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The South and NASA: Public Opinion Differences and Political Consequence

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ABSTRACT

The decision to locate many of NASA's major facilities are rooted in the political dynamics of the 1960s seeking to placate powerful Southern members of the U.S. Congress. When looked at nationally, public support for NASA and space exploration tends to be muted; might that opinion vary if respondents are more closely located to NASA's centers, particularly in the South? Using long-term data from the General Social Survey, regional differences in public support for greater space exploration funding were examined. Despite NASA's heavy presence in the South, not to mention its economic impact, individuals in the South are considerably less likely to support more space spending. Comparatively, respondents in the Mountain and Pacific regions are comparatively more likely to support space funding. Thus, to the extent that region matters in influencing spending attitudes, being in the South is a negative factor. These findings add to the body of knowledge regarding the political dynamics of space policy that play a role as NASA looks to return to the Moon in the near term.

Some space policy supporters believe that all is needed to reinvigorate space exploration is a dedicated president willing to make a bold statement, much like John F. Kennedy's call to land on the Moon. These same supporters often lament the fact that support for and interest in space exploration also seems to be on the wane. Public opinion is something that NASA has often concerned itself with, "The agency [NASA] has always been quite sensitive to its public image because it has relied heavily on public support in its quest for political backing."[1] The relationship between public support and political backing is more nuanced than this. While numerous studies have highlighted the role that public opinion

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The views presented here are those of the author and do not necessarily reflect the official policy or position of the United States government, the Department of Defense, or any of its affiliates.

[1]Mark E. Byrnes, *Politics and Space: Image Making by NASA* (Westport, CT: Praeger, 1994): 2.

plays in determining public policy,[2] just as many suggest that public opinion is not as robust an influence in public policy[3] or that the relationship is mediated by other factors, like saliency of an issue, the media, and the influence of political elites.[4]

That space policy analysts have been concerned with public opinion is nothing new. Almond first examined the effects of early Soviet achievements on global and American public opinion in 1960, while Launius highlighted the incongruity between the belief that the space race and Apollo program was publicly favored by demonstrating just the opposite.[5] More recently, Whitman Cobb explored the demographic characteristics of individuals likely to support space spending, and Steinberg demonstrated a tenuous link between it and NASA funding.[6] These studies, however, focused on national public opinion. What if NASA's public support is more regional in nature?

This paper explores regional patterns of support for space exploration utilizing data from the General Social Survey (GSS). Since the 1970s, the GSS has asked respondents whether they believe the United States spends too much, too little, or about right on space exploration programs. While a second version of this question was added in the 1980s, with the differences between the two discussed below, we can utilize this dataset to test the hypothesis that individuals located closer to NASA centers will be more likely to support space exploration and its funding. To briefly preview the findings of this research, the analysis shows that despite NASA's heavy presence in the South, individuals in the South are significantly less likely to support increased funding for space exploration. On the other hand, individuals in the Mountain and Pacific regions, both of which have NASA installations, are more likely to support increased space spending. To the extent that region does matter, being in the South appears to be a negative influence.

[2]Warren E. Miller and Donald E. Stokes, "Constituency Influence in Congress," *The American Political Science Review* 57, no. 1 (1963): 45-56. Benjamin I. Page and Robert Y. Shapiro, "Effects of Public Opinion on Policy," *The American Political Science Review* 77, no. 1 (1983): 175-90. Christopher Wlezien, "The Public as Thermostat: Dynamics of Preferences for Spending," *American Journal of Political Science* 39, no. 4 (1995): 981-1000. Alan D. Monroe, "Public Opinion and Public Policy," *The Public Opinion Quarterly* 62, no. 1 (1998): 6-28. Jeffrey R. Lax and Justin H. Phillips, "Gay Rights in the States: Public Opinion and Policy Responsiveness," *The American Political Science Review* 103, no. 3 (2009): 367-386.

[3]Lawrence R. Jacobs and Benjamin I. Page, "Who Influences US Foreign Policy?" *The American Political Science Review* 99, no. 1 (2005): 107-23.

[4]David J. Kennamer, *Public Opinion, the Press, and Public Policy* (Westport, CT: Praeger, 1994).

