 1.80$) also showed similar scores, however, these scores were significantly lower compared to the other variables.

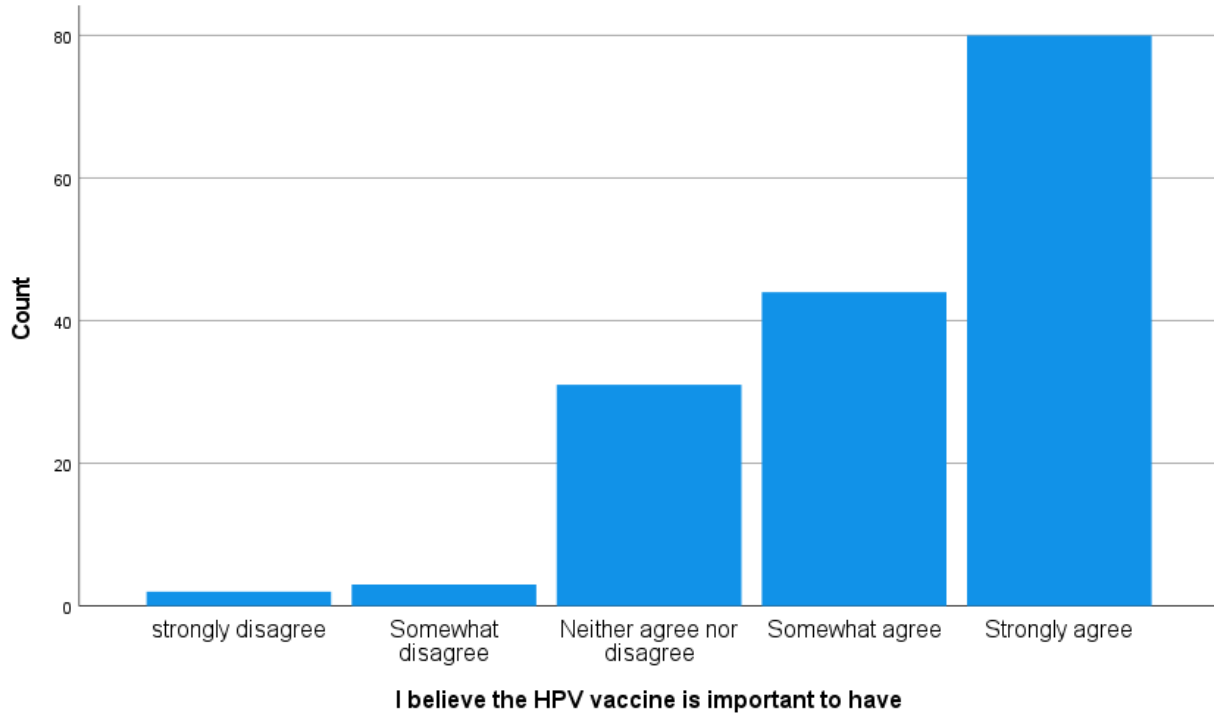
Table 2

Descriptive statistics of Dependent Variables per condition

	Narrative & individual		Narrative & social		Non-narrative & individual		Non-narrative & social	
n	41		41		38		41	
Variable	M	SD	M	SD	M	SD	M	SD
Susceptibility	2.83	0.16	3.14	0.13	2.83	0.15	2.95	0.14
Severity	3.96	0.14	3.98	0.12	4.15	0.14	3.81	0.13
Benefits	3.86	0.12	4.21	0.09	3.96	0.14	4.05	0.13
Costs	4.21	0.08	4.13	0.10	4.06	0.13	4.04	0.10
Fear	2.36	0.17	2.10	0.12	2.57	0.15	2.12	0.12
Hope	2.30	0.17	1.85	0.13	2.42	0.21	2.38	0.20
Vaccination Intent	3.58	0.19	3.95	0.15	3.89	0.20	3.64	0.17

