

Beam, M. A. (forthcoming). Automating the news: How personalized news system design choices impact news reception. *Communication Research*. doi: [10.1177/0093650213497979](https://doi.org/10.1177/0093650213497979)

Appendix 1.

Personalization Algorithm Source Code

```
// The following Appendix contains the code used in Communication Research Manuscript
// "Automating the news," doi: 10.1177/0093650213497979.
// This javascript was programmed in conjunction with Qualtrics survey
// software. The full exported QSF qualtrics survey files and question logic
// can be obtained from Michael.beam@wsu.edu
//
// The following javascript sets up the variables for minimum number
// and type of recommendations based on the participants' news viewing
// routines

<script type="text/javascript">
  if("${q://QID30/ChoiceGroup/SelectedChoices}" == "Regularly"){
    $('cablenews').value = 3;
    $('norecs').value = ++$('norecs').value;
  }
  else if("${q://QID31/ChoiceGroup/SelectedChoices}" == "Regularly"){
    $('cablenews').value = 3;
    $('norecs').value = ++$('norecs').value;
  }
  else if("${q://QID30/ChoiceGroup/SelectedChoices}" == "Sometimes"){
    $('cablenews').value = 2;
    $('norecs').value = ++$('norecs').value;
  }
  else if("${q://QID31/ChoiceGroup/SelectedChoices}" == "Sometimes"){
    $('cablenews').value = 2;
    $('norecs').value = ++$('norecs').value;
  }
  else if("${q://QID30/ChoiceGroup/SelectedChoices}" == "Hardly Ever"){
    $('cablenews').value = 1;
    $('nohardly').value = ++$('nohardly').value;
  }
  else if("${q://QID31/ChoiceGroup/SelectedChoices}" == "Hardly Ever"){
    $('cablenews').value = 1;
    $('nohardly').value = ++$('nohardly').value;
  }

  if("${q://QID2/ChoiceGroup/SelectedChoices}" == "Regularly"){
    $('newspaper').value = 3;
    $('norecs').value = ++$('norecs').value;
  }
  else if("${q://QID29/ChoiceGroup/SelectedChoices}" == "Regularly"){
    $('newspaper').value = 3;
    $('norecs').value = ++$('norecs').value;
  }
  else if("${q://QID2/ChoiceGroup/SelectedChoices}" == "Sometimes"){
    $('newspaper').value = 2;
    $('norecs').value = ++$('norecs').value;
  }
  else if("${q://QID29/ChoiceGroup/SelectedChoices}" == "Sometimes"){
    $('newspaper').value = 2;
    $('norecs').value = ++$('norecs').value;
  }
  else if("${q://QID2/ChoiceGroup/SelectedChoices}" == "Hardly Ever"){
    $('newspaper').value = 1;
    $('nohardly').value = ++$('nohardly').value;
  }
  else if("${q://QID29/ChoiceGroup/SelectedChoices}" == "Hardly Ever"){
    $('newspaper').value = 1;
    $('nohardly').value = ++$('nohardly').value;
  }
}
```

```

if("${q://QID32/ChoiceGroup/SelectedChoices}" == "Regularly")
  $('norecs').value = ++$('norecs').value;
else if("${q://QID32/ChoiceGroup/SelectedChoices}" == "Sometimes")
  $('norecs').value = ++$('norecs').value;
else if("${q://QID32/ChoiceGroup/SelectedChoices}" == "Hardly Ever")
  $('nohardly').value = ++$('nohardly').value;

if("${q://QID24/ChoiceGroup/SelectedChoices}" == "Republican")
  $('political').value = 2;
else if("${q://QID24/ChoiceGroup/SelectedChoices}" == "Democrat")
  $('political').value = 1;
else if("${q://QID25/ChoiceGroup/SelectedChoices}" == "the Republican Party")
  $('political').value = 2;
else if("${q://QID25/ChoiceGroup/SelectedChoices}" == "the Democratic Party")
  $('political').value = 1;
else if("${q://QID34/ChoiceGroup/SelectedChoices}" == "Very Conservative")
  $('political').value = 2;
else if("${q://QID34/ChoiceGroup/SelectedChoices}" == "Conservative")
  $('political').value = 2;
else if("${q://QID34/ChoiceGroup/SelectedChoices}" == "Very Liberal")
  $('political').value = 1;
else if("${q://QID34/ChoiceGroup/SelectedChoices}" == "Liberal")
  $('political').value = 1;

if ($('political').value == 0) {
  $('norecs').value = $('norecs').value * 2;
  $('nohardly').value = $('nohardly').value * 2;
}

$('minrecs').value =  $('norecs').value*1 + $('nohardly').value*1;
</script>

// Using the Qualtrics survey software interface,
// all participants were first displayed the sources they would be viewing on
// a page before entering the news portal. This page listed sources and their
// political lean (newspapers were graded "slightly liberal" or "slightly
// conservative" leaning, cable channels "liberal" or "conservative"
