The influence of Knowledge on Polarization and Negative Emotions

Esmée C. J. Holvast

s3614298

Department of Psychology, University of Groningen

PSB3E-BT15: Bachelor Thesis

Group number: 23

Supervisor: dr. N. Koudenburg

In collaboration with: Cynthia Zeimet, Fabiënne Crone, Jasmijn Hoogland, Mai Tenhunen and Rozemarijn van Staveren

January 15, 2024

Abstract

Polarization is increasingly present in today's world. This can be problematic, as research shows that polarization can lead to unwillingness to cooperate, to negative emotions and attitudes and even to harmful behavior towards people of different opinion groups. Research also indicates that knowledge can increase polarization. In the current study, we examine the relationship between knowledge and the negative emotions caused by disagreement in a discussion between two people with opposite opinions. Based on previous research, we expect to find relationships between polarization and negative emotions and between polarization and knowledge. Furthermore, we expect to find a relationship between knowledge and negative emotions, where higher levels of knowledge lead to higher levels of negative emotions towards people with opposing opinions about societal issues. We conducted an online survey ($N = 146$) which included an experiment in the form of an online discussion about the societal issue of refugees in the Netherlands. Participants chatted about this issue in one of two discussion conditions (agreeing discussion partners versus disagreeing discussion partners). Results of this study show no relation between levels of polarization and negative emotions or between knowledge and negative emotions. Our results do indicate that higher levels of experienced emotions are higher during discussions between disagreeing people and that there is a positive effect of knowledge on polarization.

Keywords: polarization, discussion, knowledge, negative emotions

The influence of Knowledge on Negative Emotions in Polarized Discussion

Polarization in the Western world has been increasing over the last years (Winkler, 2019) and it has become more personal (Gentzkow, 2016). Research shows that polarization is associated with both positive and negative processes in society.

One of those negative processes is that polarization leads to less social interactions between polarized groups, because it leads to less cooperativeness, trust and altruism between groups and of opposite sides (Dimant, 2021). Added to this, polarization becoming more personal has led to people seeing others with opposite opinions as a danger for society, as selfish and as clueless (Gentzkow, 2016). A positive process is that high income inequality is associated with less polarization, meaning that polarization might be a characteristic of a society where more income equality is present (Iversen & Soskice, 2015). Added to this, research shows that higher levels of political knowledge in society are associated with higher levels of political polarization (Iversen & Soskice, 2015; Trilling et al., 2017). Yet, it is possible that there is a relationship between knowledge and the negative consequences of polarization, as previous research indicates that there is a relationship between knowledge and polarization. Research suggests that people find it easier to choose a side in a discussion about a societal topic, once they know more about that topic (Vegetti et al., 2017). In society as a whole, choosing sides can lead to a divide that consists of groups of people with the same opinion. For example, in Europe, the issue of inequality has led to increased support for both parties on the far left and parties on the far right (Winkler, 2019). In the Netherlands relatively big polarized groups have formed around the subject of immigration. The attitude of one group was clearly against admitting migrants, while the attitude of the other group was clearly in favor of migrants (Albada et al., 2021). The relationship between knowledge and polarization suggests that it is possible that the forming of those distinct groups was influenced by how knowledgeable the members of each group are.

In this research, we aim to investigate the relationship between knowledge and polarization. We reconcile literature on the relation between polarization and negative attitudes towards members of different opinion groups as well as on the relation between knowledge and polarization. We do so in order to forward hypotheses and conduct research about the effect of knowledge on negative attitudes towards members of different opinion groups.

Polarization and Negative Emotions

Polarization is defined as "the process in which two entities (individuals or groups of people) move toward opposite extremes of a continuum of viewpoints or opinions" (Wu et al., 2022). In other words, polarization can be seen as a divide in society that can lead to the formation of groups around this divide, because of different views on societal issues in that society. Translating this to real life situations, we can take the divide in attitudes towards immigrants as an example. Research from the Netherlands shows that the topic of refugees led to such a divide, that a clear group of people with neutral opinions on the topic was not identified (Albada et al., 2021).

The forming of groups can lead to negative emotions towards members of groups of opposing opinions. People are less willing to discuss societal topics and cooperate with others from different opinion groups (Dimant, 2021; Koudenburg & Kashima, 2022) leading to feelings of disgust (Koudenburg & Kashima, 2022) and harmful behavior towards the other (Dimant, 2021). A possible explanation for this behavior is that people don't expect that those who hold opposing views are willing to cooperate with them (Dimant, 2021). Added to this, when discussing highly polarized topics, people might expect that it is not possible to change opinions on that topic and that these opinions are a threat to their social relationships (Koudenburg & Kashima, 2022). As a result, people prefer to avoid discussion, because they experience negative moral emotions when the topics are brought up (Koudenburg &

Kashima, 2022). This process also influences the perception of members of different opinion groups. People view those with opposing opinions not as well-meaning people with different opinions but rather as unintelligent and selfish. People think that those opposing opinions are so bad, that the only way to explain them is by considering an immense cluelessness or dark intentions (Gentzkow, 2016). Furthermore, polarization can create cognitive inflexibility or a conflict mindset. This can lead to an unwillingness to consider opposing opinions, an unwillingness to believe information that contradicts previous beliefs, an unwillingness to cooperate or solve disputes without conflict and to the belief that one can only achieve a goal by excluding the opposing opinion group (Wu et al., 2022). Toxic forms of polarization have even been associated with dehumanization (Moore-Berg et al., 2020). Possibly, these kinds of attitudes and behavior between people from groups with opposing opinions are caused by feelings of threat and from seeing the outgroup as the enemy (Wu et al., 2022). In other words, research shows that polarization can affect emotions and attitudes towards outgroup members, and may hamper healthy discussion between opinion groups. Added to this, expectations of the other can lead to negative emotions, unwillingness to cooperate, avoiding discussion and even harmful behavior.

