# Do those opposing wind parks suffer worse health effects?

*The effect of opinion on health and well-being*

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**Abstract**

A recently aired documentary shows the struggle in the Veenkoloniën area by the people opposing the construction of a wind park. The people in this area were inadequately informed by the government about the wind park and had many fears about negative health effects the wind park might have. Researchers disagree on the health effects of wind turbines, but some state that annoyance could cause a decrease in well-being. The aim of this research paper is to find out to what extent someone's opinion on a wind park may influence perceived changes in well-being and health and what affects people's opinion. People in the Veenkoloniën were asked to fill in a questionnaire about their health, their health before construction of the wind farm and their opinion on the wind farm, among other things. The questions in the questionnaire were based on the Rand 36 list. Results show no significant relation between opinion on the wind park and health, nor on opinion on the wind park and well-being. There was however a noticeable change in well-being since the construction of the wind park, but this research cannot conclusively give a cause of that change. This paper can give no conclusive answer to the question which factors have the most influence on people's opinion and how they influence people's opinion. More research is recommended to find out if and to what extent the wind park is the cause of the reported decrease in well-being.

## 1. Background

On the 12th of October, 2021 a documentary, shown in the Forum theatre in Groningen was received with much praise (De Veer, 2021). This documentary was Tegenwind: Het verdriet van de Veenkoloniën. It shows people in the Veenkoloniën who had been emotionally, socially and physically affected by the plans by the government to build a wind farm in their neighbourhood. Director Kees Vlaanderen said he wishes to show that these people do see the importance of green energy, however they are not taken seriously when they speak up against the wind park in their backyard(Van Wetten, 2021). Many inhabitants of the areas were involved in protests as well as both legal and illegal actions (De Veer, 2020; RTV Drenthe, 2019).

The people feel the government has not adequately informed them of the risks and profits of this new wind park. The main concerns of these civilians are that the wind park will cause adverse health effects through noise pollution, light pollution, current harmonics and stroboscopic effects caused by sunlight reflecting off windmill blades (Platform Storm, n.d.). Further concern is that due to these adverse health effects people will move out of the region and strengthen the population decline.

The main problem voiced in Tegenwind: het verdriet van de Veenkoloniën (2021) is the lack of communication by the government. The people feel that the government does not listen to the community and does not inform the community properly. Furthermore the inhabitants of the region complain that companies profit from the wind farm, while they themselves only suffer negative consequences. The government has decided to fund new projects in the Veenkoloniën, determined through polling of public opinion, using money earned by the wind farm (Windpark De Drentse Monden en Oostermoer, 2021). By doing this they hope to positively affect public opinion.

This research aims to fill in the research gap on how opinion could act as a filter on self-perceived well-being. Opinions are known to be able to affect well-being (Diener, 2009) and mental health is known to affect how someone assesses their physical health (Mechanic & Hansel, 1987). Perception and visibility seem to be important factors in (self-reported) adverse health effects (Freiberg et al., 2019a; Van Kamp & Van den Berg, 2017, Freiberg et al., 2019b), but there is no consensus on whether wind parks affect well-being (Michaud et al., 2016; Feder et al, 2015). In a location like the Veenkoloniën where opinions on the wind park seem to be very negative, self-perceived well-being may have declined since construction of the wind park.

## 2. Research Problem

This research tackles the question “To what extent is the current well-being of the people in the Veenkoloniën connected to their current opinion of the wind park and to their opinion of the wind park before its construction?”

To answer this question it has been split up in three sub questions

Is there a self-perceived change in well-being of the people in the Veenkoloniën since the start of the construction of the wind park?

How and to what extent does this self-perceived well-being correlate with perception of the wind park?

How and to what extent has the perception of the respondents changed since the construction of the wind park?

## 3. Structure

This research paper starts off by discussing the theoretical framework and conceptual model on which the research is built. The methodology section is where it is made clear how this research was conducted and what tools were used. In the results section the gathered data is statistically analysed and discussed. This is split into several parts, which help in answering the research questions. The discussion section mentions the failings of the research tool and the data gathered with this tool. In the conclusion section the results are shortly summarized with mention of the failings of the data and trustworthiness of the results.

## 4. Theoretical Framework

A lot of research has been done into a possible connection between wind parks and a decline in well-being. These researches focus mainly on noise pollution, light pollution, aesthetic pollution and visibility of one or more windmills. Pedersen and Waye (2017) investigated possible effects of wind turbine noise on well-being. Although no direct connection was made between the two they remarked that there was prevalence of annoyance or irritation and that this can have an adverse effect on health. Many studies agree on the importance of perception and visibility of windmills on negative health effects(Freiberg et al., 2019a; Van Kamp & Van den Berg, 2017, Freiberg et al., 2019b). They find that noise pollution is perceived as more annoying, with more adverse health effects, when a windmill is visible from the residence.

The conceptual model (figure 1) shows the aforementioned connection between nuisances and well-being. It also shows a connection between nuisances and opinion. As mentioned several nuisances can cause annoyance or irritation which is in itself an adverse health effect (Michaud et al., 2005).

The conceptual model furthermore shows a connection between perception and well-being. Diener (2009) laid out several theories on subjective well-being, many of these theories imply the importance of optimism and worries on subjective well-being. Buttrick et al. (2017) discusses the effects of inequality on well-being. In their research they find that opinion and perception can act as a filter, influencing the strength of the effect inequality has on well-being.

