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# HAPPINESS DYNAMICS, REFERENCE DEPENDENCE, AND MOTIVATED BELIEFS IN U.S. PRESIDENTIAL ELECTIONS

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## ABSTRACT

Collecting and analyzing panel data over the last four U.S. presidential elections, we study the drivers of self-reported happiness. We relate our empirical findings to existing models of elation, reference dependence, and belief formation. In addition to corroborating previous findings in the literature (hedonic asymmetry/hedonic loss aversion, hedonic adaptation and motivated beliefs), we provide novel results that extend the literature in four dimensions. First, happiness responds to changes relative to both the political status quo (i.e., the incumbent presidential party) and the expected electoral outcome, providing support for two major hypotheses regarding reference point formation. Individuals exhibit hedonic loss aversion to deviations from expectations, but hedonic loss neutrality to changes from the status quo. Second, the speed of hedonic adaptation to deviations from the status quo is significantly slower than the speed of hedonic adaptation to surprises. Third, expectations affect happiness in a nonlinear way, consistent with Gul's model of disappointment aversion, but contrary to other influential reference-dependent models. Fourth, both "objective" and motivated subjective beliefs matter for the happiness reactions, although subjective beliefs matter more.

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# 1 Introduction

Understanding the relationship between utility on the one hand, and happiness and well-being on the other, has been an area of extensive study by philosophers, neuroscientists, and a broad range of social scientists. One major approach, exemplified by Bentham (1781), posits that happiness is a function of total utility. In contrast, a second literature links changes in happiness to the realization of outcomes compared to a reference point, and highlights the fact that negative emotions are stronger than positive ones as the reason for loss aversion (e.g., Kahneman and Tversky 1979).

In response, an empirical literature has emerged using cross-sectional and time series data on happiness and other measures of self-reported well-being to try to understand the drivers of happiness and well-being. For example, the well-known "Easterlin Paradox" (Easterlin 1974, 1995, 2003) suggests that the dramatic increases in per capita income and consumption in the United States have not been accompanied by a strong trend in happiness, which is typically explained by positing that individuals adjust their reference incomes over time. How much this challenges the Benthamite view that happiness is equivalent to utility is tempered by the finding of Sacks et al. (2012) and Stevenson and Wolfers (2013) that increases in per capita income in other countries do seem to have been accompanied by a substantial short-run upward trend in happiness.[1] In addition, more micro-level analyses have been done to examine the response of happiness to major personal events, such as incarceration (Zamble and Porporino 1990, Zamble 1992), injury (Wortman and Silver 1987), the death of family members and diagnoses of illnesses (Kimball et al. 2015), winning the lottery (Brickman et al. 1978), and national news events, such as natural disasters (Kimball et al. 2006), school shootings (Sharkey and Shen 2021), and, particularly relevant for this paper, electoral outcomes (Pinto et al. 2021, Tsutsui et al. 2015, Kimball et al. 2007). These empirical literatures highlight the significant role of reference points in determining happiness.

However, little work has been done to carefully distinguish what kinds of reference points matter for experienced happiness—with the two leading contenders being expectations and the status quo. This paper uses a novel dataset on partisan affiliation, beliefs, and happiness over the last four U.S. presidential elections to explicitly study the linkage between happiness and different notions of reference dependence. Our data is consistent with the existing literature: we find evidence of (i) asymmetry in hedonic reactions, where losing partisans experience a larger drop than the gain experienced by winning partisans, as well as (ii) hedonic adaptation, where after several weeks we observe only very small hedonic responses. Moreover, extending

[1] In the context of the Easterlin paradox, the income or consumption levels of other people often play an important part in the determination of the reference point. In the context of this paper, where governance of the nation is a public good, for which different people make different evaluations, comparisons across people are in the background.

research on partisan bias, we find an important role for motivated beliefs, where partisans tend to ascribe higher chances of winning to their candidates than non-partisans, in the determination of happiness. We call this asymmetry in hedonic reactions "hedonic asymmetry" and "hedonic loss aversion"; these two phrases are synonymous. (In this paper, "hedonic" always refers to "having to do with happiness.")

Our main contribution is to provide new results in four important directions. First, we distinguish between two main forms of reference points in the literature: status quo and expectation. The variation in our data allows us to measure the extent to which changes in happiness are driven by changes in the incumbent (the status quo party controlling the presidency) versus differences in the election outcome relative to individual-level expectations about the winner. We find that both matter, but in distinct ways: we find significant hedonic loss aversion (where losses are felt more strongly than gains) for deviations from expectations, but loss neutrality to changes from the status quo. Second, we show that the speed of hedonic adaptation (i.e., how quickly the hedonic response fades) depends on the type of reference dependence: people adapt to status-quo changes significantly slower than they adapt to expectation deviations. Third, we derive a novel theoretical result that different models of reference dependence make different predictions about how expectations affect happiness. Using our data to discriminate among the predictions, we find that happiness depends on expectations in a nonlinear fashion, consistent with Gul (1991)'s model of disappointment aversion (and inconsistent with the predictions of Kőszegi and Rabin 2006, Bell 1985, Loomes and Sugden 1986). Fourth, decomposing individual expectations into an objective component (reflecting odds that have been cleansed of partisan bias) and a subjective component (reflecting motivated beliefs), we find that both components matter for hedonic reactions. Thus, it appears that individuals' happiness reacts to the motivated part of their beliefs in a similar way as to the unmotivated part of their beliefs. In summary, we demonstrate that happiness data can answer important questions about models of reference dependence, loss aversion, and belief formation.

To provide these new results, we collect panel data on people's happiness measures, preferences, and beliefs over the four U.S. presidential elections between 2008 and 2020. We focus on presidential elections for two reasons. They are major events that potentially involve both surprises (i.e., expectation deviations) and changes in U.S. president (i.e., status-quo changes). They also affect a large number of people at (essentially) the same point in time, enabling us to control for the confounding effect of other happiness-altering events that tend to become nontrivial in more extended time frames. The panel dimension of our data allows us to deal with unobserved personal characteristics that happiness theories predict to be important and are stable over short periods of time, but would otherwise confound our estimation if left unaccounted for (using only cross-sectional data). The multiplicity of U.S. presidential elections enables us to generalize

beyond the specificities of particular elections. We discuss details of our data in Section 2.

To motivate our later work, we first conduct a descriptive analysis of the data, suggesting that supporters of the election winners (whom we call "winners") tend to become happier after the elections, and supporters of the election losers (whom we call "losers") tend to become sadder (see Section 2.2). We also find that individuals who are more partisan and more surprised by election outcomes react more strongly to election outcomes. In addition, there is a larger change in happiness when the status quo changes (i.e., when the incumbent presidential party loses). The analysis also suggests that individuals' happiness exhibits mean reversion (i.e., hedonic adaptation) and that reactions of the losers tend to be larger than the reactions of the winners (i.e., hedonic loss aversion).

Based on these descriptive findings, in Section 3 we develop and estimate a "static" model of happiness that incorporates the traditional Benthamite approach to happiness (Bentham 1781), as well as our two forms of reference dependence (e.g., Kimball and Willis 2006). We find that both the interaction of partisanship with status-quo changes and the interaction of partisanship with surprises matter for hedonic reactions (and after controlling for these two, little else affects hedonic reactions). We also find evidence that individuals are hedonically loss-averse to surprises. We only find mixed evidence of hedonic loss aversion for deviations from the status quo. These results are consistent with well-known models of reference dependence, while the latter result is also potentially compatible with Benthamite approaches to happiness (and incompatible with hedonic loss aversion with respect to the status quo).

We then develop a novel result that relates different classes of expectation-based reference dependence to how ex-post happiness responds to ex-ante probabilities. We first derive theoretically that for some models (Kőszegi and Rabin 2006, Bell 1985, Loomes and Sugden 1986) changes in happiness should be linear in the probabilities used in constructing expectations, while for others, such as Gul (1991), they should be nonlinear. To our knowledge, we are the first to show that ex-post utility changes in very different ways in response to ex-ante probabilities across these different models. This is despite the fact that all of these models predict that ex-ante preferences over lotteries will be nonlinear in probabilities. We find our data favors a nonlinearity dependence of ex-post happiness on ex-ante probabilities. This helps demonstrate how happiness data can help distinguish between competing classes of expectation-based models of reference dependence.

In Section 4, we turn to the dynamics of hedonic responses over time. Specifically, we extend our "static" model to allow for hedonic adaptation (i.e., the adjustment of happiness over time). In particular, we relate hedonic adaptation to the adaptation of the reference point to a new situation. Our estimations suggest that people adapt their expectations much faster than they adapt to a new status quo, with the respective

estimated half-lives of adjustment being about 0.81 days and 24 days respectively. Short-run effects of a shock are driven mainly by realized outcomes relative to expectations, while long-run effects are driven by changes relative to the status quo. We also find other factors influencing the speed of adaptation: whether the initial shock was positive or negative, as well as the size of the shock—individuals mean revert towards the previous level faster if the shock is either negative or larger.

Many studies have demonstrated that individuals engage in motivated reasoning in political settings (see, e.g., Kahan 2015, Thaler 2020). However, Bullock et al. (2013) points to the possibility that monetary incentives reduce the extent of this reasoning. To what extent are the beliefs exhibited in our surveys "deeply held" rather than simply cheap talk to signal partisan affiliation? In Section 5, we investigate this issue in a new way: we decompose individuals' expectations into a portion that reflects "objective" beliefs and a portion that reflects subjective or potentially motivated beliefs. We examine whether individuals' happiness responds to their subjective beliefs in the same way that they react to objective beliefs. We first show that individuals' partisan affiliation has a significant impact on subjective beliefs about likely outcomes: individuals believe that the candidate they support is more likely to win, and this belief increases with the degree of partisanship. We then construct two measures of objective beliefs: either objective odds from pollsters or a regression-based measure of expectation beliefs with partisanship-related variations purged. Regardless of which measure of objective beliefs we use, we find that both the objective and subjective portions of expectations matter (although objective expectations seem to matter more), suggesting that even the subjective portion of expectations are held deeply enough to induce hedonic reactions.

In Section 6, we discuss our results' robustness to alternative measures of happiness and expectations and heterogeneities along time and individual dimensions. We also discuss related literature in relation to our contributions there. We conclude in Section 7.

# 2 Data and Descriptive Analysis

## 2.1 Data Description

We measure people's happiness, political preferences, and election beliefs using customized online surveys. We conduct our surveys with U.S. residents just before and after the four U.S. presidential elections spanning from 2008 to 2020. Individuals' self-reported happiness is collected by asking subjects how happy they feel on an 8-point Likert scale (ranging from extremely unhappy, 1, to extremely happy, 8).[2] We then multiply

[2]We alternatively measure happiness using a multi-dimensional construct from four questions on emotion—whether they feel happy, sad, enjoyed life, or depressed in the last week.

the responses by 12.5 linearly to measure happiness. Appendix G contains the full survey for the 2020 wave. These measures have been widely used and validated (see, e.g., Kimball et al. 2015). We maintain consistency in the survey questions across all the elections. Appendix G contains our full survey for the 2020 election.

To elicit political preferences, we ask each respondent about their political affiliation and the strength of that affiliation—strong, weak, or lean Democrat/Republican, giving us a total of three categories of partisanship per political group.[3] For each election, we coded partisanship to take on values from the set $\{\pm 1, \pm 2/3, \pm 1/3\}$, where more positive numbers indicate stronger support for the candidate who won, and more negative numbers indicate stronger support for the candidate who lost.

To measure expectations about election outcomes, we ask respondents about the chance they think each candidate would be elected (denoted by $p$). We then measure surprise by the distance of 1 and the winner's expected winning chance (i.e., $1 - p$) because it indicates how much individuals' expectations differed from the actual outcome.

To study the temporal dynamics of people's happiness in response to presidential election results, we ask each respondent two to three rounds of the survey questions per election—one round in the week immediately before the election, which includes all the questions described, another round in the week after election day, and a final third round following the second round.[4] The pre-election survey includes all the questions discussed above. For efficiency, the post-election surveys ask only the happiness questions.

We construct up to two measures of happiness changes for each individual. The first is the difference between the first and second rounds' measures of happiness. This measure is indexed by individual as well as by the number of days the survey was taken since the election was decided.[5] For individuals who answered a third round, we construct a second measure of the change in happiness by comparing their third-round response to their first-round response, and again index it by individual and the length of time since the election was decided.

For each election, we track whether there was a change in the incumbent presidential party (*Status Quo*). This allows us to define change in *Status Quo* to be 1 if there is a change in the incumbent party and 0 otherwise.

[3] In Appendix F.2, we use a different notion of partisanship, where we asked subjects their warmth (on a 0-100 scale) towards both presidential and vice-presidential candidates. We also asked hypothetical questions about their willingness to pay to have their favored candidate elected president, but this measure ended up being extremely noisy and we do not use it.

[4] All our surveys have three waves structured in this way, except for the 2008 wave, which does not have a third wave.

[5] We fielded the second-round survey on the same day when at least one major news outlet called the election. The dates were November 4, 2008, November 6, 2012, November 8, 2016 and November 8, 2020 for the four respective elections.

We fielded our surveys online via the American Life Panel for the 2008 and 2012 waves and through Amazon Mechanical Turk for the 2016 and 2020 waves. Participation in our study is voluntary and anonymous. Our surveys are equipped with various explicit and implicit attention checks that allow us to control for inattentive responses.[6] Our respondents typically spent about 10 minutes on our pre-election survey and about 2 minutes on our post-election survey(s).

Our surveys also include questions on demographic information, such as gender, age, race, employment status, and marital status.[7] 45% of our respondents are female, and the average age is 45.7. 33% of the participants are not white or Caucasian, and 87% are employed. 59% are married or living with a partner. On average, participants took the survey within 6 days after the election results were announced.[8] Table 9 in Appendix A reports additional descriptive statistics on the demographics of our respondents across the four waves.

We intentionally field our post-election surveys promptly to control for other external happiness-altering events and the fast rate of hedonic adaptation, as previous literature generally finds (Pierce et al. 2016, Sharkey and Shen 2021). Around 90% of our subjects completed the second and third waves of the survey within two weeks after learning the election outcomes (see Figure 6 in Appendix A). We sometimes restrict our sample to this two-week window to exclude individuals with very long delays after the election, as they could have already adapted hedonically by the time they took the survey and were more likely to have been affected by other happiness-altering shocks.

## 2.2 Descriptive Happiness Changes

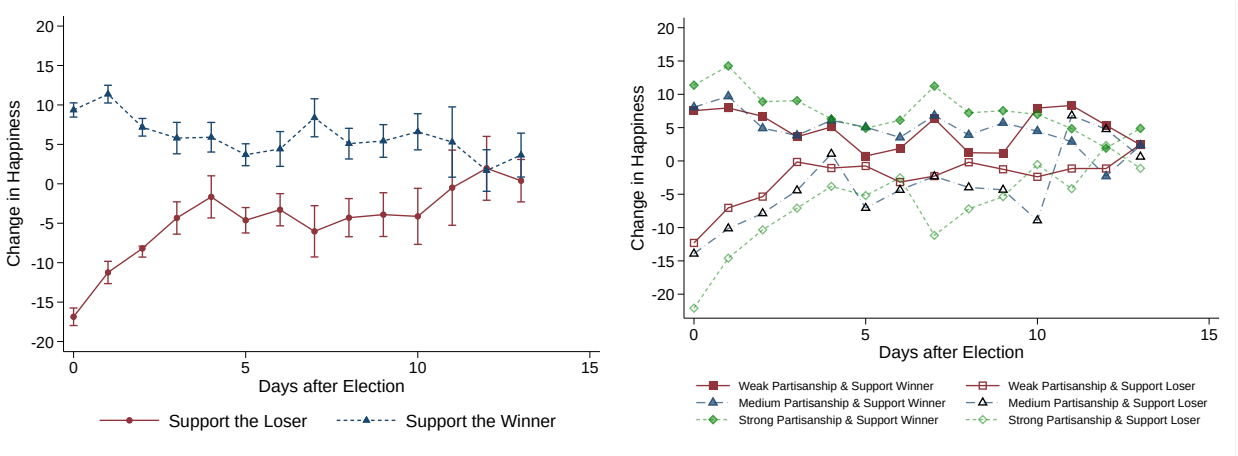
Before conducting a detailed analysis of the data, we provide some straightforward graphical and regression-based descriptions of the data. Figure 1a depicts the average change in happiness for each day in the two weeks following the elections. It shows that whether the subject supported the winner or the loser is an important factor influencing changes in happiness. Winners experienced an initial increase in happiness, while losers experienced an initial decrease. These initial changes gradually mean-revert, and towards the end of the first two weeks, the average changes in happiness converge.

We next consider the effect of the strength of political affiliation to the winning or losing party. Figure 1b shows that for all partisanship strengths, the average happiness changes exhibit the same pattern as Figure

[6] These checks include a free-response question, time on survey, and add-up tests of responses across several survey questions.

[7] The survey also includes questions on the respondents' evaluation of the accuracy of the election polls. Starting from the 2012 wave, we also measured people's beliefs about the elections' effects on various economic matters, such as individual financial situation, inflation, interest rate, and unemployment.

[8] Heffetz and Rabin (2013) points out that the response speed of individuals may be systematically related to their happiness.




(a) Happiness Change by Support

(b) Happiness Change by Partisanship and Support

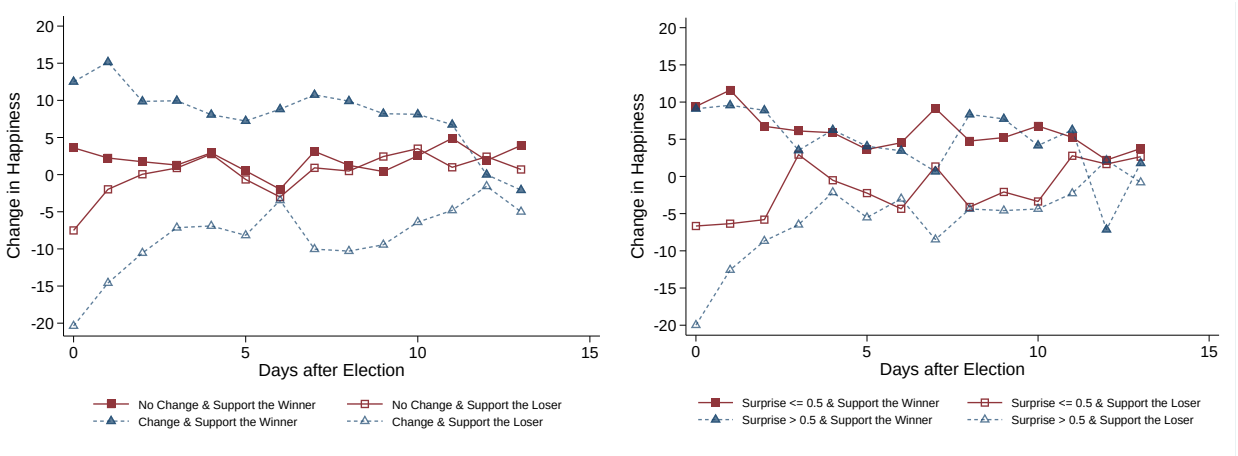
Figure 1: Happiness Changes: Partisanship

1a indicates for both the winners and the losers over time. The figure also shows that stronger partisanship correlates with larger changes in happiness.

In line with the literature on reference dependence we also measure how shifts relative to potential reference points may affect the change in happiness. Figure 2a shows that a shift in the party controlling the presidency (which happened in 2008, 2016, and 2020) affects changes in happiness more than when there is no shift, suggesting that whether *Status Quo* changes plays an important role in determining happiness changes for both winners and losers. Figure 2b plots the change in happiness for respondents with large versus small amounts of surprise. Subjects who are more surprised by the election outcome experience a greater change in happiness, although this difference is more concentrated among the losers.

The figures make it clear that there exists a substantive difference between the reactions of winners and losers, but it is less clear to what extent this difference is consistent with gain-loss asymmetry. The results in Table 1 help shed light on this. Each row of the table provides results from a separate regression of change in happiness on the row-name variable and that row-name variable interacted with a dummy for winner. We present the results of this regression in two columns: column (1) contains the estimates of the coefficients for the losers, while column (2) contains the estimates of the coefficients for the winners (which equals the sum of the coefficient for the losers plus the coefficient that applies only to winner, via the dummy variable). Across all four specifications, we can clearly see that winners have a positive change in happiness, while losers have a negative change.

Column (3) of Table 1 reports the absolute value of the ratio of the coefficient estimates in column (1) to those in column (2), which measures the degree of hedonic loss aversion: how much more strongly a loss




(a) Happiness Change by Status Quo and Support

(b) Happiness Change by Surprise and Support

Figure 2: Happiness Changes: Reference Points

is felt than a gain. All specifications in the table indicate hedonic loss aversion—the ratio is significantly greater than 1.

These suggestive regressions do not control for potential correlations with relevant omitted independent variables; however, they show that all the factors in the table (being a winner or a loser, partisanship, status quo, and surprise) appear to be important factors in determining happiness reactions. In the following section, we attempt to understand and refine these results through a static theoretical model and a more detailed data analysis.

# 3 An Atemporal Analysis of Happiness Changes

## 3.1 A Static Model of Hedonic Adaptation

We now develop a simple atemporal, before/after framework to relate our data to experienced happiness and reference dependence; we will incorporate happiness dynamics in Section 4. Prior to the election, individuals face a lottery over two states of the world (i.e., the winner of the election), where the resolution of the lottery is determined by the final vote total (which is a random variable). We assume that the individual in question understands that their behavior has a negligible impact on the outcome probabilities and thus believes that their actions do not influence which outcome occurs. The lottery is then realized (when the election is decided), and we observe the happiness reaction to the outcome of the lottery.

Formally, we denote the two states of the world by $A$ and $B$, respectively. Each individual ($i$) belongs to one of six types, $\alpha_1, \alpha_2, \alpha_3$ and $\beta_1, \beta_2, \beta_3$. Individuals of any $\alpha$ type prefer state $A$. Individuals of any

Table 1: Pilot Regressions

| | (1) | (2) | (3) |
|---|---|---|---|
| | Loser | Winner | Loss Aversion |
| Constant | -9.572 | 7.556 | 1.267 |
| | [0.000] | [0.000] | [0.000] |
| Partisanship | -9.688 | 6.003 | 1.614 |
| | [0.000] | [0.000] | [0.023] |
| Change in *Status Quo* | -11.870 | 9.101 | 1.304 |
| | [0.000] | [0.000] | [0.002] |
| Surprise | -16.489 | 13.549 | 1.217 |
| | [0.000] | [0.000] | [0.000] |

*Notes.* 1. Each row of this table presents results from an OLS regression of change in happiness on the row-name variable and the interaction of the row-name variable with the winner dummy. Column (2) lists coefficients for the winners (e.g., partisanship in Column (2) is calculated as the sum of the coefficient of partisanship and its interaction with the winner dummy). Column (3) lists the loss aversion coefficient, which is the absolute ratio of the loss over gain.
2. P values are in brackets. P values are for tests against 0 in Columns (1) and (2) and for the test against 1 in Column (3).
3. Complete regression results are in Table 10 of Appendix A.

$\beta$ type prefer state $B$. Individuals vary in their intensity of preferences in accordance with the subscripts on $\alpha$ and $\beta$—an individual with intensity $\phi_i$ receives a utility of $u_i(S) = \phi_i$ for their preferred state, and 0 for their unpreferred state. As above, we refer to supporters of the candidate who loses (i.e., supporters of the unrealized state) as losers, and supporters of the candidate who wins (i.e., supporters of the realized state) as winners. We denote the set of winners as $Z$.

We assume that before the lottery takes place, at $t = -1$, the state of the world ($S_{-1}$) is either $A$ or $B$—in other words, either $A$ or $B$ is the status quo (the incumbent). To individual $i$, the ex-ante chances of states $A$ and $B$ being realized at the time of the election ($S_0$) are $p_i$ and $1 - p_i$, respectively. We assume that the utility of the expected outcome $E$, $v_i(E)$ is equal to the strength of preferences $\phi_i$ times some underlying utility that depends on expectations $\hat{v}_i(E)$: $v_i(E) \equiv \phi_i \hat{v}_i(E)$. This is increasing in the agent's expected utility at $t = -1$. In other words, for $\alpha$ types $v_i(E)$ is increasing in $p_i$, and for $\beta$ types $v_i(E)$ is decreasing in $p_i$.

We allow our model to flexibly incorporate several potential mechanisms that drive happiness. In particular, at $t = -1$, it could be the case that happiness depends on an individual's setpoint happiness, denoted by $M_i$, which is independent of their actual circumstances. It might also be true, in accordance with Benthamite intuitions, that happiness depends on the current state of the world ($S_{-1}$), or even on the present discounted value of future flows (which depend on current expectations), $v_i(E)$, where $\kappa$ captures the weight on forward-looking utility in the present discounted value of lifetime utility.

Happiness at $t = -1$ is then

$$H_{i,-1} = \omega_M M_i + \omega_S u_i(S_{-1}) + \omega_S \kappa v_i(E),^{9}$$

where $\omega_M$ is the weight for the component independent of the state and $\omega_S$ the weight for components that depend on the state.

After the lottery has been resolved in time period 0, state $S_0 \in \{A, B\}$ is realized. Just as in $t = -1$, both setpoint happiness and the $t = 0$ state of the world (i.e. $S_0$) may matter for happiness at $t = 0$, as well as the present discounted value of future flows of being in state $S_i$, which we denote $\kappa u_i(S_0)$. We assume that the present discounted value of future flows is proportional to the current flow utility.