Polarization and Knowledge

Next to negative emotions, polarization is also associated with other factors in. For example, higher levels of polarization are associated with higher levels of knowledge (De Vreese & Boomgaarden, 2006; Drummond & Fischhoff, 2017; Iversen & Soskice, 2015; Trilling et al., 2017). The way knowledge has been researched and defined in connection to polarization differs greatly, but in this thesis, the amount of knowledge someone possesses about a certain topic will be defined as the extent to which someone is informed about that topic. Being informed about a certain issue can be attained with news exposure. This news can stem from different kinds of news outlets. More relevant and substantial content leads to

increased knowledge (De Vreese & Boomgaarden, 2006). Yet, not only news exposure leads to more knowledge. One can gain knowledge in a passive way by being exposed to political discussion in their network (Iversen & Soskice, 2015), or in an active manner by seeking independent information to use in the political discussion that one gets exposed to in their network (Iversen & Soskice, 2015). Moreover, discussion can add to political knowledge, because having discussions about politics more frequently can produce more facts and it can lead to a greater ability to structure political concepts (Eveland & Hively, 2009). Added to this, being informed is strongly associated with factors such as education, union membership and being included in informal social networks where politics are discussed (Iversen & Soskice, 2015). Although being informed and gaining knowledge can be attained in many ways, the main aim of this research is to find out how being informed in general is of influence in discussions. Therefore, this research will not make a distinction between different ways of being informed, but rather focuses on the extent to which people are informed and thus how knowledgeable they are about a certain topic.

Several researchers have discussed how knowledge is related to polarization. Knowledge about a certain topic can lead to a change in attitude towards that topic (Trilling et al., 2017). For example, knowledge on political issues leads to higher levels of political polarization, because those who hold a lower amount of political information, tend to hold opinions that can be placed in the political center (Iversen & Soskice, 2015). In other words, people who are more informed might be able to form clearer opinions and report more consistent opinions, than those who are less informed (Herne et al., 2019). Moreover, people with better understanding of the positions of different parties, will feel more confident in using their knowledge while choosing a side (Vegetti et al., 2017). The possibility that knowledge leads to confidence in choosing sides, could be explained by the possibility that knowledge increases an individuals' confidence more quickly than it increases their

knowledge (Drummond & Fischhoff, 2017). This means that confidence can come with knowledge and that the confidence one has in their own expertise can lead to increased polarization, since it can lead to making a clear choice instead of choosing the middle for safety. Another way in which knowledge and polarization are related is that people who are more educated, whether scientifically or general, might be better at using new information to support their previous opinion or better at detecting when a certain topic causes a divide and interpreting the stance of their group and taking over that opinion in order to keep their previously chosen identity (Drummond & Fischhoff, 2017).

Present Research

The current research examines the relationship between knowledge and negative emotions experienced when discussing a societal topic with someone with an opposing opinion. We tested participants' knowledge, polarization levels and negative emotions. Furthermore, participants discussed a societal issue with a partner that either agreed or disagreed with them. This way, we were able to compare the negative emotions experienced in a discussion between members of different opinion groups with the negative emotions experienced in a discussion between members of the same opinion group.

As previous research has found that polarization can be associated with a negative attitude towards people from other groups (Dimant, 2021; Gentzkow, 2016; Koudenburg & Kashima, 2022; Moore-Berg et al., 2020), we expect to find a relation between polarization and negative emotions, where stronger opinions lead to higher levels of negative emotions in a discussion between members of different opinion groups (Hypothesis 1).

Added to this, previous research suggests there is a relationship between polarization and knowledge (De Vreese & Boomgaarden, 2006; Drummond & Fischhoff, 2017; Iversen & Soskice, 2015; Trilling et al., 2017). We therefore expect to find a relation between knowledge and polarization, where higher levels of knowledge about a societal topic lead to

higher levels of polarization around the same societal topic (Hypothesis 2).

As previous research suggests there is a relationship between polarization and negative emotions and between polarization and knowledge, we suspect that there is a relationship between knowledge and negative emotions. We expect to find a relation between knowledge and negative emotions, with polarization as a mediator in this effect and where higher levels of knowledge about a societal topic lead to higher levels of negative emotions experienced in a discussion about that societal topic between members of different opinion groups (Hypothesis 3).

Methods

Participants

As our primary method of sampling, we employed a paid online sample via Prolific Panel. To complement this data, we recruited a convenience sample through our own networks. Participants from this sample were not compensated for their participation. We recruited participants who were at least eighteen years old and who spoke Dutch fluently for both samples (N = 146 (42,5% female, 57,5% male), *M age* = 30.54 years, *SD* = 10.40, Range = 53.00 (min. 18, max. 71)). Most participants had the Dutch nationality (94,5%), but the sample also included participants with a different nationality (5,5 %). Post-hoc, participants were excluded if they did not engage in a conversation (N = 17), or if they engaged in a conversation that was irrelevant to the topic of study (N = 25).

We conducted a power analysis to detect a small to medium effect size (F = .09) with a power of 80%, with a minimum sample size of N = 90 (F = .09, α = .05, power = .8). Based on previous research (Koudenburg & Kashima, 2021) and to correct for the dependence between participants, as participants were grouped into pairs, the design effect was employed $(1 - \rho)$ (Snijders & Bosker, 2011). We estimated the correlation between measures (ρ)

conservatively at .2, resulting in the corrected minimum sample size of $N = 108$. Ultimately, we yielded 146 participants (210 in raw data).

Research Design and Procedure

We used a between-subjects, multilevel experimental design in which participants were nested in dyads. Each participant filled in a questionnaire via Qualtrics. This was done individually through an electronic device. First, participants were given information about the study (see Appendix A for full study information in Dutch). Then, we asked for participants' informed consent (See Appendix B for full consent statement in Dutch).

Our pre-measures included questions about participants' opinion about the discussion statement and the strength of that opinion. After these questions, the experiment was introduced. Lastly, each participant continued the survey by answering the post-measures, which included questions about negative emotions and about knowledge and perceived knowledge about the subject of the discussion statement (immigration in the Netherlands). During the questionnaire, each participant was introduced to the same discussion statement ("*The Netherlands should take in more refugees than it does now*."). We chose this statement as previous research suggests that the topic of migration has led to polarization in the Netherlands and because opinions about this topic were well divided over both sides of the political spectrum (Albada et al., 2021).

