The Priming Effect: a Randomised Control Trial on the effect of Reading News Articles on Inflation estimates

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Abstract

This paper analyses a Randomised Control Trial using a Difference-in-Differences technique to gauge the impact of an intervention where the treatment group is asked to read short articles on inflation and their forecasts for 2021 and 2022 inflation rates are then compared before and after the intervention. The results of these techniques show an increase in the estimated inflation rate for 2021 and the forecasted rate for 2022 for the treatment group but more so for 2021 than 2022. The estimates by the control group fell during the period of intervention for 2021 estimate but increased for 2022 estimate. This could be due tense political climate which people are hearing about even despite our intervention. This indicates a strong upwards effect on inflation forecasts for our treatment group, especially for 2021. The average for the control group at the beginning of the intervention was inline with actual inflation figures for Canada. This can be explained by the scare inducing headlines used by these articles that led to an upward increase in estimates which went above the actual, correct average value mentioned by the control group at baseline. This phenomena is known as a 'Priming Effect'.

Section 1: Introduction

Priming Effect is a phenomenon where an individual's exposure to a certain stimulus affects their response to a subsequent stimulus. Numerous studies have demonstrated the detrimental impact that priming can have. In 1996, John Bargh[1] had different students unscramble sentences that reflected aggression, patience, and positivity. Once they were done unscrambling their sentences, they were asked to wait for Bargh to check their responses. It was found that the students who were given sentences about aggression were frustrated at having to wait, as compared to those given sentences about patience. Hence, if people are primed to act in a certain manner, they are more likely to act in that way.

This can impact society if enough individuals are primed to behave or think in a specific manner. Corporations can used this to exploit how people think in order to induce them to buy more products. In fact, companies can build certain associations into the memory of consumers to make them more receptive to certain products. This can dramatically influence consumer decision-making.

According to psychologists, this happens because there are units or 'schemas' of information stored in our long-term memory[2]. These schemas can be activated by sights, smells, and sounds. Once they are activated, our memories become easier to access. By priming, certain schemas are activated in unison, which in turn leads related or connected units of information to be activated at the same time. Once related schemas are activated and are more accessible, it becomes easier for us to draw related information into memory more quickly, and we can thus respond faster when the need arises.

This techniques carried out under this research paper proves the occurrence of the priming effect on inflation estimates. According to Statics Canada, the annual inflation for 2021 in Canada was 3.4%. This is the fastest pace of growth since 1991. The monthly inflation rate for 2022 reached 5% in January which has been called "the highest level in 30 years" by the Bank of Canada. This rise in inflation can be attributed to the COVID-19 pandemic which has been going strong for two years now. The economic disruption caused in the form of high unemployment and price levels have been felt all over the world.

This paper looks at the impact on people's forecast of the point estimate for 2021 and forecast for 2022 inflation using a Randomised Control trial (RCT). This consisted of rolling out five summaries of inflation-related news articles

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[1] Chartrand, T. L., Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions. Journal of Personality and Social Psychology, 71(3), 464–478. https://doi.org/10.1037/0022-3514.71.3.464.

[2] Cherry, K. (2020). How Priming Affects the Psychology of Memory. https://www.verywellmind.com/priming-and-the-psychology-of-memory-4173092.

to the treatment group over a period of two weeks. Information was collected from the 30 participants before and after the intervention and treatment was assigned based on who already know about Canada's inflation rate for 2021. In order to analyse the data, the difference-in-differences (DID) estimator is used. Both the RCT and DID when used together is possibly the best chance to extract the 'causal' impact of the intervention. Followed by this introduction, Section 2 looks at the background for this research, Section 3 covers the experimental design including the Balance test for our treatment and control groups, Section 4 looks extensively at the results with Table 1 presenting the primary outcomes, Table 2 with the sub-group analysis, Table 3 with the secondary outcomes, and Table 4 with some Robustness Checks. Section 5 offers a conclusion. An appendix has also been included to briefly extend results from Table 2 and Table 3 of the main analysis.

The results show an increase in the estimates for the treatment group at the end of the intervention for both 2021 and 2022 whereas, the estimates by the control group decreases in the absence of intervention for 2021 but increases for 2022. This indicates a strong positive effect on inflation forecasts for our treatment group, especially for 2021. The average for the control group at the beginning of the intervention was 3.42 for 2021 and 3.41 for 2022 which is equal to the actual inflation 2021 figures for Canada of 3.4%. The main results show a positive upwards effect on both the estimates for the treatment group at the end of the intervention whereas, the estimates by the control group were possibly influenced by other sources such as political climate that may induce worries among people across the globe. The average for the control group at the beginning of the intervention was inline with actual inflation figures for Canada. This can be explained by the strong, fear causing language used by these articles that led to an upward increase in estimates which went above the actual, correct average value mentioned by the control group at baseline.

