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VERTICAL PROXIMITY EFFECTS IN THE CALIFORNIA RECALL ELECTION

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Vertical Proximity Effects in the California Recall Election

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Introduction

The 2003 California recall election provides a unique opportunity to assess the impact of variations in ballot design and voting methods on the voting accuracy of citizens. Analysis of the results of the California Recall election demonstrates that candidates who were vertically adjacent to the top three vote getters received “extra” votes in the recall election – a *vertical proximity effect*. Combined, these ‘neighbor’ candidates received approximately 4 votes per thousand votes the top candidate received. The pattern is consistent across the candidates neighboring Schwarzenegger, Bustamante, and McClintock, and is noticeably higher for punch cards than for optical scan or touch screen voting technologies.

The vertical proximity effect is a variation on the theme of ballot formatting issues highlighted in the Florida recount of the 2000 presidential elections. Although there are many possible explanations for this pattern, we think they are caused by difficulties voters have aligning names with voting options. For example, lefthanders might have greater difficulty than right-handers aligning the hole in the punch card with the name; and people with poor vision might have difficulty with alignment in all technologies. While 4 erroneously cast votes in 1000 is easily the margin in a close election, this effect is not of the magnitude of the butterfly ballot effect documented in the Florida elections. That said, the appearance of clear vertical proximity effects and their variance across ballot types suggests that the randomization of names on the ballot in California is not neutral and the need remains for careful systematic evaluation of ballot designs. Elections are not the time to test ballot designs.

Data and Methods

In the 2003 election, each county was responsible for the design of its own ballot and the selection of its voting machines. Technologies included punch card, optical scan and electronic touch-screen balloting.¹ All ballots listed the candidates in order of the random alphabet drawn by the Secretary of State. (See Appendix A) Empirical research on ballot design has documented a potential top-of-the-ballot effect, a propensity for candidates appearing at the top of the ballot to receive, solely by nature of their position, more votes than other candidates. A standard practice to correct this problem is the rotation of the

¹ In our analysis we have excluded the paper ballots used in Alpine county, as they represent only 0.0067% of the voters in this election and do not constitute enough observations to provide meaningful results about this ballot format.

random alphabetical ordering. Thus, in the first Assembly district of California the names of candidates appear on the ballot in the random alphabetical order. In the second Assembly district the first candidate of the random alphabetical list is moved to the last place (135) and all other candidates move up one position. This procedure is repeated for each of the 80 state Assembly districts.

The relative positioning of a candidate's name remains constant across counties. Regardless of ordinal position, a name is surrounded by the same two "neighbor" candidates determined by the randomized alphabet.² To examine the added benefit of proximity to a high vote-receiver, we compared the relative amount of votes neighboring candidates received by their position away. Using county level election returns reported by the California Secretary of State, the relative amount of votes was constructed by summing the votes of the pair of candidates who were + i, - i positions away from the top candidate and dividing the number of votes they received by the number of votes the top candidate received, per one thousand voters. For example: $(\text{Votes for Lawrence Strauss} + \text{Votes for George Schwartzman}) * 1000 / \text{Votes for Arnold Schwarzenegger}$. This value was calculated for the neighboring candidates who were one, two and three positions away from Schwarzenegger, Bustamante and McClintock. The results are given in Figures 1, 2 and 3.³ These figures show the additional votes per thousand that neighboring candidates received, in relation to their position away from a top three vote getter.