Figure 2

Attitudes toward the importance of the HPV vaccine



Note. Number of responses to the statement “I believe the HPV vaccine is important to have” are shown

Hypotheses 1 & 2

First, a two-way ANOVA was performed to analyze the effect of the narrative style of the message (narrative vs. non-narrative) and the type of benefit (individual vs. social benefit) on vaccination intentions. As it can be seen in table 3, the two-way ANOVA revealed a non-significant effect of narrative style on vaccination intentions ($F(1) = 0.01, p = .93$) as well as a non-significant effect of the type of benefits on vaccination intentions ($F(1) = 0.09, p = .76$). The interaction effect between the two variables was also non-significant ($F(1) = 3.56, p = .06$). Therefore, hypothesis 1, that narratives lead to higher vaccination intentions, and hypothesis 2, that social benefit leads to higher vaccination intentions, have to be rejected.

Table 3*Significance of Difference between conditions*

Condition	Narrative vs. Non-narrative		Individual vs. Social benefit		Interaction Effect	
	F-value	Sig. 2-tailed	F-value	Sig. 2-tailed	F-value	Sig. 2-tailed
Susceptibility	0.33	.57	3.36	.07	0.14	.70
Severity	0.15	.70	0.67	.41	1.16	.28
Benefits	0.01	.92	3.16	.08	1.62	.21
Costs	2.22	.14	0.09	.76	0.17	.68
Fear	1.62	.20	5.13	.03	0.42	.52
Hope	4.08	.05	1.78	.19	0.74	.39
Vaccination Intent	0.01	.93	0.09	.76	3.56	.06

Hypotheses 3 & 4

Two-way ANOVAs were performed to analyze the effects of narrative style and type of benefit on the four health beliefs (susceptibility, severity, benefits and costs). For susceptibility, no statistically-significant differences could be found for both narrative style ($F(1) = 0.33, p = .57$) and type of benefit ($F(1) = 3.36, p = .07$). The interaction effect was non-significant as well ($F(1) = 0.14, p = .70$).

Severity also showed no significant differences for narrative style ($F(1) = 0.15, p = .70$) and type of benefit ($F(1) = 0.67, p = .41$). A significant interaction effect could also not be found ($F(1) = 1.16, p = .28$).

When it comes to benefits, no significant differences were found for narrative style ($F(1) = 0.01, p = .92$), type of benefit ($F(1) = 3.16, p = .08$) and the interaction effect ($F(1) = 1.62, p = .21$).

Lastly, for costs, no significant differences were found for narrative style ($F(1) = 2.22, p = .14$), type of benefit ($F(1) = 0.09, p = .76$) and the interaction effect ($F(1) = 0.17, p = .68$). Therefore, both hypotheses 3, that narratives lead to increased health beliefs and 4, that social benefit messages lead to higher perceived benefits and lower perceived costs, have to be rejected.

Hypotheses 5, 6 & 7

A Pearson correlation coefficient was computed to assess the relationship between severity and fear. As shown in table 3, results revealed a positive correlation between the two variables $r(158) = .16, p < .05$. This means that people who rated the disease as more severe reported higher feelings of fear. For susceptibility a non-significant relationship was found $r(159) = .10, p = .19$. Therefore, hypothesis 5, that higher severity and susceptibility are correlated with higher fear, can only be partially accepted, as only severity was significantly correlated with fear.

Next, a Spearman's rank correlation was performed to assess the relationship between benefits as well as costs and hope. A significant correlation between benefits and hope was found $r(158) = .24, p < .01$. This means that people who reported higher perceived benefits also reported higher feelings of hope. The relationship between costs and hope was not significant $r(157) = .05, p = .50$. Therefore, hypothesis 6, that higher perceived benefits and costs are correlated with higher hope, can be also only partially accepted, as benefits correlated significantly with hope but costs did not.