Section 2: Background

By carrying out this study, we were interested in seeing if exposing individuals to articles on the ongoing (monthly) inflation levels had a significant impact on their inflation estimates for the previous year as well as their forecasts for the upcoming year. It was found that our average baseline estimates by the control group corresponded to the actual inflation rate for 2021. Moreover, forecasts for 2022 by the control group at baseline were also anchored by 2021 figures as they were almost the same at the control group's baseline estimates for 2021.

There are 30 participants in this study. These were all the students in the Cross-Sectional Methods class. At the start of the RCT a baseline analysis was carried out whereby participants provided some basic demographic information such as age, counties lived in and monthly spending. On top of these participants were asked to provide an estimate for the 2021 inflation rate as well as a forecast for the 2022 inflation rate along with their estimated 50% and 95% confidence intervals. People were also asked other questions on a 7-point Likert scale. These included question on whether they worry about the state of the world, or if inflation affects them, if it is something they think about and whether they read up on inflation etcetera. Based on the responses from this baseline questionnaire, participants were randomly assigned into treatment and control groups based on whether or not they already know about inflation 2021. The randomisation done by stata which resulted in 16 people in the treatment group and 14 people in the control group. A balance test was carried out on this randomisation which showed we had very well balanced treatment and control groups, with no significant differences. The results of which can be found in the next section.

Section 3: Experimental Design

The intervention was then carried out over a course of nearly two weeks in the form of 5 equally spaced emails which contained a 150 word summary of a news article on inflation, along with a link to the article in case someone was interested in reading the actual article as well.

At the end of these two weeks, the endline questionnaire was rolled out which asked the same questions as the baseline. In addition, individuals in the treated group were also asked if they followed through the intervention and to what extent (number of emails and articles read). Both the baseline and endline were combined to form our final dataset. The Balance Test is given as follows:

Balance Test

VARIABLES (Means)	(1) Control Group	(2) Treatment Group	(3) P-values
2021 inflation point forecast	3.217	3.929	0.992
2022 inflation point forecast	3.414	3.264	0.626
Age	23.348	23.571	0.110
Years of education	17.130	16.714	0.282
Gender	1.609	1.143	0.481
Worry about state of the world	3.870	5.286	0.215
How often do you think about inflation	3.783	4.857	0.249
Monthly spending	3.652	3.857	0.327
Interest in inflation	0.435	0.857	0.742
Already know inflation 2021	1.571	1.562	0.962
Read about inflation	2.857	3.188	0.536

The balance test above the means for different variables for our control and treatment groups. Our treatment was stratified by the variable 'Already know about inflation 2021' so the means between the control and treatment groups should be very similar, 1.571 and 1.562 respectively. The corresponding p-value of 0.99 means differences between the two are insignificant. Similarly, knowledge about 2021 inflation is also well balanced with a p-value of 0.962.

The results show our treatment and control groups are well-balanced across all variables as shown in the table above with all p-values showing insignificant differences. The least balanced results are for the variables age, followed by worrying about the state of the world with p-values of 0.11 and 0.21 respectively. The figure 1 below show our mean estimate of 2021 inflation for the treatment and control groups before and after the intervention. Figure 2 shows the difference in the point forecasts for those in the treatment group before and after the intervention.
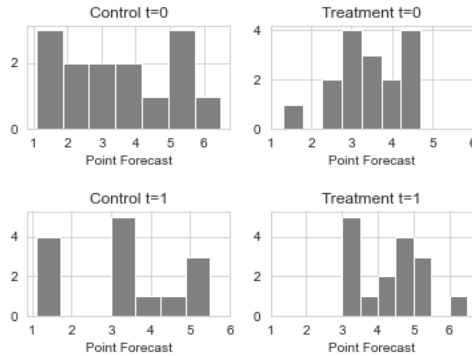
Distribution Graphs

Figure 1: Distribution of mean forecast for treatment and control groups at t=0 and t=1

In order to carry out empirical analysis, the difference-in-differences was used. The RCT is the gold standard as it is considered to be the most reliable evidence of effectiveness of any intervention. In essence, it isolates the effect of the intervention by controlling for individual and time fixed effects (and other controls). This ensures the results are as close to the truth as possible. This is used in conjunction with the difference and differences approach which is used to estimate the effect of an intervention over a period of time between treatment and control groups. This technique controls for any changes that may occur over time in the absence of the intervention. By using these two techniques together, the intent is to try to isolate the 'causal' effect of the intervention.