Drawing from the literature on elation theory and reference dependence, we also allow for two additional components to matter. The first additional component is that a change in the status quo, i.e., the incumbent party, may matter. Just as described in Kahneman and Tversky (1979), if individuals experience a change to a better state of the world, they may experience happiness from the *change* to a better state, separate from the happiness experienced from the better state itself (and the opposite for a worse state). As is typically implicit in discussions relating reference dependence to disappointment, we assume that happiness loss is proportional to the utility gap between the realized state and the status quo.

Second, in line with many recent models of reference dependence, the gap between what was expected and what actually happened (i.e., the gap between the actual outcome and $v_i(E)$) may affect happiness.[10] Happiness after the election then depends on the difference between the utility of the realized outcome and the value of the expectation.[11]

Because these two components involve the notions of gain and loss, we also incorporate the well-known insight that individuals experience losses more strongly than they experience gains: in other words, a loss causes a larger negative shift in happiness than an equivalent-sized gain causes a positive shift. Formally, if the difference between the realized outcome and the reference point (either status quo or expectations) is negative, the happiness reaction is $\lambda$ (greater than 1) times what the happiness reaction would be in the case

[9] $\omega_M$ and $\omega_S$ do not need to sum to one.

[10] Although in Kőszegi and Rabin (2006), the realized outcome is compared to each potential outcome separately, it is well known (see Gill and Prowse (2012) and Masatlioglu and Raymond (2016)) that with two states of the world, this is equivalent to taking a simple expectation, and so is equivalent to the Bell (1985) and Loomes and Sugden (1986) approaches. In Gul (1991) $v(E)$ would be endogenously determined.

[11] Although we do not build it into our model, in our empirical specification, we test for a "pure love of winning," consistent with an experimental literature that finds individuals seem to derive additional utility from being on the winning side (e.g., Herbst (2016), Brookins and Ryvkin (2014), Cason et al. (2018), Herbst (2016), Mago et al. (2013), Price and Sheremeta (2011), Sheremeta (2011), Hart et al. (2015)).

of a gain. This parameter can vary by the type of reference point employed. Overall happiness at $t = 0$ is then

$$H_{i,0} = \overbrace{\omega_M M_i}^{\text{Setpoint Happiness}} + \overbrace{\omega_S u_i(S_0) + \omega_S \kappa u_i(S_0)}^{\text{State Dependence}} + \overbrace{\omega_Q \lambda_Q^{\mathbb{I}(u_i(S_0)<u_i(S_{-1}))}[u_i(S_0) - u_i(S_{-1})]}^{\text{State Relative to Status Quo}} + \underbrace{\omega_E \lambda_E^{\mathbb{I}(u_i(S_0)<v_i(E))}[u_i(S_0) - v_i(E)]}_{\text{State Relative to Expectations}},$$

where $\omega_Q$ and $\omega_E$ are weights for the relative status-quo and expectation terms respectively, and $\mathbb{I}$ is an indicator function that equals 1 if its argument is true and 0 otherwise.

In order to derive clean predictions and account for potential selection (e.g., perhaps individuals who support candidate $A$ simply have higher setpoint happiness), we take the difference between happiness at $t = 0$ and $t = -1$, which we denote $\Delta_{i,0}$:

$$\Delta_{i,0} = \left(\omega_S + \omega_Q \lambda_Q^{\mathbb{I}(u_i(S_0)<u_i(S_{-1}))}\right)[u_i(S_0) - u_i(S_{-1})] + \left(\omega_S \kappa + \omega_E \lambda_E^{\mathbb{I}(u_i(S_0)<v_i(E))}\right)[u_i(S_0) - v_i(E)]. \quad (1)$$

This has two basic components. The first shows that changes in happiness depend on the utility gap between the state at $t = -1$ and $t = 0$. This can be attributed either to the direct dependence of happiness on the state or to changes relative to the status quo. We refer to these two plausible mechanisms as the Benthamite component and the Status-Quo-Disruption component, respectively. It is important to note that the Benthamite component does not incorporate loss aversion, while the component due to status-quo disruption does: its effect on happiness depends on, among other things, whether the realized state of the world is higher or lower than the expected state of the world.

We now derive several key hypotheses from this model. First, it is apparent that both $[u_i(S_0) - u_i(S_{-1})]$ and $[u_i(S_0) - v_i(E)]$ are weakly positive for winners, and weakly negative for losers. Thus, our basic hypothesis posits that winners should become (weakly) happier and losers (weakly) less happy after the lottery.

**Hypothesis 1** *$\Delta_{i,0}$ is (weakly) positive if $i \in Z$ and (weakly) negative if $i \notin Z$.*

Our second hypothesis derives from what would occur if there is either a Benthamite component or a Status-Quo-Disruption component: changes in happiness increase with the improvement of the status quo.

**Hypothesis 2** *$\Delta_{i,0}$ is increasing in $u_i(S_0) - u_i(S_{-1})$.*

Our third hypothesis arises from considering the implications of the expectations-dependent models or news-utility models of utility (what Kimball and Willis (2006) call "elation theory"). According to this theory, individuals would experience greater happiness when reality exceeds their expectations.

**Hypothesis 3** *$\Delta_{i,0}$ is increasing in $u_i(S_0) - v_i(E)$.*

Our fourth hypothesis concerns the differential responses of people to "good" versus "bad" events. Specifically, the concept of loss aversion, when extended to hedonic loss aversion/hedonic asymmetry, suggests that we should observe stronger reactions in the case of losses than in the case of gains: losses relative to the status quo are predicted to be experienced more intensely than gains relative to the status quo; similarly, losses relative to expectations are expected to be felt more acutely than gains relative to expectations.

**Hypothesis 4**

1. *$\lambda_Q > 1$, or in other words, fixing $|u_i(S_0) - u_i(S_{-1})|$, $|\Delta_{i,0}|$ is larger for $i \notin Z$ than for $i \in Z$.*
2. *$\lambda_E > 1$, or in other words, fixing $|u_i(S_0) - v_i(E)|$, $|\Delta_{i,0}|$ is larger for $i \notin Z$ than for $i \in Z$.*

## 3.2 Determinants of Happiness Changes

To test Hypotheses 1-4, we empirically analyze factors that influence the initial change in happiness on the day people learn about the election outcome. Based on the descriptive results shown in Section 2.2 and on the static model, it is highly possible that the strength of partisanship, surprise, change in *Status Quo* can significantly influence happiness and the effects are dependent on whether the individual supported the winner or not.

Equation (1) implies the following baseline empirical specification:

$$
\begin{aligned}
&ChangeinHappiness = \\
&\beta_0 + \overbrace{\beta_1 Partisanship * Surprise}^{\text{Loss based on Expectations}} + \underbrace{\beta_2 Partisanship * Surprise * SupportingtheWinner}_{\text{Gain based on Expectations}} \\
&+ \overbrace{\beta_3 Partisanship * ChangeinStatusQuo}^{\text{Loss based on } \textit{Status Quo}} + \underbrace{\beta_4 Partisanship * ChangeinStatusQuo * SupportingtheWinner}_{\text{Gain based on } \textit{Status Quo}} \\
&+ S_i + \epsilon_{it},
\end{aligned}
\tag{2}
$$

where $S_i$ is the state fixed effect, and the rest of the variables are defined in the same way as in Section 2.1.

Table 2 reports the results from this regression on the subsample of our data for the immediate response of happiness (the change in happiness at $t = 0$). We also run a version of this regression on the subsample with the change in happiness over the first two weeks ($t \leq 13$).[12] Because this second subsample includes both immediate reactions and ensuing reactions moderated by hedonic adaptation, there may be confounds

[12]The unit of time in our data is a day.

in interpreting the coefficients based on the second subsample and, thus, we relegate it to Appendix B.1 as a robustness check.

We again present the results by separating them into the coefficients for losers (Column 1) and the coefficients for winners (Column 2). The coefficients in Column (1) are precisely $\beta_1$ and $\beta_3$ in equation (2), while the coefficients in Column (2) are the sums of the coefficients of each row-name term and its interaction term with the winner dummy (i.e., $\beta_1 + \beta_2$ and $\beta_3 + \beta_4$, respectively). Column (3) presents the loss aversion coefficients, calculated using the absolute value of the ratio of loss over gain. We control for demographics in these regressions.[13] The full results are in the Appendix B.1. All standard errors are clustered at the individual level.

Table 2: Determinants of Happiness at $t = 0$

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Supporting the Loser | Supporting the Winner | Loss Aversion | Supporting the Loser | Supporting the Winner | Loss Aversion |
| Partisanship * Change in *Status Quo* | -13.059 | 15.915 | 0.821 | -34.250 | 8.790 | 3.896 |
| | [0.000] | [0.000] | [0.238] | [0.033] | [0.373] | [0.178] |
| Partisanship * Surprise | -20.856 | 7.393 | 2.821 | -59.818 | 24.485 | 2.443 |
| | [0.000] | [0.013] | [0.003] | [0.010] | [0.244] | [0.262] |
| Supporting the Winner | | | | 19.163 | 35.385 | |
| | | | | [0.119] | [0.000] | |
| Partisanship | | | | 20.759 | -5.622 | |
| | | | | [0.117] | [0.513] | |
| Change in *Status Quo* | | | | 13.298 | 5.198 | |
| | | | | [0.256] | [0.548] | |
| Surprise | | | | 24.484 | -15.943 | |
| | | | | [0.143] | [0.390] | |
| Change in *Status Quo* * Surprise | | | | -42.897 | 1.540 | |
| | | | | [0.030] | [0.939] | |
| Partisanship * Change in *Status Quo* * Surprise | | | | 59.554 | -5.972 | |
| | | | | [0.027] | [0.800] | |
| Demographics | Y | Y | Y | Y | Y | Y |
| Observations | 2,672 | 2,672 | 2,672 | 2,672 | 2,672 | 2,672 |
| $R^2$ | 0.409 | 0.409 | 0.409 | 0.424 | 0.424 | 0.424 |

*Notes.* 1. This table presents OLS regressions of change in happiness on the variables and their interaction with the dummy of supporting the winner. Columns (1) and (4) list the coefficient of the variable. Columns (2) and (5) list the aggregate of the coefficient of the variable and its interaction term with the dummy of supporting the winner. Columns (3) and (6) list the loss aversion coefficient, which is the absolute ratio of the loss over gain.
2. P values in brackets. P values are testing against 0 in columns (1), (2), (4), (5), and are testing against 1 in columns (3) and (6).
3. Complete results are in Table 11 of Appendix B.1.

We conduct a similar exercise by extending our set of independent variables to include the uninteracted

[13] We do not include year fixed effects because then we could not identify the effect of change in the status quo. We cannot rule out the possibility that our analysis of changes in the status quo is instead analyzing some other special feature of the 2012 US Presidential election, which is the only one of our elections without a change in the status quo presidential party.

terms of partisanship, surprise, and change in status quo, as well as their higher-order interactions, and report results from this exercise in Columns (4) to (6) of Table 2. Despite the larger standard errors, the estimates exhibit several consistent patterns. First, as in Column (1), the key coefficients in Column (4) are negative, and, as in Column (2), those in (5) are positive. This is consistent with Hypothesis 1—after election, winners experience increases in happiness and losers experience decreases in happiness.

**Result 1** *The change in happiness is positive for winners and negative for losers.*

In all the columns of (1), (2), (4), and (5), the coefficients of partisanship interacted with change in status quo are consistent with our Hypothesis 2, suggesting that the realized state of the world (compared to the previous state of the world) matters for changes in happiness. However, the data cannot distinguish whether happiness depends solely on the realized state or on status-quo reference dependence.

**Result 2** *The change in happiness increases when strength of preference interacted with change from the status quo increases.*

Our next result parallels the result on status quo effects, but for expectations. The coefficients for the interaction term of partisanship and surprise in Columns (1) and (4) are negative, and those in Columns (2) and (5) are positive. In all the tables other than Column (4) of Table 2, the coefficients for losers are significantly different from 0, while the coefficients for winners, though positive, are not different from 0 at standard significance levels. This result is consistent with our Hypothesis 3 and suggests that expectations-based models of reference dependence also are at play in our data.

**Result 3** *The change in happiness increases when surprise interacted with strength of preference increases.*

The fourth result focuses on the asymmetry between gains and losses for the reference points. The hedonic loss aversion coefficient reported in Columns (3) and (6) of Table 2 is the absolute value of the ratio of the losers' loss in happiness over the winners' the gain in happiness. We find in our primary specification in Table 2 that the hedonic loss aversion coefficient on surprise is significantly greater than 1, indicating that individuals who have similar partisan levels experience losses more strongly than gains. Because we obtain less precise estimates with all the additional covariates, we find that the hedonic loss aversion coefficient is still greater than 1, but no longer significantly so. Our estimates of the hedonic loss aversion coefficient for expectations are broadly consistent with the estimates of loss aversion (for decisions) in the literature, which usually is between 2 and 3 (see, e.g., Tversky and Kahneman 1991, 1992, Bleichrodt et al. 2001, Schmidt and Traub 2002, Pennings and Smidts 2003, Booij and Van de Kuilen 2009).

In contrast, we find much weaker evidence for loss aversion towards the status quo. In our preferred specification, Columns (1)-(3) of Table 2, hedonic loss aversion for status quo is close to 1 (0.82) and not significantly different from 1. In the other specification it is larger than 1 but not significantly so.

Thus, Hypothesis 4, that individuals are hedonically loss-averse, seems to be more consistent with changes in happiness due to expectations, rather than changes in the status quo. In the latter case, individuals appear to be loss neutral, consistent more with the Benthamite hypothesis (which conjectures utility is proportional to happiness, with no role for loss aversion).

**Result 4** *Individuals are hedonically loss-averse with respect to changes compared to a reference point of expectations, but not with respect to changes compared to the status quo.*

Our model also predicts that after controlling for partisanship interacted with the two forms of reference effects, the individual effects of partisanship and reference dependence should be negligible. Similarly, our model predicts that changes in the status quo alone, as well as surprise alone, should matter little. Columns (4) and (5) in Table 2 shows that the relevant coefficients are not statistically significant.[14] This specification gives us some confidence that the model is not excluding factors that are important, and that changes in happiness are not determined by a single variable but by their joint effects. Columns (4) and (5) also provide suggestive evidence regarding "diminishing sensitivity": the interaction of surprise, partisanship, and change in status quo has the opposite sign of the coefficient on surprise interacted with partisanship alone or change in the status quo interacted with partisanship alone. In other words, if an individual experiences a change in happiness due to both surprise and a change in the status quo, his or her change in happiness is less extreme than the sum of the two individual interaction effects.

### 3.3 Probability Weighting

Given that expectations affect happiness, we next turn to understanding to what extent different models of expectation-dependent reference dependence can explain our data. Our approach will be to analyze whether the probabilities involved in ex-ante expectations enter linearly or nonlinearly into after-election happiness. As we will show, under mild assumptions, different classes of expectations-dependent models of reference dependence make different predictions about whether the relationship should be linear or not. We turn first to explicating these theoretical underpinnings. For expositional ease, we assume that happiness at $t = 0$ only depends on outcomes relative to expectations. To our knowledge, these tests and analysis are novel — we do not know of other papers which either prove that ex-post utility changes in very different ways

[14] These estimates also indicate that we see no significant pure "love of winning."

in response to ex-ante probabilities depending on the class of expectation-based reference dependent utility, nor use this observation as the basis for an empirical test.

One of the best known models of expectation-based reference dependence is that Kőszegi and Rabin (2006). In their framework, if an agent faced a binary lottery and received an outcome $x$, their ex-post utility utility from a binary lottery consists of two components. The first is simply the consumption utility of the realized outcome $u_i(x)$. The second is gain-loss utility: the agent compares what they received to each outcome that could have occurred (a potential reference point). Each comparison is weighted by the ex-ante probability of each of the possible reference points. Moreover, losses are experiences $\lambda$ times more strongly than gains. In other words, the ex-post gain-loss utility, conditional on $x$ being realized is

$$\lambda_E^{\mathbb{I}(u_i(x)<u_i(y)}[u_i(x) - \sum_{y=A,B} u_i(x)]p_i(y)$$

The agent, when evaluating from an ex-ante perspective, then evaluates this lottery take the expectation of these two components over all possible outcomes $x$. This gives the more familiar ex-ante utility function [15]

$$\sum_{x=A,B} u_i(x)p_i(x) + \sum_{x=A,B}\sum_{y=A,B} \lambda_E^{\mathbb{I}(u_i(x)<u_i(y)} \left[u_i(x) - u_i(y)\right] p_i(y)p_i(x).$$

A second well known model of expectation-based reference dependence is derived from the approaches of Bell (1985) and Loomes and Sugden (1986). Here, conditional on a given outcome $x$, ex post utility is still the sum of consumption utility from the item as well as gain-loss utility. However, here, the agent compares the utility from the outcome $x$ to their ex-ante expected utility $\sum_{y=A,B} u_i(y)p_i(y)$. Thus, total ex-ante utility, which we obtain by taking the expectation over all possible outcomes $x$, is

$$\sum_{x=A,B} u_i(x)p_i(x) + \sum_{x=A,B} \lambda_E^{\mathbb{I}(u_i(x)<\sum_{x=A,B} u_i(x)p_i(x))} \left[u_i(x) - \sum_{y=A,B} u_i(y)p_i(y)\right] p_i(x).$$

As is well-known (see Gill and Prowse (2012) and Masatlioglu and Raymond (2016)), with binary outcomes and the assumption the gain-loss utility is piecewise linear, this formulation ends up being equivalent to the the model of Kőszegi and Rabin (2006).

Thus for both these classes of models, the utility conditional on state $S_0$ being realized is $u_i(S_0) + \lambda_E^{\mathbb{I}(u_i(S_0)<\sum_{x=A,B} u_i(x)p_i(x))}[u_i(S_0) - \sum_{x=A,B} u_i(x)p_i(x)]$. In other words,we would expect that $u_i(S_0) -$

[15] Here, unlike in Kőszegi and Rabin (2006), the consumer makes no choice. They are simply assigned a lottery and experience utility through the realization of the lottery. Thus we do not need to worry about what solution concept (i.e. what kind of personal equilibrium) generates choice.

$v_i(E) = u_i(S_0) - [p_i u_i(A) + (1 - p_i)u_i(B)]$. Under the assumption that ex-post happiness is directly proportional to $u_i(S_0) - v_i(E)$, then it is clear that ex-post happiness will be linear in ex-ante probabilities.[16]

The third most popular framework of expectation-based reference dependence is that of of Gul (1991). In this framework, each lottery $rho$ is assigned a certainty equivalent $\mu_i(\rho)$. Given a Bernoulli utility function $u_i$, $\mu_i$ solves the equation

$$u_i(\mu(\rho)) = \sum_{x=A,B} u_i(x)p_i(x) + \theta \sum_{x \leq \mu(p)} \left[u_i(x) - \mu(\rho)\right] p_i(x).$$

Here the first term captures the expected consumption utility of the lottery — i.e. the expected utility over outcomes in the lottery. The second term captures gain-loss utility, where outcomes which are disappointing, i.e., those which are worse than the certainty equivalent of $\rho$, generate feelings of losses. Although here outcomes which are better than the certainty equivalent do not generate feelings of elation, this detail is not important for our predictions.

The key observation from this model is that $\mu_i(\rho)$ is defined endogenously - it appears both on the left-and and right-hand side of the equation for the ex-ante utility of the lottery.

As before, utility conditional on $S_0$ is the consumption utility of $S_0$ plus the gain-loss utility that occurs when $S_0$ is realized. But now the reference point is the endogenously derived $\mu(\rho)$. Formally, this is $u_i(S_0) + \theta(u_i(S_0) - \mu(\rho))$ for the worse state of the world (conditional on the individual's preferences), and $u_i(S_0)$ for the better state of the world.[17] Importantly, it is well-known that from an ex-ante perspective, with only two outcomes, disappointment aversion corresponds to a particular case of rank-dependent utility (e.g., Quiggin 1982). Although we will not discuss rank-dependent utility in detail, this correspondence implies that $\mu(\rho)$ be found as the solution to the equation

$$u_i(\mu(\rho)) = w(p_i)u_i(A) + \left[1 - w(p_i)\right] u_i(B),$$

where $w$ is a strictly increasing convex function from [0,1] to [0,1] with $w(0) = 0$ and $w(1) = 1$. Substitut-

[16] It is important to observe that *only* ex-post utility and happiness are linear in the ex-ante probabilities of outcomes in these models. When we compute ex-ante utility, we take an expectation over all possible outcomes, i.e. all possible ex-post utilities. This involves multiplying ex-post utilities (which are linear functions of ex-ante probabilities) by ex-ante probabilities. This means that ex-ante utility is a quadratic function of probabilities, as is known in the literature — see Masatlioglu and Raymond (2016). This points out a clear distinction in the predictions generated by happiness data, which uses ex-post utility, relative to choices, which use ex-ante utility. The prediction that ex-post utility is linear in probabilities is true regardless of the gain-loss function in Kőszegi and Rabin (2006). However, in the framework of Bell (1985) and Loomes and Sugden (1986) it is only linear if gain-loss utility is piece-wise linear.

[17] The agent experiences no elation on receiving a good outcome. This can be approximated in the limit in our model by increasing $\lambda_E$ and decreasing $\omega_E$.

ing into our equation for ex-post utility, this implies that

$$u_i(S_0) - v_i(E) = u_i(S_0) - \{w(p_i)u_i(A) + [1 - w(p_i)]\, u_i(B)\}\,.$$

Notice that this means that, again under the assumption that ex-post happiness is proportional to $u_i(S_0) - v_i(E)$, ex-post happiness generally nonlinear in probabilities, and is linear only when $w$ is linear.

Thus, we have a clear distinguishing feature between difference two classes of expectations-based reference-dependent of models. Hypothesis 5 is true if the reference point is formed via a Kőszegi and Rabin (2006) or Bell (1985) and Loomes and Sugden (1986), while false if the reference point is formed via a Gul (1991) procedure.

**Hypothesis 5** *$\Delta_{i,0}$ is linear in $p_i$.*

In the previous regressions, we assumed that changes in happiness were linear in surprise—in other words, the ex-post change in happiness is linear in the initial beliefs about the outcomes. To test Hypothesis 5, we relax this assumption and allow for the initial beliefs that form expectations (and thus define surprise) to either be linear or nonlinear, and model this via a probability weighting function as in rank-dependent utility. We do so because, with two outcomes, it is well known that almost all other models of non-expected utility, including Gul's model, are subsets of the rank-dependent model. Recall that in rank dependent utility, subjects distort the cumulative distribution function of a lottery using a weighting function $w$. Thus given a lottery $\rho$, with associated CDF $F$, a subject acts as if the lottery has associated CDF $w(F)$, where $w(0) = 0$, $w(1) = 1$ and $w$ is strictly increasing.

In particular, we will estimate a parametric nonlinear weighting function which nests the linear case. Suppose we have a supporter of $A$ (i.e., an $\alpha$ type) with a true belief that $A$ will win $p$. Given a weighting function $w$, the individual's subjective probability of state $A$ is $w(p)$. If we have a $\beta$ type, then $B$ is preferred to $A$, and the subjective probability of $A$ is $1 - w(1 - p)$. When $w$ is linear, these subjective probabilities reduce to the objective probability of $A$, $p$. In specifying $w$ we use a flexible and popular weighting function, which allows for a variety of patterns (including the "inverse" S-shape typically assumed in the probability weighting literature; see Kahneman and Tversky (1979) for an initial discussion). Originally developed by Tversky and Kahneman (1992), the specification

$$w^{KT92}(p|\gamma) \equiv \frac{p^\gamma}{[p^\gamma + (1-p)^\gamma]^{\frac{1}{\gamma}}}$$

has been used extensively since (by, e.g., Wu and Gonzalez 1996, Prelec 1998, Etchart-Vincent 2004).[18]

[18]Unfortunately, models with more than one parameter have trouble converging in our data. This includes the two-parameter

Substituting this weighting function into our empirical specification gives

$$\begin{aligned} ChangeinHappiness =& \gamma_1 Partisanship * SupportingtheLoser * w^{KT92}(Surprise|\gamma_3) \\ &+ \gamma_2 Partisanship * SupportingtheWinner * w^{KT92}(Surprise|\gamma_4) \\ &+ \gamma_5 Partisanship * ChangeinStatus\ Quo \\ &+ \gamma_6 Partisanship * ChangeinStatus\ Quo * SupportingtheWinner. \end{aligned} \quad (3)$$

As in our preferred reduced-form specification in Section 3.2, we do not include the non-significant (uninteracted) partisan terms here.

Some researchers have discussed the fact that the weighting function may look different for gains versus losses. We can explicitly test for this—we run a specification where we allow for the winners (for whom $p$ is the probability of a good outcome) and the losers (for whom $p$ is the probability of a bad outcome) to have different curvature parameters as well as different coefficients (i.e., Columns (4) to (6) of Table 3). We also conduct an analysis where we impose that the weighting function must be the same across these two groups (i.e., Columns (1) - (3) of Table 3 suppose that $\gamma_3 = \gamma_4$). $\gamma = 1$ corresponds to a linear weighting function (i.e., no probability weighting), and Column (7) tests the weighting function against this null.

Table 3 reports that the coefficient on $\gamma$ is different from 1 in both the combined estimation and for losers in the split estimation. This suggests:

**Result 5** *Our evidence favors nonlinear probability weighting.*

In order to better visualize the weighting functions, Figure 3 graphs the estimated weighting functions. The blue line shows the scenario where $w$ is linear. The green line shows the estimated weighting function.

The estimated function is S-shaped in the combined estimation and in the estimation for losers. For winners, the weighting function is estimated to be inverse S-shaped, although not significantly different from linear. We see that for losers, the estimates of the curvature parameter are remarkably similar to that obtained when there is a single weighting function for gains and losses. Figures 3a and 3b confirm this graphically.