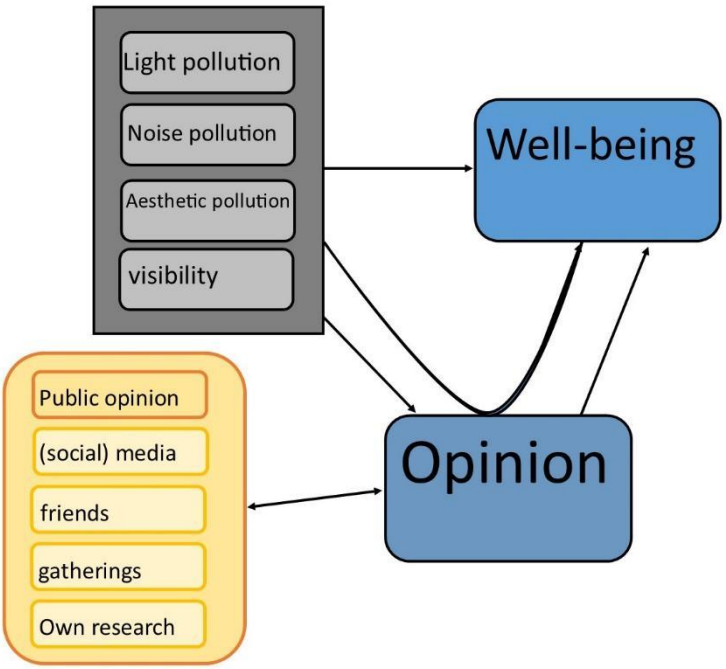


Figure 1: Conceptual model

Public opinion, social media friends and social gatherings are expected to have a significant effect on personal opinion. This is shown as the connection between “yellow” factors and opinion in figure 1. Moussaïd et al. (2013) and Bindel et al. (2015) describe how social influence can affect opinions. Personal opinions are influenced by constantly being averaged through a social network. Social media is also known to affect opinions as it provides a different social network (Shanthikumar, Wang & Wu, 2020). Doing your own research on a topic can influence and strengthen our existing opinion (Siegel, 2020).

The people in the Veenkoloniën have complained about (the lack of) government communication about the wind park (Van Wetten, 2021). Because of this the expectation is that public information provided by the government had some sort of negative influence on people’s opinions. Altafini and Lini (2014) theorized that an antagonistic interaction could influence opinion in a specific and possibly extreme direction. Should the government be seen as an antagonist by the public this could thus drive people to further negative opinions.

Although a lot is known about how nuisances, social interactions, opinion and well-being influence each other, little is known about the extent to which opinion functions as a filter, increasing or decreasing effects of nuisances on well-being. Although there has been some research into the negative health effect people expected and the negative health effect they experienced (Dudleston, 2000; Braunholtz, 2003), much about the connection between the aforementioned factors remains unknown. This research aims to find out what and how strong that connection is.

## 5. Methodology

For this research the choice was made to use a survey. This makes it possible to reach a larger group of people in order to compare and analyse data and look for correlation. In order to do this paired data is necessary and this is often not available online. Using a survey as a research method thus seemed to best overlap with this paper's research goal. The survey is included as appendix 1.

People were asked questions about their perceived well-being, including physical health. These questions were formulated by translating some questions on the SF-36 list (Ware & Sherbourne, 1992, as cited by Rand, n.d.) People were asked about perceived health, as opposed to clinical health because perceived health is more likely to be affected by mental stance (Mechanic & Hansel, 1987).

Instead of asking which factors influenced people's opinions they were asked to what extent each factor has influenced their opinions. This was done to see the differences in the extent to which something influenced their opinion. People were also asked whether the different aspects influenced their opinion positively or negatively.

The survey was to be spread by organizations. Organizations were asked to approach their members through email with the survey. This way people would be approached by a known entity. Furthermore the researcher could stay informed about how many people the survey has been sent to and use this to calculate a response rate. Out of 62 organizations that were approached only 9 organizations responded. Four organizations reacted positively about spreading the survey, but did not react to follow-up emails.

A flyer was printed and spread with a link to the survey on it. The flyer was delivered to addresses in random zip codes within the research area. The zip codes were picked using a list of zip codes in the area and a random number generator. This approach would not discriminate based on income or age. Spreading a survey this way also allows for calculation of non-response. However only a limited number of people can be reached in this way.

Social media was also used as a tool to spread the survey. Social media allows easy and fast sharing and has the chance to reach a lot of people. A problem with social media is that it is not possible to calculate non-response. Using social media can also cause exclusion or over representation of certain groups within the population (Ball, 2019). For this reason the data sets were kept apart until analysis could be done comparing the datasets.

People were asked to answer seven questions about their current health and well-being and the same seven questions on their health and well-being before construction of the wind park began (Appendix 1, questions 13 and 14). Comparing the answers of every question with their counterpart resulted in a score of -1 worsened, 0 remained the same or 1 improved. This was then combined in change of health A-G. a score ranging from -7 to 7. These questions refer mainly to mental health, however mental well-being and physical health are known to be interrelated (Ohrenberger et al., 2017; Nash, 2014).

The processing of results was done mainly through statistical analysis. A Kruskal-Wallis H test was done to compare different datasets and see if different variables affected the self-perceived health of the respondents. A Chi-square and Fisher's exact test were run to determine if there is association between perceived health and opinion on the wind park. Spearman's Rho was used to determine if there was correlation between opinion and change of opinion and a perceived change of well-being. To run the Fisher's exact, some data had to be recoded. This was done in three different ways in order to be able to exclude a possible significance found through bias recoding.