Our specification is $Y = \beta 0 + \beta 1 * [Post] + \beta 2 * [i.IndividualFixedEffects] + \beta 3 * [Post * Treatment] + \beta 4 * [Covariates] + \epsilon$.
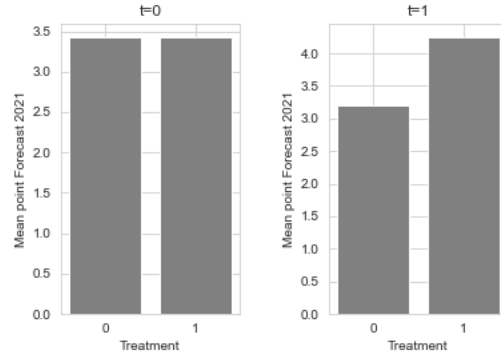
Figure 2: Mean forecast for treated at t=0 and t=1

Where the coefficient for Post*Treatment captures the change in our outcome variable (point forecasts for 2021 and 2022) at the endline as a result of our intervention as compared to the control group; the coefficient for Post captures the change in outcome for the control group over time as compared to the outcome (point forecast) at the baseline. The covariates or controls were chosen based on the results of the Balance test. The variables that were not balanced for in the treatment and control were included as controls so that our results are not affected by the differences between our treatment and control groups. Then the Fisher test is done which is especially good for small sample sizes. Bonferroni correction is carried out since we have multiple outcomes as part of multiple hypothesis testing, and fake attrition is created to calculate Manski and Lee bounds as part of this analysis.

Section 4: Results

Table 1

VARIABLES	(1) DID'21	(2) DID'22	(3) DID'21 with controls	(4) DID'22 with controls
mcgillstudentid==260716665	0.40	1.54	-0.15	0.64
	(1.90)	(1.88)	(1.92)	(2.26)
	....	....	....	....
	....	....	....	....
Post	-0.31	0.43	-0.34	0.31
	(0.30)	(0.45)	(0.35)	(0.34)
Treatment x Post	1.29**	0.59	1.54***	0.41
	(0.49)	(0.51)	(0.50)	(0.45)
How often reading about inflation			-0.03	0.08***
			(0.02)	(0.03)
How often thinking about inflation			0.19	0.22**
			(0.13)	(0.10)
Worry about state of world			-0.23	0.13
			(0.15)	(0.07)
Monthly Spending			-0.18	0.17
			(0.28)	(0.15)
Observations	60	60	60	60
R-squared	0.756	0.805	0.790	0.874

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Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Avg inflation 2021 estimate at baseline 3.42

Avg inflation 2022 forecast at baseline 3.41

Fisher p-value = 0 for both 2021 and 2022

Bonferroni correction is 0.072 for 2021 and 0.023 for 2022

Manski bounds 2021 (1.04, 1.88); 2022 (0.55, 1.37)

Lee bounds 2021 (0.48, 2.5); 2022 (0.4, 1.49)

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Table 1 above shows the DID regressions for our specifications, with and without controls, for the outcome variables inflation point forecasts for 2021 and 2022. The interaction term treatment x post has a coefficient of 1.29 which is significant at the 95% confidence interval. This implies a 1.29 percent points increase in the average inflation estimate for those in treatment compared to control whose average estimate is 3.42 percent (which is very close to the actual value), holding the changes across time fixed. This corresponds to a 54% increase over the control group's estimate of 3.42. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the control group decreases by 0.34 units. This is the change that is not attributed to the treatment. This is a considerable effect as the actual effect of our treatment is then 0.31+1.29=1.6% increase in the point forecast. This also corresponds to a one standard deviation increase for the treatment group.

The controls included are whether people read about inflation, worrying about the state of the world, think about inflation and monthly spending. The interaction term treatment x post has a coefficient of 1.54 which is significant at the 99% confidence interval. This implies a 1.54 percent points increase in the average inflation estimate for those in treatment compared to control whose average estimate is 3.42 percent, holding the changes across time fixed. This corresponds to a 54% increase over the control group's estimate of 3.42. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the control group decreases by 0.34 units. This is the change that is not attributed to the treatment. This is a considerable effect as the actual effect of our treatment is then 0.34+1.54=1.88% increase in the point forecast. This also corresponds to a one standard deviation increase for the treatment group. For the controls, a unit increase in monthly spending leads to

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[3]This table presents the main results of this paper. The individual fixed effects have been omitted from this table- except for the first, followed by dots to represent the remaining. This format is followed for all the tables in this paper. The constants for the regression have also been hidden.