// and blogs "strongly liberal" or "strongly conservative"
//
// In the generic control condition participants saw all sources of news with no recs.
//
// In the personalized (computer-generated) conditions participants were
// recommended the media types they viewed "regularly" matching their "political"
// party preference first and political ideology second (see algorithm above). If they
// did not specify two media types "regularly" then the "sometimes" and
// subsequently "hardly ever" media types would be recommended. All other types
// of media are displayed but not recommended.
// If no party or ideology lean is specified, both the liberal and conservative
// media sources from the routinely viewed media types are recommended
// If no media preference is set but a political lean is chosen, the 3 preferred
// perspective sources are recommended.
// A minimum of 2 recommendations were required for all participants
//
// In the customized (user preferences specified) conditions, participants
// selected which sources they wanted to view from the pre-news portal list of
// sources. That is, they saw all the sources and their political lean and could
// check a box next to the sources they wanted to see, which would be
// recommended
//
// Participants in the "recommended only" conditions only saw their recommended
// sources. Other participants saw their "recommended" sources first, then the other
// sources.
//
// As detailed in source below, the content of the news stories was randomly
// distributed among the sources of news.
//
// In the news portal all news sources and headlines were displayed at all times.
// When a participant clicked on a news headline in the news portal only that news
// story would be displayed while the other stories were hidden.
// The program also unobtrusive records how many times each story was clicked (if at

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// all).
//
// Users could click on any of the stories as many or few times as they chose while
//in the news portal
//
// See manuscript for more screenshots and more details.

<script language="javascript">
var rand2 = new Array();
for (var i=0; i<2; i++) { rand2[i] = i+1; } // create untique set of numbers
rand2.sort(function () {return (Math.round(Math.random())-0.5); });

var rand1 = new Array();
for (var i=0; i<4; i++) { rand1[i] = i+1; } // create untique set of numbers
rand1.sort(function () {return (Math.round(Math.random())-0.5); });

var nHeadlines = new Array(4)
nHeadlines[1] = "Governor candidates George Williams, Walter Smith spar over jobs, stem-
cell research";
nHeadlines[2] = "Gubernatorial candidates Walter Smith, George Williams debate position
on jobs, economy";
nHeadlines[3] = "Smith takes jab at Williams in first debate";
nHeadlines[4] = "Smith, Williams spar over tax plans";

var bHeadlines = new Array (2)
bHeadlines[1] = "Walter Smith and George Williams are lying!";
bHeadlines[2] = "Ohio Governor's Debate";

var news = new Array(4)
news[1] = "<div><span style=\"font-size:14px;\"><span style=\"font-
family:georgia,serif;\"><div>&nbsp;</div><div>COLUMBUS – If Republican George Williams is
elected governor and follows through on his pledge to cut taxes amid a massive budget
shortfall, essential state programs will be \"ripped apart,\" Democrat Walter Smith said
Friday during a debate.</div><div>&nbsp;</div><div>Williams said he would protect
essential services at the same time he would cut taxes on small businesses and others as
part of a plan to increase jobs in the state. He accused Smith of attacking him in the
debate, much like he did in the first one two weeks ago, because polls show he is
behind.</div><div>&nbsp;</div><div>Both candidates said the gubernatorial election comes
down to who voters trust more.</div><div>&nbsp;</div><div>Ohio's governor's office is
open for the first time in 28 years since unpopular incumbent Democratic Gov. John Downs
decided against seeking a third term. A Democrat has never been in the office for more
than eight years in state history.</div><div>&nbsp;</div><div>Friday's wide-ranging, 60-
minute debate was broadcast statewide from Columbus and included questions asked by
citizens in five other cities.</div><div>&nbsp;</div><div>Economic issues dominated the