Whenever the estimated weighting function (green line) is below the linear (blue) line, the individual is underweighting the good outcome, or in other words, being pessimistic. Our data therefore exhibits mostly

specification suggested by Goldstein and Einhorn (1987) and Lattimore et al. (1992) which has also been used widely, for example by Bruhin et al. (2010)

$$w(p) \equiv \frac{\delta p^\gamma}{\delta p^\gamma + (1-p)^\gamma}.$$

This parametrization introduces an additional asymmetry between gains and losses.

Table 3: Structural Analysis with Probability Weighting ($t = 0$)

| | (1) Supporting the Loser | (2) Supporting the Winner | (3) Loss Aversion | (4) Supporting the Loser | (5) Supporting the Winner | (6) Loss Aversion | (7) $H_0 : \gamma = 1$ |
|---|---|---|---|---|---|---|---|
| Partisanship * | -22.230 | 0.974 | 22.823 | -22.224 | 1.452 | 15.306 | |
| $w^{KT92}(Surprise\|\gamma)$ | [0.000] | [0.757] | [0.757] | [0.000] | [0.817] | [0.817] | |
| Partisanship * Change | -11.991 | 16.437 | 0.730 | -11.985 | 16.109 | 0.744 | |
| in *Status Quo* | [0.000] | [0.000] | [0.038] | [0.000] | [0.001] | [0.431] | |
| $\gamma$ : Common | 1.666 | 1.666 | | | | | |
| | [0.000] | [0.000] | | | | | [0.055] |
| $\gamma$ : Loser | | | | 1.662 | | | |
| | | | | [0.000] | | | [0.056] |
| $\gamma$ : Winner | | | | | 0.581 | | |
| | | | | | [0.810] | | [0.862] |
| Observations | 3,179 | 3,179 | 3,179 | 3,179 | 3,179 | 3,179 | |
| $R^2$ | 0.366 | 0.366 | 0.366 | 0.366 | 0.366 | 0.366 | |

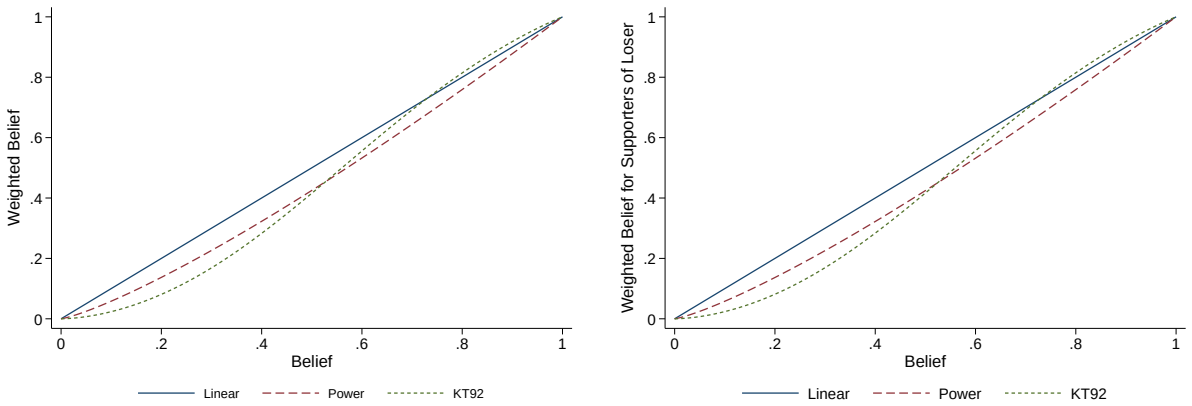
*Notes.* 1. This table presents nonlinear regressions of change in happiness on the row-name variables and its interaction with the dummy of supporting the winner. Columns (1) and (4) list the coefficients for losers. Columns (2) and (5) list coefficients for winners (e.g., partisanship in Column (2) is calculated as the aggregate of the coefficient of partisanship and its interaction with winnder dummy). Columns (3) and (6) list the loss aversion coefficient, which is the absolute ratio of the loss over gain.
2. P values in brackets. P values in columns (1), (2), (4), (5) are testing against 0, but in (3) and (6) are testing against 1. Column (7) list the p values for the t test of whether the decay rate is significantly different from 0.
3. Complete results are in Table 13 of Appendix B.2.

pessimism in the weighting function, consistent with the predictions of Gul (1991)'s model.

Thus, in contrast to the predictions of Hypothesis 5, we find evidence in favor of nonlinear weighting. This is inconsistent with the approach of expectations as linear functions of probabilities as embedded in Kőszegi and Rabin (2006), Bell (1985) and Loomes and Sugden (1986), but consistent with the approach of Gul (1991), although the estimated weighting function is not strictly convex, as Gul's model predicts. Similar conclusions can be drawn when using the sample with $t \leq 13$ (see Tables 13 and 15 of Appendix C). We also estimate a second well-known weighting function (with power weighting). Although the estimated function, drawn in red in Figure 3, is convex, it is not significantly different from linear, potentially indicating model misspecification (see Appendix B.2 for details).

# 4 Dynamics of Happiness Changes

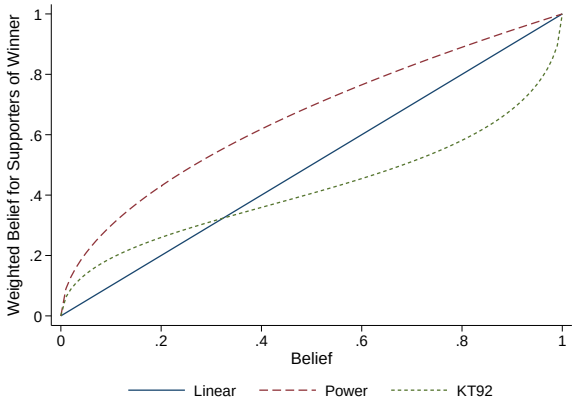
We now turn to understanding how hedonic reactions may change over time. First, we will extend our static model to allow for dynamic reactions of happiness. Then, we take this theoretical framework to our data.




(a) Common




(b) Losses




(c) Gains

Figure 3: Estimated Probability Weighting Functions

## 4.1 A Dynamic Model of Hedonic Adaptation

To model the adjustment of status quo, which might happen gradually, we suppose that at any given time period $t \geq 0$, the status-quo reference point is a weighted average of the status quo at $t = -1$ and the new state at $t = 0$, with the respective weights $\gamma_Q(t)$ and $1 - \gamma_Q(t)$. To formalize the gradual adjustment, $\gamma_Q(t)$ is assumed to be strictly decreasing in $t$ with $\gamma_Q(0) = 1$ and $\gamma_Q(\infty) = 0$. Thus, at $t = 0$, the reference point is the previous incumbent (the status quo at $t = -1$). As time goes on, the reference point gradually adjusts to the new incumbent (the state at $t = 0$). we make the same assumptions for the adjustment of expectations—the law of motion of the expectations-based reference point is an average of the utility of prior expectations and the utility of realized outcome weighted by a function $\gamma_E(t)$ that strictly decreases

from 1 to 0 as $t$ increases from 0 to $\infty$. It then follows that

$$\begin{aligned}
H_{i,t} =&\omega_M m_i + \omega_S u_i(S_0) + \omega_S \kappa u_i(S_0) \\
&+ \omega_Q \lambda_Q^{\mathbb{I}\left(u_i(S_0)<\left[\gamma_Q(t)u_i(S_{-1})+(1-\gamma_Q(t))u_i(S_0)\right]\right)} \left\{u_i(S_0) - [\gamma_Q(t)u_i(S_{-1}) + (1-\gamma_Q(t))u_i(S_0)]\right\} \\
&+ \omega_E \lambda_E^{\mathbb{I}(u_i(S_0)<[\gamma_E(t)v_i(E)+(1-\gamma_E(t))u_i(S_0)])} \left\{u_i(S_0) - [\gamma_E(t)v_i(E) + (1-\gamma_E(t))u_i(S_0)]\right\} \\
=&\omega_M m_i + \omega_S u_i(S_0) + \omega_S \kappa u_i(S_0) + \omega_Q \lambda_Q^{\mathbb{I}(u_i(S_0)<u_i(S_{-1}))} \gamma_Q(t)[u_i(S_0) - u_i(S_{-1})] \\
&+ \omega_E \lambda_E^{\mathbb{I}(u_i(S_0)<v_i(E))} \gamma_E(t)[u_i(S_0) - v_i(E)].
\end{aligned}$$

In order to take this model to the data, we parametrize the two $\gamma$'s using the exponential convergence processes of $\gamma_Q(t) = e^{-\delta_Q t}$ and $\gamma_E(t) = e^{-\delta_E t}$, which imply that the adjustments' half lives are $\ln 2/\delta_Q$ and $\ln 2/\delta_E$, respectively. The change in happiness between $t = -1$ and any period $t \geq 0$ is thus

$$\begin{aligned}
\Delta_{i,t} = &\left(\omega_S + e^{-\delta_Q t}\omega_Q \lambda_Q^{\mathbb{I}(u_i(S_0)<u_i(S_{-1}))}\right)[u_i(S_0) - u_i(S_{-1})] \\
&+ \left(\omega_S \kappa + e^{-\delta_E t}\omega_E \lambda_E^{\mathbb{I}(u_i(S_0)<v_i(E))}\right)[u_i(S_0) - v_i(E)].
\end{aligned}$$

Our hypotheses derived for the static model also apply to this dynamic framework. Here we focus on new hypotheses that emerges from the dynamic dimension, starting with the gradual adjustment of reference points:

**Hypothesis 6** $0 < \delta_Q, \delta_E < \infty$.

The idea of adaptation allows us to distinguish a Benthamite mechanism from a reference-dependent mechanism for the production of happiness. Under the Benthamite hypothesis, where $\omega_S$ is non-zero, we should observe a permanent effect on happiness when the state changes. In contrast, if we observe that there are negligible long-run effects of the change in state, we would conclude that the dynamics of happiness seem to be driven by comparing the new state to the previous state, a kind of reference dependence. This latter approach is captured in Hypothesis 7, whose satisfaction, given our maintained hypotheses, would be seen as failing to find a Benthamite mechanism, leaving possible only reference-dependent mechanisms.

**Hypothesis 7** $\frac{\partial \Delta_{i,t}}{\partial[u_i(S_0)-u_i(S_{-1})]} \to 0$ *as* $t \to \infty$.

A priori, the two kinds of reference points not necessarily adjust at the same rate, implying a testable hypothesis:

**Hypothesis 8** $\delta_Q = \delta_E$.

Although not formally implied by the model, one can easily imagine several ways in which $\delta_Q$ and $\delta_E$ could vary with the changes in status quo and expectations. First, the adjustment speed of the reference points could depend on whether positive or negative hedonic reactions are experienced. The second, referred to as the duration hypothesis in Frederick and Loewenstein (1999), says that the adjustment speed is related to the size of the "hedonic shock." We gather these in Hypothesis 9.

**Hypothesis 9**

1. $\delta \in \{\delta_Q, \delta_E\}$ *is a function of whether individuals supported the winner or the loser.*

2. $\delta \in \{\delta_Q, \delta_E\}$ *is a function of the size of the reference-dependent shock*

$$|\omega_Q \lambda_Q^{\mathbb{I}(u_i(S_0)<u_i(S_{-1}))}[u_i(S_0) - u_i(S_{-1})] + \omega_E \lambda_E^{\mathbb{I}(u_i(S_0)<v_i(E))}[u_i(S_0) - v_i(E)]|.$$

## 4.2 Reduced-Form Evidence of Hedonic Adaptation

Before testing our structural model, we first turn to a reduced-form analysis to verify that adaptation indeed occurs (as suggested by Section 2.2) by including in our analyses a new variable measuring the amount of time after election, denoted by *DaysAfterElection*, as well as its interaction terms with the variables implied by our model, i.e., the variables we used in Columns (1) to (3) of Table 2. Table 4 reports the regression results using data from the first two weeks after the elections in the first three columns and using the entire sample in the latter three columns.

Initial happiness reactions are the same as what we found previously: (i) losers experience an immediate decrease in happiness, while winners experience an immediate increase; and (ii) individuals are hedonically loss-averse with respect to surprise as a reference point and loss neutral with respect to the status quo. We also find that individuals exhibit hedonic adaptation both for the hedonic reaction driven by changes from the status quo, as well as the the reaction driven by changes relative to expectations. In the losers' column (1) we observe that partisanship interacted with status quo (or with surprise) and days after the election is positive and significant, indicating that over time losers become less unhappy. The coefficient on days after the election is negative, though marginally significant, and much smaller in size compared to the other coefficients. Similarly, the winners' column (2) shows that the interaction term of partisanship, surprise (or status quo), and days after the election is negative, indicating that after an initial positive shock, winners see their happiness falling over time. Columns (4) and (5) tell a qualitatively similar story.

Thus, we observe that overall, individuals who experience immediate decreases (increases) in happiness will experience increases (decreases) in the days afterwards, and that the size of these increases (decreases)

Table 4: Hedonic Adaptation

| | $t \leq 13$ | | | Full Sample | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Supporting the loser | Supporting the Winner | Loss Aversion | Supporting the loser | Supporting the Winner | Loss Aversion |
| Partisanship * Change in *Status Quo* | -15.600 | 16.355 | 0.954 | -15.377 | 15.314 | 1.004 |
| | [0.000] | [0.000] | [0.968] | [0.000] | [0.000] | [0.968] |
| Partisanship * Surprise | -12.584 | 0.889 | 14.155 | -10.773 | 0.512 | 21.041 |
| | [0.000] | [0.805] | [0.004] | [0.000] | [0.805] | [0.004] |
| Partisanship * Change in *Status Quo* * Days After Election | 0.954 | -1.033 | | 0.718 | -0.687 | |
| | [0.000] | [0.435] | | [0.000] | [0.405] | |
| Partisanship * Surprise * Days After Election | 1.966 | -0.428 | | 1.144 | -0.167 | |
| | [0.000] | [0.000] | | [0.000] | [0.000] | |
| Days After Election | -0.264 | 0.166 | | -0.257 | 0.052 | |
| | [0.074] | [0.550] | | [0.007] | [0.550] | |
| Observations | 10158 | 10158 | 10158 | 10754 | 10754 | 10754 |
| $R^2$ | 0.286 | 0.286 | 0.286 | 0.272 | 0.272 | 0.272 |

*Notes.* 1. This table presents OLS regressions of change in happiness on the variables and its interaction with the dummy of supporting the winner and days after election. Columns (1) and (4) list the coefficients. Columns (2) and (5) list the aggregate of the coefficients of the variable and its interaction term with the dummy of supporting the winner. Columns (3) and (6) list the loss aversion coefficient, which is the absolute ratio of the loss over gain.
2. P values in brackets. P values are for testing against 0 in Columns (1), (2), (4), (5), and for testing against 1 in (3), (6).
3. Complete results are in Table 16 of Appendix C.

is positively correlated with the size of the drop (rise)—it is faster if the status quo has changed, if surprise is larger, and if partisanship is stronger.

## 4.3 Structural Evidence of Hedonic Adaptation

Although the reduced-form evidence is strongly suggestive of hedonic adaptation, in order to better estimate rates of reference-point adjustment we turn to estimating a structural model derived from our theory in Section 4.1. Adapting the theoretical model, we allow for the change in happiness to have both a permanent component and a temporary component. The permanent component exhibits no adjustment and so does not change over time (due to, e.g., Benthamite-type mechanisms), while the temporary component eventually decays to 0 at an exponential rate.

$$
\begin{aligned}
&ChangeinHappiness = \\
&\underbrace{\gamma_1 * Partisanship * ChangeinStatus\ Quo + \gamma_2 * Partisanship * ChangeinStatus\ Quo * SupportingtheWinner}_{\text{Permanent effect based on } \textit{Status Quo}} \\
&+ \underbrace{\gamma_3 * Partisanship * Surprise + \gamma_4 * Partisanship * Surprise * SupportingtheWinner}_{\text{Permanent effect based on expectations}} \\
&+ \underbrace{(\gamma_5 * Partisanship * ChangeinStatus\ Quo + \gamma_6 * Partisanship * ChangeinStatus\ Quo * SupportingtheWinner)}_{\text{Temporary effect based on } \textit{Status Quo}} e^{\gamma_7 * DaysAfterElection} \\
&+ \underbrace{(\gamma_8 * Partisanship * Surprise + \gamma_9 * Partisanship * Surprise * SupportingtheWinner)}_{\text{Temporary effect based on expectations}} e^{\gamma_{10} * DaysAfterElection}. \qquad (4)
\end{aligned}
$$

To simplify exposition, we denote the permanent effect based on status quo as $PQ$, the permanent effect based on expectations as $PE$, the temporary effect based on status quo as $TQ$, and the temporary effect based on expectations as $TE$. Then our above specification becomes

$$ChangeinHappiness = PQ + PE + TQe^{\gamma_{11} * DaysAfterElection} + TEe^{\gamma_{12} * DaysAfterElection}. \quad (5)$$

Columns (1) to (3) in Table 5 report the regression results from this specification. Consistent with our previous findings, we find that individuals are hedonically loss-averse to temporary shocks to their expectations. We find that individuals are not hedonically loss-averse to any other shock, permanent or temporary.

Table 5: Structural Analysis: Exponential Decay with Full Sample

| | Persistent and Temporary | | | Temporary Only | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Loser | Winner | Loss Aversion | Loser | Winner | Loss Aversion |
| **Permanent Effects:** | | | | | | |
| Partisanship * Change in *Status Quo* | -2.28 | -11.613 | 0.196 | | | |
| | [0.672] | [0.300] | [0.529] | | | |
| Partisanship * Surprise | 1.497 | 3.056 | 0.490 | | | |
| | [0.169] | [0.056] | [0.429] | | | |
| **Temporary Effects:** | | | | | | |
| Partisanship * Change in *Status Quo* | -10.347 | 26.861 | 0.385 | -12.798 | 15.648 | 0.818 |
| | [0.069] | [0.016] | [0.090] | [0.000] | [0.000] | [0.166] |
| Partisanship * Surprise | -22.371 | 4.341 | 5.153 | -20.629 | 7.353 | 2.806 |
| | [0.000] | [0.030] | [0.000] | [0.000] | [0.004] | [0.023] |
| **Exponential Decay Rate:** | | | | | | |
| Change in *Status Quo* | -0.029 | -0.029 | | -0.044 | -0.044 | |
| | [0.064] | [0.064] | | [0.000] | [0.000] | |
| Surprise | -0.859 | -0.859 | | -0.930 | -0.930 | |
| | [0.000] | [0.000] | | [0.000] | [0.000] | |
| Observations | 12661 | 12661 | 12661 | 12661 | 12661 | 12661 |
| $R^2$ | 0.250 | 0.250 | 0.250 | 0.249 | 0.249 | 0.249 |

*Notes.* 1. This table presents nonlinear regressions of change in happiness on the exponential decay model both with permanent and temporary effects. Columns (1) and (4) list the coefficients for supporters of the loser. Columns (2) and (5) list coefficients for supporters of the winner (e.g., partisanship in Column (2) is calculated as the aggregate of the coefficient of partisanship * change in *Status quo* and its interaction with the dummy of supporting the winner). Columns (3) and (6) list the hedonic loss aversion coefficient, which is the absolute ratio of the loss over gain.

2. Columns (1) to (3) report the results when we assume the same decay rates gains and losses for change in *status quo* and surprise. Columns (4) to (6) report the results when we assume different decay rates for change in *status quo* and surprise.

3. P values in brackets. P values in columns (1), (2), (4), (5) are testing against 0, but in (3) and (6) are testing against 1.

4. Complete results in Table 17 of Appendix C.

The adjustment rates of the reference points are estimated to be significantly less than 0 but greater than negative infinity for both specifications. This suggests that hedonic adaptation to changes in status quo and expectations is non-instantaneous, consistent with Hypothesis 6 (and Hypothesis 7).

**Result 6** *Individuals exhibit non-instantaneous adaptation in their status quo and expectations reference points.*

Consistent with our reduced-form results, but inconsistent with Hypothesis 8, we find that the adjustment rate is more negative for our surprise term than for change in status quo, indicating much faster hedonic adaptation to deviations from expectations than to changes from the status quo.

**Result 7** *Hedonic adaptation occurs much faster for expectations compared to status quo.*

A key question is whether, consistent with Hypothesis 7, individuals eventually fully adapt—the effects of the previous state and of expectations actually go to 0. To assess this, we can look at whether there are any large permanent effects on happiness.

Our results provide little evidence for this. Only one of the coefficients for permanent effects is significant (i.e., the one for partisanship interacted with surprise for those who support the winner), which, however, is small. Overall, our evidence is more consistent with full adaptation and Hypothesis 7 (and reference dependence as a major force driving happiness).

**Result 8** *We find no evidence that there are large permanent effects on happiness. In other words, we see almost complete hedonic adaptation.*

Because there seems to be little permanent effects in our data, we consider a specification that leaves them out. Columns (4) through (6) of Table 5 report the results, which are qualitatively similar to what we find above: no evidence of hedonic loss aversion for changes relative to the status quo, while a significant degree of hedonic loss aversion with respect to expectations, and very different decay rates.

To provide further intuition for our results, we plot in Figure 4 our estimated happiness reaction function—the change in happiness as a function of time using our estimates from Columns (4) and (5) of Table 5. We plot the total change in happiness, the change in happiness due to status quo changes, and the change in happiness due to changes relative to expectations, separately for winners and losers. To highlight the differences across groups in the plot, we focus on individuals who are the most partisan and maximally surprised.

We can clearly see that a large portion of the immediate reaction is driven by surprise, particularly for losses. The longer-term effect is driven by changes relative to the status quo because the hedonic adaptation

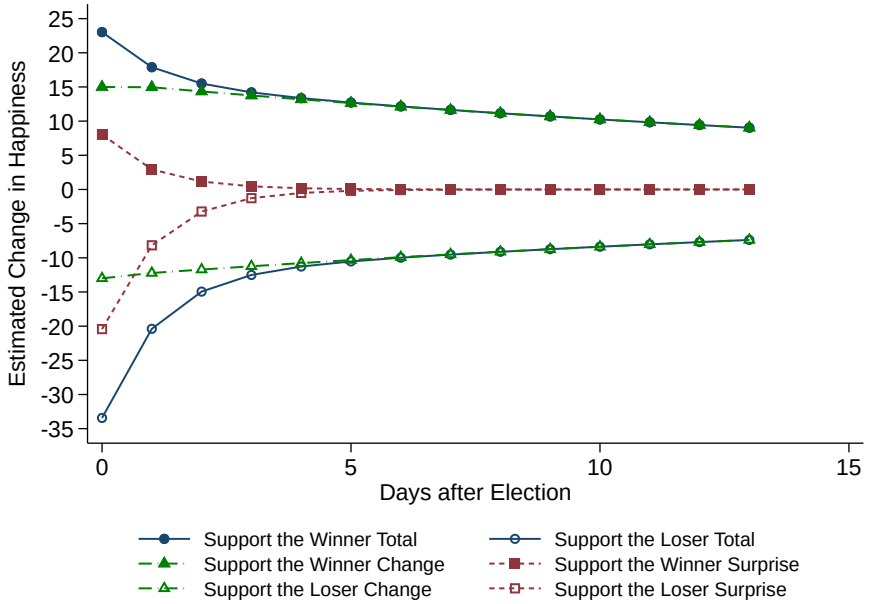



Figure 4: Happiness Reaction Function with Exponential Decay of Temporary Effects

to disruptions of the status quo are relatively slow. To measure election's cumulative effect on happiness, we compute the area between the reaction function and the horizontal axis plotted in Figure 4 for a maximally partisan and maximally surprised individual. The total happiness gained by winners is 363.55, while the total happiness loss by losers is 313.04. 97.8% and 92.9% of the total happiness changes arise from changes in status quo for the winners and the losers, respectively. Even though the immediate reaction exhibits hedonic loss aversion, the cumulative happiness reaction exhibits hedonic loss *loving* because changes in status quo has a larger cumulative effect on the winners' happiness than it does for the losers' happiness.

To test the first part of Hypothesis 9, we allow the adjustment rate to depend on whether the individual is a winner or a loser:

$$ChangeinHappiness = (TQ + TE)e^{(\gamma_{11}+\gamma_{12}*SupportingtheWinner)*DaysAfterElection}. \quad (6)$$

Columns (1) to (3) of Table 6 report the results from this specification: winners have a significantly slower adaptation speed with an exponential decay rate of -0.063, compared to the exponential decay rate of -0.274 for the losers.

To test the duration hypothesis, the second part of Hypothesis 9, we look at whether the decay rate depends on the size of the shock. That is, which decay more quickly, larger or smaller shocks. We do this

by allowing the decay rate to depend on the size of the temporary shocks.

$$ChangeinHappiness = (TQ + TE)e^{(\gamma_{11}+\gamma_{12}*|TQ+TE|)*DaysAfterElection}. \quad (7)$$

The estimates in columns (4) and (5) of Table 6 show that the coefficient for the size of the shock is significantly negative: the larger the size of the shock, the slower the adaptation speed. In summary, we thus find confirmation for both parts of Hypothesis 9:

**Result 9** *Hedonic adaptation to positive and large shocks tend to be slower than negative and small shocks.*

Table 6: Structural Analysis: Variant with Temporary Effects

| | Gain/Loss Dependence | | | Size Dependence | | |
|---|---|---|---|---|---|---|
| | (1) Supporting the Loser | (2) Supporting the Winner | (3) Loss Aversion | (4) Supporting the Loser | (5) Supporting the Winner | (6) Loss Aversion |
| **Temporary Effects** | | | | | | |
| Partisanship * Change in *Status Quo* | -15.659 | 15.720 | 0.996 | -16.699 | 16.629 | 1.004 |
| | [0.000] | [0.000] | [0.970] | [0.000] | [0.000] | [0.964] |
| Partisanship * Surprise | -15.116 | 5.108 | 2.959 | -10.977 | 6.457 | 1.7 |
| | [0.000] | [0.005] | [0.000] | [0.000] | [0.001] | [0.062] |
| **Exponential Decay Rates** | | | | | | |
| Days After Election | -0.274 | -0.063 | | -0.04 | -0.04 | |
| | [0.000] | [0.000] | | [0.080] | [0.080] | |
| Size of the Shock | | | | -0.006 | -0.006 | |
| | | | | [0.000] | [0.000] | |
| Observations | 12661 | 12661 | 12661 | 12661 | 12661 | 12661 |
| $R^2$ | 0.244 | 0.244 | 0.244 | 0.24 | 0.24 | 0.24 |

*Notes.* 1. This table presents nonlinear regressions of change in happiness on the models where we allow the decay rates to be dependent on the dummy of supporting the winner (Columns (1) to (3)) and the size of the temporary shock (Columns (4) to (6)). Columns (1) and (4) list the coefficients for supporters of the loser. Columns (2) and (5) list coefficients for supporters of the winner (e.g., partisanship*change in *status quo* in Column (2) is calculated as the aggregate of the coefficient of partisanship * change in *status quo* and its interaction with the dummy of supporting the winner). Columns (3) and (6) list the hedonic loss aversion coefficient, which is the absolute ratio of the loss over gain.
2. Columns (1) to (3) report the results when we assume the same decay rates for change in *status quo* and surprise. Columns (4) to (6) report the results when we assume different decay rates for change in *status quo* and surprise.
3. P values in brackets. P values in Columns (1), (2), (4), (5) are testing against 0, but in (3) and (6) are testing against 1.
4. Complete results in Appendix C Table 18.