0.18% decrease in the inflation estimate for 2021. A unit increase in thinking about inflation leads to 0.19% increase in the inflation estimate for 2021.

For 2022, the interaction term treatment x post has a coefficient of 0.59 which is significant at the 95% confidence interval. This implies a 0.59 percent points increase in the average inflation estimate for those in treatment compared to control whose average estimate is 3.41 percent, holding the changes across time fixed. This corresponds to a 17% increase over the control group's estimate of 3.41. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the control group increases by 0.43 units. This is the change that is not attributed to the treatment. This is a considerable effect as the actual effect of our treatment is then 0.59-0.43=0.16% increase in the point forecast. This means the estimate for 2021 decreased while that for 2022 increased in the absence of the treatment.

When controls are added, the interaction term treatment x post has a coefficient of 0.41 which is not significant at the 90% confidence interval. This implies a 0.41 percent points (pp)increase in the average inflation estimate for those in treatment compared to control whose average estimate is 3.41 percent, holding the changes across time fixed. This corresponds to a 12% increase over the control group's estimate of 3.41. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the control group increases by 0.31 units. This is the change that is not attributed to the treatment. This is a considerable effect as the actual effect of our treatment is then 0.41-0.31=0.10 percentage point increase in the point forecast. This means the estimate for 2021 decreased while that for 2022 increased in the absence of the treatment. Reading about inflation leads to a 0.08 pp increase in the point estimate. This result is significant at the 99% confidence interval. Similarly, thinking about inflation increases the point forecast for 2022 by 0.22 compared to the the control group's estimate of 3.41. This result is also significant on the 95% confidence interval. Worrying about the state of the world and monthly spending produce insignificant results.

The difference in signs for the coefficients for 2021 and 2022 point forecasts may be because everyone, both treatment and control groups are exposed to inflation-related news (maybe even through news of Russia's invasion of Ukraine). This impacts forecasts for 2022 in a way that they are revised or pushed upwards. However, the same news does not affect people's estimates of the 2021 inflation which is retrospective. This might explain the difference between these two results. The raise in the point estimate for our treatment group (above the actual value of 3.4 for 2021) can be explained by the fact that all the articles used have strong negative language which prepare the reader for even worse inflation rates over the upcoming months.

I first test for differentiated attrition (despite the obvious difference). The coefficient for treatment when regressed against attrition is -0.04. This is pretty close to zero although the p-value is 0.485 so our coefficient is not significant, indicating differentiated attrition. When we create unequal, artificial attrition, the worst-case Manski bounds are 1.04 and 1.88 for 2021; they are 0.55 and 1.37 for 2022. Manski bounds replace missing values with the minimum or maximum of the support since nothing is assumed about the counterfactual probabilities. The Lee bounds for 2021 are 0.48, 2.5 and for 2022 they are 0.4 and 1.49. Lee bounds require the distribution to be trimmed based on the differential attrition between treatment and control groups.
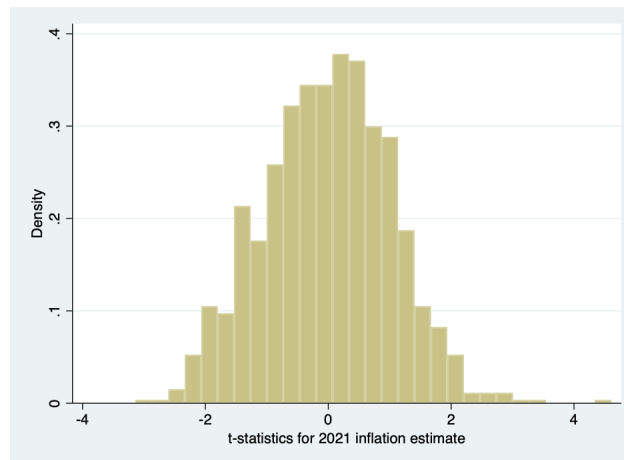

Figure 3: Distribution of t statistics for 2021 Inflation estimate

The t-stat for the dataset for 2021 is -0.69. The figure above shows the distribution of t-values for each of the 1000 permuted treatments. For point estimations of 2021, the Fisher p-value is 0.