discussion, but one of the most spirited interchanges came over their positions on stem
cell research.</div><div>&nbsp;</div><div>Smith supports abortion rights and embryonic
stem cell research, which was pioneered at The Ohio State University. In response to a
question, Williams said as governor he would direct state funding to research on types of
stem cell research other than embryonic.</div><div>&nbsp;</div><div>\"We don't need to
get caught up in the political controversy of this,\" Williams
said.</div><div>&nbsp;</div><div>Smith challenged Williams, noting that he had told anti-
abortion rights group Pro-Life Ohio that he was in favor of banning embryonic stem cell
research.</div><div>&nbsp;</div><div>\"Politicians should not be telling world-renowned
scientists what they should do,\" Smith said.</div><div>&nbsp;</div><div>On the economy,
Williams attempted to tie Smith to Downs, who is leaving office instead of seeking a
third term. Williams said Smith supports the same policies Downs championed that
contributed to the current recession.</div><div>&nbsp;</div><div>Smith, the mayor of
Cleveland, argued that Williams, the Cuyahoga County executive, hasn't followed through
on promises he made before taking office eight years ago and his pledges to cut state
taxes are unrealistic.</div><div>&nbsp;</div><div>The third and final debate will be held
in Cincinnati.</div></span></span></div>";
news[2] = "<div><span style=\"font-size:14px;\"><span style=\"font-
family:georgia,serif;\"><div>&nbsp;</div><div>COLUMBUS – Republican George Williams
promised in Friday's debate that as governor he would immediately cut taxes for small
businesses and eliminate a tax on health savings accounts, saying he could pay for it by
reducing government waste.</div><div>&nbsp;</div><div>In response, his Democratic
challenger Walter Smith said Williams has an abysmal record as Cuyahoga County executive
in creating jobs and would be no better as governor.</div><div>&nbsp;</div><div>\"He's
continuing his pattern of saying anything to anyone to get elected,\" Smith, the
Cleveland mayor, said in a debate on Friday.</div><div>&nbsp;</div><div>Smith cited
Williams's elimination of a county economic development office last year as evidence of a

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taxes.

The lively one-hour debate was the second of three debates before the gubernatorial election.

Smith accused Williams of not being forthright with voters about his plans to cut billions of dollars in taxes, including those benefiting couples earning over \$300,000 a year and large, multistate businesses. Smith said implementing those tax cuts, and also doing away with the corporate income tax, would be an "outright assault on education, health care, and property taxes."

Smith said in the face of a \$2.7 billion budget shortfall it would be irresponsible to cut taxes and he hasn't promised to do that.

Williams focused on other tax cuts he's touted targeting small businesses and companies that relocate to Ohio. Cutting those taxes, he said, would spur growth and help lead to the creation of 250,000 jobs over four years.

Smith, the Cleveland mayor, challenged Williams's record as Cuyahoga County executive the past eight years, saying he's done nothing to help create jobs within the city. Williams has run an ad in the campaign attacking Smith's leadership as mayor given Cleveland's high poverty rate.

Williams said Smith was only offering attacks against him and not real solutions.

"I think the voters are sick and tired of that," he said.

Williams and Smith will find out how voters feel on Tuesday. The winner will replace retiring Gov. John Downs, a Democrat who decided not to seek a third term and is suffering under his worst approval ratings of his tenure. The seat is open for the first time in 28 years.

The White House has shown keen interest in the election because Ohio is traditionally a swing state and will be important in the 2012 presidential race. President Barack Obama has already hosted a fundraiser for Smith as well as a rally on The Ohio State University campus where Smith introduced him to more than 26,000 students and others.

A number of Republican governors have come to Ohio to campaign for Williams;