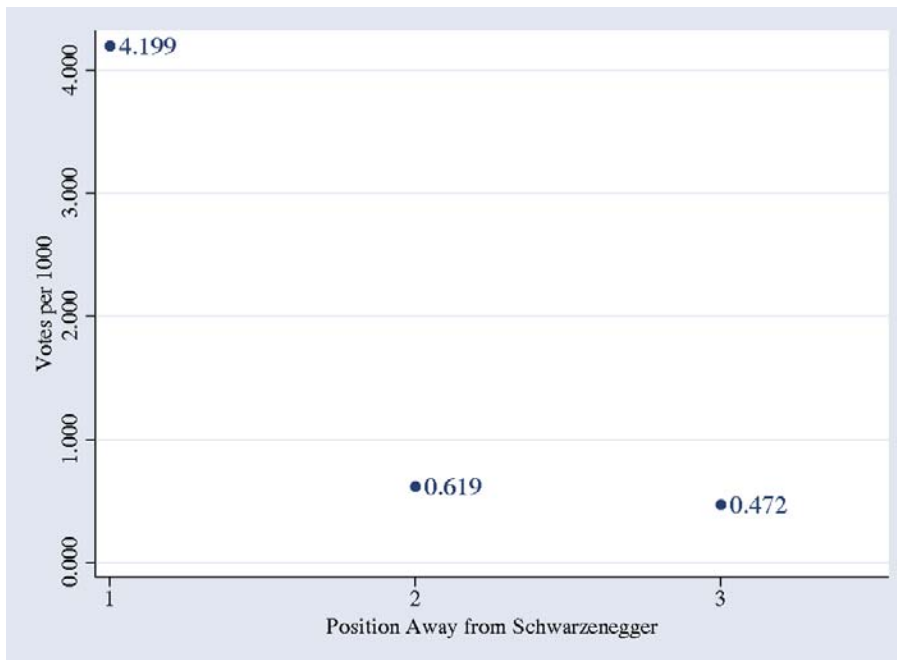


Figure 1. Vertical proximity effect for neighbor candidates of Schwarzenegger

² The only exceptions are the assembly districts in which the candidate's name is listed in the first position or in the 135th position. Even in these two districts, the candidate will be adjacent to one of his two neighbor candidates, while his other adjacent spot is empty.

³ This value was also calculated for the fourth highest vote recipient, Camejo, but at this level the results are within the margin of error and are not statistically significant