Figure 4: Distribution of t statistics for 2022 Inflation forecast

The t-stat for the dataset for 2022 is -1.32. The figure above shows the distribution of t-values for each of the 1000 permuted treatments. For point estimations of 2021, the Fisher p-value is 0.
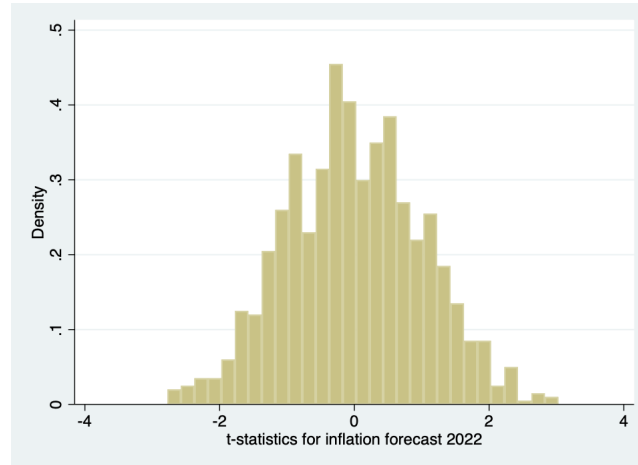
The Bonferroni correction for 2021 is 0.05*(1/2)*-1.32/0.49 = 0.077 at the 5% error rate. For 2022, it is 0.05*(1/2)*0.41/0.45 = 0.023 at the 5% error rate.

Table 2

VARIABLES	(1) DID'21 for males	(2) DID'22 for males	(3) DID'21 for females	(4) DID'22 for females
mcgillstudentid==260716665	-1.51	4.89*	...	...
	(2.67)	(2.38)		
	....	....	....	....
	....	....	....	....
Post	-0.22	1.14	-0.60	-0.17
	(0.88)	(0.83)	(0.59)	(0.33)
Treatment x Post	1.34	-0.81	2.07*	1.26
	(1.05)	(0.99)	(1.04)	(0.78)
How often do you read about inflation	-0.02	0.07*	-0.09	0.07
	(0.03)	(0.04)	(0.15)	(0.09)
Worry about state of world	-0.20	0.33**	-0.31*	0.01
	(0.26)	(0.14)	(0.16)	(0.09)
How often thinking about inflation	0.06	0.21	0.32	0.25
	(0.27)	(0.23)	(0.18)	(0.14)
Monthly Spending	0.05	0.09	-0.81	-0.11
	(0.42)	(0.31)	(0.73)	(0.34)
Observations	30	30	30	30
R-squared	0.673	0.862	0.870	0.940

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2 above shows DID regression results for the point estimates of 2021 and 2022 by gender. 2021: Using the same controls as used in Table 1, for males, the interaction term treatment x post has a coefficient of 1.34 (not significant at 90% confidence interval) which implies a 1.34 pp increase in the average inflation estimate for those in treatment compared to control whose average estimate is 3.42, holding the changes across time fixed. This corresponds to a 39% increase over the control group's estimate of 3.42. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the males in the control group decreases by 0.22 units (not significant at 90% confidence interval). This is a considerable effect as the actual effect of our treatment is then 0.22+1.34=1.56 pp increase in the point forecast for 2021. These results have been controlled for by monthly spending, reading about inflation, thinking about inflation and worrying about the world.

2022: For males, the interaction term treatment x post has a coefficient of -0.81 which implies a 0.81 pp decrease in the average inflation estimate for those in treatment compared to control whose average estimate is 3.41 (not significant at 90% confidence interval), holding the changes across time fixed. This corresponds to a 25% decrease over the control group's estimate of 3.41. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the males in the control group increases by 1.14 units (not significant). This result shows a reversal in signs from what we have seen so far: males in the treatment groups have lower forecast for 2022 at the end of the period whereas that for the control group has increased. One way to explain would be non-compliance with treatment that is if people are not reading the material sent to them like they claim to. The covariate 'Worrying about the state of the world' is significant at the 95% confidence interval. It reads: each point increase in worrying on the Likert (1-7) scale leads to a 33 pp increase in the forecast for 2022. Similarly, the control 'reading about inflation' is significant at the 90% confidence interval. It reads: for anyone who read an additional article on inflation in the past week, the average inflation forecast goes up by 0.07 pp.