# 5 Motivated Beliefs

People may distort their beliefs in self-serving ways; that is, people could hold motivated beliefs (see Bénabou 2015 for a survey), which have been documented in the realm of political discourse (see, e.g., Kahan 2015, Thaler 2020). If the election beliefs we measure is distorted in a way not deeply held (Bullock et al. 2013), ex-post happiness may not depend on them very much, implying that we could be underestimating the effect of expectation deviations.

We address this concern in two steps. First, we gauge how prevalent motivated beliefs are in our setting, by showing the extent to which beliefs vary in systematic ways with political preferences. We start with a simple model of optimal belief formation in the vein of Bracha and Brown (2012), which is similar to models in Bénabou and Tirole (2011). As before, let $p_i$ be individual $i$'s objective belief about state $A$ happening. At $t = -1$ they can distort these beliefs to $\tilde{p}_i$ in order to get an anticipatory utility about what will happen in the future, given by $u_i(A)\tilde{p}_i + u_i(B)(1 - \tilde{p}_i)$. They pay a cost of $c(p_i - \tilde{p}_i)$ if the motivated belief is different from the objective belief, where $c$ is a convex function with a minimum at $\tilde{p}_i = p_i$. Thus, in period $t = -1$, they simply choose $\tilde{p}_i$ to maximize $u_i(A)\tilde{p}_i + u_i(B)(1 - \tilde{p}_i) - c(p_i - \tilde{p}_i)$. The optimal choice of $\tilde{p}_i$ implies:

**Hypothesis 10** *$\tilde{p}_i$ is increasing in $\phi_i$ for $\alpha$ type and decreasing in $\phi_i$ for $\beta$ type.*

Figure 5 plots surprise against partisanship strength by election year. In each year, surprise decreases in the degree of partisanship towards the election winner's party. In other words, the more someone supported the eventual winner, the less they were surprised by the election outcome. A simple regression analysis confirms that these effects are statistically significant (see Table 19 in Appendix D for details). This suggests that expectations do seem to depend on partisanship strength, consistent with our Hypothesis 10.

**Result 10** *Individuals' beliefs about election outcomes are correlated with the strength of their partisan affiliation.*

Second, we explore to what extent distorted beliefs are deeply held, by measuring their effects on hedonic reactions. To do this, we decompose observed beliefs into two components, one of which is plausibly "objective" and the other "subjective", and investigate whether individuals' happiness reacts to the subjective component of beliefs as it does to the objective component.

Formally, let $\tilde{p}_i$ denote reported beliefs and $p_i$ the "unmotivated" or objective beliefs about election outcomes. We can then define the subjective component of the reported beliefs as the residual $\tilde{p}_i^{res} = \tilde{p}_i - p_i$. Our hypothesis is that both components of the election belief matters ex-post happiness, implying that the subjective beliefs are deeply held:

**Hypothesis 11** *$\Delta_{i,0}$ depends on both $p_i$ and $\tilde{p}_i^{res}$.*

If happiness reacts to both components in similar ways, the subjective beliefs are as deeply held (for hedonic reactions) as objectively determined beliefs. In contrast, if almost all of hedonic reaction is driven by objective, rather than subjective beliefs, subjectively distorted beliefs would not to be deeply held.

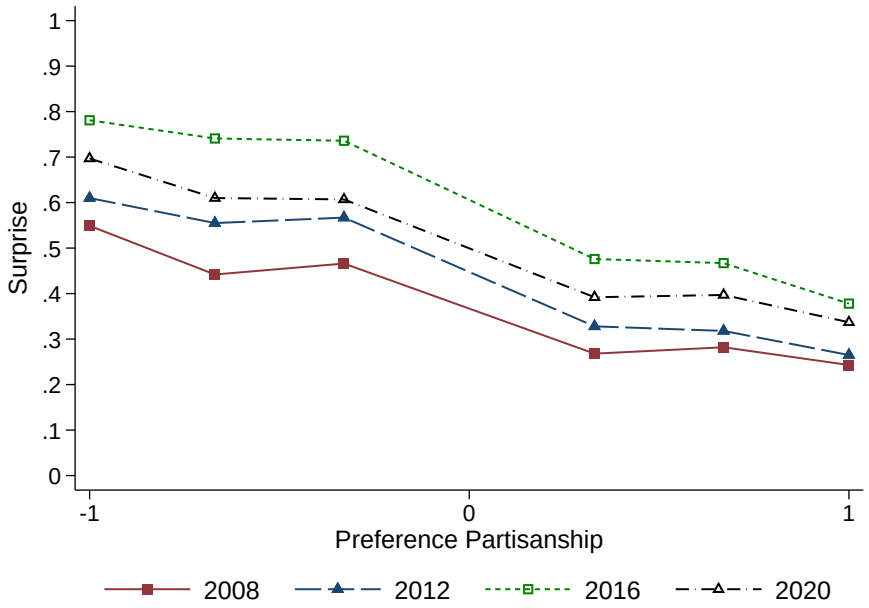



Figure 5: Preference Partisanship and Surprise by Year

To test Hypothesis 11, we measure the objective "unmotivated" beliefs in two ways, which gives us two corresponding measures of the subjective "motivated" beliefs. In the first way, we define *market surprise* as the amount of surprise the best available election forecasts would have experienced by the results. In practice, we use Fivethirtyeight.com's election predictions on the day of the election (or the day closest to the election that the predictions are available). For 2008, 2012, 2016 and 2020, the surprise someone who had the same beliefs as Fivethirtyeight.com would have been 1.12%, 9.1%, 71.4%, and 11%, respectively.[19] For each individual, in each year, we can then compute the component of surprise that is due to idiosyncratic deviations from the market surprise, which we call residual-to-market surprise. Formally,

$$\textit{residual-to-market surprise} \equiv \textit{surprise} - \textit{market surprise}.$$

Our second approach constructs objective belief using what an individual with no partisan leanings (i.e., a partisan strength of 0) would believe. That is, we regress surprise on partisanship and year dummies as well as their interactions and use the coefficient for the year dummies to measure objective beliefs, which we label as *corrected surprise*. Then for any given individual, in any given year, we can describe the

[19]The original predictions for each year are available at https://web.archive.org/web/20081106113055/http://www.fivethirtyeight.com/ for 2008; https://web.archive.org/web/20121106233226/http://fivethirtyeight.blogs.nytimes.com/ for 2012; https://projects.fivethirtyeight.com/2016-election-forecast/ for 2016, and https://projects.fivethirtyeight.com/2020-election-forecast/ for 2020.

residual-to-corrected surprise as the difference between their actual surprise and the corrected surprise for that year:

$$\textit{residual-to-corrected surprise} \equiv \textit{surprise} - \textit{corrected surprise}.$$

Corrected surprise accounts for 14.1% of the individual belief, while residual-to-corrected surprise accounts for 92.3% of the individual belief (see Table 21 in Appendix D for details).

We now redo our analyses in Columns (1)-(3) of Table 2, taking into account surprise having both an objective component (measured in one of two ways) and a subjective component. This allows us to separately test to what extent individuals are affected by surprise defined solely in terms of what an objective individual would believe, versus surprise defined by subjective beliefs.

Table 7 presents results from these regressions, showing that both ways of decomposing beliefs tell a similar story: both objective and subjective beliefs matter for changes in happiness (although as a caveat, we do not have a significant coefficient for the effect of winning for market surprise, nor the effects of winning for residual-to-corrected surprise). Moreover, in general, the effect of subjective beliefs, while still important, are less important than the effect of objective beliefs. Individuals are also hedonically loss-averse with respect to deviations from both kinds of beliefs. The complete results are in Appendix D.

**Result 11** *Change in happiness is affected by both objective beliefs and subjective beliefs.*

Further support for this result comes from estimating our baseline structural model with surprise into two constituent components. Guided by our earlier findings, we include only temporary effects and use separate decay rates for status-quo changes and surprises. We denote the temporary effect based on objective expectations *TOE*, and the temporary effect based on residual expectations *TRE*. Recalling that *TQ* refers to the temporary effect of changing the status quo, we then run the following regression:

$$ChangeinHappiness = TQe^{\gamma_{13}DaysAfterElection} + (TOE + TRE)e^{\gamma_{14}DaysAfterElection}. \quad (8)$$

Columns (1) to (3) of Table 8 report the estimation results based on market surprise, and Columns (4) to (6) results based on corrected surprise. The temporary effects are significant both for objective and residual surprise for most of the terms (as before, we do not have significance for winners on market surprise, or for losers for residual-to-corrected surprise). Individuals are also hedonically loss-averse with respect to deviations from both kinds of beliefs. The effects of objective surprise tend to larger, except for winners using market surprise, compared to the effects of residual partisanship. As in our baseline results, the rate of reference-point adjustment is slower for status suo compared to surprise. These results are consistent with our Hypothesis 11 and lend support to the argument that subjective beliefs matter to individuals beyond purely "objective" beliefs.

Table 7: Hednoic Reactions to Objective and Subjective Surprises ($t = 0$)

| | Market Surprise | | | Corrected Surprise | | |
|---|---|---|---|---|---|---|
| | (1) Supporting the Loser | (2) Supporting the Winner | (3) Loss Aversion | (4) Supporting the Loser | (5) Supporting the Winner | (6) Loss Aversion |
| Partisanship * Objective Surprise | -28.345 | 5.438 | 5.212 | -27.625 | 13.673 | 2.02 |
| | [0.000] | [0.174] | [0.000] | [0.000] | [0.001] | [0.052] |
| Partisanship * Change in *Status Quo* | -10.932 | 16.226 | 0.674 | -10.266 | 12.394 | 0.828 |
| | [0.000] | [0.007] | [0.063] | [0.000] | [0.000] | [0.418] |
| Partisanship * Residual Surprise | -16.818 | 8.066 | 2.085 | -10.834 | 0.311 | 34.836 |
| | [0.000] | [0.000] | [0.040] | [0.025] | [0.927] | [0.073] |
| Observations | 2,672 | 2,672 | 2,672 | 2,672 | 2,672 | 2,672 |
| $R^2$ | 0.412 | 0.412 | 0.412 | 0.413 | 0.413 | 0.413 |

*Notes.* 1. This table presents OLS regressions of change in happiness on change in *status quo* and objective surprise and residual surprise. Columns (1) and (4) list the coefficients for supporters of the loser. Columns (2) and (5) list coefficients for supporters of the winner (e.g., partisanship*objective surprise in Column (2) is calculated as the aggregate of the coefficient of partisanship * objective surprise and its interaction with the dummy of supporting the winner). Columns (3) and (6) list the hedonic loss aversion coefficient, which is the absolute ratio of the loss over gain.
2. Columns (1) to (3) report the results where we use market surprise as the objective surprise and market corrected surprise as residual surprise. Columns (4) to (6) report the results where we use corrected surprise as objective surprise and average surprise by partisanship as residual surprise.
3. P values in brackets. P values in columns (1), (2), (4), (5) are testing against 0, and in (3), (6) are testing against 1.
4. Complete results are in Table 22 of Appendix D.

# 6 Discussion and Related Literature

## 6.1 Robustness

In this subsection, we report two sets of analyses for evaluating the robustness of our results. We check robustness of our results to alternative measures of happiness and partisanship in our survey and to nonlinear scaling of our partisanship strength.

We asked respondents four questions on their feelings, which were used extensively in the Health and Retirement Study, and combine the responses to obtain a score that ranges from 0 to 100.[20] We find that the direction and significance of the results are qualitatively similar to the results from our main specification (see Table 34 of Appendix F.1).

We consider two alternative definitions of partisanship and again show that our primary results are robust. We elicited a feeling thermometer for both the presidential and vice-presidential candidates (on a scale of 0-100) in each election. Our first alternative definition of partisanship takes the difference between the

[20]The four questions are as follows.i) Much of the time during the past week, you felt you were happy. Would you say yes of no? ii) Much of the time during the past week, you felt sad. Would you say yes or no? iii) Much of the time during the past week, you enjoyed life. Would you say yes or no? iv) Much of the time during the past week, you felt depresses. Would you say yes or no?

Table 8: Structural Analysis with Only Temporary Effects and Decomposed Surprises

| | Market Surprise | | | Corrected Surprise | | |
|---|---|---|---|---|---|---|
| | (1) Supporting the Loser | (2) Supporting the Winner | (3) Loss Aversion | (4) Supporting the Loser | (5) Supporting the Winner | (6) Loss Aversion |
| **Temporary Effects** | | | | | | |
| Partisanship * Change in *Status Quo* | -11.204 | 16.137 | 0.694 | -10.796 | 13.693 | 0.788 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.003] |
| Partisanship * Objective Surprise | -29.667 | 1.519 | 19.531 | -28.049 | 9.88 | 2.839 |
| | [0.000] | [0.510] | [0.000] | [0.000] | [0.000] | [0.000] |
| Partisanship * Residual Surprise | -13.859 | 11.857 | 1.169 | -8.635 | -0.909 | 9.499 |
| | [0.000] | [0.000] | [0.477] | [0.029] | [0.772] | [0.125] |
| **Exponential Decay Rates** | | | | | | |
| Change in *Status Quo* | -0.044 | -0.044 | | -0.026 | -0.026 | |
| | [0.000] | [0.000] | | [0.003] | [0.003] | |
| Objective and Residual Surprises | -0.753 | -0.753 | | -0.742 | -0.742 | |
| | [0.000] | [0.000] | | [0.000] | [0.000] | |
| Observations | 12661 | 12661 | 12661 | 12661 | 12661 | 12661 |
| $R^2$ | 0.254 | 0.254 | 0.254 | 0.251 | 0.251 | 0.251 |

*Notes.* 1. This table presents nonlinear regressions of change in happiness on change in *status quo* and objective surprise and residual surprise. Columns (1) and (4) list the coefficients for supporters of the loser. Columns (2) and (5) list coefficients for supporters of the winner (e.g., partisanship*objective surprise in column (2) is calculated as the aggregate of the coefficient of partisanship * objective surprise and its interaction with the dummy of supporting the winner). Columns (3) and (6) list the hedonic loss aversion coefficient, which is the absolute ratio of the loss over gain.
2. Columns (1) to (3) report the results where we use market surprise as the objective surprise and market corrected surprise as residual surprise. Columns (4) to (6) report the results where we use corrected surprise as objective surprise and average surprise by partisanship as residual surprise.
3. P values in brackets. P values in columns (1), (2), (4), (5) are testing against 0, but in (3) and (6) are testing against 1.
4. Complete results in Table 23 of Appendix D.

warmth toward the two presidential candidates (the warmth toward the winner minus the warmth toward the loser). Our second alternative definition of partisanship instead takes difference between the warmth toward the two presidential candidates plus the difference in warmth between the two vice-presidential candidates (again, winners minus losers). Results from our baseline regression based on these two alternative measures of partisanship are similar to what we find in our main specification, both in direction and significance (see Tables 36 and 37 of Appendix F.2). The primary difference is that some of the effect sizes become slightly smaller compared to the main specification.

In the baseline analyses, we assumed that the difference in partisan emotions (and so utility from winning an election) between lean Democrat and moderate Democrat was the same as the difference between moderate Democrat and a strong Democrat. We relax this assumption by using separate dummies for each category of partisanship and affiliation. We find that more partisan individuals experience larger changes in happiness, consistent with the outcomes of our main analysis (see Table 35 for details).

## 6.2 Heterogeneity

In the body of the paper we use panel data that combines information over time (i.e., across four US presidential elections) as well as across people, who vary in their background. Given our data, we can also study the degree of heterogeneity, both across time and across people, in terms of their hedonic reactions to election outcomes. We highlight several of the more important results below and Appendix E contains further details.

There is heterogeneity in the importance of each reference point over time. We explore this in Table 24 by running our basic static specification separately for each year. Because we only look at a single year, we can't consider the effect of the change in status quo. In 2016 and 2020 expectations mattered very little. We find that partisanship alone (which is equivalent to partisanship interacted with a change in the status quo in these two years) drives much of the hedonic reaction. In contrast, this was not true in 2008 and 2012, where expectations drove much of the reaction. As Table 26 demonstrates, much of the importance of the status quo is driven by the 2016 and 2020 elections. More generally, and consistent with intuitions, we find that individuals reacted more strongly to 2016 and 2020 elections than to previous elections, even controlling for partisanship (in several different ways — including our alternative measures of partisanship).

There is also variation in hedonic reactions across the demographic characteristics of respondents, as indicated in Table 31. Older individuals tend to have more extreme reactions in general, perhaps due to paying more attention to the election. The employed tend to be less happy when winning than the unemployed, as do the married relative to the unmarried. Both of these could potentially be driven by the fact that these individuals have "more to do" and get on with their lives more quickly after winning.

Women tend to have more sizeable reactions than men when losing (although they are not different from men when winning). Non-white individuals also tend to have more sizeable reactions when losing compared to white individuals, although when winning they seem to have a smaller reaction. In Table 32, breaking down demographic effects on changes in happiness by year, we find that these are driven primarily by female and non-white Democrats tended to having much stronger hedonic reactions in 2016 (potentially due to that the election of Trump was particularly meaningful for those groups).

## 6.3 Utility Levels, Differences, and Happiness

Our results speak to broader discussions over what happiness reflects (see Frederick and Loewenstein 1999 and Frey and Stutzer 2010 for surveys); whether, as laid out by Bentham (1781)[21] and discussed more in

[21] Bentham's original definition of utility makes this linkage explicit: "By the principle of utility is meant that principle which approves or disapproves of every action whatsoever according to the tendency it appears to have to augment or diminish the

Kahneman et al. (1999) and Layard (2005), happiness directly reflects utility (either as a stock or flow), or if happiness reflects changes in utility relative to a reference point, as in Kimball and Willis (2006) (who suppose that happiness is related to recent news innovations in utility—in other words, happiness reflects the change in utility from past expectations).[22] Our evidence is more supportive of the latter approach: both changes from status quo and changes relative to expectations matter for happiness.

There is also a literature looking specifically at hedonic reactions to elections. The broad consensus is that supporters of the losing candidates tend to experience significant reductions in happiness, but disagreement about whether supporters of the winning candidates experience any significant increase in happiness (Di Tella and MacCulloch 2005, Pierce et al. 2016, Pinto et al. 2021, Kavetsos et al. 2021)—we find evidence of both.[23] Unlike most of these other studies, we collect data on subjective beliefs and use them carefully to extend the literature by more specifically estimating the importance of different kinds of reference points, as well as potentially motivated beliefs.

### 6.4 Reference Dependence and Hedonic Loss Aversion

Our model is explicitly inspired by the large literature in economics on reference points and hedonic loss aversion, which was introduced into economics by Markowitz (1952), and popularized by Kahneman and Tversky (1979). Reference-dependence captures the idea that utility depends not only on outcomes, but also on outcomes compared to a reference point. Many of these papers (e.g., Kőszegi and Rabin 2006, Bell 1985, Loomes and Sugden 1986, Gul 1991) are motivated by the intuition that negative emotions in response to outcomes below the reference point are likely to be stronger than positive emotions from outcomes above the references point (e.g., they explicitly use as a motivation fear of losses or disappointment).[24] Kimball

happiness of the party whose interest is in question."

[22] Although early economists discussed happiness and hedonic well-being, often as a measurable function of utility, exploration of this relationship was put on hold in economics by the revealed preference revolution, which inferred utility directly from choices. The rise of behavioral economics, and our subsequent understanding of potential gaps between utility and choice, has helped spur renewed interest in understanding the relationship between utility and happiness—and between utility and emotions more generally.

[23] Those doing comparative work find that the magnitude of the hedonic responses to election outcomes can be substantial; Pierce et al. (2016) find that the 2012 U.S. general election induced stronger hedonic responses than those from the Newtown shootings to respondents with children and the Boston Marathon bombings to respondents living in Boston.

[24] For example, Grant et al. (2001) say "when a lottery (or act) results in a relatively bad outcome, agents may experience disappointment at not having got a better outcome. This disappointment can worsen the disutility that the outcome produces directly. Similarly, relatively good outcomes can yield pleasurable feelings of elation over and above the utility that the outcomes produce directly. A disappointment-averse agent is one who dislikes disappointment more than she likes elation; this reduces the certainty equivalent value of lotteries or acts." Similarly, Kahneman and Tversky (1979) say "the aggravation that one experiences in losing a sum of money appears to be greater than the pleasure associated with gaining the same amount"

and Willis (2006) links happiness and reference-dependence by explicitly supposing that the production of happiness is a function of a reference-dependent function.

Sometimes models of reference dependence posit recent outcomes or the status quo as the reference point, while others specify forward-looking expectations. Despite the fact that these specifications would have distinct implications for the time path of happiness, there has been little use of happiness data to explicitly estimate models of references dependence. Card and Dahl (2011), who find that spousal abuse increases when local sports teams unexpectedly lose, posit that the disappointment felt when sports teams fall short of expectations leads to spousal abuse. However, they do not measure hedonic responses, nor do they try to distinguish between status quo and expectational effects.

There is a small set of lab studies that try to understand what individuals use as a reference point; the results are mixed:[25] Song (2016) finds that expectations play a large role, while Baillon et al. (2020) find very little role for expectations. Hack and Lammers (2009) and Terzi et al. (2016) find a role for both. The one paper we know of using field evidence to try and identify what the reference point is determined by is Chiyachantana and Yang (2020). Using trading data, they find evidence that both expectations and the status quo matter. We go beyond their paper, and the rest of the existing literature—showing not only that both changes in expectations and status quo matter, but also that they differ in the degree of hedonic loss aversion (as well as the speed of hedonic adaptation). There are few papers on the hedonic effects of election expectations; the key previous paper there is Kinari et al. (2019), who find that expectations of election outcomes affect ex-post happiness: only surprised voters experienced hedonic changes to the outcome of Japan's 2009 general election.[26] However, they cannot look at the relative effects of status quo and expectations, and because they look at a single election, they do not have data for supporters of the same party or faction being winners and losers across different elections.

Within the class of expectation-dependent reference-dependent models there are a variety of formulations of what the expectation is. In Kőszegi and Rabin (2006) it is a distribution, while in Bell (1985) and Loomes and Sugden (1986), it is the expected utility of the lottery being faced, while in Gul (1991), it is the solution to a fixed point problem. Despite years of experimental work studying choices over lotteries, there

[25] Although there is a large literature estimating models of reference dependence from field data, they differ from us in that they use ex-ante choice, rather than happiness data, and tend to assume a reference-point specification, rather than testing multiple specifications at once.

[26] There are several other papers on election outcomes and happiness that are handicapped by not having both before and after data: Gilbert et al. (1998), Tsutsui et al. (2010), Pierce et al. (2016) and Tsutsui et al. (2015). The most interesting thing from these papers, which is visible despite all the confounds, is pointed out by Kinari et al. (2015): when happiness is measured long after the election, essentially no effect can be found, while interesting results can be seen when happiness is measured soon after the election, consistent with hedonic adaptation.

is still not a clear consensus on which of these expectation formation processes is correct, although in the lab Song (2016) finds some evidence in support of Kőszegi and Rabin (2006) versus the models of Bell (1985) and Loomes and Sugden (1986). A novel contribution of ours to this literature is that we show, through the lens of ex-post happiness reactions, that one can derive a clean test that allows one to distinguish between models in which disappointment and elation are linear in the ex-ante probabilities (including Kőszegi and Rabin 2006, Bell 1985, Loomes and Sugden 1986) and models, like Gul (1991), in which they are nonlinear.

### 6.5 Hedonic Adaptation

Consistent with our finding, evidence in the literature typically suggests fast adaptation of happiness to electoral outcomes, usually within one to two weeks (Pierce et al. 2016, Sharkey and Shen 2021). The literature also indicates that people adapt quicker to positive hedonic changes than to negative hedonic changes (Pinto et al. 2021), which has been observed in other settings, e.g., security trading (Arkes et al. 2008, Baucells et al. 2011). Our findings are consistent with other studies that also find that happiness slowly reverts back to a baseline level after a shock, including incarceration (Zamble and Porporino 1990, Zamble 1992), loss of limbs (Wortman and Silver 1987), burns (Patterson et al. 1993), and spousal deaths (Kaprio et al. 1987, Kimball et al. 2015), national disasters (Kimball et al. 2006), and winning the lottery (Brickman et al. 1978).