In order to assess personal opinions about the discussion statement, participants indicated the extent to which they agreed with the statement (1 = *not at all,* 6 = *very much).* We assigned the data of the participants to two conditions. The first condition, the agree condition, consisted of participants who chatted with another participant with the same or a similar opinion. The second condition, the disagree condition, consisted of participants who chatted with another participant with a different opinion. After assigning participants to one of these two conditions, we were able to compare differences in outcome variables for

participants with a disagreeing discussion partner versus participants with an agreeing discussion partner. We did not differentiate the extent to which participants agreed or disagreed with the discussion statement. Therefore, the opinions of participants about the statement were classified into two categories, either disagreeing (options 1 - 3 on the scale) or agreeing (options 4 - 6 on the scale) with the discussion statement. The discussions took place on Chatplat and participants were assigned to a partner by this platform. Participants had a maximum of ten minutes for this discussion, but most discussions were shorter. The timer of each chat was set at ten minutes, in order to prevent participants from skipping the chat. This resulted in shorter chats in some cases, because participants were able to leave the chat before actually having chatted for ten minutes, as their timer started before their partner had arrived. Another cause for shorter chats was that discussions were finished or participants stopped chatting before the ten minutes were over. Lastly, some chats were shorter because we initially instructed participants to have an eight-minute chat. After about twenty participants we noticed eight minutes was not sufficient, and thus we instructed the rest of the participants to discuss for ten minutes. Ultimately, 85 participants chatted in the agree condition and 61 participants chatted in the disagree condition. Before starting the experiment, participants were reminded to not disclose any identifying information and to chat about the statement: "*The Netherlands should take in more refugees than it does now*." We also encouraged the participants to remain patient in case it would take a while before another participant joined the chat (see Appendix C for full instructions).

The end of the questionnaire contained multiple questions that served as checks. We asked participants to indicate if they were paired, not paired or paired without receiving a reply from their discussion partner. Afterwards we manually validated these answers in the conversations. We also asked if the discussion was about the statement: "*The Netherlands should take in more refugees than it does now*." or not. Again, we manually validated these

answers in the conversations afterwards. For both these checks, participants were manually removed from the sample if they were not paired, were paired but had no conversation or had a conversation that did not revolve around the discussion statement. For the expected 20 minutes it took participants to finish the study, they were compensated with 3 GBP in Prolific Credits. The study was approved by the ethical committee of the Faculty of Behavioural and Social Sciences at the University of Groningen.

Measures

Polarization

We measured levels of polarization on the discussion topic by asking participants about the strength of the opinion they held about the discussion statement. Participants indicated how strongly they felt about the statement: "*The Netherlands should take in more refugees than it does now*" (1 = very weak, 7 = very strong). We used this measure, as opinion strength and polarization are closely related. Previous research suggests that people project their stances onto others. When people are aware of a divide in attitudes, people with stronger opinions about a certain topic expect others to have stronger opinions too, leading to them experiencing more polarization around that topic (Van Boven et al., 2012; Westfall et al., 2015).

Knowledge and Perceived Knowledge

We measured knowledge with two different measures. First, we included a measure of objective knowledge. Based on previous research, participants' knowledge of topics related to the statement was measured with six questions (Eveland & Hively, 2009). Participants had three answers to choose from; *true, untrue* and *I don't know.* In order to minimize biases from guessing, people were encouraged to choose *I don't know* if they didn't know the answer (Carpini & Keeter, 1993). Items were scored Correct (1) or Incorrect (0). The option *I don't know* was always scored Incorrect (0). Then, the scores were calculated for each participant,

resulting in a knowledge percentage for each participant (Eveland & Hively, 2009) (*M* = .400, *SD* = .210, □ = .329). Although having a higher internal consistency for this measure would be better, ad hoc political knowledge measures often have relatively low reliability. This is caused by the fact that a relatively small number of indicators are meant to cover a varied domain of knowledge (Eveland & Hively, 2009) (see Appendix D for questions and answers).

Secondly, we measured participant's self-perceptions of their knowledge. We did so because previous research suggests that people with more confidence in their knowledge are better at choosing sides ((Drummond & Fischhoff, 2017; Vegetti et al., 2017). Participants indicated how much they knew about the subject of the statement by answering the question: "*You had a conversation about this statement:* "*The Netherlands should take in more refugees than it does now*." *How much do you know about this subject?"* (1 = very little, 7 = very much).

Experienced Negative Emotions and Expected Negative emotions

We measured negative emotions with two different measures. We measured the negative emotions participants experienced during the discussion with two questions from the Discrete Emotions Questionnaire (Harmon-Jones et al., 2016). Participants indicated to what extent they experienced anger and revulsion about the opinion of their discussion partner (1 = not at all, 7 = very much) (α = .871). This measure only tests for negative emotions experienced during the discussion, while previous research suggests polarization leads to negative perceptions towards outgroup members even without discussion (Gentzkow, 2016) and negative expectations of discussions with outgroup members (Dimant, 2021; Koudenburg & Kashima, 2022).

Therefore, we also measured the emotions participants expected to experience in a conversation with someone of a different opinion group. Participants indicated the extent to which they expected to experience happiness, anger, comfort, surprise, indifference, disgust,

and contempt in an interaction with someone who holds a different opinion than them on the statement: "*The Netherlands should take in more refugees than it does now*" (1 = not at all, 7 = very much). A negative moral emotions scale was calculated from the items anger, disgust and contempt (Koudenburg & Kashima, 2022) (α = .842).

Results

Condition and Experienced Negative Emotions

We performed a one-way Analysis of Variance (ANOVA) to examine the effect of condition on experienced negative emotions. Due to unequal variances between groups, assessed by tests of homogeneity of variances (p = .021), we opted for a Welch test. This analysis yielded a significant effect of condition on experienced negative emotions, (F(1, 101.636) = 6.929, p = .010). Participants who discussed in the disagree condition experienced higher levels of negative emotions compared to participants who discussed in the agree condition. Tests of normality revealed a slight violation of the assumption of a normal distribution of residuals. The one-way ANOVA is considered relatively robust against the normality assumption. Still, these results should be interpreted with caution.