*Ethical considerations*

The survey did not ask personally traceable questions in order to, as much as possible, avoid privacy sensitive data. People were asked for their email address, which was kept in a separate safe file. Storing email addresses makes it possible for people to retract their response from the research at a later date. It also makes it possible to, to a certain extent, check if people have filled in the Survey more than once. By filling in and completing the survey one agreed to privacy terms mentioned in the survey introduction (Appendix 2).

The researcher is part of the research population having been born and raised in the research area. She has her own perception of the windmills and effects this has on her well-being, but will try not to let her opinion influence the research. The questionnaire was made as neutral as possible to not let a possible bias shine. The questionnaire was mainly based on the RAND-36 survey instrument (Ware & Sherbourne, 1992). "The RAND-36 is perhaps the most widely used health-related quality of life (HRQoL) survey instrument in the world today" (Hays & Morales, 2001, p350).

## 6. Results

*Comparability datasets and groups*

In order to determine whether there exists a significant difference between the data gathered through social media and the data gathered through flyers a Kruskal-Wallis H test was done. As can be seen in Table 1 there is no significant difference between the two datasets on the matter of opinion on the wind park, change in opinion, change in perceived health and general perceived health. Because there is no significant difference, further analysis uses both datasets combined.

| KRUSKAL-WALLIS H | OPINION | CHANGE OF OPINION | CHANGE OF HEALTH A-G | GENERAL HEALTH |
|---|---|---|---|---|
| DATASETS (DF=1) | 0,613 | 0,217 | 0,574 | 0,842 |
| DURATION OF RESIDENCE (DF=4) | 0,426 | 0,539 | 0,726 | 0,466 |
| LOCATION OF RESIDENCE (DF=4) | 0,454 | 0,018 | 0,775 | 0,887 |

Table 1: comparison of differences in data based on residence, duration of residence and data gathering method used.

The importance of duration of residence was also tested but turned out to have no significant difference. The Kruskal-Wallis H test was used to determine if different locations or different duration of residence would show significantly different results.

The change of opinion shows a significant difference, based on location of residence. Neither opinion, health or change of health shows a significant difference based on location of residence. The expectation was that living closer to the wind park would negatively affect opinion on the wind park. It seems however that opinion is not influenced by location of residence, but the change in one's opinion is.

*Change in health and well-being*

Not a single one of the respondents reported to be in bad health, although some reported their health had declined over the past 2 years. Figure 2 shows that 19% of respondents said their health was reasonable, over half said their health was simply good, a few even called their health fantastic. When asked how their health compared to 2 years ago two-third responded saying it was the same, while 27% said their health had gotten worse (figure 3). Over half of respondents had a score of less than zero on the variable change of health A-G. This implies that their overall well-being has decreased.

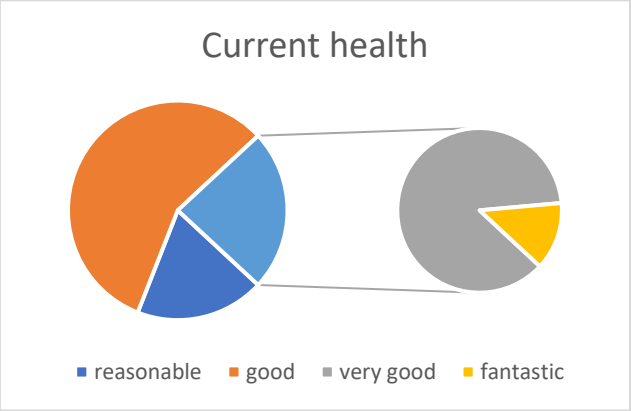


Figure 2: respondents on their current health

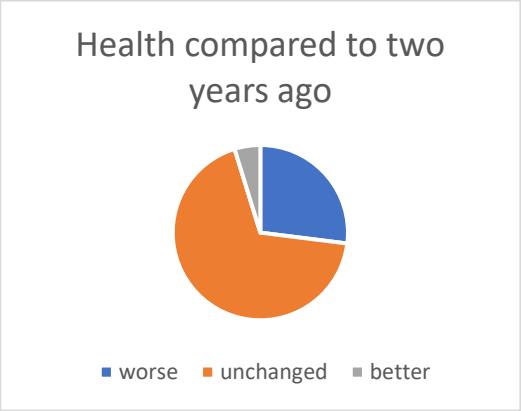


Figure 3: change in respondents health compared to two years ago

*Opinion and what influenced it*

There is no clear image on what has had the biggest influence on people's opinions on the wind park (Appendix D). Those who claim their opinion was greatly influenced by their own research were people with neutral and slightly negative opinions on the wind park, as well as those with an extremely negative opinion towards the wind park. This contradicts expectation as doing one's own research is expected to strengthen one's opinion, making it more extreme (Siegel, 2020). Public information by governments has affected both positive and negative opinions, and not just negative opinions as was expected. Public meetings have, rather noticeably affected mainly the opinions of those who currently have negative opinions.

In the open question about other things that have influenced their opinion on the wind park several people gave similar answers. Several people say their experience with the wind park influences their opinion. In their experience noise pollution is worse than they expected it to be. Another factor influencing opinions is experience with aesthetic pollution. Some found this worse than expected and their opinion was negatively influenced by it, while others found it to be not as bad as expected and their opinion was positively influenced by this. The last factors

mentioned that influenced people's opinion was the process through which people felt the wind park was forced upon them and the documentary made about this process and peoples struggles.