Monroe, "Public Opinion and Public Policy". Stuart N. Soroka, "Media, Public Opinion, and Foreign Policy," *The International Journal of Press/Politics* 8, no. 1 (2003): 27-48. Lawrence R. Jacobs et al, "Congressional Leadership of Public Opinion," *Political Science Quarterly* 113, no. 1 (1998): 21-41. For an excellent review of the state of public opinion-public policy research, see Paul Burstein, "The Impact of Public Opinion on Public Policy: A Review and an Agenda," *Political Research Quarterly* 56, no. 1 (2003): 29-40.

[5]Gabriel Almond, "Public Opinion and the Development of Space Technology," *Public Opinion Quarterly* 24, no. 4 (1960): 553-72. Roger D. Launius, "Public Opinion Polls and Perceptions of US Human Spaceflight," *Space Policy* 19, no. 3 (2003): 163-75.

[6]Wendy N. Whitman Cobb, "Who's Supporting Space Activities? An 'Issue Public' for US Space Policy," *Space Policy* 27, no. 4 (2011): 234-39. Alan Steinberg, "Space Policy Responsiveness: The Relationship between Public Opinion and NASA Funding," *Space Policy* 27, no. 4 (2011): 240-46.

This paper proceeds as follows. First, I review previous findings on NASA's public opinion and the influence of public opinion in general. Second, I explore the different versions of the GSS questions, both in terms of general patterns and why respondents might answer differently. Finally, I utilize logistic regression to incorporate region into a model of support for space exploration funding, controlling for variables that are significant in terms of public support previously.

Public opinion, policy, and space

In a democratic government, the relationship between what the public wants and what it gets is of intrinsic importance. Scholars have often considered whether public opinion influences policy outcomes, as well as the mechanism through which public opinion is translated into policy. Wlezien proposes a "thermostatic" model of public opinion in which broad preferences for more or less spending are translated into actual policy changes.[7] He argues that when public preference is different from the actual policy outcome, public opinion rises to support greater funding and then readjusts itself if spending is then raised. Utilizing the same GSS that will be used here, Wlezien shows that the public does indeed respond in the predicted manner in defense policy, but not necessarily in areas where issue salience is less.[8] Wlezien's finding about the role of salience is important. If people are not aware of policy outputs whether from ignorance or lack of information, it will be more difficult to take a position on policy spending or responses to survey questions will be inconsistent.[9] Other studies have similarly shown that salience of an issue is an important determinant in whether public opinion is translated into policy outcomes. For example, Lax and Phillips find that state representatives are sensitive to constituent opinion in some areas of gay rights more than others; what seems to distinguish between the two is salience.[10]

It is one thing to understand that public opinion may be correlated to policy change and another to understand the causal mechanism underlying the process. Mayhew's argument that elected officials, specifically members of the U.S. Congress, are single-minded seekers of reelection speaks to the fact that if representatives wish to continue in their position, they must behave in such a way that is consistent with the desires of their constituents.[11] Rational elected officials, then, have an incentive to act in accordance with the public opinion of their voters. Stimson, Mackuen, and Erikson expand on this idea to propose that not only is public opinion at work when officials are not reelected

7Wlezien, "The Public as Thermostat"
8Ibid.
9John Zaller, *The Nature and Origins of Mass Opinion* (Cambridge: Cambridge University Press, 1992).
10Lax and Phillips, "Gay Rights in the States"
11David R. Mayhew, *Congress: The Electoral Connection* (New Haven, CT: Yale University Press, 1974).

but that rational representatives actively anticipate changes in public opinion and adjust their views accordingly.[12] This theory of dynamic representation proposes that change either occurs through rational anticipation of electoral outcomes or through electoral change itself.[13] Stimson, Mackuen, and Erikson do include important assumptions including that politicians are both aware and in agreement with each other about the nature and direction of public opinion. If policy issues are not salient or well known to the public, then they will not be able to express a collective opinion on it, thereby limiting the ability of politicians to know what the public desires.