Polarization and Experienced Negative Emotions

We examined the relationship between polarization and negative emotions and we did not find a significant correlation (r = -.010, p = .906). We performed a moderation test with condition as the predictor, experienced negative emotions as the dependent variable and polarization as the moderator. Before running this multiple regression analysis, polarization and the interaction variable were centered. This analysis did not result in a significant model (F(3,142) = 2.640, p = .052, R2 = .053). After further examining the individual predictors, our results indicated that only condition is a significant predictor in the model. The main effect of condition on experienced negative emotions was (**β**= .485, p = .006). The main effect of polarization on experienced negative emotions was not significant (**β**= -.011, p =

.870). The interaction was also not found to be significant (**β**= -.035, *p* = .761) these results indicate that the relationship between condition and experienced negative emotions is not moderated by polarization.

Polarization and Knowledge

We performed a simple linear regression analysis to examine the effect of knowledge on polarization. As previous research suggests that polarization and knowledge are positively related, our analysis was one-tailed. This resulted in a significant model (R2 = .022, *F*(1, 144) = 3.171, *p* = .39), indicating that higher levels of knowledge predict higher levels of polarization (See Figure 1 in Tables and Figures for regression plot).

Knowledge and Experienced Negative Emotions

We examined the relationship between knowledge and experienced negative emotions and we did not find a significant correlation (*r* = .054, *p* = .514). We performed a moderation test with condition as the predictor, experienced negative emotions as the dependent variable and knowledge as the moderator. Before running this multiple regression analysis, knowledge and the interaction variable were centered. This analysis resulted in a significant model (*F*(3,142) = 2.714, *p* = .047, R2 = .054). After further examining the individual predictors, our results indicated that only condition is a significant predictor in the model. The main effect of condition on experienced negative emotions was (**β**= .471, *p* = .007). The main effect of knowledge on experienced negative emotions was not significant (**β**= .363, *p* = .494). The interaction was also not found to be significant (**β**= -.453, *p* = .582). These results indicate that the relationship between condition and experienced negative emotions is not moderated by knowledge. As we found no relation between neither polarization nor knowledge and experienced negative emotions, we did not find a mediation effect of polarization on the relation between knowledge and experienced negative emotions. Tests of normality revealed a slight violation of the assumption of a normal distribution of residuals.

Regression is considered relatively robust against the normality assumption. Still, these results should be interpreted with caution.

Explorative Analysis

Perceived Knowledge

As previous research suggests that there is a positive relationship between knowledge and perceived knowledge, we performed a one-tailed correlation analysis of knowledge and perceived knowledge. We found a significant small to medium positive correlation between knowledge and perceived knowledge ($r = .283$, $p < .001$).

Perceived Knowledge and Polarization

In order to test for possible alternative explanations, we performed a simple linear regression analysis to examine the effect of perceived knowledge on polarization. The model was significant (R2 = .191, $F(1, 144) = 33.958$, $p < .001$), indicating that higher levels of perceived knowledge predict higher levels of polarization (See Figure 2 in Tables and Figures for regression plot).

Perceived Knowledge and Experienced Negative Emotions

Additionally, we analyzed the relationship between perceived knowledge and experienced negative emotions and we did not find a significant correlation ($r = -.123$, $p = .139$). We performed a moderation test with condition as the predictor, experienced negative emotions as the dependent variable and perceived knowledge as the moderator. Before running this multiple regression analysis, perceived knowledge and the interaction variable were centered. This analysis resulted in a significant model ($F(3,142) = 3.621$, $p = .015$, R2 = .071). After further examining the individual predictors, our results indicated that only condition is a significant predictor in the model. The main effect of condition on experienced negative emotions was (**β**= .452, $p = .009$). The main effect of perceived knowledge on experienced negative emotions was not significant (**β**= -.018, $p = .819$). The interaction was

also not found to be significant (**β**= -.142, p = .245). These results indicate that the relationship between condition and experienced negative emotions is not moderated by perceived knowledge. Tests of normality revealed a slight violation of the assumption of a normal distribution of residuals. Regression is considered relatively robust against the normality assumption. Still, these results should be interpreted with caution.

Expected Negative Emotions

To further test for possible alternative explanations, we analyzed the relationships between expected negative emotions and experienced negative emotions, polarization, knowledge and perceived knowledge individually by means of a correlation analysis. We found a small significant positive correlation between expected negative emotions and experienced negative emotions (r = .184, p = .026). We did not find a significant correlation between polarization and expected negative emotions (r = .055, p = .506), knowledge and expected negative emotions (r = -.023, p = .780) and perceived knowledge and expected negative emotions (r = .096, p = .247), indicating that there is no correlation between any of these three predictors and either experienced or expected negative emotions.

All analyses were performed in SPSS 28 (see Table 1 in Tables and Figures for descriptive statistics).

Discussion

The results of this study provided evidence for Hypothesis 2, but not for Hypothesis 1 and Hypothesis 3. In line with Hypothesis 2, we found a relation between knowledge and polarization. This means that our results show that higher levels of knowledge predict higher levels of polarization. Added to this our results indicate that higher levels of perceived knowledge also predict higher levels of polarization. Furthermore, our results show that participants who chatted with someone with an opposing opinion experienced higher levels of negative emotions than participants who chatted with a discussion partner with a similar

opinion. Our results did not show a relationship between polarization and negative emotions (Hypothesis 1), nor a relationship between knowledge and negative emotions (Hypothesis 3). Added to this, our results did not indicate relationships between knowledge, perceived knowledge and polarization and expected negative emotions individually either.

These results are not in line with previous research, as previous research suggests there is a relationship between polarization and negative emotions. Our results do indicate that people experience more negative emotions when they discuss a societal topic with someone with an opposing opinion. Yet, our results also indicate that the level of negative emotions that people experience and expect to experience in a discussion with someone with a different opinion cannot be predicted by levels of knowledge, levels of perceived knowledge or levels of polarization

Theoretical and Practical Implications

The results of this study indicate that there is a relationship between knowledge and polarization. Our research therefore supports the previous finding that people who are more informed are able to form clearer opinions and report more consistent opinions, than those who are less informed (Herne et al., 2019). Added to this, the results of this study indicate that there is a relationship between perceived knowledge and polarization. This is in line with previous research, which suggests that knowledge leads to confidence in choosing sides (Drummond & Fischhoff, 2017). These findings suggest that the more informed people are about a societal issue, the greater their ability to form an opinion about that issue. This means that, according to the results of this study, the amount of people who do not have an opinion about a societal issue can be reduced by exposing those people to more information. Informing these people with accurate information, thus helping them form an opinion about social issues, might lead to positive consequences such as lowering the number of undecided voters. Nonetheless, since perceived knowledge also predicts polarization, the spread of false

information can have negative impacts on opinion formation. Previous research indicates that exposure to false information influences opinions (Allcott & Gentzkow, 2017) and voting behavior and that fake news has led to more support for populist parties (Cantarella et al., 2023).