Lastly, a Pearson correlation between fear and vaccination intentions was performed. The analysis showed a significant correlation between the two variables $r(154) = .21, p < .01$. Furthermore, a Spearman's rank correlation between hope and vaccination intentions was performed. This test also revealed a significant correlation $r(153) = .20, p < .05$. Therefore, people that reported higher fear and hope also showed higher vaccination intentions. Because of this, hypothesis 7, that increased fear and hope are correlated with higher vaccination intentions, can be accepted. This shows that people who reported stronger fear and hope emotions were more willing to get vaccinated.

Table 4*Correlations for Study Variables*

Variable	N	1	2	3	4	5	6	7	8	9
1. Narrative Style	161	-								
2. Type of Benefit	161	.02	-							
3. Vaccination Intentions	161	-.01	-.03	-						
4. Susceptibility	159	.04	-.15	.16*	-					
5. Severity	158	-.03	-.03	.06	.44**	-				
6. Benefits	159	.01	-.14	.59**	.17*	.37**	-			
7. Costs	157	.12	.03	.45**	.17*	.34**	.51**	-		
8. Fear	161	-.10	.17*	.21**	.10	.16*	.20*	.06	-	
9. Hope ^a	160	-.14	.09	.20*	-.02	.21**	.24**	.05	.42**	-

^a A Pearson correlation could not be performed for this variable as it was measured at the ordinal level. A Spearman correlation was used instead. Differences between Pearson and Spearman correlations for this variable were minor.

* $p < .05$. ** $p < .01$

Discussion

The purpose of this study was to gain a better understanding of the impact of different types of messages on vaccination intentions. To do this, participants were presented with one of four messages, informing the participant about the risks of HPV. The messages were either in a narrative or non-narrative format and focused on either the individual risk or social risks. There are four key findings of this research. First, the different types of messages did not affect vaccination intentions. Second, perceived severity, susceptibility, benefits and costs are linked with people's vaccination intentions. Third, the emotions of fear and hope are also linked with

vaccination intentions. Fourth, perceived severity is associated with fear and perceived benefits are associated with hope.

Surprisingly, the main effect of narrative messages on vaccination intentions could not be confirmed. This is especially confusing as most of the literature predicts narrative messages to be more effective than non-narrative messages (Haase et al., 2020; M. Kim et al., 2018; Liu et al., 2021; Okuhara et al., 2018; Ye et al., 2021). A difference between individual risk and social risk messages could also not be found. These findings are not in line with most of the literature that finds social risk messages to be very effective (Betsch et al., 2013; Lazić et al., 2021; Mo et al., 2021). However, because social risk messages have never been combined with narratives before, the combination of the two might be causing these unexpected results. This raises the question of whether the theoretical model has to be adjusted or whether other factors caused the results.

First, looking at the manipulation checks, it can be seen that the manipulation achieved the intended effects and that the messages were also perceived to be equally long and interesting. The study also had a sufficient sample size of 161 participants. Furthermore, all measures showed sufficient reliability. Additionally, the participants in the four conditions did not show significant differences in age, gender, education, prior knowledge or amount of vaccinated people. However, it has to be noted that gender was close to showing significant differences between the groups ($p = .08$). Another factor that has to be considered is the sample used for this study. With a mean age of 24, most participants were rather young. As most participants were collected through SONA systems of the University of Twente and the social environment of the researcher, a large majority of the participants consisted of students. Lastly, with 66%, the majority of participants were female. Therefore, the sample is not necessarily representative and results cannot be generalized to the whole population. However, the sample consists of a relevant target group as vaccination is especially important for younger people and loses importance with ongoing age.

Another factor also has to be considered when evaluating the impact of the results. Looking at the participants, it can be seen that the majority of participants already knew of HPV before the study, and 31% were vaccinated against HPV. Therefore, it could have been the case that most participants already had a set opinion about HPV and that, because of this, the messages were not able to change the vaccination intentions to a significant degree. Also, if we take a closer look at the individual items for vaccination intent, it can be seen that the majority of participants had high vaccination intentions. Especially, when asked if participants think the HPV

vaccine is important, only five participants strongly or somewhat disagreed with this statement. Given these high vaccination intentions, it is likely that the different messages did not increase vaccination intentions, as most people already knew of the HPV vaccine and already thought of it to be important.