Over half of the respondents say their opinion on the wind park has remained the same over the past 2 years. Over 37% say their opinion has changed to be more negative, nearly half of those say their opinion on the wind park has become much more negative. This is surprising as older research shows significant increase in positivity towards wind parks after their construction (Bishop & Proctor, 1994; Elliott 1994). Watts et al. (2004) also shows a mostly positive opinion on a wind park built in the respondents' area.

| | | **Opinion on green energy** | | |
|---|---|---|---|---|
| | | negative | positive | total |
| **Opinion on the Wind park** | very negative | 2 | 11 | 13 |
| | negative | 2 | 17 | 19 |
| | neutral | 0 | 23 | 23 |
| | positive | 0 | 6 | 6 |
| | very positive | 0 | 2 | 2 |
| | **total** | **4** | **59** | **63** |

Table 2: Opinion on the wind park compared with opinion on green energy transition

There is no significant correlation between people's opinions on the wind park and those same people's opinion on green energy development. Table 2 shows that none who think positively about the wind park think negatively of green energy developments. Most of the participants are neutral or positive about the green energy developments, regardless of their opinions on the wind park in the Veenkoloniën. This "not in my backyard" mindset is not uncommon where people do want the benefits of certain things, in this case green energy, but do not want the local negative effect, in this case a wind park (Carson, 2017)

When asked to elaborate on their opinion on green energy developments many state it is "unavoidable, "important" and "better for the environment". Those who think negatively of the green energy development say there should be other options to generate energy, or to save energy by consuming less.

*Testing association and correlation of opinion and health*

A chi-square analysis was done to determine association between perceived health and opinion on the wind park. Both of these variables were measured on Likert scale with five groups. This turned out to be too many groups which resulted in too many cells having an expected count of less than five (Table E1).

Both the perceived health data and the opinion on the wind park data were transformed into binary variables. The health data was transformed into negative and positive where *slecht* and *redelijk* were merged into one negative score. *Goed*, *zeer goed* en *geweldig* were merged into one positive score. For opinion on the wind park it was a bit more difficult to make the data binary because there was a neutral option as well. Three binary data sets were made out of the opinion data, one where neutral was counted among negative, one where neutral was counted among positive and one where neutral was not defined.

Using the newly created binary datasets a Chi-square test was run along with the Fisher's Exact test. Neither of the three *opinion on wind park* datasets turned out a significant association with perceived health (table 3). Thus we cannot reject the null-hypothesis that there is no association between perceived health and opinion on the wind park.

| Fishers' exact | Exact sig. (2-sided) | Exact sig. (1-sided) |
|---|---|---|
| Opinion positive (df=1) | 0,107 | 0,060 |
| Opinion negative (df=1) | 1,000 | 0,523 |
| Opinion no neutral (df=1) | 0,653 | 0,341 |

Table 3: Fisher's exact test on opinion of wind park and perceived health

The analysis of the variable Change of Health A-G showed a significant correlation with how people rated their health compared to two years ago with a strength of $r_s$=0.464 (Table E5). From this we may conclude that there is a positive correlation between perceived change in health and change of health A-G. This correlation was expected because both variables are about self-perceived well-being. The difference between the datasets was that health compared to two years ago was a single question asked in the questionnaire, while health A-G is a variable composed of answers to a total of fourteen questions about mental and physical aspects of well-being. A significant correlation between these two variables means that it is likely that the aspects of well-being asked about in health A-G are aspects that people consider when simply asked about their well-being. Because change of health A-G is correlated with health compared to two years ago and because it is a bit more elaborate it was used for further analysis.

To see if change of health A-G has correlation with current opinion on the wind park and change of opinion Spearman's Rho was used. Table 4 shows that there is positive, significant correlation between current opinion on the wind park and change of opinion. It also shows that there appears to be no significant correlation between change of health A-G and opinion on the wind park, nor between change of health A-G and change in opinion.

| Spearman's rho | Current opinion | Change of opinion | Change of health |
|---|---|---|---|
| Current opinion | - | 0,000 | 0,280 |
| Change of opinion | 0,000 | - | 0,379 |
| Change of health | 0,280 | 0,379 | - |

Table 4: Significance (2-tailed) of correlation between current opinion, change of opinion and change of health.

Based on these results we cannot reject the Null-Hypothesis that there is no correlation between change of health A-G and opinion on the wind park. We can thus conclude that the current well-being of inhabitants of the Veenkoloniën is unlikely to be connected to their current opinion of the wind park, nor to their opinion of the wind park before its construction.

There is significant correlation between the current opinion and the change of opinion. It is thus likely that changes in one's opinion are influenced by their opinion, although no test has been run to determine causation.

## 7. Conclusions

The main question of this research paper is “To what extent is the current well-being of the people in the Veenkoloniën connected to their current opinion of the wind park and to their opinion of the wind park before its construction?”. Based on this research it can be said that no significant relation between opinion on the wind park and well-being has been found. Furthermore a connection between people’s opinion before construction of the wind park and well-being was also not found.

*Is there a self-perceived change in well-being of the people in the Veenkoloniën since the start of the construction of the wind park?*

There has been a self-perceived change in well-being since the construction of the wind park. Over half of all respondents rated their well-being as lower than two years ago. There is a chance this self-perceived change is well-being is caused by the wind park (Pedersen and Waye, 2017; Freiberg et al., 2019a; Van Kamp & Van den Berg, 2017; Freiberg et al., 2019b), however other factors could also play a role.

*How and to what extent does this self-perceived well-being correlate with perception of the wind park?*

No significant correlation has been found between perception of the wind park and self-perceived well-being. Change of well-being shows no correlation with current opinion, not with change of opinion.