Most research into the connection between public opinion and policy tends to focus on salient, or perennially important, policy areas like defense spending, social issues, and foreign policy. However, it is regularly recognized that NASA and space exploration is not a routinely salient policy for the general public.[14] As such, few consistent, long-term sources of information regarding public opinion on NASA exist. Aggregating several sources which asked about NASA and space exploration, Launius finds that even though opinion data from the 1960s demonstrate that the public was not completely supportive of the Apollo program, Americans have consistently given NASA high confidence and approval ratings.[15]

The GSS is another source of consistent tracking of approval for space since the early 1970s specifically asking respondents if they believe the government is spending too much, about right, or too little on space exploration. Figure 1

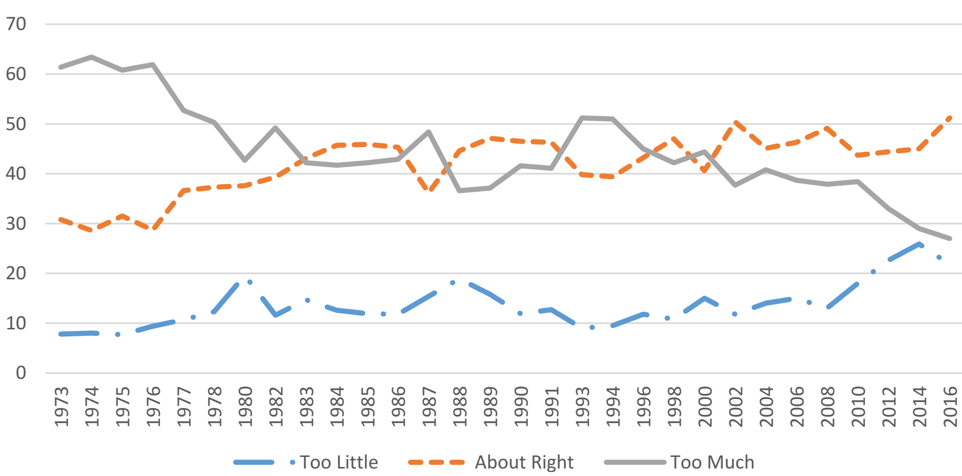

Figure 1. Attitudes towards spending on the space exploration program, 1973–2016.

[12]James A. Stimson, Michael B. Mackuen, and Robert S. Erikson, "Dynamic Representation," *The American Political Science Review* 89, no. 3 (1995): 543-65.
[13]Ibid.
[14]Roger Handberg, "The Fluidity of Presidential Policy Choice: The Space Station, the Russian Card, and US Foreign Policy," *Technology in Society* 20, no. 4 (1998): 421-39.
[15]Launius, "Public Opinion Polls and Perceptions of US Human Spaceflight"

provides the overall trends since 1973. Confirming Launius's findings regarding support in the late 1960s, over 60% of GSS respondents in 1973 believed the government was spending too much on space exploration. While that percentage has since decreased, there are significant bumps in the percentage of respondents who believe there is too little spending on space exploration particularly in 1980, 1988, and between 2008 and 2014. The 1980s correlate with NASA's Space Shuttle program, both its first flight, which occurred in 1981, and the Challenger disaster in 1986. What is more interesting is the uptick that occurs beginning in 2008. It is not easy to pinpoint a specific NASA event beginning 2008 that might warrant such an increase since the Space Shuttle Columbia accident occurred in 2003 and the Space Shuttle's retirement was a decade or more away. The anticipation of the Space Shuttle's retirement could have been significant, particularly beyond 2011, but enthusiasm about privatized space exploration could also have been driving the increase.

Again, knowing public opinion is only the first step in connecting it to policy change. In examining the relationship between public opinion and spending for NASA, Steinberg finds a mix of responsiveness and non-responsiveness depending on the time period under study.[16] In particular, Steinberg finds that NASA spending tends to rise when the public is more generally tolerant about spending. This confirms a similar finding by Conley and Whitman Cobb who show that the state of the economy is a significant contributor to NASA funding patterns; when the economy is good, and thus tax revenues high, NASA tends to benefit.[17] Steinberg does note that a key element missing from the analysis is what people know about NASA and its budget. Under the assumption that NASA's budget is quite high, people might naturally believe spending should be lower and vice versa. Voters, then, must overcome two issues in establishing a preference on NASA spending: lack of knowledge and lack of salience. In a later study, Steinberg examines the influence of knowledge on public opinion of NASA finding that providing information on NASA's budget does change people's views on space spending.[18]

Being located near a NASA installation may solve both of these problems. Writing about bureaucracies in general, Goodsell notes that "bureaucracy looks better the more intimately it is encountered."[19] Living near Kennedy Space Center, for example, voters are likely to know that NASA's budget has been cut in previous years, although it has achieved a modicum of stability recently, and the issue is likely to be salient for them as they witness a decline in the economic fortunes of the surrounding areas. Consider the sheer number

[16]Steinberg, "Space Policy Responsiveness"

[17]Richard S. Conley and Wendy N. Whitman Cobb, "Presidential Vision or Congressional Derision? Explaining Budgeting Outcomes for NASA, 1958-2008," *Congress and the Presidency* 39 (2012): 51-73.