Very few papers have explicitly considered the speed of adjustment of reference points and they have come to differing conclusions. In lab settings, where expectations were used as a reference point, Song (2016), Buffat and Senn (2015), and Gill and Prowse (2012) find that adaptation of reference points happens quickly (although Song (2016) notes there is slower adjustment with larger stakes and losses), as does Post et al. (2008) in a field setting. In contrast, in papers where the status quo was assumed to be the reference point, as in the lab setting of Thaler and Johnson (1990), or the field settings of DellaVigna et al. (2017), the speed of adjustment is relatively slow. Our results reconcile these seemingly inconsistent findings: the speed of adjustment for the status quo is slower than for expectations.

### 6.6 Motivated Political Beliefs

Our paper also touches on the extensive literature regarding motivated beliefs in political settings. It is widely documented that political affiliation shifts beliefs (Granberg and Brent 1983, Gerber et al. 2010, Krizan et al. 2010, see, e.g.,). However, recent work (e.g., Bullock et al. 2013) poses a challenge to these studies, finding that providing monetary incentives for beliefs reduces the extent of the partisan gap in beliefs. This of course, raises the question: To what extent does the partisan gap in reported beliefs reflects

true beliefs rather than cheap signaling. Our paper contributes to this literature by comparing how objective versus subjective (and motivated) beliefs affect happiness—showing that they both matter for ex-post hedonic reactions, although the former matter more. This suggests that the subjective portion of beliefs is important, albeit to a smaller degree than the objective portion.

# 7 Conclusions

Our panel data, combining information on political preferences, beliefs, demographics, and measures of happiness over the last four presidential elections, can serve as a fruitful testing ground for questions of what drives hedonic responses to outcomes. We confirm three already established facts: individuals seem to exhibit loss aversion in happiness reactions and partisan bias in beliefs, and they hedonically adapt. Our additional results are able to significantly enrich our knowledge of how happiness is affected by political outcomes, reference dependence, and motivated beliefs. First, we show that individuals' happiness is affected by who has won relative both to the status quo and to expectations about the electoral outcome. Moreover, individuals exhibit no hedonic asymmetry for changes relative to the status quo, but significant hedonic asymmetry for changes relative to expectations. There is also a difference in the speed at which people adapt to the two types of changes: reference dependence tied to the status quo or incumbency adjusts much more slowly than reference dependence tied to expectations, but both seem to adjust fully over time. Thus, although the immediate impact of outcomes on happiness is driven mostly by comparisons to expectations, the longer-lived reaction—and so the total time-integrated change in happiness—is primarily driven by changes relative to the status quo.

These results lend support to theories positing that happiness is driven primarily by comparisons of the current situation to a reference point. We find relatively little evidence, like others before us, for happiness depending on the realized state of the world (controlling for setpoint happiness), rather than the state of the world relative to reference point. But our results point to a much more nuanced picture regarding the heterogeneity of reference points, the extent of hedonic loss aversion and the speed of adaptation. That said, our study is underpowered to pin down the long-run effects of changes in the status quo.

Using novel implications of expectation-based reference-dependent preferences for happiness, we find that individuals' ex-ante probabilities play a nonlinear role in ex-post happiness, inconsistent with some models of reference dependence but consistent with models such as Gul (1991).

We also extend the motivated beliefs literature by showing that when decomposing beliefs, both its "objective" and "subjective" components matter for happiness changes. Thus, beliefs that reflect bias due to

preferences seem to be, at least in part, genuinely held in a hedonic sense.

Our results point to the ways in which happiness data can be used in a disciplined way to shed light not just on traditional questions about happiness and hedonic adaptation, but also on understanding the factors that matter for preferences, beliefs, and economic models, including reference dependence and motivated beliefs.

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# Appendices

The following appendices provide additional materials for the paper, including complete results for regressions discussed in the paper, some additional regressions, an analysis on the time and demographic heterogeneity of our results, and various robustness checks.

## A Additional Materials for Section 2

This appendix contains an additional figure and two additional tables, as mentioned in Section 2, on the summary statistics of our sample and the cumulative distribution function of survey response rate, as well as the full regression results for the pilot regression.

Table 9 summarizes our sample's demographics and main variables of interest.

Table 9: Descriptive Statistics

| Variables | Min | Max | Mean | Variance | Observations |
|---|---|---|---|---|---|
| Change in Happiness | -87.50 | 87.50 | -0.27 | 384.77 | 17307 |
| Supporting the Winner | 0 | 1 | 0.53 | 0.25 | 15907 |
| Partisanship | 0.33 | 1 | 0.71 | 0.08 | 21220 |
| Change in *Status Quo* | 0 | 1 | 0.53 | 0.25 | 22496 |
| Surprise | 0 | 1 | 0.48 | 0.06 | 21198 |
| Days After Election | 0 | 145 | 5.83 | 134.13 | 22496 |
| Female | 0 | 1 | 0.45 | 0.25 | 22301 |
| Age | 17 | 97 | 45.70 | 233.11 | 22356 |
| Not White/Caucasian | 0 | 1 | 0.33 | 0.22 | 22414 |
| Hispanic | 0 | 1 | 0.10 | 0.09 | 22329 |
| Employed | 0 | 1 | 0.87 | 0.11 | 18228 |
| Married or Living with a Partner | 0 | 1 | 0.59 | 0.24 | 22433 |

*Note.* The Days After Election measures the number of days each respondent took the last survey since the election outcome became available.

Figure 6 graphs the cumulative survey response rate as a function of days after the elections had been decided.

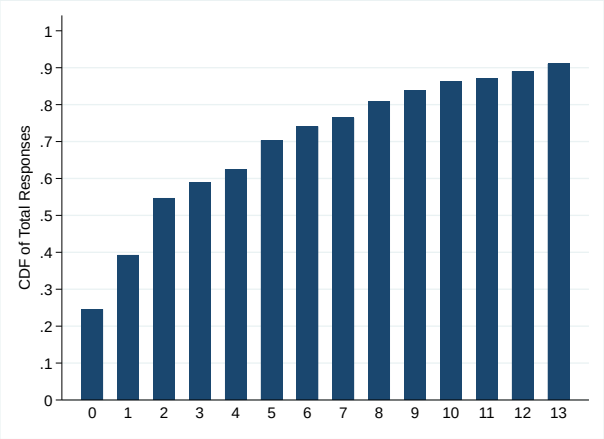


Figure 6: Response Rate by Day

Table 10 presents the full regression results for Table 1, with t-statistics in parentheses. Each column of the table corresponds to an OLS regression of change in happiness on the variables in each row of Table 1, their interactions with the dummy of supporting the winner and the dummy of supporting the winner itself.

Table 10: Pilot Regressions

| | Change in Happiness | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Supporting the Winner | 17.128 | 5.827 | 3.780 | 6.069 |
| | (38.034) | (4.868) | (5.537) | (4.559) |
| Partisanship | | -9.688 | | |
| | | (-7.983) | | |
| Partisanship * Supporting the Winner | | 15.691 | | |
| | | (9.708) | | |
| Change in *Status Quo* | | | -11.870 | |
| | | | (-17.912) | |
| Change in *Status Quo* * Supporting the Winner | | | 20.971 | |
| | | | (24.082) | |
| Surprise | | | | -16.489 |
| | | | | (-9.053) |
| Surprise * Supporting the Winner | | | | 17.706 |
| | | | | (7.429) |
| Constant | -9.572 | -2.640 | -1.704 | 1.069 |
| | (-27.737) | (-3.020) | (-3.270) | (0.904) |
| Observations | 11888 | 11882 | 11888 | 11884 |
| $R^2$ | 0.164 | 0.175 | 0.221 | 0.175 |

# B Additional Regression Results for Section 3

This appendix contains details on the complete regression results for the two tables in Section 3. We also provide robustness checks using the two-week measure of change in happiness in the regressions underlying these two tables and using an alternative weighting function in our main specification for Section 3.3 (equation 3).

## B.1 Determinants of Change in Happiness

Table 11 shows the complete regression results for Table 2.

Table 11: Determinants of Happiness at $t = 0$

| | (1) | (2) |
|---|---|---|
| Partisanship | | 20.759 |
| | | [0.117] |
| Partisanship * Supporting the Winner | | -26.381 |
| | | [0.093] |
| Partisanship * Change in *Status Quo* | -13.059 | -34.25 |
| | [0.000] | [0.033] |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 28.974 | 43.04 |
| | [0.000] | [0.022] |
| Partisanship* Surprise | -20.856 | -59.818 |
| | [0.000] | [0.010] |
| Partisanship* Surprise * Supporting the Winner | 28.249 | 84.303 |
| | [0.000] | [0.007] |
| Supporting the Winner | | 19.163 |
| | | [0.119] |
| Change in *Status Quo* | | 13.298 |
| | | [0.256] |
| Surprise | | 24.484 |
| | | [0.143] |
| Change in *Status Quo* * Supporting the Winner | | -8.1 |
| | | [0.577] |
| Surprise * Supporting the Winner | | -40.427 |
| | | [0.104] |
| Surprise * Change in *Status Quo* | | -42.897 |
| | | [0.030] |
| Surprise*Change in *Status Quo* * Supporting the Winner | | 44.437 |
| | | [0.112] |
| Partisanship * Surprise * Change in *Status Quo* | | 59.554 |
| | | [0.027] |
| Partisanship * Surprise * Change in *Status Quo* * Supporting the Winner | | -65.526 |
| | | [0.067] |
| Female | -1.936 | -2.066 |
| | [0.014] | [0.009] |
| Age | 0.007 | -0.013 |
| | [0.819] | [0.664] |
| Not White / Caucasian | -5.359 | -4.932 |
| | [0.000] | [0.000] |
| Hispanic | 1.343 | 0.88 |
| | [0.343] | [0.544] |
| Employed | -1.067 | -1.606 |
| | [0.368] | [0.172] |
| Married or Living with a Partner | -0.988 | -1.003 |
| | [0.258] | [0.246] |
| Constants | 26.271 | 16.222 |
| | [0.000] | [0.109] |
| Income Levels | Yes | Yes |
| State Fixed effects | Yes | Yes |
| Observations | 2,672 | 2,672 |
| $R^2$ | 0.409 | 0.424 |

*Notes.* This table presents the original OLS regressions of change in happiness on the variables and its interaction with the dummy of supporting the winner. P values are in brackets.

Table 12 reports two robustness checks: one to see what happens when the change in happiness is measured in the first two weeks, instead of immediately, after the election, and the other to see if the ad-

ditional controls of demographics, income level dummies and state-fixed effects affect the results (see the first and third columns). The estimates are broadly consistent with those in Table 11, with correct signs and similar but attenuated magnitudes for the main variables of interest. The magnitudes being smaller and less significant are consistent with hedonic adaptation that we discuss in detail in Section 4.

Table 12: Determinants of Happiness Within the First Two Weeks

| | Change in Happiness | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Partisanship | 3.236 | 2.817 | 2.431 | 3.447 |
| | (1.879) | (1.389) | (0.387) | (0.471) |
| Partisanship * Supporting the Winner | 0.050 | 1.174 | -4.620 | -1.480 |
| | (0.029) | (0.583) | (-0.642) | (-0.173) |
| Partisanship * Change in *Status Quo* | -13.748 | -14.724 | -13.915 | -16.592 |
| | (-14.635) | (-13.426) | (-1.709) | (-1.800) |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 25.842 | 26.827 | 27.420 | 25.817 |
| | (21.465) | (19.337) | (2.940) | (2.416) |
| Partisanship* Surprise | -10.209 | -8.990 | -13.665 | -15.406 |
| | (-4.392) | (-3.453) | (-1.277) | (-1.224) |
| Partisanship* Surprise * Supporting the Winner | 9.067 | 6.472 | 32.731 | 24.971 |
| | (2.892) | (1.940) | (2.221) | (1.446) |
| Supporting the Winner | | | 4.462 | -0.174 |
| | | | (0.800) | (-0.026) |
| Change in *Status Quo* | | | 3.331 | 1.171 |
| | | | (0.552) | (0.169) |
| Surprise | | | 5.549 | 3.728 |
| | | | (0.693) | (0.383) |
| Change in *Status Quo* * Supporting the Winner | | | -2.157 | 3.641 |
| | | | (-0.304) | (0.441) |
| Surprise * Supporting the Winner | | | -18.463 | -9.102 |
| | | | (-1.634) | (-0.658) |
| Surprise * Change in *Status Quo* | | | -18.911 | -15.978 |
| | | | (-1.906) | (-1.380) |
| Surprise*Change in *Status Quo* * Supporting the Winner | | | 32.309 | 22.077 |
| | | | (2.357) | (1.376) |
| Partisanship * Surprise * Change in *Status Quo* | | | 16.732 | 19.947 |
| | | | (1.268) | (1.328) |
| Partisanship * Surprise * Change in *Status Quo* * Supporting the Winner | | | -42.307 | -36.897 |
| | | | (-2.349) | (-1.807) |
| Female | | -1.478 | | -1.609 |
| | | (-3.227) | | (-3.524) |
| Age | | -0.024 | | -0.028 |
| | | (-1.344) | | (-1.568) |
| Not White / Caucasian | | -2.967 | | -2.778 |
| | | (-5.656) | | (-5.207) |
| Hispanic | | 1.270 | | 1.341 |
| | | (1.356) | | (1.439) |
| Employed | | -1.748 | | -1.773 |
| | | (-2.520) | | (-2.570) |
| Married or Living with a Partner | | -0.684 | | -0.656 |
| | | (-1.342) | | (-1.292) |
| Constants | -0.118 | 10.270 | -1.041 | 10.851 |
| | (-0.204) | (2.142) | (-0.222) | (1.459) |
| Income Levels | No | Yes | No | Yes |
| State Fixed Effects | No | Yes | No | Yes |
| Observations | 11878 | 10158 | 11878 | 10158 |
| $R^2$ | 0.230 | 0.267 | 0.237 | 0.275 |

*Notes.* This table presents the original OLS regressions of change in happiness within two weeks after the elections on the variables and their interaction with the dummy of supporting the winner. T statistics are in parentheses.

## B.2 Probability Weighting

Columns (1) and (2) of Table 13 present the complete results for the regressions underlying Table 3. As a robustness check, we switch to the sample of responses finished within two weeks after the elections and report the regression results in Columns (3) and (4) of Table 13.

Table 13: Structural Analysis with KT92 Probability Weighting

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Partisanship * Supporting the Loser | -22.230 | -22.224 | -6.679 | -6.684 |
| | (-10.763) | (-10.769) | (-5.104) | (-5.078) |
| Partisanship * Supporting the Winner | 0.974 | 1.452 | -3.657 | -7.460 |
| | (0.309) | (0.231) | (-1.812) | (-1.798) |
| Partisanship * Change in *Status Quo* | -11.991 | -11.985 | -13.431 | -13.434 |
| | (-7.821) | (-7.815) | (-14.507) | (-14.497) |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 28.428 | 28.094 | 29.773 | 34.167 |
| | (13.321) | (5.366) | (21.306) | (8.824) |
| $\gamma$ : Common | 1.666 | | 1.840 | |
| | (4.809) | | (2.783) | |
| $\gamma$ : Loser | | 1.662 | | 1.847 |
| | | (4.795) | | (2.733) |
| $\gamma$ : Winner | | 0.581 | | 0.292 |
| | | (0.241) | | (1.816) |
| Observations | 3,179 | 3,179 | 11878 | 11878 |
| $R^2$ | 0.366 | 0.366 | 0.228 | 0.228 |

*Notes.* This table presents the nonlinear regression results with the KT92 probability weighting function. Columns (1) and (3) show the results when we assume a common decay rate, while in Columns (2) and (4) we assume different decay rates for supporters of the loser and winner. Columns (1) and (2) are based on the subsample of the first day, and columns (3) and (4) are based on the subsample of the first two weeks. T statistics in parentheses.

Table 14 reruns our main specification with a different weighting function, a power weighting function:

$$w^{power}(p) = p^{\gamma},$$

which has been discussed extensively in the literature (Camerer and Ho 1994, Tversky and Fox 1995, Wu and Gonzalez 1996, Gonzalez and Wu 1999, Abdellaoui 2000, Bleichrodt and Pinto 2000, Kilka and Weber 2001, Diecidue et al. 2009). This function allows for either a convex or concave probability weighting function. Our specification is otherwise the same as our main specification (equation 3), whose exact regression equation is

$$\begin{aligned} ChangeinHappiness = {} & \gamma_1 Partisanship * SupportingtheLoser * (1 - belief)^{\gamma_3} \\ & + \gamma_2 Partisanship * SupportingtheWinner * (1 - (1 - belief)^{\gamma_4}) \\ & + \gamma_5 Partisanship * ChangeinStatus\ Quo + \gamma_6 Partisanship * ChangeinStatus\ Quo * SupportingtheWinner. \end{aligned} \tag{9}$$

Columns (4) through (6) are based on the data of the first two weeks after elections.

Table 14: Structural Analysis with Power Probability Weighting with $t = 0$

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Supporting the Loser | Supporting the Winner | Loss Aversion | Supporting the Loser | Supporting the Winner | Loss Aversion | $H_0 : \gamma = 1$ |
| Partisanship | -22.814 | -0.477 | 47.828 | -22.819 | -1.389 | 16.428 | |
| | [0.000] | [0.901] | [0.901] | [0.000] | [0.758] | [0.758] | |
| Partisanship * Change in *Status Quo* | -12.087 | 17.150 | 0.705 | -12.091 | 17.452 | 0.693 | |
| | [0.000] | [0.000] | [0.111] | [0.000] | [0.000] | [0.093] | |
| $\gamma$ : Common | 1.234 | 1.234 | | | | | |
| | [0.000] | [0.000] | | | | | [0.271] |
| $\gamma$ : Loser | | | | 1.236 | 1.236 | | |
| | | | | [0.000] | [0.000] | | [0.268] |
| $\gamma$ : Winner | | | | 0.524 | 0.524 | | |
| | | | | [0.897] | [0.897] | | [0.906] |
| Observations | 3,179 | 3,179 | 3,179 | 3,179 | 3,179 | 3,179 | |
| $R^2$ | 0.365 | 0.365 | 0.365 | 0.365 | 0.365 | 0.365 | |

*Notes.* 1. This table presents nonlinear regressions of change in happiness power probability weighting function. Columns (1) and (4) list the original coefficients and p values. Columns (2) and (5) list coefficients for supporters of the winner (e.g., partisanship in column (2) is calculated as the aggregate of the coefficient of partisanship and its interaction with the dummy of supporting the winner). Columns (3) and (6) list the hedonic loss aversion coefficient, which is the absolute ratio of the loss over gain.
2. Columns (1) to (3) report the results when we assume the same decay rates for supporters of the loser and winner. Columns (4) to (6) report the results when we assume different decay rates for supporters of the loser and winner.
3. P values in brackets. P values in columns (1), (2), (4), (5) are testing against 0, but in (3) and (6) are testing against 1. Column (7) list the p values for the t test of whether the decay rate is significantly different from 0. P values in brackets. P values in columns (1), (2), (4), (5) are testing against 0, but in (3) and (6) are testing against 1.
4. Complete results in Table 15 of Appendix B.2.

Again, we find evidence in favor of nonlinear weighting, in that the estimated $\gamma$ is larger than 1. The red line in Figure 3 graphs the estimated weighting function, indicating it is convex when $\gamma$ is restricted to be the same among the winners and losers as well as when $\gamma$ is specific to the losers. The weighting function is estimated to be concave for winners. As in Table 3, we again see that for losers, the coefficients are remarkably similar to the coefficients we obtained with the common-$\gamma$ weighting function. Figures 3a and 3b confirm this graphically.

Table 15 reports full regression results from this specification. Columns (1) and (3) suppose that $\gamma_3 = \gamma_4$, while Columns (2) and (4) allow them to differ.

Table 15: Structural Analysis with Power Probability Weighting

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Partisanship * Supporting the Loser | -22.814 | -22.819 | -6.892 | -6.926 |
| | (-10.250) | (-10.249) | (-5.062) | (-5.033) |
| partisanship * Supporting the Winner | -0.477 | -1.389 | 4.626 | 7.140 |
| | (-0.124) | (-0.308) | (1.805) | (1.851) |
| Partisanship * Change in *Status Quo* | -12.087 | -12.091 | -13.506 | -13.525 |
| | (-7.812) | (-7.814) | (-14.564) | (-14.563) |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 29.238 | 29.543 | 24.903 | 27.293 |
| | (9.177) | (9.270) | (11.466) | (19.677) |
| $\gamma$ : Common | 1.234 | | 1.394 | |
| | (5.803) | | (3.198) | |
| $\gamma$ : Loser | | 1.236 | | 1.427 |
| | | (5.804) | | (3.102) |
| $\gamma$ : Winner | | 0.524 | | 0.110 |
| | | (0.129) | | (0.818) |
| Observations | 3,179 | 3,179 | 11878 | 11878 |
| $R^2$ | 0.365 | 0.365 | 0.228 | 0.228 |

*Notes.* This table presents the nonlinear regression results with the power probability weighting function. Columns (1) and (3) show the results when we assume a common decay rate, while in Columns (2) and (4) we assume different decay rates for supporters of the loser and winner. Columns (1) and (2) are based on the subsample of the first day, and columns (3) and (4) are based on the subsample of the first two weeks. T statistics in parentheses.

# C Additional Regression Results for Section 4

This appendix provides complete regression results for the three tables in Section 4, together with a robustness check allowing for additional factors to affect the adaptation rate.

Table 16 presents the complete regression results for Table 4 of Section 4.2.

Table 16: Hedonic Adaptation

| | Change in Happiness | |
|---|---|---|
| | (1) | (2) |
| Days After Election | -0.257 | -0.264 |
| | [0.007] | [0.074] |
| Days After Election * Supporting the Winner | 0.309 | 0.43 |
| | [0.005] | [0.012] |
| Partisanship * Change in *Status Quo* | -15.377 | -15.6 |
| | [0.000] | [0.000] |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 30.691 | 31.955 |
| | [0.000] | [0.000] |
| Partisanship * Surprise | -10.773 | -12.584 |
| | [0.000] | [0.000] |
| Partisanship * Surprise * Supporting the Winner | 11.285 | 13.473 |
| | [0.000] | [0.000] |
| Partisanship * Change in *Status Quo* * Days After Election | 0.718 | 0.954 |
| | [0.000] | [0.000] |
| Partisanship * Change in *Status Quo* * Days After Election * Supporting the Winner | -1.405 | -1.987 |
| | [0.000] | [0.000] |
| Partisanship * Surprise * Days After Election | 1.144 | 1.966 |
| | [0.000] | [0.000] |
| Partisanship * Surprise * Days After Election * Supporting the Winner | -1.311 | -2.394 |
| | [0.000] | [0.000] |
| Female | -1.425 | -1.48 |
| | [0.001] | [0.001] |
| Age | -0.017 | -0.023 |
| | [0.327] | [0.197] |
| Not White / Caucasian | -2.573 | -2.632 |
| | [0.000] | [0.000] |
| Hispanic | 1.309 | 1.467 |
| | [0.152] | [0.115] |
| Employed | -1.559 | -1.673 |
| | [0.024] | [0.016] |
| Married or Living with a Partner | -0.655 | -0.746 |
| | [0.193] | [0.145] |
| Constants | 9.193 | 9.935 |
| | [0.066] | [0.084] |
| Income Levels | Yes | Yes |
| State Fixed Effects | Yes | Yes |
| Observations | 10754 | 10158 |
| $R^2$ | 0.272 | 0.286 |

*Notes.* This table presents the OLS regressions of change in happiness on the variables and its interaction with the dummy of supporting the winner. T statistics in parentheses.

Table 17 provides the complete results for our structural analyses of hedonic adaptation and additional robustness checks. Column (1) runs the specification from the first panel of Table 5 but assumes the rate of adaptation is the same across reference points. Column (2) is the complete result for the first panel in Table 5. Column (3) runs the specification from Table 5 but again assuming a common adaptation, while Column (4) provides the results from the second panel of Table 5.

Table 17: Structural Analysis: Exponential Decay

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| **Permanent** | | | | |
| Partisanship * Change in *Status Quo* | -10.584 | -2.280 | | |
| | (-9.882) | (-0.424) | | |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 21.296 | -9.333 | | |
| | (15.318) | (-0.629) | | |
| Partisanship * Surprise | 2.222 | 1.497 | | |
| | (1.951) | (1.376) | | |
| Partisanship * Surprise * Supporting the Winner | 1.055 | 1.559 | | |
| | (0.514) | (0.791) | | |
| **Temporary** | | | | |
| Partisanship * Change in *Status Quo* | -2.324 | -10.347 | -15.279 | -12.798 |
| | (-1.374) | (-1.819) | (-12.361) | (-13.512) |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 7.631 | 37.208 | 32.715 | 28.446 |
| | (3.673) | (2.523) | -21.001 | -20.823 |
| Partisanship * Surprise | -22.402 | -22.371 | -11.579 | -20.629 |
| | (-11.418) | (-15.249) | (-7.503) | (-14.713) |
| Partisanship * Surprise * Supporting the Winner | 26.307 | 26.712 | 17.361 | 27.982 |
| | (8.548) | (10.410) | -6.798 | -10.792 |
| **Exponential Decay** | | | | |
| Common | -0.647 | | -0.139 | |
| | (-8.481) | | (-14.876) | |
| Change in *Status Quo* | | -0.029 | | -0.044 |
| | | (-1.851) | | (-5.323) |
| Surprise | | -0.859 | | -0.859 |
| | | (-6.762) | | (-6.762) |
| Observations | 12661 | 12661 | 12661 | 12661 |
| $R^2$ | 0.249 | 0.250 | 0.239 | 0.249 |

*Notes.* This table presents structural regression results. T statistics in parentheses. Columns (1) and (2) show the results when assuming both permanent and temporary effects, while Columns (3) and (4) show the results when assuming only temporary effects. Meanwhile, Columns (1) and (3) both assume the same decay rate for change in *status quo* and surprise, while Columns (2) and (4) assume different decay rates accordingly.