2021: For females, the interaction term treatment x post has a coefficient of 2.07 which implies a 2.07 pp increase in the average inflation estimate for those in treatment compared to control whose average estimate is 3.42, holding the changes across time fixed. This result is significant at the 90% confidence interval. This corresponds to a 60% increase over the control group's estimate of 3.42. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the females in the control group decreases by 0.6 units (not significant at 90% confidence interval). This is an enormous effect as the actual effect of our treatment is then 0.6+2.07=2.67 pp increase in the point forecast for 2021. Surprisingly, for females, a point increase on the Likert scale on 'worrying about the world' leads to a 0.31pp decrease in the 2021 estimate. This result is significant

at the 90% confidence interval.

2022: For females, the interaction term treatment x post has a coefficient of 1.26 (not significant at 90% confidence interval) which implies a 1.26 pp increase in the average inflation estimate for those in treatment compared to control group's estimate of 3.41, holding the changes across time fixed. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the females in the control group decreases by 0.17 units (not significant). The two-sided ttest for 2021 forecast has a p-value of 0.0194 which is less that 0.05 which means there are significant differences in the estimates for males and females. Similarly, the two-sided ttest for 2022 forecast has a p-value of 0.0206 which is less that 0.05 which means there are significant differences in the estimates for males and females. Overall, we can see that females are more receptive to the priming effect (explained earlier) than males. This could be important to bear in mind for policy directives as this could mean companies/organisations/think tanks are more likely to influence women's decisions as compared to males. It can even be something women can be trained in: to look out for these possibilities and try to overcome them.

Table 3

VARIABLES	(1) Concerned about Inflation	(2) Feel fin secure	(3) Feel Affected by Inflation	(4) Worry
mcgillstudentid==260716665	2.33***	2.20***	-1.40*	0.20
	(0.36)	(0.41)	(0.70)	(2.23)
	....	....	....	....
	....	....	....	....
Post	0.80**	-0.53	0.20	-0.13
	(0.33)	(0.35)	(0.35)	(0.46)
Treatment x Post	-0.33	0.40	0.20	0.40
	(0.48)	(0.59)	(0.47)	(0.67)
Observations	60	60	60	60
R-squared	0.845	0.640	0.803	0.702
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 3 shows the secondary outcome analysis. I was interested in seeing if our intervention had any effect on people's concerns regarding inflation. This could include worrying more about it, thinking about it, or feeling affected by inflation. All of these variables are on a the Likert scale where individuals rank themselves from 1 to 7, hereon referred to as 'points'.

Concerned about inflation: According to the regression, the intervention decreases concerns by 0.33 points for those in treatment group at the end of the intervention as compared to the control group (not significant at 90% confidence interval). Whereas, in the control group concern rises by 0.8 points (on a scale of 1 to 7, Likert scale) by the end of the intervention. This result is significant at the 95% confidence interval. This result seems counter intuitive to the intervention however the positive upward trend by the control group can be explained by spillover effects or the control group hearing about inflation (and related issues) through other means whereas maybe the treatment group did not feel the need to seek out information and instead relied on the articles as their source of information.

2021: For females, the interaction term treatment x post has a coefficient of 2.07 which implies a 2.07 pp increase in the average inflation estimate for those in treatment compared to control whose average estimate is 3.42, holding the changes across time fixed. This result is significant at the 90% confidence interval. This corresponds to a 60% increase over the control group's estimate of 3.42. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the females in the control group decreases by 0.6 units (not significant at 90% confidence interval). This is an enormous effect as the actual effect of our treatment is then 0.6+2.07=2.67 pp increase in the point forecast for 2021. Surprisingly, for females, a point increase on the Likert scale on 'worrying about the world' leads to a 0.31pp decrease in the 2021 estimate. This result is significant at the 90% confidence interval.

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[4]This table looks at four different secondary outcomes, all revolving around the general fear of inflation or whether people feel affected by it.

Feeling of financial security: For those in treatment group interaction term treatment x post has a coefficient of 0.4 at the end of the intervention as compared to the control (not significant at 90%). For the control group it decreased by 0.53 points at the end of the intervention (not significant at 90%). This is inline with our intervention so far.

Feel affected by inflation: Moreover, both the treatment and the control group feel affected by inflation (compared to control group at baseline) by 0.2 points each). The results are not significant at the 90% confidence interval. This (taken in isolation) could mean our intervention has no effect on people feeling affected by inflation.

Worrying about inflation: For the control group, there is a decrease in worrying at endline by 0.13 points, whereas it increases in the treatment group by 0.4 points (both compared to the control group's baseline value). Both are not significant at 90%. This (taken in isolation) could mean our intervention induced a worry about inflation in the treated group (total effect given by 0.13+0.4) which may not have happened in the absence of the intervention. Once again, this goes in tandem with the theory on priming and how individuals can be swayed by the information they receive.