It is, however, encouraging that Hypotheses 5 and 6 could be partially confirmed as perceived severity was correlated with fear and perceived benefits were correlated with hope. Furthermore, the health beliefs susceptibility, benefits and costs were correlated to vaccination intentions. This confirms the predictions made by the health belief model (Becker & H., 1974; Becker et al., 1977) and the protection motivation theory (Maddux & Rogers, 1983; Rogers, 1975) and grants further credibility to these models in the context of vaccination behaviour. Additionally, fear and hope were also correlated with vaccination intent as predicted by the extended parallel process model (Witte, 1994).

As the non-significant results of the different messages might have been caused by the sample, the question arises of what this study contributes to the literature. First of all, this study confirmed the importance of perceived severity, susceptibility, costs and benefits on vaccination intentions. Thus supporting the health belief model and the protection motivation theory. Furthermore, it also supported the impact of the emotions of fear and hope on vaccination intentions as predicted by the extended parallel process model. Therefore, this study further emphasizes the importance of targeting these factors to increase vaccination intentions. Unfortunately, this study could not confirm the effectiveness of neither narrative nor social benefit messages on vaccination intentions. Furthermore, as most participants already knew about HPV and many were already vaccinated, the results of this study can only be applied to other vaccines if people already have some knowledge about that vaccine. Despite the results of the study potentially not being generalizable, the research still identified an important field of research, which should be explored further. Additionally, the study suggests that it might be important, how much knowledge participants have about the vaccine before taking part in a study.

In future research, it would therefore be valuable to repeat this study with a more diverse sample. Additionally, it should be considered which vaccine to use as the prior knowledge of participants can have a large impact on the results. If participants know about a disease/vaccine before taking part in an intervention, they might already have a set opinion, which is a lot harder to influence compared to people who have no prior knowledge of the vaccine. Accordingly,

studies on well-known diseases like COVID-19 or HPV might find lower effectiveness of manipulations than studies that use lesser-known diseases. Because of this, using a fictional disease could be an option, as was done in the study by Jolley & Douglas (2014). Furthermore, more research on the workings of narrative messages as well as social benefit messages on vaccination intentions is necessary, as it is still not clear why certain vaccination interventions are more effective than others and which factors are underlying these differences.

To sum everything up, this study investigated the influence of different vaccination messages on vaccination intentions. No difference between the four types of messages could be found for vaccination intentions. This is likely the case as most of the participants had positive vaccination intentions before the study, and this ceiling effect is why the messages could not increase their vaccination intentions further. However, this study confirmed the relevance of the health belief model, the protection motivation theory and the extended parallel process model for explaining vaccination intentions. Because of this, even though the study did not produce results that can easily be generalized, it does still contribute to getting a better understanding of the factors influencing vaccination intentions. Furthermore, the study revealed important considerations for further research, namely which target groups to choose and which disease/vaccine to use as this could influence the results. Lastly, the study identified that there is still a lack of information when it comes to the factors underlying the effectiveness of narrative interventions and interventions using social benefits.

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Appendix A

Questionnaire and Vaccination Messages

Introduction

Thank you for participating in my study. The goal of this study is to compare different kinds of newspaper articles on vaccines. The study will take approximately 10 minutes to complete. You may only participate if you are 16 or older.

Your participation in this study is completely voluntary and you can withdraw at any time. You are free to omit any questions.

Your responses are completely anonymous, and cannot be traced back to you because no personally identifying information such as names are asked in this survey. Your anonymous responses will be used for scientific research into various aspects of psychology.

Demographics

How old are you?

What is your gender?

Male

Female

Non-binary / third gender

Prefer not to say

Which country are you living in?