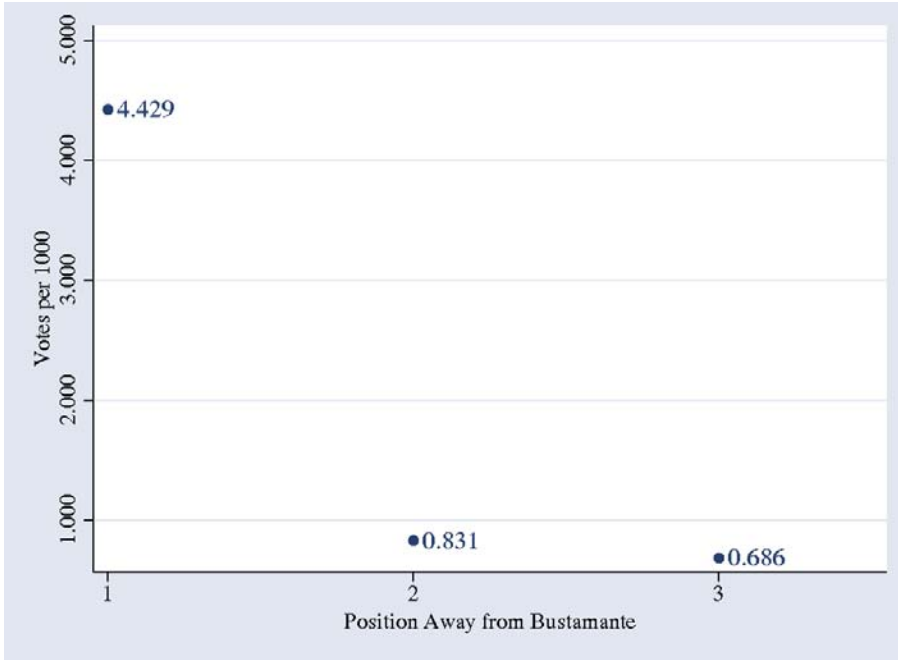


Figure 2. Vertical proximity effect for neighbor candidates of Bustamante

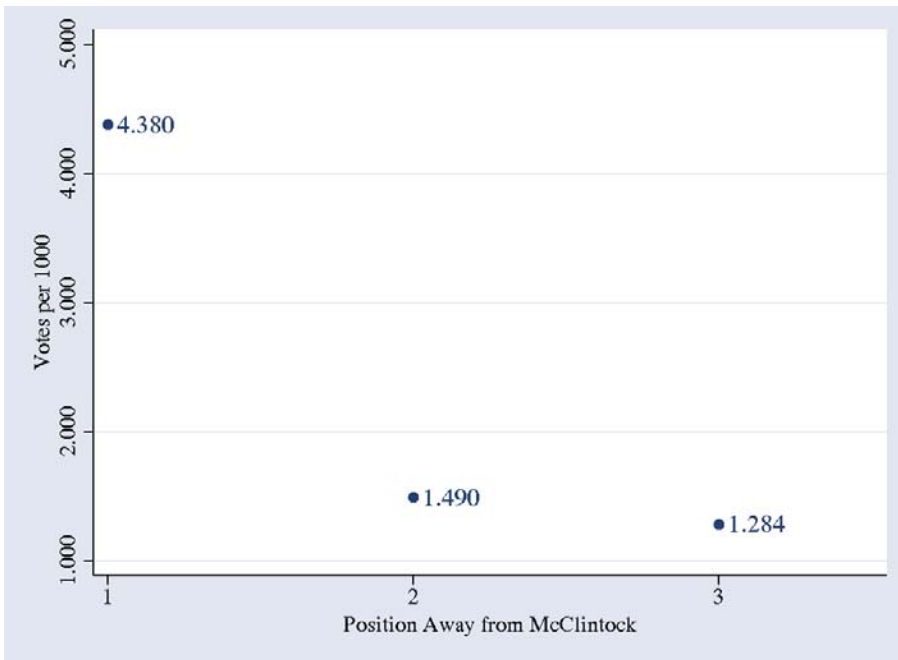


Figure 3. Vertical proximity effect for neighbor candidates of McClintock

The consistency across candidates of the benefit vertical proximity confers is crucial to our result. While in absolute terms the neighbor candidates of Schwarzenegger received more votes than Bustamante's neighbor candidates received, Figures 1, 2 and 3

demonstrate that all neighbor candidates are benefiting from the same effect. The increase in their absolute votes is in proportion to the amount of votes their top-three neighbor candidate received. A simple model of this effect is that the number of votes a neighbor candidate receives is the sum of their base vote (defined as the average votes received by all non-top vote getters) plus an additional 0.004% of the votes received by the top vote getting candidate they are adjacent to. The ratio for candidates two and three positions away increases from Schwarzenegger to Bustamante to McClintock because the initial ratio of base vote to top candidate vote increases: $(\text{base vote} / \text{McClintock}) > (\text{base vote} / \text{Bustamante}) > (\text{base vote} / \text{Schwarzenegger})$, as the absolute vote of the top candidate decreases ($\text{McClintock} < \text{Bustamante} < \text{Schwarzenegger}$).

Having shown this effect to be consistent across candidates, what is the causal mechanism underlying the increase in votes from vertical proximity? One possible answer, gleaned from the lessons of the Florida 2000 Presidential recount, is voter alignment errors.⁴ The vertical proximity effect may be the result of alignment errors: voters see the name of the candidate they intend to vote for, but somehow instead accidentally mark their ballot in such a way as to cast their vote for one of the neighboring candidates. Bad eyesight or shaky hands could cause voters to misalign their decision mark with their candidate choice. Additionally, left-handedness could contribute to alignment errors.⁵ When casting their ballots, left-handed voters often must position their hand in a way that covers the candidate names, which frequently appears to the left of the box to be marked. Their inability to see the candidate name and box at the same time may result in increased error.

While bad eyesight, shaky hands and left-handedness are likely to cause some alignment errors on any type of ballot, the punch card ballots suffer an additional propensity to alignment errors that is irrespective of voter characteristics: errors that result from the punch card being inserted into the machine incorrectly. Indeed, many of the problems in the recount of the Florida presidential vote in 2000 focused on alignment errors in the format of the punch card ballots, which gave rise butterfly ballots and caterpillar effects.

How large is the difference between punch cards and other technologies on vertical proximity errors in the California recall? We estimated the differences in average vertical proximity effects for counties using punch cards, counties using optically scanned ballots, and counties using touch screen machines. Vertical alignment effects were not statistically distinguishable between optical scan and touch screen technologies. Punch card technologies showed vertical proximity effects that were higher by almost 2 votes per 1000.⁶

⁴ We do note that it is impossible, *ex post facto*, to definitively determine what kind of error was made, or even to distinguish errors from intentional votes for the neighbor candidate. However, we feel the statistical evidence is strong enough to warrant suspicion that these votes were not intentional.

⁵ I thank Professor Charles Stewart for suggesting this explanation to me.

⁶ Regressing the relative benefit ratio used above on dummy variables for optical scan ballots and touch screen ballots gives coefficients of -1.831 (s.e. 0.324) and -1.914 (s.e. 0.538) respectively, with an adjusted R^2 of 0.380. Since vote and ballot type data was reported in county units, this regression was weighted by the number of ballots.

Discussion

While the top-of-the-ballot effects have long been a concern, other formatting issues are of equal concern. The Butterfly Ballot revealed problems with horizontal proximity. Our analysis shows vertical proximity effects. Again, punch cards seem to be somewhat worse than other technologies in this regard. Horizontal and vertical proximity effects suggest that ballot order is not neutral, even when randomized. There may be other problems, such as top of the page effects. All of this raises questions about the practice of randomized order. One interesting experimental test to run is whether a ballot randomized by first letter has fewer problems and biases than other orderings, such as alphabetic order.

The more general lesson from this study is the need for thorough evaluation of ballot formats, leading ultimately to the design of better ballots. Vertical proximity, as documented in this study, and horizontal proximity effects clearly exist. But we have studied one fairly unique election with a restricted set of alignments. The question for those engaged in the design of ballots is this: What are appropriate guidelines and rules of thumb for minimizing the sorts of errors in evidence here and in elections past?