```
var blog = new Array(2)
```

```
blog[1] = "<div><span style=\"font-size:14px;\"><span style=\"font-family:georgia,serif;\"><div>&nbsp;</div><div>Everyone knows the American public has a low opinion of politicians. What's sometimes overlooked is why. And the biggest reason is the politicians themselves – not what they do, necessarily, but what they say about each other. During the second of three scheduled debates both candidates took shots at each other, Smith more than Williams, while making lofty claims about themselves.</div>&nbsp;</div><div>Make no mistake: There are genuine and substantial differences between the two candidates. Smith is pro-choice; Williams is \"100% pro-life\" and even opposes a law that requires the state's public schools to teach contraception. Williams opposes federal funding for embryonic stem-cell research; Smith supports it, warning of lost jobs in Ohio if his opponent imposes new controls. But these distinctions in policy are all but lost in the din of the campaign and especially the ads run by the candidates and their supporters. Here the differences are more stark – not between this way or that, but between good and evil, right and wrong.</div>&nbsp;</div><div>Lies about each other</div>&nbsp;</div><div>The will to distort runs deep in both campaigns. Take Williams's accusation that Smith voted for \"the largest tax increase in history.\" In fact, the 1993 federal tax hike Smith voted for as a member of Congress was actually the ninth highest, well behind the hike passed in 1982 under President Ronald Reagan. It's only the largest in terms of raw dollars, unadjusted for inflation, which hardly seems fair. Moreover, as We the People fact check noted, this tax hike mostly increased the tax burden on the very wealthy, while reducing the burden for low-income families.</div>&nbsp;</div><div>Smith, in turn, claims Williams saddled Cuyahoga County taxpayers with $400 million in pension-fund debt, which Smith contrasts to his own much more competent handling of the city of Cleveland's pension fund shortfall. But, as We the People noted, Smith's claim to have filled the city's gap with \"smart cuts\" overlooks that he also raised the tax levy by 4%. And while Cuyahoga County under Williams did issue $400 million in pension obligation bonds, this money will be reinvested and hopefully yield a higher return. It's risky, but if the economy improves it could prove to be smart.</div>&nbsp;</div><div>Whoever wins the election will have to contend with expectations he can't meet and promises he can't keep. And knowing that, at least on occasion, he reached the state's highest office by taking the lowest roads.</div></span></span></div>";
```

```
blog[2] = "<div><span style=\"font-size:14px;\"><span style=\"font-family:georgia,serif;\"><div>&nbsp;</div><div>The second \"debate\" for Ohio governor between George Williams and Walter Smith was held Friday night. Here are my impressions:</div>&nbsp;</div><div>First of all, it was not a debate. Opening statements were made by both candidates and then a panel of three took turns asking questions. There was little room or time for rebuttal. The debate ended with closing statements by both candidates.</div>&nbsp;</div><div>Both seemed well-prepared. I didn't notice any slip-ups although I'm sure some one will find some.</div>&nbsp;</div><div>Nor did I hear any new ground. Most of the talking points I'd heard before. The themes for Williams were tax cuts and getting government to work for people again. Smith's themes were that Ohio needs adult leadership and we have
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serious problems that need serious answers.</div><div>&nbsp;</div><div>Smith was more
often on the attack. Williams was content, for the most part, to present his program,
although he attacked as well.</div><div>&nbsp;</div><div>The winner? Each side will claim
victory, although the format precludes determining a clear
winner.</div></span></span></div>"
```