Our results do not provide evidence that higher levels of polarization or higher levels of knowledge lead to higher levels of negative emotions towards people with different opinions. Nonetheless, our results also suggest that discussing a societal topic with someone with an opposing opinion is related to negative emotions. It is possible that it is not the level of polarization that predicts negative emotions, but that the experience of discussing a societal topic with someone with an opposing opinion is what leads to negative emotions. This means that there can still exist a relationship between polarization and negative emotions as is suggested by previous research (Dimant, 2021; Gentzkow, 2016; Koudenburg & Kashima, 2022; Moore-Berg et al., 2020). Experiencing the divide in opinions about a societal topic, thus the experience of being confronted with polarization rather than the level of polarization, can be what leads to negative emotions. This can give important directions for future research, as the results of this study were based on an experiment where participants actually discussed with others, while results of previous studies were based on for example expectancies and behavioral intentions (Koudenburg & Kashima, 2022), controlled experiments with Dictator Games (Dimant, 2021) and survey results (Gentzkow, 2016). Our experiment could be replicated and expanded for future research, in order to gain more insights on how, rather than if, polarization is related to negative emotions experienced in a discussion between disagreeing discussion partners.

Limitations

It is possible that the results of this study were influenced by the fact that it started the day after the national elections in the Netherlands, right after the announcement of the exit

polls. The populist party PVV, known for anti-immigration standpoints, became the biggest party. This might have influenced the results of our study in multiple ways. While noting that these are just speculations, it is possible that participants with an anti-immigration standpoint might have been more confident in sharing their opinion, while pro-immigration participants might have been more afraid to share their opinion. On the other hand, it is also possible that anti-immigration people might have felt like they had to defend their opinion more strongly, as they might have felt like their opinion was not shared by the majority of the Dutch population. This means that the elections might have influenced how strongly participants reported to feel about the discussion statement and how strongly participants held onto their opinion during the experiment. The elections can as well have led to more discussions about this subject on the daily, leaving participants less surprised when encountering someone with a different opinion, leading to participants reporting fewer negative emotions and feeling more confident about sharing their opinion, no matter the side they are on. Yet, it is also possible that the discussion topic has become more sensitive after the election and, per consequence, that the discussion topic on its own already led to negative emotions, leading to elevated levels of negative emotions before the experiment even started. In other words, it is possible that participants would have reported their opinion about the discussion statement to be stronger or less strong and that participants would have reported higher or lower levels of negative emotions if the study would have taken place under different political circumstances.

Added to this, is possible that the results of this study were influenced by the communication channel we used for our experiment. Our participants chatted online, without any personal knowledge of their discussion partner, including physical features. While chatting online, less communication aspects, like gestures and facial expressions, can be used. These things might have led to the discussions in our experiment feeling less

personal. This could have led to participants being more open about their opinion in the discussion, if participants experienced less direct social consequences of what they said. On the other hand, it is also possible that the discussion feeling less personal has led to participants reporting lower negative emotions than they would have if they had a face-to-face discussion, if they perceived less judgment from or confrontation with their discussion partner. Furthermore, using online chat as a communication method also led to technical issues, such as participants having to wait for a discussion partner to arrive. It is possible that this influenced participants' moods or made participants bored, leading to them being less motivated to actively discuss the statement or accurately answer the questionnaire. In other words, it is possible that participants would have reported more or less negative emotions if they had face to face discussion instead of online.

Conclusion

The results of this study suggest that people experience a higher level of negative emotions when discussing a societal issue with someone with an opposing opinion than during a discussion with a discussion partner with a similar opinion. The results of this study do not indicate that the level of experienced emotions is influenced by the levels of polarization, nor that polarization levels predict that people expect to experience negative emotions in a future discussion with someone with an opposing opinion. Furthermore, the results of this study suggest that both levels of actual knowledge and levels of perceived knowledge predict polarization. Lastly, our research does not provide evidence for a relation between either levels of actual knowledge or levels of perceived knowledge and negative emotions.

Bibliography

Albada, K., Hansen, N., & Otten, S. (2021). Polarization in attitudes towards refugees and migrants in the Netherlands. *European Journal of Social Psychology, 51(3)*, 627-643. https://doi.org/10.1002/ejsp.2766

Allcott, H., & Gentzkow, M. (2017). Social media and fake news in the 2016 election. *Journal of economic perspectives, 31*(2), 211-236. https://doi.org/10.1257/jep.31.2.211

Cantarella, M., Fraccaroli, N., & Volpe, R. (2023). Does fake news affect voting behaviour?. *Research Policy, 52*(1), 104628. https://doi.org/10.1016/j.respol.2022.104628

Carpini, M. X. D., & Keeter, S. (1993). Measuring political knowledge: Putting first things first. *American Journal of Political Science*, 1179-1206. https://doi.org/10.2307/2111549

De Vreese, C. H., & Boomgaarden, H. (2006). News, political knowledge and participation: The differential effects of news media exposure on political knowledge and participation. *Acta politica, 41*, 317-341. https://doi.org/10.1057/palgrave.ap.5500164

Dimant, E. (2021). Hate Trumps Love: The Impact of Political Polarization on Social Preference. *CESifo Working Paper No. 9073*. http://dx.doi.org/10.2139/ssrn.3848335

Drummond, C., & Fischhoff, B. (2017). Individuals with greater science literacy and education have more polarized beliefs on controversial science topics. *Proceedings of the National Academy of Sciences, 114*(36), 9587-9592. https://doi.org/10.1073/pnas.1704882114

Eveland, W. P., & Hively, M. H. (2009). Political discussion frequency, network size, and "heterogeneity" of discussion as predictors of political knowledge and participation. *Journal of Communication, 59*(2), 205–224. https://doi.org/10.1111/j.1460-2466.2009.01412.x