Columns (1) and (2) of Table 18 show the complete results for Table 6 where we analyze the heterogeneity in decay rates. In Column (1) we allow the decay rate to vary between the winners and the losers. In Column (2) we allow that the decay rate to be dependent on the size of the temporary shock. Column (3) presents a robustness check where we allow for additional factors to affect the adaptation rate, finding that they are insignificant.

Table 18: Structural Analysis: Variant (Temporary)

| | (1) Direction | (2) Size | (3) Heterogeneity |
|---|---|---|---|
| **Temporary Effects** | | | |
| Partisanship * Change in *Status Quo* | -15.659 | -16.699 | -10.426 |
| | (-11.495) | (-13.388) | (-7.562) |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 31.379 | 33.328 | 26.278 |
| | -19.421 | -21.576 | -16.301 |
| Partisanship * Surprise | -15.116 | -10.977 | -22.017 |
| | (-8.818) | (-7.162) | (-11.978) |
| Partisanship * Surprise * Supporting the Winner | 20.224 | 17.434 | 27.903 |
| | -8.067 | -7.091 | -11.143 |
| **Exponential Decay** | | | |
| Days After Election | -0.274 | -0.04 | -1.338 |
| | (-12.965) | (-1.751) | (-2.617) |
| Supporting the Winner | 0.211 | | 1.399 |
| | -9.324 | | -2.734 |
| Size Coefficient | | -0.006 | |
| | | (-4.380) | |
| Partisanship * Change in *Status Quo* | | | 0.06 |
| | | | -0.848 |
| Partisanship * Change in *Status Quo* * Supporting the Winner | | | -0.066 |
| | | | (-0.808) |
| Partisanship * Surprise | | | -0.46 |
| | | | (-6.612) |
| Partisanship * Surprise * Supporting the Winner | | | 0.262 |
| | | | -3.012 |
| Change in *Status Quo* | | | 1.328 |
| | | | -2.585 |
| Change in *Status Quo* * Supporting the Winner | | | -1.398 |
| | | | (-2.714) |
| Observations | 12661 | 12661 | 12661 |
| $R^2$ | 0.244 | 0.24 | 0.249 |

*Notes.* This table presents the nonlinear regressions of change in happiness on the variables and its interaction with the dummy of supporting the winner. In Column (1) we assume the decay rate is dependent on the dummy for supporting the winner. In Column (2) we assume that the decay rate is dependent on the size of the temporary shock. In Column (3) we assume that there is heterogeneity in decay rates.

# D Additional Regression Results for Section 5

In this appendix, we provide additional regression analyses confirming the existence of motivated beliefs. We regress surprise on partisanship, controlling for year and the interaction of year with partisanship. The results are reported in Table 19. Again, it can be clearly seen that in all the years there is a significant negative relationship between the degree of partisanship and the amount of surprise.[27]

[27] As can be seen, the degree of this relationship peaks in 2016.

Table 19: Regressions on Surprise

| | (1) |
|---|---|
| Year dummy for 2008 | 0.378 |
| | [0.000] |
| Year dummy for 2012 | 0.440 |
| | [0.000] |
| Year dummy for 2016 | 0.596 |
| | [0.000] |
| Year dummy for 2020 | 0.507 |
| | [0.000] |
| Preference Partisanship | -0.153 |
| | [0.000] |
| Year dummy for 2012 * Preference Partisanship | -0.031 |
| | [0.002] |
| Year dummy for 2016 * Preference Partisanship | -0.057 |
| | [0.000] |
| Year dummy for 2020 * Preference Partisanship | -0.027 |
| | [0.007] |
| Observations | 15888 |
| $R^2$ | 0.884 |

*Notes.* This table presents OLS regressions of surprise on the year dummies and their interaction terms with preference partisanship. P values in brackets.

The following table shows the results from regressing observed surprise on our measures of objective surprise.

Table 20: Regressions of Surprise on Different Objective Measures of Surprise

| | (1) | (2) |
|---|---|---|
| Corrected Surprise | 1.027 | |
| | (22.163) | |
| Market Surprise | | 0.229 |
| | | (18.143) |
| Supporting the Winner | -0.147 | -0.142 |
| | (-11.105) | (-10.613) |
| Preference Partisanship | -0.092 | -0.093 |
| | (-10.444) | (-10.410) |
| Constant | 0.139 | 0.619 |
| | (2.690) | (11.696) |
| Observations | 13541 | 13541 |
| R Square | 0.473 | 0.460 |

In Table 21 we show the results when decomposing surprise into objective and residual surprise.

Table 21: Objective and Residual Surprises

| | Market Surprise | Market Surprise | Corrected Surprise | Corrected Surprise |
|---|---|---|---|---|
| Objective Surprise | 0.982 | | 1.346 | |
| | (13.284) | | (41.121) | |
| Residual Surprise | | 1.000 | | 1.031 |
| | | (1,078.819) | | (339.580) |
| Constants | 0.340 | 0.089 | -0.175 | 0.486 |
| | (50.954) | (240.512) | (-10.678) | (697.468) |
| Observations | 16262 | 16262 | 21198 | 21198 |
| $R^2$ | 0.012 | 0.988 | 0.141 | 0.923 |

*Notes.* This table presents OLS regression results of surprise on objective surprise and residual surprise respectively.

Table 22 presents the complete regression results for Table 7. Column (1) shows the results when using market surprise as the objective surprise and market corrected surprise as residual surprise. Column (2) lists the results when using corrected surprise as objective surprise and average surprise by partisanship as residual surprise.

Table 22: Regressions on Objective and Residual Surprises

| | Change in Happiness | |
|---|---|---|
| | (1) | (2) |
| Partisanship * Objective Surprise | -28.345 | -27.625 |
| | (-8.144) | (-6.018) |
| Partisanship * Objective Surprise * Supporting the Winner | 33.783 | 41.298 |
| | (7.478) | (8.960) |
| Partisanship * Change in *Status Quo* | -10.932 | -10.266 |
| | (-5.519) | (-4.926) |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 27.158 | 22.660 |
| | (11.308) | (8.808) |
| Partisanship * Residual Surprise | -16.818 | -10.834 |
| | (-5.463) | (-2.236) |
| Partisanship * Residual Surprise * Supporting the Winner | 24.884 | 11.145 |
| | (6.468) | (1.873) |
| Constants | 25.420 | 25.635 |
| | (6.456) | (6.243) |
| Observations | 2,672 | 2,672 |
| $R^2$ | 0.412 | 0.413 |

*Notes.* This table presents the nonlinear regressions of change in happiness on the variables and its interaction with the dummy of supporting the winner. T statistics in parentheses. Column (1) shows the results when using market surprise as the objective surprise and market corrected surprise as residual surprise. Column (2) lists the results when using corrected surprise as objective surprise and average surprise by partisanship as residual surprise.

Table 23 shows the complete structural analyses results for Table 8. In Column (1) we are using market surprise as objective surprise and market corrected surprise as the residual surprise. In Column (2) we are

using corrected surprise as objective surprise and average surprise by partisanship as residual surprise.

Table 23: Structural Analysis with Objective and Residual Surprises

| | (1) | (2) |
|---|---|---|
| **Temporary Effects** | | |
| Partisanship * Change in *Status Quo* | -11.204 | -10.796 |
| | (-11.078) | (-11.128) |
| Partisanship * Change in *Status Quo* *?Supporting the Winner | 27.341 | 24.489 |
| | (19.354) | (16.640) |
| Partisanship * Objective Surprise | -29.667 | -28.049 |
| | (-14.403) | (-12.914) |
| Partisanship * Objective Surprise * Supporting the Winner | 31.186 | 37.929 |
| | (9.597) | (12.066) |
| Partisanship * Residual Surprise | -13.859 | -8.635 |
| | (-7.594) | (-2.184) |
| Partisanship * Residual Surprise * Supporting the Winner | 25.716 | 7.726 |
| | (8.571) | (1.532) |
| **Exponential Decay Rates** | | |
| Change in *Status Quo* | -0.044 | -0.026 |
| | (-5.398) | (-3.003) |
| Surprise | -0.753 | -0.742 |
| | (-7.997) | (-8.058) |
| Observations | 12661 | 12661 |
| $R^2$ | 0.254 | 0.251 |

*Notes.* This table presents nonlinear regressions of change in happiness on change in status quo and objective surprise and residual surprise. Column (1) uses market surprise as objective surprise and market corrected surprise as the residual surprise. Column (2) uses corrected surprise as objective surprise and average surprise by partisanship as residual surprise. T statistics are in parentheses.

# E Heterogeneity

In this appendix we gauge our results' heterogeneity along two dimensions: time and demographics.

## E.1 Temporal Heterogeneity

In Table 24, we replicate our baseline reduced-form regression underlying the first three columns of Table 2 but run the regression separately for each election year. Because we only look at individual years, we cannot include a dummy for changes in the status quo. We, thus, include only partisanship, instead of partisanship interacted with the status quo.

Our analysis reveals that partisanship alone is the major determinant of hedonic reactions in 2016 and 2020—the degree of surprise an individual experienced about the outcome mattered very little. In contrast,

in 2008 and 2012, partisanship alone mattered very little—the results were primarily driven by partisanship interacted with surprise.

Table 24: Determinants of Happiness By Year ($t = 0$)

| | 2008 | | | 2012 | | |
|---|---|---|---|---|---|---|
| | (1) Supporting the Loser | (2) Supporting the Winner | (3) Loss Aversion | (4) Supporting the Loser | (5) Supporting the Winner | (6) Loss Aversion |
| Partisanship | 1.092 | 3.635 | 0.3 | 6.715 | -0.42 | 15.988 |
| | [0.831] | [0.471] | [0.616] | [0.260] | [0.885] | [0.392] |
| Partisanship * Surprise | -27.131 | 2.411 | 11.253 | -32.606 | 6.75 | 4.831 |
| | [0.000] | [0.811] | [0.045] | [0.000] | [0.265] | [0.019] |
| Female | -2.526 | -2.526 | | -0.497 | -0.497 | |
| | [0.206] | [0.206] | | [0.726] | [0.726] | |
| Age | 0.103 | 0.103 | | -0.076 | -0.076 | |
| | [0.269] | [0.269] | | [0.165] | [0.165] | |
| Not White/Caucasian | 1.096 | 1.096 | | -0.028 | -0.028 | |
| | [0.754] | [0.754] | | [0.989] | [0.989] | |
| Hispanic | 7.359 | 7.359 | | 0.623 | 0.623 | |
| | [0.231] | [0.231] | | [0.784] | [0.784] | |
| Employed | 5.765 | 5.765 | | -10.982 | -10.982 | |
| | [0.164] | [0.164] | | [0.000] | [0.000] | |
| Married or Living with a Partner | -1.207 | -1.207 | | -1.707 | -1.707 | |
| | [0.588] | [0.588] | | [0.256] | [0.256] | |
| Constants | 6.485 | 6.485 | 6.485 | 16.458 | 16.458 | 16.458 |
| | [0.695] | [0.695] | [0.695] | [0.006] | [0.006] | [0.006] |
| Observations | 329 | 329 | 329 | 674 | 674 | 674 |
| $R^2$ | 0.327 | 0.327 | 0.327 | 0.218 | 0.218 | 0.218 |
| | 2016 | | | 2020 | | |
| | (5) | (6) | (7) | (8) | (9) | (10) |
| Partisanship | -30.07 | 21.283 | 1.413 | -28.76 | 27.985 | 1.028 |
| | [0.000] | [0.000] | [0.333] | [0.001] | [0.000] | [0.941] |
| Partisanship * Surprise | 6.222 | 2.79 | 2.23 | -5.906 | -12.934 | 0.457 |
| | [0.465] | [0.578] | [0.363] | [0.607] | [0.130] | [0.620] |
| Female | -2.725 | -2.725 | | -2.659 | -2.659 | |
| | [0.053] | [0.053] | | [0.135] | [0.135] | |
| Age | 0.101 | 0.101 | | -0.12 | -0.12 | |
| | [0.078] | [0.078] | | [0.083] | [0.083] | |
| Not White/Caucasian | -3.729 | -3.729 | | -3.954 | -3.954 | |
| | [0.041] | [0.041] | | [0.083] | [0.083] | |
| Hispanic | 0.053 | 0.053 | | -0.696 | -0.696 | |
| | [0.982] | [0.982] | | [0.840] | [0.840] | |
| Employed | -1.085 | -1.085 | | 0.065 | 0.065 | |
| | [0.485] | [0.485] | | [0.979] | [0.979] | |
| Married or Living with a Partner | -0.96 | -0.96 | | -1.483 | -1.483 | |
| | [0.518] | [0.518] | | [0.475] | [0.475] | |
| Constants | -29.089 | -29.089 | -29.089 | 26.802 | 26.802 | 26.802 |
| | [0.000] | [0.000] | [0.000] | [0.002] | [0.002] | [0.002] |
| Observations | 1,034.00 | 1,034.00 | 1,034.00 | 635 | 635 | 635 |
| $R^2$ | 0.447 | 0.447 | 0.447 | 0.539 | 0.539 | 0.539 |

*Notes.* This table presents OLS regressions of change in happiness on the variables for each individual year. P values in brackets. P values in columns (1), (2), (3), (4), (5), (6), (8) and (9) are testing against 0, but in (3), (6), (7) and (10) are testing against 1.

Table 25 show the complete results for Table 24.

Table 25: Determinants of Change in Happiness by Year

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | 2008 | 2012 | 2016 | 2020 |
| Partisanship | 1.092 | 6.715 | -30.070 | -28.760 |
| | (0.214) | (1.128) | (-4.045) | (-3.493) |
| Partisanship * Supporting the Winner | 2.543 | -7.135 | 51.353 | 56.745 |
| | (0.502) | (-1.229) | (7.228) | (7.086) |
| Partisanship * Surprise | -27.131 | -32.606 | 6.222 | -5.906 |
| | (-3.681) | (-3.510) | (0.731) | (-0.515) |
| Partisanship * Surprise * Supporting the Winner | 29.542 | 39.356 | -3.432 | -7.028 |
| | (2.333) | (3.507) | (-0.348) | (-0.496) |
| Female | -2.526 | -0.497 | -2.725 | -2.659 |
| | (-1.266) | (-0.350) | (-1.941) | (-1.495) |
| Age | 0.103 | -0.076 | 0.101 | -0.120 |
| | (1.107) | (-1.391) | (1.763) | (-1.738) |
| Not White/Caucasian | 1.096 | -0.028 | -3.729 | -3.954 |
| | (0.314) | (-0.014) | (-2.050) | (-1.739) |
| Hispanic | 7.359 | 0.623 | 0.053 | -0.696 |
| | (1.199) | (0.274) | (0.022) | (-0.202) |
| Employed | 5.765 | -10.982 | -1.085 | 0.065 |
| | (1.395) | (-3.733) | (-0.698) | (0.026) |
| Married or Living with a Partner | -1.207 | -1.707 | -0.960 | -1.483 |
| | (-0.542) | (-1.137) | (-0.646) | (-0.715) |
| Constants | 6.485 | 16.458 | -29.089 | 26.802 |
| | (0.393) | (2.752) | (-4.190) | (3.042) |
| Observations | 329 | 674 | 1,034 | 635 |
| $R^2$ | 0.327 | 0.218 | 0.447 | 0.539 |

*Notes.* This table presents the OLS regression results of change in happiness on the variables for each individual year. T statistics in parentheses.

Given these results, we want to know to what extent the status quo effects are driven only by the last two elections. Thus, we rerun our baseline reduced-form regression, but with an additional dummy for 2016 and another dummy for 2020 (interacted with partisanship). Table 26 reports these results. Thus, the change in status quo reflects the shared component across 2008, 2016 and 2020, distinct from the contributions of 2016 and 2020. We find that there is a small potential effect (insignificant for supporters of the losers, significant for supports of the winner) from status quo which is shared across 2008, 2016 and 2020, but that most of the effects are driven by 2016 and 2020.

Table 26: Decomposing the Change in *Status Quo* Dummy

| | Supporting the Loser | Supporting the Winner | Loss Aversion |
|---|---|---|---|
| Partisanship * Change in *Status Quo* | -2.744 | 3.924 | 0.699 |
| | [0.170] | [0.040] | [0.682] |
| Partisanship * 2016 Dummy | -16.053 | 10.385 | 1.546 |
| | [0.000] | [0.000] | [0.146] |
| Partisanship * 2020 Dummy | -16.19 | 20.459 | 0.791 |
| | [0.000] | [0.000] | [0.226] |
| Partisanship * Surprise | -16.416 | 5.12 | 3.206 |
| | [0.000] | [0.077] | [0.014] |

*Notes.* This table presents OLS regressions of change in happiness on the variables for each individual year. P values in brackets. P values in columns (1), (2) are testing against 0, but in (3) is testing against 1.

Table 27 shows the complete results for Table 26.

Table 27: Decomposing Change in *Status Quo* with Year Dummy

| | (1) |
|---|---|
| Partisanship * Change in *Status Quo* | -2.744 |
| | (-1.373) |
| Partisanship * Year Dummy 2016 | -16.053 |
| | (-6.311) |
| Partisanship * Year Dummy 2020 | -16.190 |
| | (-5.880) |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 6.668 |
| | (2.523) |
| Partisanship * Year Dummy 2016 * Supporting the Winner | 26.438 |
| | (8.538) |
| Partisanship * Year Dummy 2020 * Supporting the Winner | 36.649 |
| | (10.692) |
| Partisanship * Surprise | -16.416 |
| | (-5.555) |
| Partisanship * Surprise * Supporting the Winner | 21.536 |
| | (5.890) |
| Female | -1.929 |
| | (-2.473) |
| Age | 0.007 |
| | (0.236) |
| Not White/Caucasian | -3.613 |
| | (-3.563) |
| Hispanic | 1.053 |
| | (0.758) |
| Employed | -1.253 |
| | (-1.061) |
| Married or Living with a Partner | -1.115 |
| | (-1.295) |
| Constants | 16.278 |
| | (4.169) |
| Observations | 2,672 |
| $R^2$ | 0.436 |

*Notes.* This table presents the OLS regressions of change in happiness where we have an individual year dummy for 2016 and 2020 respectively. T statistics in parentheses.

These results raise the question to what extent "partisanship" is felt in a way that is not captured by self-identified party affiliation. We use our alternative measures of partisanship, in particular the degree of warmth felt towards candidates. Tables 28 and 29 report the results, which are similar to those above.

Although there is an overall change from the status quo effect, we see that both 2016 and 2020 have particularly strong partisan effects. It seems less plausible that these warmth measures are subject to large scale drift, leading to the conclusion that perhaps partisanship is becoming more important over time. The results for each individual year are in Table 30.

Table 28: Decomposing the Change in *Status Quo* Dummy with Alternative Measures of Partisanship

| | Warmth towards President | | | Warmth towards President and Vice President | | |
|---|---|---|---|---|---|---|
| | Supporting the Loser | Supporting the Winner | Loss Aversion | Supporting the Loser | Supporting the Winner | Loss Aversion |
| Partisanship * Change in *Status Quo* | -0.053 | 0.088 | 0.602 | -0.032 | 0.041 | 0.780 |
| | [0.066] | [0.000] | [0.373] | [0.034] | [0.001] | [0.674] |
| Partisanship * 2016 Dummy | -0.183 | 0.08 | 2.288 | -0.121 | 0.054 | 2.241 |
| | [0.000] | [0.007] | [0.034] | [0.000] | [0.001] | [0.008] |
| Partisanship * 2020 Dummy | -0.192 | 0.178 | 1.079 | -0.086 | 0.092 | 0.935 |
| | [0.000] | [0.000] | [0.773] | [0.000] | [0.000] | [0.795] |
| Partisanship * Surprise | -0.127 | 0.123 | 1.033 | -0.077 | 0.059 | 1.305 |
| | [0.000] | [0.000] | [0.948] | [0.000] | [0.000] | [0.499] |
| Female | -1.846 | -1.846 | | -2.009 | -2.009 | |
| | [0.022] | [0.022] | | [0.012] | [0.012] | |
| Age | 0.031 | 0.031 | | 0.045 | 0.045 | |
| | [0.315] | [0.315] | | [0.150] | [0.150] | |
| Not White/Caucasian | -3.014 | -3.014 | | -2.461 | -2.461 | |
| | [0.004] | [0.004] | | [0.017] | [0.017] | |
| Hispanic | 1.131 | 1.131 | | 0.705 | 0.705 | |
| | [0.451] | [0.451] | | [0.636] | [0.636] | |
| Employed | -1.879 | -1.879 | | -1.648 | -1.648 | |
| | [0.126] | [0.126] | | [0.174] | [0.174] | |
| Married or Living with a Partner | -0.622 | -0.622 | | -0.419 | -0.419 | |
| | [0.480] | [0.480] | | [0.630] | [0.630] | |
| Constants | 12.428 | 12.428 | | 11.825 | 11.825 | |
| | [0.002] | [0.002] | | [0.003] | [0.003] | |
| Observations | 2,364 | 2,364 | | 2,344 | 2,344 | |
| $R^2$ | 0.443 | 0.443 | | 0.463 | 0.463 | |

*Notes.* This table presents the OLS regressions of change in happiness on the variables and its interaction with the dummy of supporting the winner. Besides the change in *Status quo* dummy, we add the year dummies of 2016 and 2020 and the interaction terms with partisanship and supporting the winner dummy. Columns (1) to (3) show the results when using warmth toward the president as the measure of partisanship. Column (4) to (6) show the results when using warmth towards the president and vice president as the measure of partisanship. P values in parentheses. P values in columns (1), (2), (4) and (5) are testing against 0, but in (3) and (6) are testing against 1. Full results in Appendix E Table 29.

Table 29 shows the complete results for Table 28.

Table 29: Decomposing Change in *Status Quo* with Alternative Measures of Partisanship

| | (1) Partisanship = Warmth towards President | (2) Partisanship = Warmth towards President and Vice President |
|---|---|---|
| Partisanship * Change in *Status Quo* | -0.053 | -0.032 |
| | (-1.842) | (-2.125) |
| Partisanship * 2016 Dummy | -0.183 | -0.121 |
| | (-5.586) | (-6.930) |
| Partisanship * 2020 Dummy | -0.192 | -0.086 |
| | (-4.510) | (-3.981) |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 0.141 | 0.073 |
| | -3.843 | -3.828 |
| Partisanship * 2016 Dummy * Supporting the Winner | 0.263 | 0.175 |
| | -6.58 | -8.354 |
| Partisanship * 2020 Dummy * Supporting the Winner | 0.37 | 0.178 |
| | -7.265 | -6.956 |
| Partisanship * Surprise | -0.127 | -0.077 |
| | (-3.713) | (-4.304) |
| Partisanship * Surprise * Supporting the Winner | 0.25 | 0.136 |
| | -5.905 | -6.041 |
| Female | -1.846 | -2.009 |
| | (-2.285) | (-2.500) |
| Age | 0.031 | 0.045 |
| | -1.005 | -1.441 |
| Not White/Caucasian | -3.014 | -2.461 |
| | (-2.865) | (-2.384) |
| Hispanic | 1.131 | 0.705 |
| | -0.754 | -0.474 |
| Employed | -1.879 | -1.648 |
| | (-1.532) | (-1.361) |
| Married or Living with a Partner | -0.622 | -0.419 |
| | (-0.707) | (-0.482) |
| Constants | 12.428 | 11.825 |
| | -3.076 | -2.999 |
| Observations | 2,364 | 2,344 |
| $R^2$ | 0.443 | 0.463 |

*Notes.* This table presents the OLS regressions of change in happiness on the variables and its interaction with the dummy of supporting the winner. T statistics in parentheses. Column (1) shows the results when using warmth toward the president as the measure of partisanship. Column (2) shows the results when using warmth towards the president and vice president as the measure of partisanship.

Table 30: Decomposing the Change in *Status Quo* Dummy with Alternative Measures of Partisanship by Year

| | 2008 | | | 2012 | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Supporting the Loser | Supporting the Winner | Loss Aversion | Supporting the Loser | Supporting the Winner | Loss Aversion |
| Partisanship | -0.22 | 3.739 | 0.059 | 7.286 | 0.033 | 220.79 |
| | [0.970] | [0.578] | [0.693] | [0.252] | [0.992] | [0.324] |
| Partisanship * Surprise | -27.187 | 2.743 | 9.911 | -33.706 | 6.102 | 5.524 |
| | [0.000] | [0.789] | [0.050] | [0.000] | [0.324] | [0.013] |
| Female | -1.126 | -3.861 | | -1.593 | 0.289 | |
| | [0.688] | [0.197] | | [0.459] | [0.148] | |
| Age | 0.104 | 0.116 | | -0.117 | -0.039 | |
| | [0.340] | [0.358] | | [0.101] | [0.001] | |
| Not White/Caucasian | -2.692 | 1.789 | | 5.349 | -0.555 | |
| | [0.682] | [0.663] | | [0.234] | [0.186] | |
| Employed | 5.324 | 5.625 | | -8.366 | -13.711 | |
| | [0.384] | [0.347] | | [0.016] | [0.737] | |
| Married or Living with a Partner | -0.102 | -1.731 | | -2.433 | -1.494 | |
| | [0.971] | [0.573] | | [0.329] | [0.003] | |
| Observations | 329 | 329 | 329 | 674 | 674 | 674 |
| $R^2$ | 0.329 | 0.329 | 0.329 | 0.222 | 0.222 | 0.222 |
| | 2016 | | | 2020 | | |
| | (5) | (6) | (7) | (8) | (9) | (10) |
| | Supporting the Loser | Supporting the Winner | Loss Aversion | Supporting the Loser | Supporting the Winner | Loss Aversion |
| Partisanship | -18.22 | 8.444 | 2.158 | -13.166 | 20.789 | 0.633 |
| | [0.024] | [0.015] | [0.276] | [0.147] | [0.000] | [0.467] |
| Partisanship * Surprise | 2.529 | -0.302 | 8.374 | -10.064 | -14.542 | 0.692 |
| | [0.770] | [0.952] | [0.824] | [0.374] | [0.098] | [0.753] |
| Female | -5.132 | 2.863 | | -0.924 | -3.883 | |
| | [0.005] | [0.148] | | [0.777] | [0.050] | |
| Age | 0.018 | 0.25 | | -0.407 | 0.055 | |
| | [0.788] | [0.001] | | [0.000] | [0.451] | |
| Not White/Caucasian | -5.993 | 3.561 | | -12.5 | -2.093 | |
| | [0.004] | [0.186] | | [0.013] | [0.402] | |
| Employed | -2.183 | -0.666 | | -0.853 | -1.116 | |
| | [0.270] | [0.737] | | [0.813] | [0.700] | |
| Married or Living with a Partner | 1.447 | -6.591 | | 2.071 | -3.557 | |
| | [0.421] | [0.003] | | [0.555] | [0.106] | |
| Observations | 1,034 | 1,034 | 1,034 | 635 | 635 | 635 |
| $R^2$ | 0.471 | 0.471 | 0.471 | 0.56 | 0.56 | 0.56 |

*Notes.* This table presents the OLS regressions of change in happiness on the variables and its interaction with the dummy of supporting the winner for each individual year. Columns (1) to (3) show the results when using warmth toward the president as the measure of partisanship. Column (4) to (6) show the results when using warmth towards the president and vice president as the measure of partisanship. P values in parentheses. P values in columns (1), (2), (4) and (5) are testing against 0, but in (3) and (6) are testing against 1.