```
// Only show a single article body at a time when a user clicks on the headline
```

```
function toggle1() {
  var ele1 = document.getElementById("toggleText1");
  var ele2 = document.getElementById("toggleText2");
  var ele3 = document.getElementById("toggleText3");
  var ele4 = document.getElementById("toggleText4");
  var ele5 = document.getElementById("toggleText5");
  var ele6 = document.getElementById("toggleText6");
  if(ele2.style.display == "block") {
    ele2.style.display = "none";
  }
  if(ele3.style.display == "block") {
    ele3.style.display = "none";
  }
  if(ele4.style.display == "block") {
    ele4.style.display = "none";
  }
  if(ele5.style.display == "block") {
    ele5.style.display = "none";
  }
  if(ele6.style.display == "block") {
    ele6.style.display = "none";
  }
  if(ele1.style.display = "block") {
    ele1.style.display = "block";
    $('click1').value=++$('click1').value;
  }
}
```

```
function toggle2() {

  var ele1 = document.getElementById("toggleText1");
  var ele2 = document.getElementById("toggleText2");
  var ele3 = document.getElementById("toggleText3");
  var ele4 = document.getElementById("toggleText4");
  var ele5 = document.getElementById("toggleText5");
  var ele6 = document.getElementById("toggleText6");
  if(ele1.style.display == "block") {
    ele1.style.display = "none";
  }
  if(ele3.style.display == "block") {
    ele3.style.display = "none";
  }
  if(ele4.style.display == "block") {
    ele4.style.display = "none";
  }
  if(ele5.style.display == "block") {
    ele5.style.display = "none";
  }
  if(ele6.style.display == "block") {
    ele6.style.display = "none";
  }
  if(ele2.style.display = "block") {
    ele2.style.display = "block";
    $('click2').value = ++$('click2').value;
  }
}
```

```
function toggle3() {
  var ele1 = document.getElementById("toggleText1");
  var ele2 = document.getElementById("toggleText2");
  var ele3 = document.getElementById("toggleText3");
  var ele4 = document.getElementById("toggleText4");
  var ele5 = document.getElementById("toggleText5");
```

```

var ele6 = document.getElementById("toggleText6");

if(ele1.style.display == "block") {
    ele1.style.display = "none";
}
if(ele2.style.display == "block") {
    ele2.style.display = "none";
}
if(ele4.style.display == "block") {
    ele4.style.display = "none";
}
if(ele5.style.display == "block") {
    ele5.style.display = "none";
}
if(ele6.style.display == "block") {
    ele6.style.display = "none";
}
if(ele3.style.display == "block") {
    ele3.style.display = "block";
    $('click3').value = ++$('click3').value;
}
}

function toggle4() {
    var ele1 = document.getElementById("toggleText1");
    var ele2 = document.getElementById("toggleText2");
    var ele3 = document.getElementById("toggleText3");
    var ele4 = document.getElementById("toggleText4");
    var ele5 = document.getElementById("toggleText5");
    var ele6 = document.getElementById("toggleText6");
    if(ele1.style.display == "block") {
        ele1.style.display = "none";
    }
    if(ele2.style.display == "block") {
        ele2.style.display = "none";
    }
    if(ele3.style.display == "block") {
        ele3.style.display = "none";
    }
    if(ele5.style.display == "block") {
        ele5.style.display = "none";
    }
    if(ele6.style.display == "block") {
        ele6.style.display = "none";
    }
    if(ele4.style.display == "block") {
        ele4.style.display = "block";
        $('click4').value = ++$('click4').value;
    }
}