Table 4: Robustness Checks

VARIABLES	(1) Inflation estimate 2021	(2) Inflation forecast 2022
mcgillstudentid==260716665	0.63	1.87
	(1.94)	(2.15)
	....	....
	....	....
Post	0.02	0.03
	(0.34)	(0.34)
Treatment x Post	-1.47	-1.11**
	(1.25)	(0.49)
How often reading about inflation	0.17	-0.05
	(0.10)	(0.04)
How many of the emails did you read	0.51*	0.38***
	(0.29)	(0.13)
How many of the articles did you read	-0.11	0.25***
	(0.17)	(0.06)
Observations	54	54
R-squared	0.833	0.910

<div align="center">Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1</div>

I use this space to control for some additional effects. For instance, one participant in the treatment group (somehow) did not know they were being treated. This individual was removed from our analysis. Similarly, there were individuals who did not provide confidence interval estimates (provided a single value instead of an upper and lower bound). So, three individuals in total were removed from the analysis.

For the remaining 27 individuals, I wanted to see the impact of actually reading the emails and articles sent to them (which was the intervention). These variables asked for the number of emails read which included the summary and the number of articles read by those in the treatment group. By controlling for these two, along with whether people read about inflation in general (besides the treatment), the treatment x post variable has a coefficient of -1.47 for 2021 estimate which is not significant at the 90% confidence interval. This implies a 1.47 percent points (pp) decrease in the average inflation 2021 estimate for those in treatment compared to control whose average estimate is 3.42 percent, holding the changes across time fixed. This corresponds to a 57% decrease over the control group's estimate of 3.42. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the control group increases by 0.02 pp. This is the change that is not attributed to the treatment. This is a considerable effect as the actual effect of our treatment is then -1.47-0.02=-1.49 percentage point decrease in the point forecast. The control, reading emails is significant at the 90% confidence interval. It means: reading an additional email increases the inflation estimate 2021 by 0.51 pp. This leads to a 15% increase in the control group's estimate of 3.42.

For 2022, the treatment x post variable has a coefficient of -1.11 which is significant at the 90% confidence interval. This implies a 1.11 percent points (pp) decrease in the average inflation 2021 estimate for those in treatment compared to control whose average estimate is 3.41 percent, holding the changes across time fixed. This corresponds to a 33% decrease over the control group's estimate of 3.41. The variable post looks at the difference across time for those in the control group: so between the two time periods, the inflation forecast by the control group increases by 0.03 pp. This result is not significant at the 90% confidence interval. This is the change that is not attributed to the treatment. This is a considerable effect as the actual effect of our treatment is then -1.11-0.03=-1.14 percentage point decrease in the point forecast.

It is interesting to note that standard deviation for our post variable remains unchanged for 2021 and 2022 and has a very similar coefficient. But for the treatment x post variable, the standard deviation for 2021 estimate is more than twice that of 2022. This could be because those who did not know inflation estimates revised them significantly following the intervention.

In 2022 too, reading emails has a positive significant impact on the point estimate. Reading an additional email increases the 2022 forecast by 0.38 pp. This result is significant at the 99% confidence interval. Similarly, each additional article read lead to a 0.25 pp increase in the 2022 forecast. This result is also significant at the 99% confidence interval. Both of these are considerably large results and go in favour of our intervention.

With these controls, the signs for post and txpost flip as compared to the main regression in Table 1. This means when we control for actually reading articles and summaries on inflation, which was the intervention we carried out, the effect on our treatment and control groups does not hold. I checked a number of specifications in order to understand what is going on here and it seems like using the variable on emails read always leads to this sign reversal (in the specifications checked). This could be due to high collinearity with the treatment effect. This can be used as a rule of caution meaning one should steer clear of using highly collinear variables to avoid such results.

Section 5: Conclusion

To summarise, the intervention involved asking the participants to read summaries on inflation and see whether their point estimate for 2021 and forecast for 2022 inflation changes as a result. The main results show a positive upwards effect on both the estimates for the treatment group at the end of the intervention whereas, the estimates by the control group went down in the absence of intervention for 2021 but rose for 2022. This indicates a strong upwards effect on inflation forecasts for our treatment group, especially for 2021. The average for the control group at the beginning of the intervention was inline with actual inflation figures for Canada. This can be explained by the fear inducing language used by these articles that led to an upward increase in estimates which went above the actual, correct average value mentioned by the control group at baseline.