*How and to what extent has the perception of the respondents changed since the construction of the wind park?*

Most of the participants say their opinion on the wind park has not changed since its construction started. Those who do claim their opinion has changed can give no conclusive insight on what has influenced their opinion the most. This opposes the numbers given by Elliott (1994) and Bishop and Proctor (1994), both of which report a more positive opinion after the construction of a wind park. Public information provided by the government has influenced both people who now have a negative opinion and people whose opinion is now positive.

The location of one’s residence is a possible factor influencing changes in opinion on the wind park over the past two years. Change of opinion was shown to significantly differ based on location of residence. The duration of one’s residence does not cause significant differences of opinion on the wind park, nor on the change of opinion.

People are generally positive on green energy developments, even if they do not have a positive opinion on the wind park in their backyard. This means there may be support for different kinds of green energy projects.

## 8. Discussion

The data gathered for this research might not properly and fully represent the population of this research. The preferred sampling method, using clustered sampling where non-response could be counted as well, did not work as a gathering tool and other methods had to be used. Most of the response to the survey was obtained by spreading the survey on social media.

Spreading a survey this way makes it susceptible to a snowball effect where people with a specific opinion share the survey with likeminded people which can lead a specific group to be overrepresented in the survey results (Ball, 2019).

Other data was gathered using clustered geographic sampling, where flyers with Qr-code and link to the survey were spread in randomly picked zip-codes in the research area. Dividing the number of responses by the amount of flyers gathered resulted in a response rate of 2,7%.

A problem with social media and flyers with Qr-code as a data gathering tool is the high proportion of elderly people in the research area. In the Netherlands the number of people with no or very little knowledge of technology is rising after age 55 (CBS 2020). In the Drentse and Groningse Veenkoloniën the proportion of people aged over 65 is higher than the Dutch average, being around 25% compared to a national average of just below 20% (CBS 2021). Because this research was spread online or through a flyer promoting an online link it is likely that this proportion of the population is underrepresented, possibly not even represented at all, even though they make up a quarter of the population. This is why the preferred method for data gathering was to spread the survey through organizations, such as churches. Sadly, this method yielded no response.

No personally traceable data, such as age and gender, was gathered in the survey. This was done both to prevent possible issues with privacy as well as to prevent people from being scared of an array of personal questions. The lack of information about gender and age means it is not possible to compare this data with CBS data about the population.

A large proportion of the respondents has stated their mental well-being is worse than two years ago. It is however not possible to blame this in any way on the construction of the wind park because other factors, such as the corona pandemic and its restrictions, may also be a large influence on the decrease of mental well-being (Sahu, 2020; Sritharan & Sritharan, 2020). Because of this it is impossible to determine to what extent the wind park may have affected mental well-being.

In this research people were asked to rate their current health, their health two years ago and how they feel their health has changed in the past two years. This has two main benefits compared to gathering current health data and data from two years ago. The first benefit is that the data is gathered from the same people and can thus be compared as such. The second benefit is that the respondents judge their health now and their health two years ago at the same time and because of that by the same standard(Diener & Ryan, 2009).

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**Appendix A**



# Windmolens en Welzijn

Beste inwoner van de Veenkoloniën,

Deze enquête is onderdeel van een bachelor thesis dat onderzoek doet naar veranderingen in welzijn voor en na constructie van windmolens. Het doel is om te zien of er veranderingen zijn in het welzijn van mensen voor en na constructie van het windpark. Verder is het de bedoeling om te kijken of dit samenhangt met de manier waarop mensen naar windmolens kijken.

Voor dit onderzoek wordt geen persoonlijk te herleiden informatie aan u gevraagd. Om een zo eerlijk mogelijk resultaat te krijgen vragen wij ieder om de enquête maar een maal in te vullen.

Door deel te nemen aan deze enquête gaat u akkoord met de in het volgende document aangegeven voorwaarden.
https://docs.google.com/document/d/1Y-Pc4wvE7JpRUQ38QzL9VXgTfXvyr1BgLfc-rv048RM/edit?usp=sharing

Vriendelijk bedankt voor de medewerking
M.J. ten Cate

* Required

1. Email *

2. Hoe lang woont u al in de Veenkoloniën?

*Mark only one oval.*

- ◯ minder dan 1 jaar
- ◯ 1-5 jaar
- ◯ 5-10 jaar
- ◯ 10-20 jaar
- ◯ 20-30 jaar
- ◯ meer dan 30 jaar
- ◯ Ik heb nooit in de Veenkoloniën gewoond
- ◯ Ik heb in de Veenkoloniën gewoond, maar woon hier nu niet meer
- ◯ anders

3. Waar in de Veenkoloniën woont u?

*Mark only one oval.*

- ◯ De monden of nieuw Buinen (1e exloermond, 2e exloermond, valthermond, drouwenermond, gasselternijveenschemond)
- ◯ Noord van de Monden (Stadskanaal, Musselkanaal, Ter Apel, Ter Apelkanaal)
- ◯ Zuid van de Monden (Valthe, Exloo, Buinen, Gasselternijveen, Nieuw-weerdinge etc.)
- ◯ Elders in de veenkoloniën
- ◯ buiten de Veenkoloniën

4. Hoe staat u tegenover windmolens in de Veenkoloniën? *

*Mark only one oval.*

- ◯ zeer negatief
- ◯ negatief
- ◯ neutraal
- ◯ positief
- ◯ zeer positief

5. Wilt u dit toelichten?

6. Is uw mening over windmolens veranderd sinds de bouw van het windpark in de veenkoloniën

*Mark only one oval.*

- ◯ ja, ik ben veel positiever over windmolens
- ◯ ja, ik ben een beetje positiever over windmolen
- ◯ nee, mijn mening is hetzelfde gebleven
- ◯ ja, ik ben nu negatiever over windmolens
- ◯ ja, ik ben nu veel negatiever over windmolens
- ◯ nee, ik had geen mening en heb dit nog steeds niet.