Gentzkow, M. (2016). Polarization in 2016. *Toulouse Network for Information Technology Whitepaper, 1.* https://web.stanford.edu/~gentzkow/research/PolarizationIn2016.pdf

Harmon-Jones, C., Bastian, B., & Harmon-Jones, E. (2016). The Discrete Emotions Questionnaire: A new tool for measuring state self-reported emotions. *PLoS ONE, 11*(8). https://doi.org/10.1371/journal.pone.0159915

Herne, K., Christensen, H. S., & Grönlund, K. (2019). The influence of political knowledge on opinion polarization in citizen deliberation. *Political Research Exchange, 1*(1), 1-23. https://doi.org/10.1080/2474736X.2019.1702887

I&O Research. (2022). *Flitspeiling asielzoekersopvang – januari 2022*. Ministerie van Justitie en Veiligheid. https://www.rijksoverheid.nl/documenten/rapporten/2022/02/01/flitspeiling-asielzoekersopvang---januari-2022

Iversen, T., & Soskice, D. (2015). Information, inequality, and mass polarization: Ideology in advanced democracies. *Comparative Political Studies, 48*(13)*,* 1781-1813. https://doi.org/10.1177/0010414015592643

Koudenburg, N., & Kashima, Y. (2022). A polarized discourse: effects of opinion differentiation and structural differentiation on communication. *Personality and Social Psychology Bulletin, 48*(7), 1068–1086. https://doi.org/10.1177/01461672211030816

Moore-Berg, S. L., Hameiri, B., & Bruneau, E. (2020). The prime psychological suspects of toxic political polarization. *Current Opinion in Behavioral Sciences, 34,* 199-204. https://doi.org/10.1016/j.cobeha.2020.05.001

Snijders, T. A. B., & Bosker, R. (2011). Multilevel Analysis: An introduction to basic and advanced multilevel modeling. *SAGE Publications, Inc. eBooks*. http://lib.ugent.be/nl/catalog/rug01:001698339

Trilling, D., Van Klingeren, M., & Tsfati, Y. (2017). Selective exposure, political polarization, and possible mediators: Evidence from the Netherlands. *International Journal of Public Opinion Research, 29*(2)*,* 189-213. https://doi.org/10.1093/ijpor/edw003

UNHCR Nederland. *Cijfers: Vluchtelingen*. https://www.unhcr.org/nl/vluchtelingen.

UNHCR Nederland. *Veelgestelde vragen over vluchtelingen*. https://www.unhcr.org/nl/media/begrippenlijst/vluchtelingen/

Van Boven, L., Judd, C. M., & Sherman, D. K. (2012). Political polarization projection: social projection of partisan attitude extremity and attitudinal processes. J*ournal of personality and social psychology, 103*(1), 84. https://doi.org/10.1037/a0028145

Vegetti, F., Fazekas Zoltán, & Méder Zsombor Zoltán. (2017). Sorting your way out: perceived party positions, political knowledge, and polarization. *Acta Politica, 52*(4), 479–501. https://doi.org/10.1057/s41269-016-0029-6

VluchtelingenWerk Nederland. (2023). *Vluchtelingen in getallen 2023.* https://www.vluchtelingenwerk.nl/nl/nieuws-en-kennis/cijfers-over-vluchtelingen-nederland-europa-wereldwijd

Westfall, J., Van Boven, L., Chambers, J. R., & Judd, C. M. (2015). Perceiving political polarization in the United States: Party identity strength and attitude extremity exacerbate the perceived partisan divide. *Perspectives on Psychological Science, 10*(2), 145-158. https://doi.org/10.1177/1745691615569849

Winkler, H. (2019). The effect of income inequality on political polarization: Evidence from European regions, 2002–2014. *Economics & Politics, 31*(2), https://doi.org/10.1111/ecpo.12129

Wu, J. S. T., Hauert, C., Kremen, C., & Zhao, J. (2022). A Framework on Polarization,

Cognitive Inflexibility, and Rigid Cognitive Specialization. *Frontiers in Psychology, 13,* 1386 https://doi.org/10.3389/fpsyg.2022.776891

Tables and Figures

Table 1

Descriptive Statistics

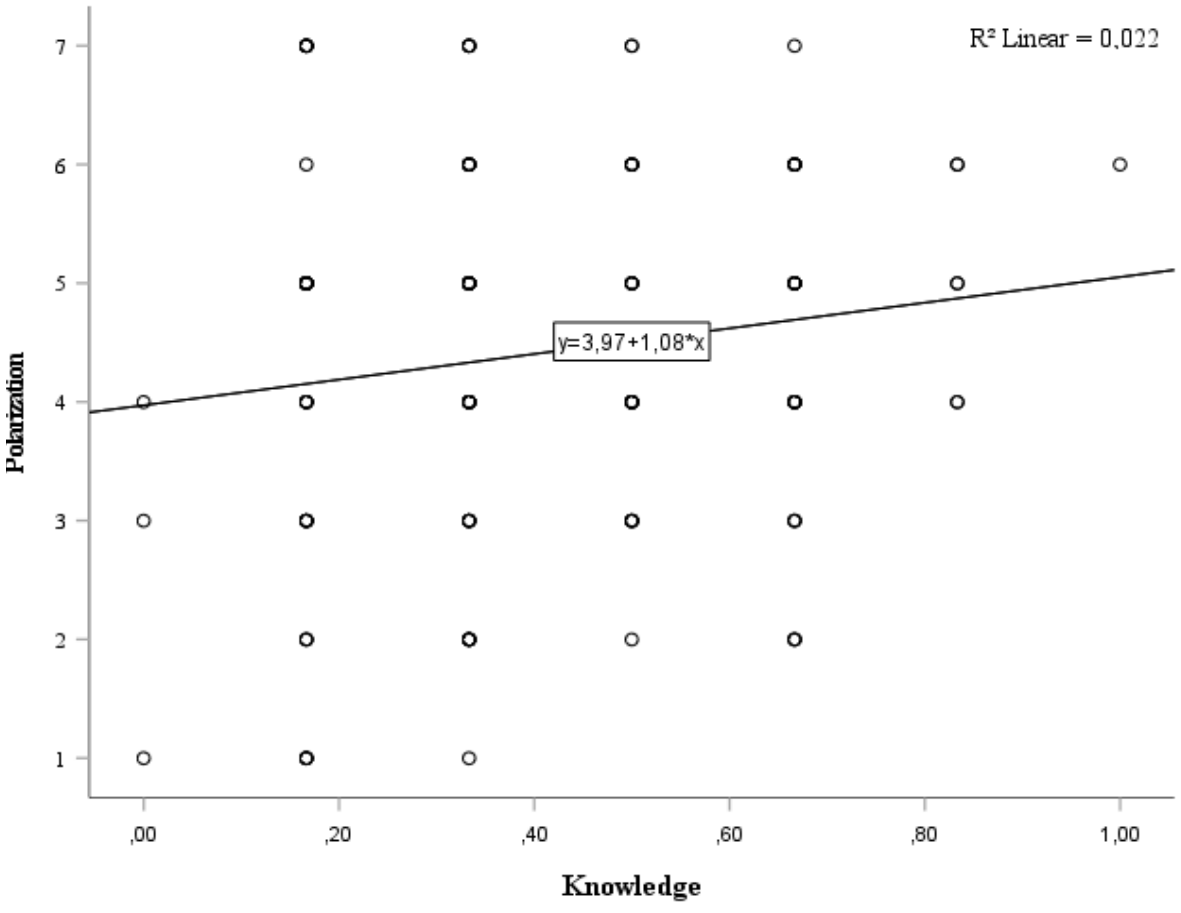
	N	Mean	Std. Deviation
Experienced negative emotions	146	1.675	1.040
Expected negative emotions	146	2.986	1.378
Polarization[1]	146	4.400	1.547
Knowledge[2]	146	.400	.210
Perceived knowledge[1]	146	4.180	1.403