Germany

Netherlands

Another EU country

Another non-EU country

What is the highest level of education you have completed?

Less than highschool

Highschool

College / professional degree

Bachelor's degree

Master's degree

Doctoral degree

Conditions

Condition 1

Please read this short newspaper article.

Consequences of the human papillomavirus

The human papillomavirus (HPV) is a virus that causes different kinds of cancer in males as well as females, including cervical, vulva, vagina, penis and anus cancer. HPV is responsible for 70% of all cases of cervical cancer and in 2002 250.000 people died of cancer caused by the HPV virus. The transmission of the virus can be prevented through vaccination.

This is what a HPV patient said:

I was diagnosed with cervical cancer at a medical examination at the age of 29 years. I underwent a total hysterectomy and lost my uterus. It happened about a year after I got married. I was

hoping to have children but was robbed of this dream. Fortunately, the cancer was found early and my life was saved. However, this experience continues to impact my life. Every time the phone rings, I am terrified it is the oncologist calling and I hold my breath until I get the results. I am hopeful that I will live a long and healthy life, but thoughts of the cancer returning are always lurking in the back of my mind. I do not want others to have the same difficult experience as myself. I always say to people: Please receive the HPV vaccine to prevent cervical cancer. It is so easy and does not take long.

Condition 2

Please read this short newspaper article.

Consequences of the human papillomavirus

The human papillomavirus (HPV) is a virus that causes different kinds of cancer in males as well as females, including cervical, vulva, vagina, penis and anus cancer. HPV is responsible for 70% of all cases of cervical cancer and in 2002 250.000 people died of cancer caused by the HPV virus. The transmission of the virus can be prevented through vaccination.

This is what a nurse said about HPV:

We often have patients who get diagnosed with some kind of cancer caused by HPV. Even when the cancer is found early, the treatment often has extreme consequences. Some patients need to have their uterus removed and many are terrified for the rest of their life that the cancer may return. Often these are people who cannot get the vaccine themselves, because of medical reasons, and who are therefore relying on others getting the vaccine to protect them. It makes me sad that these vulnerable people are not protected because others do not vaccinate themselves. I always say to people: Please receive the HPV vaccine so that you help to protect the society. It is so easy and does not take long.

Condition 3

Please read this short newspaper article.

Consequences of the human papillomavirus

The human papillomavirus (HPV) is a virus that causes genital warts as well as different kinds of cancer in males as well as females, including cervical, vulva, vagina, penis and anus cancer. HPV is responsible for 70% of all cases of cervical cancer and in 2002 250.000 people died of cancer caused by the HPV virus. Even if the cancer is detected early, many people still have to face extreme consequences. These consequences are always physical, some women for example have their uterus removed. But often people also have to face strong mental consequences. Many people are afraid of the cancer returning for their whole life. HPV is highly transmissible with peak incidence soon after the onset of sexuality. The transmission of the virus can be prevented through vaccination. Therefore, it is important that people vaccinate themselves so that they avoid the consequences of cancer caused by HPV. The vaccination process is very easy and does not take long.

Condition 4

Please read this short newspaper article.

Consequences of the human papillomavirus

The human papillomavirus (HPV) is a virus that causes genital warts as well as different kinds of cancer in males as well as females, including cervical, vulva, vagina, penis and anus cancer. HPV is responsible for 70% of all cases of cervical cancer and in 2002 250.000 people died of cancer caused by the HPV virus. HPV is highly transmissible, but the transmission of the virus can be prevented through vaccination. It is important that people vaccinate themselves as it does not only protect oneself but also makes it impossible to pass the disease to others. This is especially important for individuals who are vulnerable to the disease, such as people with a weak immune system. These people rely on others vaccinating to protect them. Therefore, it is important that people vaccinate themselves so that the society is protected from HPV. The vaccination process is very easy and does not take long.

Manipulation checks and emotions

How long was the text?

- Very short
- Short
- Medium
- Long
- Very long

How interesting was the text?