7. Hoe staat u tegenover de ontwikkelingen omtrent groene energie?

*Mark only one oval.*

- ◯ zeer negatief
- ◯ negatief
- ◯ neutraal
- ◯ positief
- ◯ zeer positief

8. Wilt u dit toelichten?

9. In hoeverre hebben de volgende dingen uw mening over windmolens beïnvloed?

*Mark only one oval per row.*

| | niet | zeer weinig | weinig | gemiddeld | veel | heel veel |
|---|---|---|---|---|---|---|
| media zoals nieuws en krant | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| sociale media | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| vrienden | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| samenkomsten | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| voorlichting vanuit de overheid | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| eigen onderzoek | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

10. Zijn er nog andere factoren die invloed hebben gehad op uw mening over windmolens?

## Huidige gezondheid en gezondheid twee jaar geleden

de volgende vragen gaan over uw huidige gezondheid en uw gezondheid twee jaar geleden en zijn gebaseerd op de RAND corporation short form survey instrument.
Probeert u zich zo goed mogelijk te herinneren hoe u zich twee jaar geleden voelde.

11. Hoe beschouwt u over het algemeen uw gezondheid?

*Mark only one oval.*

- ◯ geweldig
- ◯ zeer goed
- ◯ goed
- ◯ redelijk
- ◯ slecht

12. Hoe beoordeelt u uw huidige gezondheid vergeleken met 2 jaar geleden? *

*Mark only one oval.*

- ◯ Veel beter dan twee jaar geleden
- ◯ beter dan twee jaar geleden
- ◯ hetzelfde als twee jaar geleden
- ◯ slechter dan twee jaar geleden
- ◯ veel slechter dan twee jaar geleden

13. Hoe ging het over de afgelopen 4 weken met u?

*Mark only one oval per row.*

| | altijd | bijna altijd | vaak | regelmatig | soms | nooit |
|---|---|---|---|---|---|---|
| Voelde u zich vol energie? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich nerveus? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich kalm? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich teneergeslagen? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich uitgeput? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich vrolijk? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich alsof niets u meer vrolijk kon maken? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

14. Hoe ging het 2 jaar geleden met u?

*Mark only one oval per row.*

| | altijd | bijna altijd | vaak | regelmatig | soms | nooit |
|---|---|---|---|---|---|---|
| Voelde u zich vol energie? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich nerveus? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich kalm? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich teneergeslagen? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich uitgeput? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich vrolijk? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Voelde u zich alsof niets u meer vrolijk kon maken? | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

**Bedankt voor het meedoen aan deze Enquête.**

15. Heeft u nog opmerkingen aan de hand van deze enquête?

16. Wil u op de hoogte gehouden worden van Resultaten van dit onderzoek *

*Mark only one oval.*

◯ ja
◯ nee

## delen van de enquête

Als u deze enquête wilt delen via uw persoonlijke sociale media account kunt u dit doen door de onderstaande link te delen.
https://forms.gle/GHZwZXDd4UzVxJ176
wilt u de enquête delen via een groep op sociale media, dan vraag ik u vooraf contact op te nemen via mtc.onderzoek@gmail.com

**Appendix B**

**Privacy statement**

Door de enquête windmolens en welzijn in te vullen gaat u akkoord met de volgende voorwaarden.

In dit onderzoek wordt geprobeerd zo min mogelijk persoonlijk herleidbare informatie op te vragen.
De door u ingevulde gegevens worden tot maximaal een jaar bewaard op een veilige schijf. Uiterlijk 2 november, 2022 zal dit verwijderd worden.
Uw e-mailadres wordt gebruikt om ervoor te zorgen dat mensen niet meerdere keren de enquête invullen om de uitslag te beïnvloeden. Tevens biedt het opslaan van e-mailadressen u de mogelijkheid uw ingevulde antwoorden terug te trekken. Het door u opgegeven e-mailadres wordt opgeslagen tot maximaal eind februari 2022.

Uw data zal geanonimiseerd geanalyseerd worden op statistische wijze.

U kunt uw deelname aan de enquête terugtrekken. Mocht u dit willen kunt u een email sturen naar mtc.onderzoek@gmail.com en hierbij uw e-mailadres vermelden dat u uit het onderzoek verwijderd wil. U hoeft geen reden op te geven om uw deelname terug te trekken.

**Appendix C**

**Test Statistics[a,b]**

| | mening | 0 mening veranderd | Change of health on scores A to G | gezondheid algemeen |
|---|---|---|---|---|
| Kruskal-Wallis H | ,255 | 1,527 | ,317 | ,040 |
| df | 1 | 1 | 1 | 1 |
| Asymp. Sig. | ,613 | ,217 | ,574 | ,842 |

a. Kruskal Wallis Test

b. Grouping Variable: dataset

Table C1: result Kruskal-Wallis H test determining difference between 2 datasets

**Test Statistics[a,b]**

| | mening | 0 mening veranderd | Change of health on scores A to G | gezondheid algemeen |
|---|---|---|---|---|
| Kruskal-Wallis H | 3,854 | 3,115 | 2,055 | 3,579 |
| df | 4 | 4 | 4 | 4 |
| Asymp. Sig. | ,426 | ,539 | ,726 | ,466 |