## E.2 Demographic Heterogeneity

We now turn to understanding how happiness might vary by demographics. In Tables 31 and 32 we look for evidence of heterogeneity by demographic group, as well as by year. Table 31 reports results from a

version of our baseline reduced-form regression allowing the demographic controls to vary by support while pooling all the years.

We find that female and non-white supporters of the loser tend to have more sizeable reactions, while female and non-white supporters of the winner tend to have less sizeable reactions. Being older tends to induce more sizeable reactions for both kinds of supporters.

Table 31: Heterogeneity in Demographics

| | (1) Supporting the Loser | (2) Supporting the Winner | (3) Loss Aversion |
|---|---|---|---|
| Partisanship * Change in *Status Quo* | -10.779 | 13.519 | 0.797 |
| | [0.000] | [0.000] | [0.259] |
| Partisanship * Surprise | -15.59 | 1.838 | 8.482 |
| | [0.000] | [0.562] | [0.002] |
| Female | -2.54 | -0.635 | |
| | [0.031] | [0.536] | |
| Age | -0.090 | 0.095 | |
| | [0.021] | [0.007] | |
| Not White/Caucasian | -9.618 | -2.78 | |
| | [0.000] | [0.100] | |
| Employed | -0.799 | -2.672 | |
| | [0.595] | [0.062] | |
| Married or Living with a Partner | 1.099 | -3.268 | |
| | [0.380] | [0.002] | |
| Observations | 2,672 | 2,672 | 2,672 |
| $R^2$ | 0.421 | 0.421 | 0.421 |

*Notes.* This table presents OLS regressions of change in happiness on demographic variables and their interactions with the dummy for supporting the winner. P values in brackets. P values in columns (1), (2) are testing against 0, but in (3) is testing against 1. Complete results are in Appendix E Table 33.

We break our analysis down by year in Table 32 to understand whether particular elections happened to influence some demographic groups more strongly. We find that women reacted particularly strongly to the election of Trump, with female Democrats being sadder than other Democrats post-election, something that is also true in 2020 for female Democrats. We find that older Trump supporters individuals tended to be happier in 2016 and sadder in 2020. Non-white Democrats also tended to be particularly disappointed by Trump's election. Perhaps surprisingly, non-white Republicans also seemed to be particularly disappointed by Obama's first win.

Table 32: Heterogeneity in Demographics by Year (t = 0)

| | 2008 | | | 2012 | | |
|---|---|---|---|---|---|---|
| | (1) Supporting the Loser | (2) Supporting the Winner | (3) Loss Aversion | (4) Supporting the Loser | (5) Supporting the Winner | (6) Loss Aversion |
| Partisanship | -0.22 | 3.739 | 0.059 | 7.286 | 0.033 | 220.79 |
| | [0.970] | [0.578] | [0.693] | [0.252] | [0.992] | [0.324] |
| Partisanship * Surprise | -27.187 | 2.743 | 9.911 | -33.706 | 6.102 | 5.524 |
| | [0.000] | [0.789] | [0.050] | [0.000] | [0.324] | [0.013] |
| Female | -1.126 | -3.861 | | -1.593 | 0.289 | |
| | [0.688] | [0.197] | | [0.459] | [0.148] | |
| Age | 0.104 | 0.116 | | -0.117 | -0.039 | |
| | [0.340] | [0.358] | | [0.101] | [0.001] | |
| Not White/Caucasian | -2.692 | 1.789 | | 5.349 | -0.555 | |
| | [0.682] | [0.663] | | [0.234] | [0.186] | |
| Employed | 5.324 | 5.625 | | -8.366 | -13.711 | |
| | [0.384] | [0.347] | | [0.016] | [0.737] | |
| Married or Living with a Partner | -0.102 | -1.731 | | -2.433 | -1.494 | |
| | [0.971] | [0.573] | | [0.329] | [0.003] | |
| Observations | 329 | 329 | 329 | 674 | 674 | 674 |
| $R^2$ | 0.329 | 0.329 | 0.329 | 0.222 | 0.222 | 0.222 |
| | 2016 | | | 2020 | | |
| | (7) | (8) | (9) | (10) | (11) | (12) |
| Partisanship | -18.220 | 8.444 | 2.158 | -13.166 | 20.789 | 0.633 |
| | [0.024] | [0.015] | [0.276] | [0.147] | [0.000] | [0.467] |
| Partisanship * Surprise | 2.529 | -0.302 | 8.374 | -10.064 | -14.542 | 0.692 |
| | [0.770] | [0.952] | [0.824] | [0.374] | [0.098] | [0.753] |
| Female | -5.132 | 2.863 | | -0.924 | -3.883 | |
| | [0.005] | [0.148] | | [0.777] | [0.050] | |
| Age | 0.018 | 0.250 | | -0.407 | 0.055 | |
| | [0.788] | [0.001] | | [0.000] | [0.451] | |
| Not White/Caucasian | -5.993 | 3.561 | | -12.500 | -2.093 | |
| | [0.004] | [0.186] | | [0.013] | [0.402] | |
| Employed | -2.183 | -0.666 | | -0.853 | -1.116 | |
| | [0.270] | [0.737] | | [0.813] | [0.700] | |
| Married or Living with a Partner | 1.447 | -6.591 | | 2.071 | -3.557 | |
| | [0.421] | [0.003] | | [0.555] | [0.106] | |
| Observations | 1,034 | 1,034 | 1,034 | 635 | 635 | 635 |
| $R^2$ | 0.471 | 0.471 | 0.471 | 0.56 | 0.56 | 0.56 |

*Notes.* This table presents OLS regressions of change in happiness on demographic variables and their interactions with the dummy for supporting the winner for each individual year. P values in brackets. P values in columns (1), (2), (3), (4), (5), (6), (8) and (9) are testing against 0, but in (3), (6), (7) and (10) are testing against 1. Full results in Appendix E Table 33.

These analyses confirm our previous results that 2016 and 2020 were somehow "more important" in that they tend to induce stronger hedonic reactions.

Table 33 presents the complete results for Tables 31 and 32.

Table 33: Heterogeneity in Demographics (Full Results)

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | 4 years | 2008 | 2012 | 2016 | 2020 |
| Partisanship * Change in *Status Quo* | -10.779 | | | | |
| | (-5.540) | | | | |
| Partisanship * Change in *Status Quo* * Supporting the Winner | 24.298 | | | | |
| | (10.360) | | | | |
| Partisanship | | -0.220 | 7.286 | -18.220 | -13.166 |
| | | (-0.037) | (1.147) | (-2.265) | (-1.452) |
| Partisanship *Supporting the Winner | | 3.959 | -7.253 | 26.664 | 33.955 |
| | | (0.440) | (-1.030) | (3.119) | (3.445) |
| Partisanship * Surprise | -15.590 | -27.187 | -33.706 | 2.529 | -10.064 |
| | (-5.154) | (-3.636) | (-3.616) | (0.293) | (-0.890) |
| Partisanship * Surprise * Supporting the Winner | 17.428 | 29.930 | 39.808 | -2.831 | -4.478 |
| | (4.020) | (2.310) | (3.526) | (-0.286) | (-0.315) |
| Female * Supporting the Winner | 1.905 | -2.735 | 1.882 | 7.995 | -2.959 |
| | (1.225) | (-0.662) | (0.619) | (2.987) | (-0.781) |
| Age * Supporting the Winner | 0.185 | 0.012 | 0.078 | 0.232 | 0.462 |
| | (4.323) | (0.083) | (0.902) | (2.503) | (4.579) |
| Not White/Caucasian * Supporting the Winner | 7.838 | 4.481 | -5.904 | 9.554 | 10.407 |
| | (4.737) | (0.572) | (-1.179) | (2.957) | (1.850) |
| Employed * Supporting the Winner | -1.873 | 0.301 | -5.345 | 1.517 | -0.263 |
| | (-1.052) | (0.037) | (-1.195) | (0.579) | (-0.064) |
| Married * Supporting the Winner | -4.367 | -1.629 | 0.939 | -8.038 | -5.628 |
| | (-2.797) | (-0.429) | (0.312) | (-2.908) | (-1.460) |
| Female | -2.540 | -1.126 | -1.593 | -5.132 | -0.924 |
| | (-2.161) | (-0.402) | (-0.741) | (-2.827) | (-0.283) |
| Age | -0.090 | 0.104 | -0.117 | 0.018 | -0.407 |
| | (-2.317) | (0.956) | (-1.642) | (0.269) | (-4.264) |
| Not White/Caucasian | -9.618 | -2.692 | 5.349 | -5.993 | -12.500 |
| | (-7.192) | (-0.410) | (1.191) | (-2.867) | (-2.478) |
| Hispanic | 0.884 | 8.496 | 0.568 | 0.576 | 0.929 |
| | (0.625) | (1.256) | (0.247) | (0.234) | (0.287) |
| Employed | -0.799 | 5.324 | -8.366 | -2.183 | -0.853 |
| | (-0.532) | (0.872) | (-2.422) | (-1.105) | (-0.237) |
| Married or Living with a Partner | 1.099 | -0.102 | -2.433 | 1.447 | 2.071 |
| | (0.878) | (-0.037) | (-0.978) | (0.805) | (0.590) |
| Constants | 26.211 | 6.893 | 17.036 | -30.174 | 22.959 |
| | (6.636) | (0.416) | (2.410) | (-4.361) | (2.598) |
| Observations | 2,672 | 329 | 674 | 1,034 | 635 |
| $R^2$ | 0.421 | 0.329 | 0.222 | 0.471 | 0.560 |

*Notes.* This table presents the OLS regressions of change in happiness on the demographical variables and their interaction with the dummy of supporting the winner. T statistics in parentheses. Column (1) shows the results with the full sample, and columns (2) to (5) show the results for each individual year.

# F Additional Robustness Checks

This appendix contains additional robustness checks on our results using an alternative measure of happiness and three alternative measures of partisanship.

## F.1 Alternative measures of happiness

In our survey we also collected a second measurement of happiness based on the the average answers to four questions.[28] We again scale the responses so that happiness is on a 0 to 100 scale. In Columns (1) and (2) we rerun our baseline estimation of the static model, i.e. the specification used for the first column of Table 11; while in Columns (3) and (4) we replicate the dynamic model for Table 16 but in both cases using our alternative measure of happiness. This alternative measure provides noisier estimates, but the results for surprise and partisanship are qualitatively consistent with those found in the paper.

[28]The four questions are as follows. Much of the time during the past week, you felt you were happy. Would you say yes of no? Much of the time during the past week, you felt sad. Would you say yes or no? Much of the time during the past week, you enjoyed life. Would you say yes or no? Much of the time during the past week, you felt depresses. Would you say yes or no?

Table 34: Regressions With Alternative Measure of Change in Happiness

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Strong Republican | 1.994 | 10.591** | | |
| | (1.205) | (2.252) | | |
| Mediate Republican | 3.902** | 13.301*** | | |
| | (2.252) | (2.845) | | |
| Weak Republican | 3.030 | 13.539*** | | |
| | (1.644) | (2.854) | | |
| Weak Democrat | 2.589* | 11.922*** | | |
| | (1.717) | (2.602) | | |
| Mediate Democrat | 2.117* | 11.341** | | |
| | (1.724) | (2.550) | | |
| Strong Democrat | 3.095*** | 13.881*** | | |
| | (3.981) | (3.162) | | |
| Strong Republican * Change in *Status Quo* | -12.643*** | -13.506*** | -12.512*** | -13.637*** |
| | (-11.710) | (-11.221) | (-11.588) | (-11.315) |
| Mediate Republican * Change in *Status Quo* | -11.157*** | -11.477*** | -10.562*** | -11.288*** |
| | (-8.745) | (-8.125) | (-8.419) | (-8.109) |
| Weak Republican * Change in *Status Quo* | -8.523*** | -9.226*** | -8.298*** | -9.186*** |
| | (-7.857) | (-7.420) | (-7.768) | (-7.461) |
| Weak Democrat * Change in *Status Quo* | -12.620*** | -12.784*** | -12.431*** | -12.822*** |
| | (-4.444) | (-4.125) | (-4.311) | (-4.134) |
| Mediate Democrat * Change in *Status Quo* | -12.265*** | -10.730*** | -11.777*** | -11.016*** |
| | (-4.079) | (-2.924) | (-3.966) | (-3.025) |
| Strong Democrat * Change in *Status Quo* | -10.892 | -11.997 | -10.206 | -11.535 |
| | (-1.499) | (-1.435) | (-1.363) | (-1.357) |
| Strong Republican * Change in *Status Quo* * Supporting the Winner | -1.838 | 22.802*** | -0.709 | 21.158*** |
| | (-0.165) | (4.139) | (-0.063) | (4.038) |
| Mediate Republican * Change in *Status Quo* * Supporting the Winner | 12.485*** | 12.937*** | 13.543*** | 13.164*** |
| | (4.797) | (4.488) | (5.327) | (4.652) |
| Weak Republican * Change in *Status Quo* * Supporting the Winner | 14.645*** | 13.996*** | 15.159*** | 14.243*** |
| | (6.017) | (5.407) | (6.315) | (5.632) |
| Weak Democrat * Change in *Status Quo* * Supporting the Winner | 21.429*** | 22.375*** | 22.100*** | 22.239*** |
| | (6.992) | (6.655) | (7.211) | (6.729) |
| Mediate Democrat * Change in *Status Quo* * Supporting the Winner | 19.241*** | 18.266*** | 19.475*** | 18.121*** |
| | (6.148) | (4.869) | (6.223) | (4.807) |
| Strong Democrat * Change in *Status Quo* * Supporting the Winner | 22.819*** | 23.434*** | 23.389*** | 23.666*** |
| | (3.123) | (2.788) | (3.106) | (2.770) |
| Strong Republican * Surprise | -8.920*** | -6.885** | -6.317*** | -9.218*** |
| | (-3.407) | (-2.335) | (-5.225) | (-5.702) |
| Mediate Republican * Surprise | -7.107** | -6.669** | -2.071 | -5.621*** |
| | (-2.531) | (-2.136) | (-1.270) | (-2.823) |
| Weak Republican * Surprise | -7.282** | -7.675** | -2.982** | -6.007*** |
| | (-2.347) | (-2.087) | (-2.307) | (-3.284) |
| Weak Democrat * Surprise | 2.073 | 2.329 | 6.001* | 1.619 |
| | (0.532) | (0.554) | (1.891) | (0.484) |
| Mediate Democrat * Surprise | -0.918 | -3.858 | 1.660 | -5.215 |
| | (-0.269) | (-0.876) | (0.524) | (-1.203) |
| Strong Democrat * Surprise | 7.638 | 8.293 | 11.577 | 10.033 |
| | (0.878) | (0.761) | (1.305) | (0.907) |
| Strong Republican * Surprise * Supporting the Winner | 36.699 | -23.351*** | 35.985 | -21.221*** |
| | (1.505) | (-2.760) | (1.471) | (-2.612) |
| Mediate Republican * Surprise * Supporting the Winner | 1.996 | 2.308 | 2.951 | 2.391 |
| | (0.433) | (0.451) | (0.636) | (0.467) |
| Weak Republican * Surprise * Supporting the Winner | -4.657 | -1.046 | -3.567 | -0.819 |
| | (-1.157) | (-0.255) | (-0.884) | (-0.200) |
| Weak Democrat * Surprise * Supporting the Winner | -6.203* | -6.473* | -5.842 | -6.555* |
| | (-1.721) | (-1.676) | (-1.581) | (-1.699) |
| Mediate Democrat * Surprise * Supporting the Winner | 0.367 | 3.710 | 1.200 | 3.452 |
| | (0.097) | (0.773) | (0.325) | (0.724) |
| Strong Democrat * Surprise * Supporting the Winner | -8.153 | -10.107 | -6.547 | -9.625 |
| | (-0.926) | (-0.919) | (-0.726) | (-0.859) |
| Observations | 12802 | 10862 | 12802 | 10862 |
| $R^2$ | 0.233 | 0.270 | 0.230 | 0.269 |

*Notes.* T statistics in parentheses.
Control variables include: gender, age, race, being a hispanic or not, employment status, marriage status and income levels.

## F.2 Alternative measures of partisanship

Previously we assumed that the effects of partisanship were linear, given our scale of measurement (where the values were $1/3$, $2/3$ and $1$). We readily admit that this may represent a substantive assumption about the structure of partisanship. In order to ensure that our results do not depend on this, we re-rerun our baseline static regression (as reported in Column 1 of Table 11) but individually for each level of partisanship by the supporting political party, i.e., strong Republican, mediate Republican, weak Republican, weak Democrat, mediate Democrat and Strong Democrat. We also examine the interaction effects with change in status quo and surprise.

Table 35: Regressions With Alternative Measure of Partisanship

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Strong Republican | 4.666 | 3.611 | | |
| | (3.334) | (1.034) | | |
| Mediate Republican | 6.161 | 5.847 | | |
| | (4.420) | (1.695) | | |
| Weak Republican | 6.571 | 7.032 | | |
| | (5.107) | (2.067) | | |
| Weak Democrat | 3.729 | 4.573 | | |
| | (3.228) | (1.387) | | |
| Mediate Democrat | 4.466 | 4.591 | | |
| | (4.195) | (1.416) | | |
| Strong Democrat | 2.419 | 3.653 | | |
| | (3.656) | (1.154) | | |
| Strong Republican * Change in *Status Quo* | -11.950 | -12.334 | -11.605 | -12.342 |
| | (-13.042) | (-11.795) | (-12.634) | (-11.846) |
| Mediate Republican * Change in *Status Quo* | -8.190 | -8.515 | -7.016 | -8.168 |
| | (-8.471) | (-7.533) | (-7.534) | (-7.554) |
| Weak Republican * Change in *Status Quo* | -5.869 | -6.562 | -4.993 | -6.133 |
| | (-7.122) | (-6.649) | (-6.212) | (-6.384) |
| Weak Democrat * Change in *Status Quo* | 5.321 | 5.700 | 6.360 | 5.790 |
| | (6.018) | (5.684) | (7.720) | (6.334) |
| Mediate Democrat * Change in *Status Quo* | 4.770 | 5.835 | 6.160 | 5.924 |
| | (5.233) | (5.789) | (7.421) | (6.445) |
| Strong Democrat * Change in *Status Quo* | 10.545 | 10.416 | 11.464 | 10.136 |
| | (15.133) | (12.359) | (16.911) | (12.502) |
| Strong Republican * Surprise | -12.278 | -11.440 | -6.074 | -12.464 |
| | (-5.435) | (-4.430) | (-6.158) | (-9.329) |
| Mediate Republican * Surprise | -12.274 | -11.928 | -4.136 | -10.080 |
| | (-5.613) | (-4.705) | (-3.498) | (-6.517) |
| Weak Republican * Surprise | -13.757 | -13.355 | -4.332 | -9.601 |
| | (-6.244) | (-4.970) | (-4.319) | (-6.424) |
| Weak Democrat * Surprise | -6.417 | -8.345 | -0.198 | -8.001 |
| | (-2.746) | (-3.138) | (-0.150) | (-4.693) |
| Mediate Democrat * Surprise | -7.702 | -9.758 | -0.728 | -9.413 |
| | (-3.520) | (-4.142) | (-0.515) | (-5.429) |
| Strong Democrat * Surprise | 1.893 | -0.013 | 6.483 | -1.257 |
| | (1.003) | (-0.006) | (5.097) | (-0.663) |
| Controls | No | Yes | No | Yes |
| State Fixed Effects | No | Yes | No | Yes |
| Observations | 17213 | 13852 | 17213 | 13852 |
| $R^2$ | 0.175 | 0.214 | 0.167 | 0.214 |

*Notes.* T statistics in parentheses.
Control variables include: gender, age, race, being a hispanic or not, employment status, marriage status and income levels.

As it is shown in Table 35, individuals with stronger partisanship experience a greater change in happiness with a change in *Status Quo*.

Next, motivated by the fact that party affiliation might not be the only way of measuring partisanship, we construct an alternative measure of partisanship based on the feeling thermometer for the candidate,

i.e., the warmth felt towards the presidential candidate who won the election, minus the warmth felt to the presidential candidate who lost. In Columns (1) and (2) we rerun the basic estimation of the static model, i.e., the specification used in the first column of Table 11; while in Columns (3) and (4) we replicate the dynamic model reported in Table 16 but in both cases using our alternative definition of partisanship. The results are reported in Table 36.

Table 36: Regressions With Warmth Towards President

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Partisanship * Change in *Status Quo* | -0.177 | -0.184 | -0.189 | -0.205 |
| | (-15.585) | (-13.100) | (-13.317) | (-11.833) |
| Partisanship * Change in *Status Quo** Supporting the Winner | 0.317 | 0.331 | 0.347 | 0.376 |
| | (22.489) | (20.065) | (20.364) | (18.969) |
| Partisanship * Surprise | -0.063 | -0.052 | -0.110 | -0.095 |
| | (-4.441) | (-2.973) | (-6.182) | (-4.273) |
| Partisanship * Surprise * Supporting the Winner | 0.119 | 0.115 | 0.198 | 0.183 |
| | (5.623) | (4.570) | (7.830) | (6.175) |
| Days After Election | | | 0.877 | 0.783 |
| | | | (1.520) | (1.200) |
| Days After Election * Supporting the Winner | | | -1.011 | -1.036 |
| | | | (-1.572) | (-1.416) |
| Partisanship * Days After Election | | | -0.017 | -0.017 |
| | | | (-2.146) | (-1.777) |
| Partisanship * Days After Election * Supporting the Winner | | | 0.023 | 0.025 |
| | | | (2.643) | (2.435) |
| Change in *Status Quo* * Days After Election | | | -0.299 | -0.220 |
| | | | (-1.126) | (-0.744) |
| Change in *Status Quo* * Days After Election * Supporting the Winner | | | 0.050 | 0.157 |
| | | | (0.133) | (0.383) |
| Surprise * Days After Election | | | -0.729 | -0.610 |
| | | | (-0.693) | (-0.518) |
| Surprise * Days After Election * Supporting the Winner | | | 0.952 | 0.784 |
| | | | (0.742) | (0.545) |
| Partisanship * Change in *Status Quo* * Days After Election | | | 0.019 | 0.020 |
| | | | (4.349) | (4.046) |
| Partisanship * Change in *Status Quo* * Days After Election * Supporting the Winner | | | -0.024 | -0.031 |
| | | | (-4.046) | (-4.662) |
| Partisanship * Surprise * Days After Election | | | 0.032 | 0.031 |
| | | | (2.329) | (1.888) |
| Partisanship * Surprise * Days After Election * Supporting the Winner | | | -0.049 | -0.046 |
| | | | (-2.787) | (-2.289) |
| Income Controls | No | Yes | No | Yes |
| State Fixed Effects | No | Yes | No | Yes |
| Constants | 0.353 | 13.466 | -0.228 | 11.699 |
| | (0.910) | (4.399) | (-0.498) | (3.153) |
| Observations | 9,988 | 8,291 | 9,988 | 8,291 |
| $R^2$ | 0.235 | 0.283 | 0.257 | 0.306 |

*Notes.* T statistics in parentheses.
Control variables include: gender, age, race, being a hispanic or not, employment status, marriage status and income levels.

Another alternative partisanship measure is based on warmth towards ticket (i.e. the president and vice president). To construct this measure, we sum up the warmth towards president plus warmth towards the vice president. We then replicate the exercise conducted underlying Table 36. The results are reported in Table 37.