[1]All ratings were on 7-point scales ranging from 1 to 7

[2]Score percentage ranging from .000 to 1.000

Figure 1

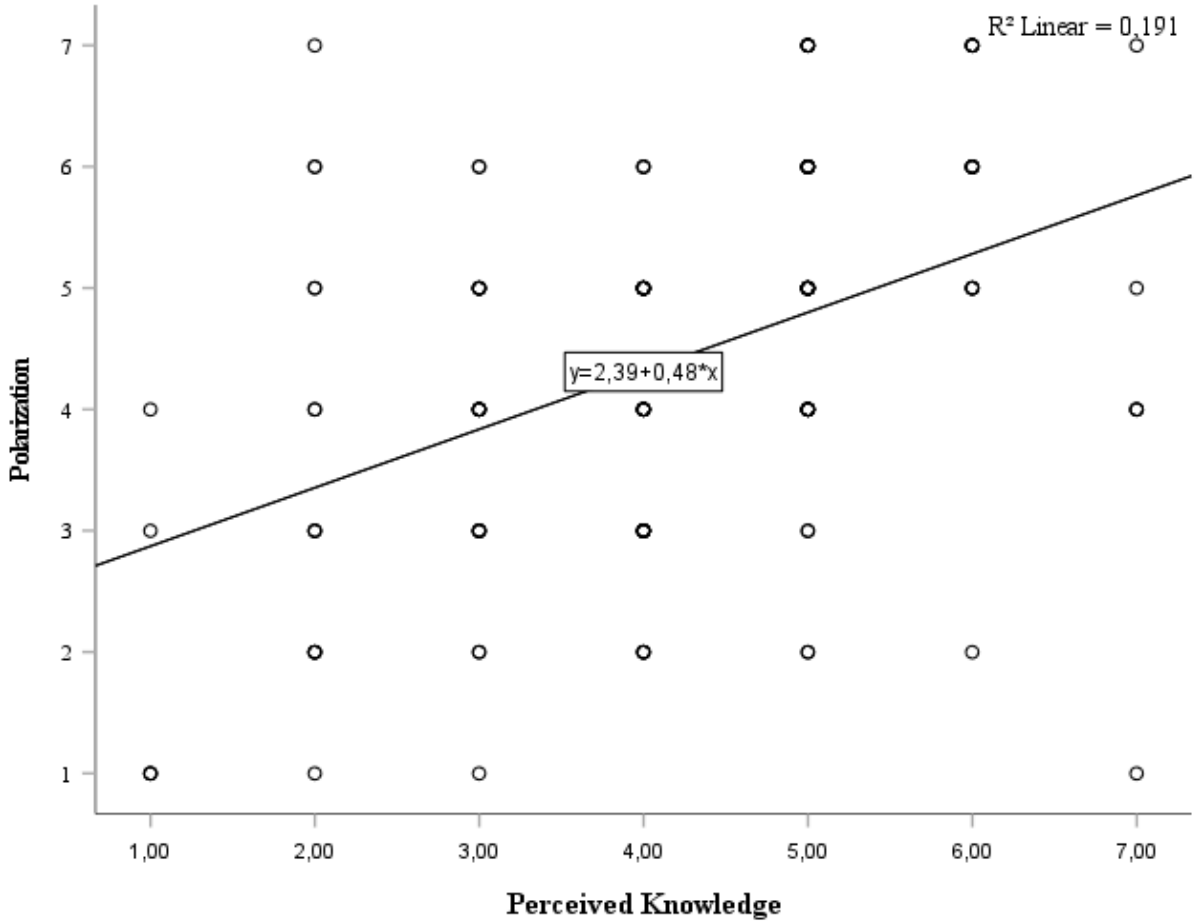
Regression Knowledge on Polarization



Note. This graph is a visual representation of the regression of knowledge on polarization.

Figure 2

Regression Perceived Knowledge on Polarization



Note. This graph is a visual representation of the regression of perceived knowledge on polarization.

Appendix A

Study Information

Studie Informatie "alledaagse gesprekken" (PSY-2324-S-0063)

Waarom krijg ik deze informatie?

Je bent uitgenodigd om deel te nemen aan een onderzoek over maatschappelijke gesprekken. Het onderzoek loopt van 22 november tot 1 december. Het onderzoeksplan is goedgekeurd door de Ethische Commissie Psychologie (ECP) van de Rijksuniversiteit van Groningen. Het onderzoek wordt uitgevoerd door Cynthia Zeimet, Mai Tenhunen, Rozemarijn van Staveren, Esmée Holvast, Fabiënne Crone en Jasmijn Hoogland onder supervisie van Dr. N. Koudenburg van de Universiteit van Groningen, Nederland.