function toggle5() {
    var ele1 = document.getElementById("toggleText1");
    var ele2 = document.getElementById("toggleText2");
    var ele3 = document.getElementById("toggleText3");
    var ele4 = document.getElementById("toggleText4");
    var ele5 = document.getElementById("toggleText5");
    var ele6 = document.getElementById("toggleText6");
    if(ele1.style.display == "block") {
        ele1.style.display = "none";
    }
    if(ele2.style.display == "block") {
        ele2.style.display = "none";
    }
    if(ele3.style.display == "block") {
        ele3.style.display = "none";
    }
    if(ele4.style.display == "block") {
        ele4.style.display = "none";
    }
    if(ele6.style.display == "block") {

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```

        ele6.style.display = "none";
    }
    if(ele5.style.display = "block") {
        ele5.style.display = "block";
        $('click5').value = ++$('click5').value;
    }

function toggle6() {
    var ele1 = document.getElementById("toggleText1");
    var ele2 = document.getElementById("toggleText2");
    var ele3 = document.getElementById("toggleText3");
    var ele4 = document.getElementById("toggleText4");
    var ele5 = document.getElementById("toggleText5");
    var ele6 = document.getElementById("toggleText6");
    if(ele1.style.display == "block") {
        ele1.style.display = "none";
    }
    if(ele2.style.display == "block") {
        ele2.style.display = "none";
    }
    if(ele4.style.display == "block") {
        ele4.style.display = "none";
    }
    if(ele5.style.display == "block") {
        ele5.style.display = "none";
    }
    if(ele3.style.display == "block") {
        ele3.style.display = "none";
    }
    if(ele6.style.display = "block") {
        ele6.style.display = "block";
        $('click6').value = ++$('click6').value;
    }
}

</script>

// Randomly assign news stories to news sources

<span class="class1"><a href="javascript:toggle3();"><h3><script
type="text/JavaScript">
document.write (nHeadlines[rand1[3]]);
</script></h3></a></span>
<div id="toggleText3" style="display: none"><script type="text/JavaScript">
document.write (news[rand1[3]]);
</script></div>

<span class="class1"><a href="javascript:toggle4();"><h3><script
type="text/JavaScript">
document.write (nHeadlines[rand1[0]]);
</script></h3></a></span>
<div id="toggleText4" style="display: none"><script type="text/JavaScript">
document.write (news[rand1[0]]);
</script></div>

<span class="class1"><a href="javascript:toggle1();"><h3><script
type="text/JavaScript">
document.write (nHeadlines[rand1[1]]);
</script></h3></a></span>
<div id="toggleText1" style="display: none"><script type="text/JavaScript">
document.write (news[rand1[1]]);
</script></div>

```



```
<span class="class1"><a href="javascript:toggle2();"><h3><script
type="text/JavaScript">
document.write (nHeadlines[rand1[2]]);
</script></h3></a></span>
<div id="toggleText2" style="display: none"><script type="text/JavaScript">
document.write (news[rand1[2]]);
</script>
</div>
```

```
<span class="class1"><a href="javascript:toggle5();"><h3><script
type="text/JavaScript">
document.write (bHeadlines[rand2[1]]);
</script></h3></a></span>
<div id="toggleText5" style="display: none"><script type="text/JavaScript">
document.write (blog[rand2[1]]);
</script></div>
```

```
<span class="class1"><a href="javascript:toggle6();"><h3><script
type="text/JavaScript">
document.write (bHeadlines[rand2[0]]);
</script></h3></a></span>
<div id="toggleText6" style="display: none"><script type="text/JavaScript">
document.write (blog[rand2[0]]);
</script></div>
```

```
<div id="toggleText1" style="display: none"></div>
<div id="toggleText2" style="display: none"></div>
<div id="toggleText3" style="display: none"></div>
<div id="toggleText4" style="display: none"></div>
<div id="toggleText5" style="display: none"></div>
<div id="toggleText6" style="display: none"></div>
```