a. Kruskal Wallis Test

b. Grouping Variable: hoelang veenkoloniën gecodeerd

Table C2: no significant difference based on duration of residence

**Test Statistics[a,b]**

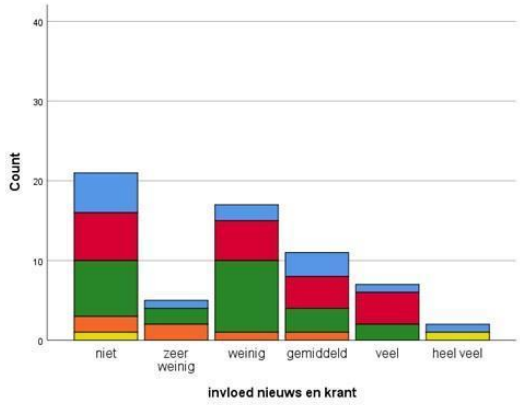
| | mening | 0 mening veranderd | Change of health on scores A to G | gezondheid algemeen |
|---|---|---|---|---|
| Kruskal-Wallis H | 3,661 | 11,942 | 1,787 | 1,147 |
| df | 4 | 4 | 4 | 4 |
| Asymp. Sig. | ,454 | ,018 | ,775 | ,887 |

a. Kruskal Wallis Test

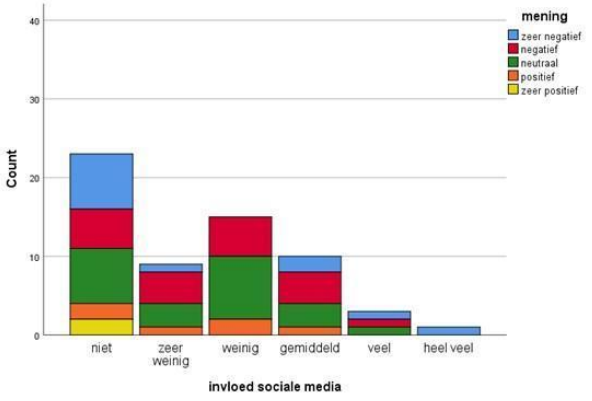
b. Grouping Variable: waar in veenkolonien code

Table C3: significant difference on change of opinion based on location of residence