Ben ik verplicht om deel te nemen aan dit onderzoek?

Deelname aan het onderzoek is vrijwillig. Om deze studie te kunnen starten is je toestemming echter vereist. Als je besluit niet deel te nemen aan dit onderzoek, hoef je niet uit te leggen waarom niet, en dit zal geen negatieve consequenties hebben. Je hebt te allen tijde het recht om te stoppen, ook na je instemming om deel te nemen aan het onderzoek.

Waarom dit onderzoek?

Het doel van dit onderzoek is het verkrijgen van informatie over hoe mensen gesprekken voeren over maatschappelijke onderwerpen met anderen die het wel of niet met hen eens zijn over het onderwerp. We onderzoeken ook of het gesprek wordt beïnvloed door persoonlijke kenmerken van de gesprekspartner, of het gesprek invloed heeft op hun standpunten over het onderwerp en of het invloed heeft op hun toekomstige intenties om het onderwerp te bespreken.

Wat vragen we van jou tijdens dit onderzoek?

We vragen je om je toestemming voor deelname aan dit onderzoek. Je wordt gevraagd om eerst een vragenlijst in te vullen, vervolgens deel te nemen in een gesprek met een andere

deelnemer en ten slotte nogmaals een vragenlijst in te vullen. Het onderzoek zal naar verwachting ongeveer 19 minuten in beslag nemen, waarvoor je gecompenseerd zal worden met 2.85 GBP in Prolific Credits.

Wat zijn de consequenties van deelname?

Deelname aan dit onderzoek zou geen blijvende negatieve gevolgen voor je moeten hebben, maar sommige deelnemers ervaren het mogelijk als wat ongemakkelijk om te praten over maatschappelijke onderwerpen. We waarderen de tijd die je in dit onderzoek investeert. Als je geïnteresseerd bent in de resultaten, kun je een mail sturen naar n.koudenburg@rug.nl. Je ontvangt dan een samenvatting van de bevindingen na afronding van het onderzoek.

Hoe gaan we met je gegevens om?

Je gegevens zullen gebruikt worden voor wetenschappelijke doeleinden. Algemene demografische gegevens (leeftijd, geslacht) zullen gevraagd worden maar je kan niet geïdentificeerd worden op basis van deze gegevens en dus blijf je anoniem. We vragen je om geen persoonlijke gegevens (naam, stad waar je woont) te delen in het gesprek. De data uit de chats wordt met een unieke code verbonden aan je antwoorden op de vragenlijst.

We hebben geen toegang tot de persoonlijke informatie die Prolific mogelijk van je heeft. Je Prolific-ID wordt twee weken na het beëindigen van de studie verwijderd uit de data. Gedurende deze twee weken worden de gegevens opgeslagen op een EU server en heb je het recht om gegevens in te zien, te corrigeren en te verwijderen door een e-mail te sturen naar één van de onderzoekers. Na deze twee weken is het niet langer mogelijk om uw antwoorden Appenduit het onderzoek aan u te koppelen. Na de analyse van de data zal je anonieme data beschikbaar zijn bij n.koudenburg@rug.nl, in overeenstemming met het gegevensopslag protocol van de Universiteit van Groningen.

Wat moet je nog meer weten?

Je kan altijd vragen stellen over het onderzoek door een e-mail te sturen naar één van de onderzoekers (n.koudenburg@rug.nl).

Heb je vragen of zorgen over je rechten als deelnemer aan het onderzoek? Dan kun je ook contact opnemen met de Ethische Commissie Psychologie van de Universiteit van Groningen: ecp@rug.nl.

Heb je vragen of zorgen over je privacy of de manier waarop er met je gegevens wordt omgegaan? Dan kun je ook contact opnemen met de Data Protection Officer van de Universiteit van Groningen: privacy@rug.nl.

Als deelnemer van dit onderzoek heb je recht op een kopie van deze onderzoeksinformatie.

Appendix B

Informed Consent

Geïnformeerde Toestemming onderzoek: Alledaagse gesprekken (PSY-2324-S-0063)

Ik heb de informatie over het onderzoek gelezen.

Ik begrijp waar het onderzoek over gaat, wat er van mij gevraagd wordt, hoe mijn gegevens behandeld zullen worden en wat mijn rechten zijn.

Ik begrijp dat deelname aan het onderzoek vrijwillig is. Ik kies ervoor om deel te nemen aan het onderzoek. Ik kan elk moment stoppen met deelname. Als ik stop, hoef ik niet uit te leggen waarom. Stoppen zal geen negatieve gevolgen voor mij hebben.

Hieronder geef ik aan waar ik toestemming voor geef:

Toestemming voor deelname aan het onderzoek:

(Als je geen toestemming geeft, zal je niet kunnen deelnemen aan dit onderzoek)

Appendix C

Chatplat Instructions

Now we would like you to have a conversation with another participant about this statement "*The Netherlands should take in more refugees than it does now*." The conversation will take

place in an online chat environment. We ask of you to only talk about this subject, and to reveal no personal information (for privacy reasons). It could take a few minutes before we have found a conversation partner for you. We ask for your patience. As soon as we have found a conversation partner, the conversation will start. The conversation will take 8 minutes.

Appendix D

Knowledge Questions and Answers

Six statements were used for the measure of knowledge.

1. *The total number of migrants (Including migration for work or expertise and Dutch people who migrate back to the Netherlands) consisted in 2022 for more than 35% of asylum seekers* (Correct answer: Untrue) (I&O Research, 2022).
2. *Most refugees worldwide were from Syria in 2022* (Correct answer: True) (VluchtelingenWerk Nederland, 2023).
3. *More than 65% of refugees is taken in in their own region* (Correct answer: Untrue) (UNHCR Nederland).
4. *Refugees can apply for a dutch passport after 5 years of being here, if they meet all conditions* (Correct answer: True) (UNHCR Nederland).
5. *Every asylum seeker is a refugee* (Correct answer: Untrue) (UNHCR Nederland).
6. *In 2022, the Netherlands was one of the top ten countries that, in percentage, took in the most refugees* (Correct answer: Untrue) (VluchtelingenWerk Nederland, 2023).