Table 37: Regressions with Warmth towards President and Vice President

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Partisanship * Change in *Status Quo* | -0.099 | -0.100 | -0.107 | -0.114 |
| | (-16.621) | (-13.653) | (-14.610) | (-12.641) |
| Partisanship * Change in *Status Quo** Supporting the Winner | 0.174 | 0.179 | 0.194 | 0.208 |
| | (23.642) | (20.622) | (21.952) | (20.000) |
| Partisanship * Surprise | -0.039 | -0.039 | -0.064 | -0.062 |
| | (-5.363) | (-4.214) | (-7.118) | (-5.392) |
| Partisanship * Surprise * Supporting the Winner | 0.066 | 0.064 | 0.111 | 0.103 |
| | (5.907) | (4.788) | (8.189) | (6.447) |
| Days After Election | | | 0.823 | 0.551 |
| | | | (1.672) | (1.001) |
| Days After Election * Supporting the Winner | | | -0.849 | -0.824 |
| | | | (-1.497) | (-1.278) |
| Partisanship * Days After Election | | | -0.008 | -0.007 |
| | | | (-2.182) | (-1.620) |
| Partisanship * Days After Election * Supporting the Winner | | | 0.011 | 0.012 |
| | | | (2.702) | (2.555) |
| Change in *Status Quo* * Days After Election | | | -0.204 | -0.048 |
| | | | (-0.753) | (-0.161) |
| Change in *Status Quo* * Days After Election * Supporting the Winner | | | 0.073 | 0.188 |
| | | | (0.196) | (0.460) |
| Surprise * Days After Election | | | -0.525 | -0.244 |
| | | | (-0.592) | (-0.248) |
| Surprise * Days After Election * Supporting the Winner | | | 0.846 | 0.712 |
| | | | (0.740) | (0.556) |
| Partisanship * Change in *Status Quo* * Days After Election | | | 0.010 | 0.010 |
| | | | (4.386) | (3.989) |
| Partisanship * Change in *Status Quo* * Days After Election * Supporting the Winner | | | -0.014 | -0.018 |
| | | | (-4.653) | (-5.364) |
| Partisanship * Surprise * Days After Election | | | 0.015 | 0.014 |
| | | | (2.487) | (1.989) |
| Partisanship * Surprise * Days After Election * Supporting the Winner | | | -0.026 | -0.025 |
| | | | (-3.222) | (-2.800) |
| Income Controls | No | Yes | No | Yes |
| State Fixed Effects | No | Yes | No | Yes |
| Constants | 0.443 | 13.962 | -0.316 | 11.688 |
| | (1.156) | (4.987) | (-0.693) | (3.469) |
| Observations | 9,841 | 8,210 | 9,841 | 8,210 |
| $R^2$ | 0.241 | 0.289 | 0.265 | 0.315 |

*Notes.* T statistics in parentheses.
Control variables include: gender, age, race, being a Hispanic or not, employment status, marriage status and income levels.

We find that the results in Table 36 and 37 are qualitatively similar to each, as well as to our main specification, both in direction and significance. The main difference is that the effect sizes become smaller compared to the specification in the body of the paper.

# G Survey Instrument

This appendix contains the survey questions from all the three rounds of our 2020 survey.[29]

[29] Our surveys for previous presidential elections are essentially the same as the 2020 survey.

# Survey Wave 1

Start of Block: Feelings

How happy do you feel today?

- O Extremely happy (1)
- O Very happy (2)
- O Quite happy (3)
- O Somewhat happy (4)
- O Somewhat unhappy (5)
- O Quite unhappy (6)
- O Very unhappy (7)
- O Extremely unhappy (8)

Much of the time during the past week, you felt you were happy.

Would you say yes or no?

- O Yes (1)
- O No (2)

1/27

Much of the time during the past week, you felt sad.

Would you say yes or no?

- O Yes (1)
- O No (2)

Much of the time during the past week, you enjoyed life.

Would you say yes or no?

- O Yes (1)
- O No (2)

Much of the time during the past week, you felt depressed.

Would you say yes or no?

- O Yes (1)
- O No (2)

How much time have you spent thinking about the election in the last hour?

▼ 0–5 minutes (1) ... 55–60 minutes (12)

People often care a great deal about their own personal lives. On a typical day, most people get good news or bad news (or both) about their personal lives. How strong would you say your positive and negative emotional reactions are to the good and bad news that comes in a typical day?

- O Very strong (1)
- O Quite strong (2)
- O Not so strong (3)
- O Muted (4)

How strongly do you agree with the following statement?

"My personal life from day to day is like a roller coaster."

- O Strongly agree (1)
- O Agree (2)
- O Agree somewhat (3)
- O Neither agree nor disagree (4)
- O Disagree somewhat (5)
- O Disagree (6)
- O Strongly disagree (7)

**End of Block: Feelings**

**Start of Block: Demographics**

In what year were you born?

▼ 2003 (1) ... 1900 (104)

3/27

Were you born in the United States?

- O Yes (1)
- O No (2)

*Display This Question:*

*If Were you born in the United States? = Yes*

In what state were you born?

▼ ALASKA (AK) (1) ... PUERTO RICO (52)

What is your age?

▼ 17 (1) ... 120 (104)

What is your gender?

- O Male (1)
- O Female (2)
- O Nonbinary (3)

Are you a citizen of the United States?

- O Yes (1)
- O No (2)

Not counting your work on MTurk, what is your current employment situation?

- O Working Now (1)
- O Unemployed and looking for work (2)
- O Temporarily laid off, on sick or other leave (3)
- O Disabled (4)
- O Retired (5)
- O Homemaker (6)
- O Other (7)

For your current, main job outside of MTurk, do you work for someone else, are you self-employed, or what?

- O Work for someone else (1)
- O Self-employed (2)
- O Other (3)

What is your current living situation?

- O Married or living with a partner (1)
- O Separated (2)
- O Divorced (3)
- O Widowed (4)
- O Never married (5)

Do you consider yourself primarily white or Caucasian, Black or African American, American Indian, or Asian?

- O White/Caucasian (1)
- O Black/African American (2)
- O American Indian or Alaskan Native (3)
- O Asian or Pacific Islander (4)
- O Other (5)

*Display This Question:*

*If Do you consider yourself primarily white or Caucasian, Black or African American, American Indian... = Asian or Pacific Islander*

Are you Asian or Pacific Islander?

- O Asian (1)
- O Pacific Islander (2)

Do you consider yourself Hispanic or Latino?

- O Yes (1)
- O No (2)

*Display This Question:*

*If Do you consider yourself Hispanic or Latino? = Yes*

Would you say that you are primarily Mexican American, Puerto Rican, Cuban, or something else?

- O Mexican American (1)
- O Puerto Rican (2)
- O Cuban (3)
- O Something else (4)

Which category represents the total combined income of all members of your family (living here) during the past 12 months?

This includes money from jobs, net income from business, farm or rent, pensions, dividends, interest, social security payments and any other money income received by members of your family who are 15 years of age or older.

▼ Less than $5,000 (1) ... $75,000 or more (14)

*Display This Question:*

*If Which category represents the total combined income of all members of your family (living here) d... = $75,000 or more*

You told us that the total combined income of all members of your family (living here) during the preceding 12 months was more than $75,000. Thinking about the total combined income of your family from all sources, approximately how much did members of your family receive during the previous 12 months?

▼ $75,000-$99,999 (1) ... $200,000 or more (4)

How many members are there in your immediate family (living with you; **include yourself**)?

▼ 1 (2) ... 10 (11)

What is the highest level of school you have completed or the highest degree you have received?

▼ Less than 1st grade (1) ... Doctorate degree (For example: PhD, EdD) (16)

In which state do you currently reside?

▼ ALASKA (AK) (1) ... PUERTO RICO (52)

Which of the following categories best describes the type of work you do?

▼ Management Occupations (1) ... Transportation and Material Moving Occupations (22)

**End of Block: Demographics**

**Start of Block: Political Preferences/Beliefs 1 Trump**

Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or what?

- O Republican (1)
- O Democrat (2)
- O Independent (3)
- O Other, please specify (4) _____

*Display This Question:*

*If Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent,... = Republican*

Would you call yourself a strong Republican or a not so strong Republican?

- O Strong (1)
- O Not so strong (2)

*Display This Question:*

*If Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent,... = Democrat*

Would you call yourself a strong Democrat or a not so strong Democrat?

- O Strong (1)
- O Not so strong (2)

*Display This Question:*

*If Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent,... = Independent*

*Or Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent,... = Other, please specify*

Do you think of yourself as closer to the Republican Party or to the Democratic Party?

- O Closer to Republican (1)
- O Closer to Democratic (2)

Regardless of how you intend to vote, who do you think will actually be elected President—Donald Trump, the Republican, or Joe Biden, the Democrat?

- O Donald Trump (1)
- O Joe Biden (2)

*Display This Question:*

*If Regardless of how you intend to vote, who do you think will actually be elected President—Donald... = Donald Trump*

What is the percent chance that the elected president will be
Donald Trump? : _____ (1)
Joe Biden? : _____ (2)
Total : _____

*Display This Question:*

*If Regardless of how you intend to vote, who do you think will actually be elected President—Donald... = Joe Biden*

What is the percent chance that the elected president will be
Joe Biden? : _____ (1)
Donald Trump? : _____ (2)
Total : _____

What do you think opinion polls say about the percentage of voters who support Biden or Trump?
Joe Biden : _____ (1)
Donald Trump : _____ (2)
Total : _____

Do you think opinion polls overstate the level of support for Joe Biden relative to Donald Trump?

O Yes (1)

O No (2)

Focusing on the difference in their polling numbers, by how many percentage points do you think opinion polls overstate the level of support for Joe Biden relative to Donald Trump?

▼ 0 (1) ... 100 (101)

Have you already voted?

- O Yes (1)
- O No (2)

*Display This Question:*
*If Have you already voted? = Yes*

Who did you vote for?

- O Joe Biden (1)
- O Donald Trump (2)
- O Other (3)

*Display This Question:*
*If Have you already voted? = No*

What is the percent chance that you will vote?

▼ 0 (4) ... 100 (106)

*Display This Question:*
*If Have you already voted? = No*

If you vote, who will you vote for?

- O Joe Biden (1)
- O Donald Trump (2)
- O Other (3)

*Display This Question:*

*If If you vote, who will you vote for? = Joe Biden*

If you vote, what is the percent chance that you will vote for
Joe Biden? : _____ (1)
Donald Trump? : _____ (2)
Total : _____

*Display This Question:*

*If If you vote, who will you vote for? = Donald Trump*

If you vote, what is the percent chance that you will vote for
Donald Trump? : _____ (1)
Joe Biden? : _____ (2)
Total : _____

Out of the two major party candidates, Joe Biden and Donald Trump, whom would you prefer to have as president?

- O Joe Biden (1)
- O Donald Trump (2)

Generally speaking, would you say that you personally care a good deal who wins the presidential election this fall, or that you don't care very much who wins?

- O Care a good deal (1)
- O Don't care very much (2)

**End of Block: Political Preferences/Beliefs 1 Trump**

**Start of Block: Political Preferences/Beliefs 1 Biden**

Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or what?

- O Republican (1)
- O Democrat (2)
- O Independent (3)
- O Other, please specify (4) _____

*Display This Question:*

*If Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent,... = Republican*

Would you call yourself a strong Republican or a not so strong Republican?

- O Strong (1)
- O Not so strong (2)

*Display This Question:*

*If Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent,... = Democrat*

Would you call yourself a strong Democrat or a not so strong Democrat?

- O Strong (1)
- O Not so strong (2)

*Display This Question:*

*If Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent,... = Independent*

*Or Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent,... = Other, please specify*

Do you think of yourself as closer to the Republican Party or to the Democratic Party?

O Closer to Republican (1)

O Closer to Democratic (2)

Regardless of how you intend to vote, who do you think will actually be elected President—Joe Biden, the Democrat, or Donald Trump, the Republican?

O Joe Biden (1)

O Donald Trump (2)

*Display This Question:*

*If Regardless of how you intend to vote, who do you think will actually be elected President—Joe Bid... = Donald Trump*

What is the percent chance that the elected president will be
Donald Trump? : _____ (1)
Joe Biden? : _____ (2)
Total : _____

*Display This Question:*

*If Regardless of how you intend to vote, who do you think will actually be elected President—Joe Bid... = Joe Biden*

What is the percent chance that the elected president will be
Joe Biden? : _____ (1)
Donald Trump? : _____ (2)
Total : _____

What do you think opinion polls say about the percentage of voters who support Biden or Trump?
Joe Biden : _____ (1)
Donald Trump : _____ (2)
Total : _____

Do you think opinion polls overstate the level of support for Joe Biden relative to Donald Trump?

- O Yes (1)
- O No (2)

Focusing on the difference in their polling numbers, by how many percentage points do you think opinion polls overstate the level of support for Joe Biden relative to Donald Trump?

▼ 0 (1) ... 100 (101)

Have you already voted?

- O Yes (1)
- O No (2)

*Display This Question:*

*If Have you already voted? = Yes*

Who did you vote for?

- O Joe Biden (1)
- O Donald Trump (2)
- O Other (3)

*Display This Question:*

*If Have you already voted? = No*

What is the percent chance that you will vote?

▼ 0 (4) ... 100 (106)

*Display This Question:*

*If Have you already voted? = No*

If you vote, who will you vote for?

- O Joe Biden (1)
- O Donald Trump (2)
- O Other (3)

*Display This Question:*

*If If you vote, who will you vote for? = Joe Biden*

If you vote, what is the percent chance that you will vote for
Joe Biden? : _____ (1)
Donald Trump? : _____ (2)
Total : _____

*Display This Question:*

*If If you vote, who will you vote for? = Donald Trump*

If you vote, what is the percent chance that you will vote for
Donald Trump? : _____ (1)
Joe Biden? : _____ (2)
Total : _____

Out of the two major party candidates, Joe Biden and Donald Trump, whom would you prefer to have as president?

- O Joe Biden (1)
- O Donald Trump (2)

Generally speaking, would you say that you personally care a good deal who wins the presidential election this fall, or that you don't care very much who wins?

- O Care a good deal (1)
- O Don't care very much (2)

**End of Block: Political Preferences/Beliefs 1 Biden**

**Start of Block: Political Preferences/Beliefs 2 Trump**

On a scale from 0 to 100, please rate the following people in terms of how favorable and warm you feel toward each person.

Remember: Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward the person. Ratings between 0 degrees and 50 degrees mean that you don't feel favorable toward the person. Rating the person at the midpoint, 50 degrees, means that you don't feel particularly warm or cold toward the person.

One person is **Donald Trump.** Where on the feeling thermometer would you rate Donald Trump?

▼ 100 (1) ... 0 (201)

The next person is **Joe Biden**. Where on the feeling thermometer would you rate Joe Biden?

▼ 100 (1) ... 0 (201)

The next person is **Kamala Harris**. Where on the feeling thermometer would you rate Kamala Harris?

▼ 100 (1) ... 0 (201)

The next person is **Mike Pence**. Where on the feeling thermometer would you rate Mike Pence?

▼ 100 (1) ... 0 (201)

*Display This Question:*

*If Who did you vote for? = Donald Trump*

*Or If you vote, who will you vote for? = Donald Trump*

*Or Who did you vote for? = Donald Trump*

*Or If you vote, who will you vote for? = Donald Trump*

Looking ahead at the next four years, how much worse off do you think the country would be with Joe Biden as president than with Donald Trump as president?

- O Dramatically worse off (1)
- O Much worse off (2)
- O Somewhat worse off (3)
- O A little worse off (4)
- O Not any worse off (5)

*Display This Question:*

*If Who did you vote for? = Donald Trump*

*Or If you vote, who will you vote for? = Donald Trump*

*Or Who did you vote for? = Donald Trump*

*Or If you vote, who will you vote for? = Donald Trump*

How much would you be willing to pay to have Donald Trump be elected president? (Please enter a dollar amount.)

▼ 0 (6) ... more than $30,000 (18)

*Display This Question:*

*If Who did you vote for? = Joe Biden*

*Or If you vote, who will you vote for? = Joe Biden*

*Or Who did you vote for? = Joe Biden*

*Or If you vote, who will you vote for? = Joe Biden*

Looking ahead at the next four years, how much worse off do you think the country would be with Donald Trump as president than with Joe Biden as president?

- O Dramatically worse off (1)
- O Much worse off (2)
- O Somewhat worse off (3)
- O A little worse off (4)
- O Not any worse off (5)

*Display This Question:*

*If Who did you vote for? = Joe Biden*

*Or If you vote, who will you vote for? = Joe Biden*

*Or Who did you vote for? = Joe Biden*

*Or If you vote, who will you vote for? = Joe Biden*

How much would you be willing to pay to have Joe Biden be elected president?

▼ $0 (6) ... more than $30,000 (18)

Do you know which party currently has the most members in the House of Representatives in Washington D.C.?

- O Yes (1)
- O No (2)

*Display This Question:*

*If Do you know which party currently has the most members in the House of Representatives in Washing... = Yes*

Which party?

- O Democratic (1)
- O Republican (2)

Do you know which party has currently the most members in the Senate in Washington, D.C.?

- O Yes (1)
- O No (2)

*Display This Question:*

*If Do you know which party currently has the most members in the House of Representatives in Washing... = Yes*

Which party?

- O Republican (1)
- O Democratic (2)

During this presidential election season, did you wear a campaign button, put a campaign sticker on your car, or place a campaign sign in your window or in front of your house for any presidential candidate running for president this year?

O Yes (1)

O No (2)

During an election year people are often asked to make a contribution to support campaigns. Did you give money to a presidential campaign of anyone running for president?

O Yes (1)

O No (2)

**End of Block: Political Preferences/Beliefs 2 Trump**

**Start of Block: Political Preferences/Beliefs 2 Biden**

On a scale from 0 to 100, please rate the following people in terms of how favorable and warm you feel toward each person.

Remember: Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward the person. Ratings between 0 degrees and 50 degrees mean that you don't feel favorable toward the person. Rating the person at the midpoint, 50 degrees, means that you don't feel particularly warm or cold toward the person.

One person is **Joe Biden**. Where on the feeling thermometer would you rate Joe Biden?

▼ 100 (1) ... 0 (201)

The next person is **Donald Trump**. Where on the feeling thermometer would you rate Donald Trump?

▼ 100 (1) ... 0 (201)

The next person is **Kamala Harris**. Where on the feeling thermometer would you rate Kamala Harris?

▼ 100 (1) ... 0 (201)

The next person is **Mike Pence**. Where on the feeling thermometer would you rate Mike Pence?

▼ 100 (1) ... 0 (201)

*Display This Question:*

*If Who did you vote for? = Donald Trump*

*Or If you vote, who will you vote for? = Donald Trump*

*Or Who did you vote for? = Donald Trump*

*Or If you vote, who will you vote for? = Donald Trump*

Looking ahead at the next four years, how much worse off do you think the country would be with Joe Biden as president than with Donald Trump as president?

- O Dramatically worse off (1)
- O Much worse off (2)
- O Somewhat worse off (3)
- O A little worse off (4)
- O Not any worse off (5)

*Display This Question:*

*If Who did you vote for? = Donald Trump*

*Or If you vote, who will you vote for? = Donald Trump*

*Or Who did you vote for? = Donald Trump*

*Or If you vote, who will you vote for? = Donald Trump*

How much would you be willing to pay to have Donald Trump be elected president? (Please enter a dollar amount.)

▼ 0 (6) ... more than $30,000 (18)

*Display This Question:*

*If Who did you vote for? = Joe Biden*

*Or If you vote, who will you vote for? = Joe Biden*

*Or Who did you vote for? = Joe Biden*

*Or If you vote, who will you vote for? = Joe Biden*

Looking ahead at the next four years, how much worse off do you think the country would be with Donald Trump as president than with Joe Biden as president?

- O Dramatically worse off (1)
- O Much worse off (2)
- O Somewhat worse off (3)
- O A little worse off (4)
- O Not any worse off (5)

*Display This Question:*

*If Who did you vote for? = Joe Biden*

*Or If you vote, who will you vote for? = Joe Biden*

*Or Who did you vote for? = Joe Biden*

*Or If you vote, who will you vote for? = Joe Biden*

How much would you be willing to pay to have Joe Biden be elected president?

▼ $0 (6) ... more than $30,000 (18)

Do you know which party currently has the most members in the House of Representatives in Washington D.C.?

- O Yes (1)
- O No (2)

*Display This Question:*

*If Do you know which party currently has the most members in the House of Representatives in Washing... = Yes*

Which party?

- O Democratic (1)
- O Republican (2)

Do you know which party has currently the most members in the Senate in Washington, D.C.?

- O Yes (1)
- O No (2)

*Display This Question:*

*If Do you know which party has currently the most members in the Senate in Washington, D.C.? = Yes*

Which party?

- O Republican (1)
- O Democratic (2)

During this presidential election season, did you wear a campaign button, put a campaign sticker on your car, or place a campaign sign in your window or in front of your house for any presidential candidate running for president this year?

- O Yes (1)
- O No (2)

During an election year people are often asked to make a contribution to support campaigns. Did you give money to a presidential campaign of anyone running for president?

- O Yes (1)
- O No (2)

**End of Block: Political Preferences/Beliefs 2 Biden**

**Start of Block: Economic Questions**

**A year from now**, do you expect that you will be:

- O better off financially (1)
- O just about the same as now financially (2)
- O worse off financially (3)

**A year from now**, do you expect that in the country as a whole business conditions will be:

- O better than they are at present (1)
- O just about the same as they are at present (2)
- O worse than they are at present (3)

How about people out of work during **the coming 12 months**—do you think that there will be:

- O more unemployment than now (1)
- O about the same unemployment as now (2)
- O less unemployment than now (3)

No one can say for sure, but what do you think will happen to interest rates for borrowing money during **the next 12 months**:

- O interest rates will go up (1)
- O interest rates will stay the same (2)
- O interest rates will go down (3)

During **the next 12 months**, do you think that **prices in general** will go up, or go down, or stay where they are now?

- O Go up (1)
- O Stay the same (2)
- O Go down (3)

*Display This Question:*

*If During the next 12 months, do you think that prices in general will go up, or go down, or stay wh... = Stay the same*

Do you mean that prices will go up at the same rate as now, or that prices in general will not go up during **the next 12 months**?

- O Will go up at same rate (1)
- O Will not go up (2)

*Display This Question:*

*If Do you mean that prices will go up at the same rate as now, or that prices in general will not go... = Will go up at same rate*

*Or During the next 12 months, do you think that prices in general will go up, or go down, or stay wh... = Go up*

By about what percent do you expect prices to go up on the average, during **the next 12 months**?

▼ 1 (1) ... 100 (100)

*Display This Question:*

*If During the next 12 months, do you think that prices in general will go up, or go down, or stay wh... = Go down*

By about what percent do you expect prices to go down on the average, during **the next 12 months**?

▼ 1 (1) ... 100 (100)

How would you describe yourself politically? (This is a crucial question. Please write at least **TWO** sentences.)

_____

_____

_____

_____

_____

**End of Block: Economic Questions**

# Survey Wave 2

Start of Block: Feelings

Who do you think won the presidential election?

- O Biden (1)
- O Trump (2)
- O It's still unclear (3)

*Display This Question:*

*If Who do you think won the presidential election? = It's still unclear*

What is the percent chance that the one elected president will be
Biden? : _____ (1)
Trump? : _____ (2)
Total : _____

How happy do you feel today?

- O Extremely happy (1)
- O Very happy (2)
- O Quite happy (3)
- O Somewhat happy (4)
- O Somewhat unhappy (5)
- O Quite unhappy (6)
- O Very unhappy (7)
- O Extremely unhappy (8)

Much of the time during the past week, you felt you were happy.

Would you say yes or no?

- O Yes (1)
- O No (2)

Much of the time during the past week, you felt sad.

Would you say yes or no?

- O Yes (1)
- O No (2)

Much of the time during the past week, you enjoyed life.

Would you say yes or no?

- O Yes (1)
- O No (2)

Much of the time during the past week, you felt depressed.

Would you say yes or no?

- O Yes (1)
- O No (2)

How much time have you spent thinking about the election in the last hour?

▼ 0–5 minutes (1) ... 55–60 minutes (12)

People often care a great deal about their own personal lives. On a typical day, most people get good news or bad news (or both) about their personal lives. How strong would you say your positive and negative emotional reactions are to the good and bad news that comes in a typical day?

- O Very strong (1)
- O Quite strong (2)
- O Not so strong (3)
- O Muted (4)

How strongly do you agree with the following statement?

"My personal life from day to day is like a roller coaster."

- O Strongly agree (1)
- O Agree (2)
- O Agree somewhat (3)
- O Neither agree nor disagree (4)
- O Disagree somewhat (5)
- O Disagree (6)
- O Strongly disagree (7)

**End of Block: Feelings**

# Survey Wave 3

Start of Block: Feelings

Who do you think won the presidential election?

- O Biden (1)
- O Trump (2)
- O It's still unclear (3)

*Display This Question:*
*If Who do you think won the presidential election? = It's still unclear*

What is the percent chance that the one elected president will be
Biden? : _____ (1)
Trump? : _____ (2)
Total : _____

How happy do you feel today?

- O Extremely happy (1)
- O Very happy (2)
- O Quite happy (3)
- O Somewhat happy (4)
- O Somewhat unhappy (5)
- O Quite unhappy (6)
- O Very unhappy (7)
- O Extremely unhappy (8)

Much of the time during the past week, you felt you were happy.

Would you say yes or no?

- O Yes (1)
- O No (2)

Much of the time during the past week, you felt sad.

Would you say yes or no?

- O Yes (1)
- O No (2)

Much of the time during the past week, you enjoyed life.

Would you say yes or no?

- O Yes (1)
- O No (2)

Much of the time during the past week, you felt depressed.

Would you say yes or no?

- O Yes (1)
- O No (2)

How much time have you spent thinking about the election in the last hour?

▼ 0–5 minutes (1) ... 55–60 minutes (12)

People often care a great deal about their own personal lives. On a typical day, most people get good news or bad news (or both) about their personal lives. How strong would you say your positive and negative emotional reactions are to the good and bad news that comes in a typical day?

- O Very strong (1)
- O Quite strong (2)
- O Not so strong (3)
- O Muted (4)

How strongly do you agree with the following statement?

"My personal life from day to day is like a roller coaster."

- O Strongly agree (1)
- O Agree (2)
- O Agree somewhat (3)
- O Neither agree nor disagree (4)
- O Disagree somewhat (5)
- O Disagree (6)
- O Strongly disagree (7)

**End of Block: Feelings**