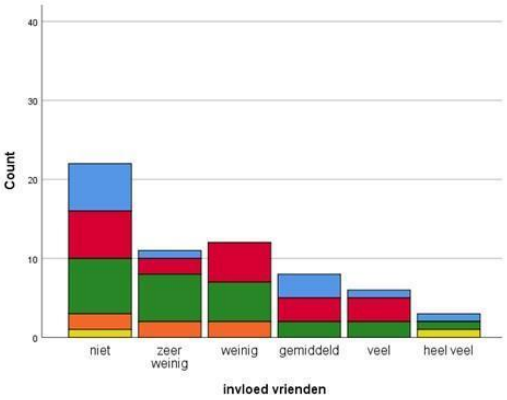
## Appendix D



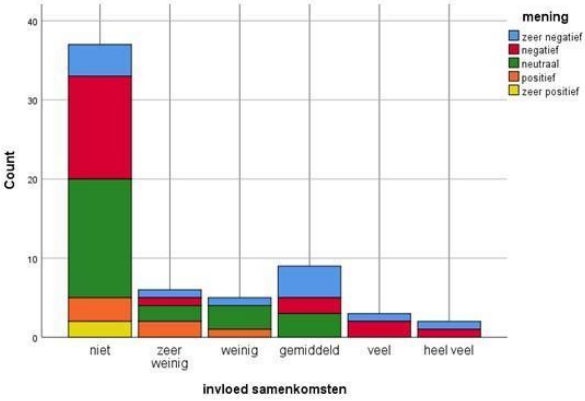

invloed nieuws en krant



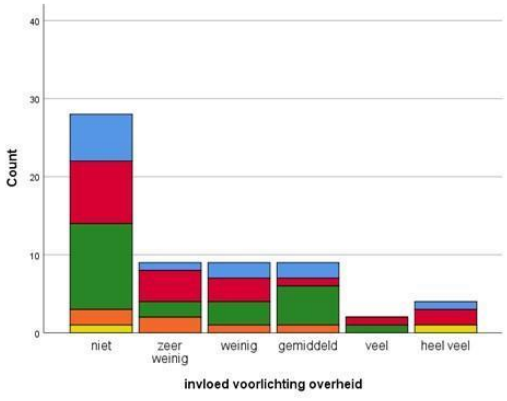

invloed sociale media



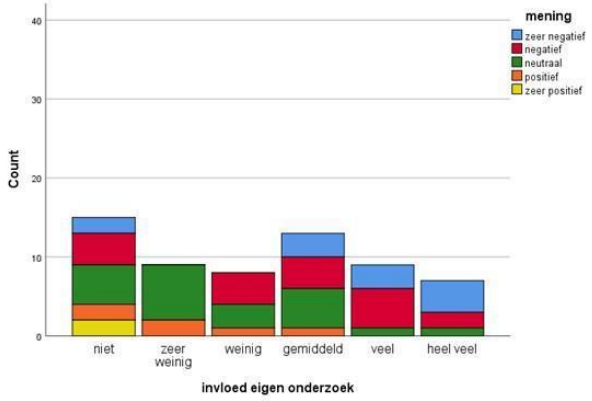

invloed vrienden




invloed samenkomsten




invloed voorlichting overheid




invloed eigen onderzoek

## Appendix E

**mening windmolens * gezondheid algemeen Crosstabulation**

| | | | gezondheid algemeen | | | | |
|---|---|---|---|---|---|---|---|
| | | | redelijk | goed | zeer goed | geweldig | Total |
| mening windmolens | zeer negatief | Count | 3 | 6 | 2 | 2 | 13 |
| | | Expected Count | 2,5 | 7,4 | 2,7 | ,4 | 13,0 |
| | | % within mening windmolens | 23,1% | 46,2% | 15,4% | 15,4% | 100,0% |
| | | % within gezondheid algemeen | 25,0% | 16,7% | 15,4% | 100,0% | 20,6% |
| | negatief | Count | 6 | 8 | 5 | 0 | 19 |
| | | Expected Count | 3,6 | 10,9 | 3,9 | ,6 | 19,0 |
| | | % within mening windmolens | 31,6% | 42,1% | 26,3% | 0,0% | 100,0% |
| | | % within gezondheid algemeen | 50,0% | 22,2% | 38,5% | 0,0% | 30,2% |
| | neutraal | Count | 2 | 19 | 2 | 0 | 23 |
| | | Expected Count | 4,4 | 13,1 | 4,7 | ,7 | 23,0 |
| | | % within mening windmolens | 8,7% | 82,6% | 8,7% | 0,0% | 100,0% |
| | | % within gezondheid algemeen | 16,7% | 52,8% | 15,4% | 0,0% | 36,5% |
| | positief | Count | 1 | 3 | 2 | 0 | 6 |
| | | Expected Count | 1,1 | 3,4 | 1,2 | ,2 | 6,0 |
| | | % within mening windmolens | 16,7% | 50,0% | 33,3% | 0,0% | 100,0% |
| | | % within gezondheid algemeen | 8,3% | 8,3% | 15,4% | 0,0% | 9,5% |
| | zeer positief | Count | 0 | 0 | 2 | 0 | 2 |
| | | Expected Count | ,4 | 1,1 | ,4 | ,1 | 2,0 |
| | | % within mening windmolens | 0,0% | 0,0% | 100,0% | 0,0% | 100,0% |
| | | % within gezondheid algemeen | 0,0% | 0,0% | 15,4% | 0,0% | 3,2% |
| Total | | Count | 12 | 36 | 13 | 2 | 63 |
| | | Expected Count | 12,0 | 36,0 | 13,0 | 2,0 | 63,0 |
| | | % within mening windmolens | 19,0% | 57,1% | 20,6% | 3,2% | 100,0% |
| | | % within gezondheid algemeen | 100,0% | 100,0% | 100,0% | 100,0% | 100,0% |

Table E1: too many squares with expected count below 5 for Chi square test.

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | 3,475[a] | 1 | ,062 | | |
| Continuity Correction[b] | 2,382 | 1 | ,123 | | |
| Likelihood Ratio | 3,615 | 1 | ,057 | | |
| Fisher's Exact Test | | | | ,107 | ,060 |
| Linear-by-Linear Association | 3,420 | 1 | ,064 | | |
| N of Valid Cases | 63 | | | | |

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 5,90.

b. Computed only for a 2x2 table

Table E2: No significance association well-being and opinion where neutral was counted among the positive.

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | ,255[a] | 1 | ,614 | | |
| Continuity Correction[b] | ,001 | 1 | ,982 | | |
| Likelihood Ratio | ,278 | 1 | ,598 | | |
| Fisher's Exact Test | | | | 1,000 | ,523 |
| Linear-by-Linear Association | ,251 | 1 | ,617 | | |
| N of Valid Cases | 63 | | | | |

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 1,52.

b. Computed only for a 2x2 table

Table E3: No significant association between well-being and opinion where neutral was counted among the negative.

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | ,833[a] | 1 | ,361 | | |
| Continuity Correction[b] | ,208 | 1 | ,648 | | |
| Likelihood Ratio | ,934 | 1 | ,334 | | |
| Fisher's Exact Test | | | | ,653 | ,341 |
| Linear-by-Linear Association | ,812 | 1 | ,367 | | |
| N of Valid Cases | 40 | | | | |

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 2,00.

b. Computed only for a 2x2 table

Table E4: No significant association between well-being and opinion where neutral was not counted.

## Nonparametric Correlations

**Correlations**

| | | | gezondheid vergeleken 2 jaar geleden | Change of health on scores A to G |
|---|---|---|---|---|
| Spearman's rho | gezondheid vergeleken 2 jaar geleden | Correlation Coefficient | 1,000 | ,464** |
| | | Sig. (2-tailed) | . | ,000 |
| | | N | 63 | 58 |
| | Change of health on scores A to G | Correlation Coefficient | ,464** | 1,000 |
| | | Sig. (2-tailed) | ,000 | . |
| | | N | 58 | 58 |

**. Correlation is significant at the 0.01 level (2-tailed).

Table E5: comparing health and well-being

**Correlations**

| | | | mening | 0 mening veranderd | Change of health on scores A to G |
|---|---|---|---|---|---|
| Spearman's rho | mening | Correlation Coefficient | 1,000 | ,524** | ,144 |
| | | Sig. (2-tailed) | . | ,000 | ,280 |
| | | N | 63 | 60 | 58 |
| | 0 mening veranderd | Correlation Coefficient | ,524** | 1,000 | ,121 |
| | | Sig. (2-tailed) | ,000 | . | ,379 |
| | | N | 60 | 60 | 55 |
| | Change of health on scores A to G | Correlation Coefficient | ,144 | ,121 | 1,000 |
| | | Sig. (2-tailed) | ,280 | ,379 | . |
| | | N | 58 | 55 | 58 |

**. Correlation is significant at the 0.01 level (2-tailed).

Table E6: Results of Spearman's Rho correlation test between opinion on the wind park, change of opinion and change of health A-G