This could imply that the language used by the media people consume can have strong priming effects. To the extent that they bias otherwise correct results even though the intention is only to educate or inform rather than distort reality. However, if the intention is to distort reality in the first place, this can have harmful consequences on the beliefs of individuals and thinking about how this can be kept in check (without encroaching free speech) is a challenge that needs to be addressed openly.

Some of the things that may bias our result is the small size of the sample. The fact that we are masters students of economics meant the average estimates were correct yet the deceptive nature of language on a group of individuals who were on average familiar with the truth is concerning. Moreover, there were multiple interventions going on, on the same set of individuals which could lead to issues. For once, the housing pricing intervention may have had a similar effect on priming individuals to believe prices are rising (which they are).

In accordance with Hawthorne effect, people may have just looked up the inflation rate on Google which would seriously hamper the validity of our results. Whether they did so at baseline or endline would affect the loss of information as a result of this 'search' differently. By John Henry effect, individuals in control group may have just searched or found out about inflation rate (owing to the political climate) on their own which would also effect our results.

In hindsight, it might have been better to perform staggered interventions in more controlled environments (i.e. access to internet may render our results invalid). It would have been good to see beforehand, which IVs could be possibly used (that are exogenous) and so we could have collected information on such variables.

References

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Appendix

Table 1

VARIABLES	(1) DID'21 for age	(2) DID'22 for age
mcgillstudentid==260716665	-0.15	0.64
	(1.92)	(2.26)
	....	....
	....	....
Post	-0.34	0.31
	(0.35)	(0.34)
Treatment x Post	1.54***	0.41
	(0.50)	(0.45)
How often reading about inflation	-0.03	0.08***
	(0.02)	(0.03)
Worry about state of world	-0.23	0.13
	(0.15)	(0.07)
How often thinking about inflation	0.19	0.22**
	(0.13)	(0.10)
Monthly Spending	-0.18	0.17
	(0.28)	(0.15)
Age over 24	-0.76	-1.74**
	(0.72)	(0.69)
Observations	60	60
R-squared	0.790	0.874

<div align="center">Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1</div>

2021: As compared to those below, people above the age of 24 estimate 2021 estimate to be 0.76 points lower on average. The treatment x post coefficient is 1.54 which implies a 1.54 points increase in the average inflation estimate for those in treatment compared to control, holding the changes across time fixed. This result is significant at the 99% confidence interval. Between the two time periods, the control group's estimate falls by 0.34 points, controlling for by monthly spending, reading about inflation, thinking about inflation and worrying about the world. 2022: As compared to those below, people above the age of 24 estimate 2022 estimate to be 1.74 points lower on average. This result is significant at the 95% confidence interval. The treatment x post coefficient is 0.41 which implies a 0.41 points increase in the average inflation estimate for those in treatment compared to control, holding the changes across time fixed. Between the two time periods, the control group's estimate rises by 0.31 points, controlling for by monthly spending, reading about inflation, thinking about inflation and worrying about the world. The two-sided ttest for 2021 estimate by age gives a p-value of 0.88 which is greater that 0.05 which means there are no significant differences in the two age groups. For 2022 forecast, the p-value is 0.66 which is greater that 0.05 which means there are no significant differences in the two age groups.

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[5]This is another version of the Table 2 in the main text which looks at different age groups as part of the sub group analysis.

Table 2

VARIABLES	(1) First stage	IV: Worrying about the state of the world
Worry about state of world		0.99
		(2.27)
mcgillstudentid==260716665	1.69	0.20
	(1.36)	(1.35)
	....	....
	....	....
post	-0.015	-0.18
	(0.037)	(0.54)
txpost	0.43	0.90
	(0.68)	(1.11)
Observations	60	60
R-squared	0.703	0.134
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Here, the variable "worrying about the state of the world" has been used as an instrument for whether they read the articles that were sent to them as part of the treatment. The three condition for eligibility of the instrumental variable "Worrying" is as follows: i) The IV is correlated with X: The number of articles people read is directly affected by how much they worry about the world in the first place. ii) The IV is exogenous: this criterion is not met iii) The IV affects Y only through X: While worrying about the world impacts whether or not someone reads about inflation, worrying about the world does not directly lead to better knowledge of inflation point estimates. The only relationship between the IV and Y is through X. Because two of the three conditions are met, the IV is considered.

The estat firststage test shows a partial R squared of 0.062 which is not high enough. The F-stat received is 0.16 which is smaller than all the critical values shown in the table so we reject our hypothesis that "worrying" is a decent IV.

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[6]This table considers an IV regression as a supplement to the secondary outcomes Table 3.