Appendix A: Certified List of Candidates for the California Statewide Special Election held October 7, 2003 (In random alphabetical order).

Source: California Secretary of State, http://www.ss.ca.gov/elections/2003_cert_cand_list.htm

Notes: Top three vote getters are in bold; their neighbors are marked with *.

Governor

DAVID LAUGHING HORSE
ROBINSON
NED ROSCOE
DANIEL C. RAMIREZ
CHRISTOPHER RANKEN
JEFF RAINFORTH
KURT E. "TACHIKAZE"
RIGHTMYER
DANIEL W. RICHARDS
KEVIN RICHTER
REVA RENEE RENZ
SHARON RUSHFORD
GEORGY RUSSELL
MICHAEL J. WOZNAK
DANIEL T. WATTS
NATHAN WHITECLOUD WALTON
MAURICE WALKER
CHUCK WALKER
LINGEL H. WINTERS
C.T. WEBER
JIM WEIR
BRYAN QUINN
MICHAEL JACKSON
JOHN "JACK" MORTENSEN
DARRYL L. MOBLEY
JEFFREY L. MOCK
BRUCE MARGOLIN
GINO MARTORANA
PAUL MARIANO
ROBERT C. MANNHEIM
FRANK A. MACALUSO, JR.
PAUL "CHIP" MAILANDER
DENNIS DUGGAN MCMAHON
*MIKE MCNEILLY
*MIKE P. MCCARTHY
*BOB MCCLAIN
TOM MCCLINTOCK
*JONATHAN MILLER
*CARL A. MEHR
*SCOTT A. MEDNICK
DORENE MUSILLI
VAN VO
PAUL W. VANN
JAMES M. VANDEVENTER, JR.
BILL VAUGHN
MARC VALDEZ
MOHAMMAD ARIF

ANGELYNE
DOUGLAS ANDERSON
IRIS ADAM
BROOKE ADAMS
ALEX-ST. JAMES
JIM HOFFMANN
KEN HAMIDI
SARA ANN HANLON
IVAN A. HALL
JOHN J. "JACK" HICKEY
RALPH A. HERNANDEZ
C. STEPHEN HENDERSON
ARIANNA HUFFINGTON
ART BROWN
JOEL BRITTON
AUDIE BOCK
VIK S. BAJWA
BADI BADIOZAMANI
VIP BHOLA
*JOHN W. BEARD
*ED BEYER
*JOHN CHRISTOPHER BURTON
CRUZ M. BUSTAMANTE
*CHERYL BLY-CHESTER
*B.E. SMITH
*DAVID RONALD SAMS
*JAMIE ROSEMARY SAFFORD
*LAWRENCE STEVEN STRAUSS
ARNOLD SCHWARZENEGGER
*GEORGE B. SCHWARTZMAN
*MIKE SCHMIER
*DARRIN H. SCHEIDLE
BILL SIMON
RICHARD J. SIMMONS
CHRISTOPHER SPROUL
RANDALL D. SPRAGUE
TIM SYLVESTER
JACK LOYD GRISHAM
JAMES H. GREEN
GARRETT GRUENER
GEROLD LEE GORMAN
RICH GOSSE
LEO GALLAGHER
JOE GUZZARDI
JON W. ZELHOEFER
PAUL NAVE
ROBERT C. NEWMAN II

BRIAN TRACY
A. LAVAR TAYLOR
WILLIAM TSANGARES
PATRICIA G. TILLEY
DIANE BEALL TEMPLIN
MARY "MARY CAREY" COOK
GARY COLEMAN
TODD CARSON
PETER MIGUEL CAMEJO
WILLIAM "BILL" S. CHAMBERS
MICHAEL CHELI
ROBERT CULLENBINE
D. (LOGAN DARROW)
CLEMENTS
S. ISSA
BOB LYNN EDWARDS
ERIC KOREVAAR
STEPHEN L. KNAPP
KELLY P. KIMBALL
D.E. KESSINGER
EDWARD "ED" KENNEDY
TREK THUNDER KELLY
JERRY KUNZMAN
PETER V. UEBERROTH
BILL PRADY
DARIN PRICE
GREGORY J. PAWLIK
LEONARD PADILLA
RONALD JASON PALMIERI
CHARLES "CHUCK" PINEDA JR.
HEATHER PETERS
ROBERT "BUTCH" DOLE
SCOTT DAVIS
RONALD J. FRIEDMAN
GENE FORTE
DIANA FOSS
LORRAINE (ABNER ZURD)
FONTANES
WARREN FARRELL
DAN FEINSTEIN
LARRY FLYNT
CALVIN Y. LOUIE
DICK LANE
TODD RICHARD LEWIS
GARY LEONARD
SPACE FOR WRITE-IN
CANDIDATE