- Not interesting at all
- Slightly interesting
- Moderately interesting
- Very interesting
- Extremely interesting

How much did the article focus on individual risks of HPV?

- Not at all
- A little
- A moderate amount
- A lot
- A great deal

How much did the article focus on societal risks of HPV?

- Not at all
- A little
- A moderate amount
- A lot
- A great deal

Was the text written in an personal (i.e. use of I or We) or objective style (entirely based on facts)?

- Completely personal
- Mostly personal
- Neither Nor
- Mostly objective
- Completely objective

How much do you feel the following emotions after reading the message?

Afraid

- None at all
- A little

- A moderate amount
- A lot
- A great deal
- Hopeful
 - None at all
 - A little
 - A moderate amount
 - A lot
 - A great deal
- Fearful
 - None at all
 - A little
 - A moderate amount
 - A lot
 - A great deal

Vaccination Intentions

Have you already heard of HPV?

- No
- Don't know
- Yes

Have you already been vaccinated against HPV?

- No
- Don't know
- Yes

Assuming that you have not been vaccinated against HPV yet.

How willing would you be to get the HPV vaccine within the next month?

- Not likely at all
- Somewhat likely
- Undecided
- Likely
- Very likely

How willing would you be to get the HPV vaccine within the next year?

- Not likely at all
- Somewhat likely
- Undecided
- Likely
- Very likely

I believe the HPV vaccine is important to have

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Health beliefs

How much do you agree with the following statements, if you are assuming that you have not been vaccinated yet?

Strongly Disagree Somewhat disagree Neither agree nor Disagree Somewhat agree Strongly agree

It is likely that I will contract HPV
 I believe that HPV can cause severe health problems for me
 I have the money to get the HPV vaccine
 HPV vaccine is effective in preventing HPV
 I am able to get vaccinated to prevent HPV
 I am at risk of getting HPV
 I believe that HPV would have serious negative consequences for me
 It is possible that I will get HPV
 HPV vaccine works in preventing HPV
 I have the time to get the HPV vaccine
 I believe that HPV would be extremely harmful for me
 If I get the HPV vaccine I will protect others around me
 I have the skills to get the HPV vaccine
 Getting the HPV vaccine involves great risk

Debriefing

Thank you for having participated in my study.

The goal of this experiment was to compare the influence of different messages on the intention to get vaccinated. You read one of four different messages which was either narrative or non-narrative and focussed on either social or individual consequences. The information about the humane papillomavirus given in this experiment was correct and was retrieved from the official website of the WHO (<https://www.who.int/teams/health-product-policy-and-standards/standards-and-specifications/vaccine-standardization/human-papillomavirus>).

This study was conducted, because I believe that vaccinations are important. Here are some more information about the HPV vaccine:

The German Standing Committee on Vaccination recommends an HPV vaccination for girls and boys from the age of 9-14. This is as most people infect themselves with the HPV virus about 1-2 years after the onset of sexual activity. If the vaccination is not received during this period it can be received until the age of 17. After the age of 17, an HPV vaccination might still be useful depending on the lifestyle and number of sexual partners of a person. Every HPV vaccine is approved without an age limit. For more information visit https://www.rki.de/SharedDocs/FAQ/Impfen/HPV/FAQ-Liste_HP_V_Impfen.html (German information) <https://www.cdc.gov/vaccines/vpd/hpv/public/index.html> (English information)

For further information about this study, you may contact Dr. Kuttschreuter, m.w.m.kuttschreuter@utwente.nl, the person in charge of this research study, or write an email to l.schalow@student.utwente.nl, the researcher.

If you would like to talk with someone other than the researchers to discuss any problems or concerns, to discuss situations in the event that a member of the research team is not available, or to discuss your rights as a research participant, please contact the Ethical Review Committee of

the Behavioral and Management Sciences Faculty, University of Twente, Netherlands,
ethicscommittee-bms@utwente.nl.