[18]Alan Steinberg, "Influencing Public Opinion of Space Policy: Programming Effects versus Education Effects," *Astropolitics*, vol. 11, no. 3 (2013): 187-202.

[19]Charles T. Goodsell, *The New Case for Bureaucracy* (Thousand Oaks, CA, CQ Press, 2015): 50.

of NASA installations located in the South: of a total of 20 NASA centers and facilities, 13 are in the South including Kennedy Space Center in Florida, Johnson Space Center in Texas, Marshall Space Flight Center in Alabama, and Stennis Spaceflight Center in Louisiana. While the decisions to build facilities in these locations have their roots in appeasing political masters in Congress, today, these centers generate significant economic impacts for their communities. The Marshall Space Flight Center, for example, supports approximately 38,000 jobs and has a total economic impact of almost 7 USD billion dollars.[20] In Florida, the Kennedy Space Center supports over 23,000 jobs and adds 3.9 USD billion to the Florida economy.[21] An additional measure of how important the region is to NASA is in terms of the procurement dollars NASA spends each year. Figure 2 displays the percentage of procurement dollars per capita given to each region between 1997 and 2016 and clearly shows that the South is the biggest beneficiary of NASA spending over this period.

Given NASA's heavy presence in the South, people in the South may, one, be able to express a more informed or more consistent opinion on NASA and its spending, and two, believe NASA and space exploration to be a salient issue for them. In those cases, politicians have an electoral incentive to pay attention

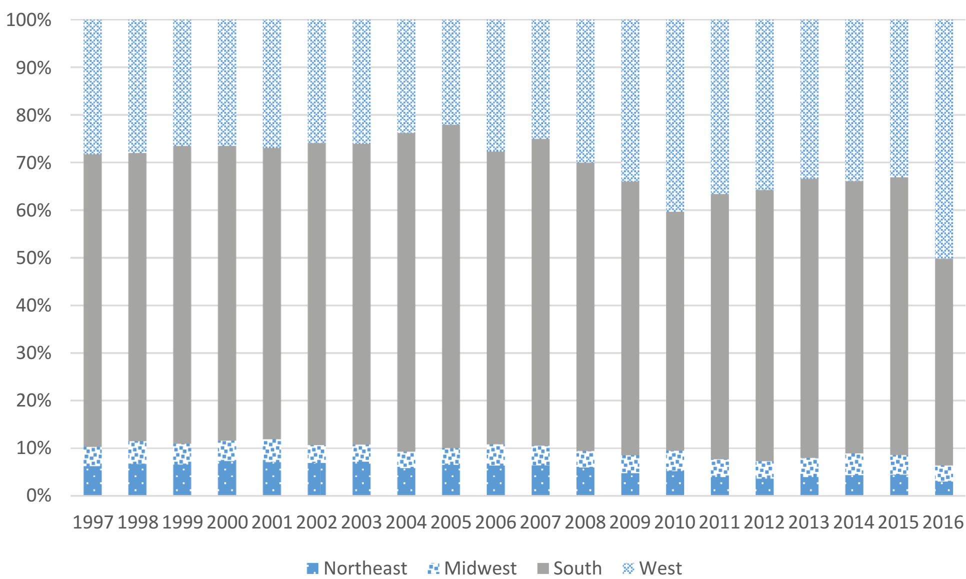

Figure 2. NASA procurement per capita by region, 1997–2016. *Notes: NASA Annual Procurement Reports, https://www.nasa.gov/office/procurement/annual-procurement-reports; U.S. Census Bureau Population Estimates, https://www.census.gov/topics/population.html.*

[20]National Aeronautics and Space Administration, "Marshall Space Flight Center Economic Impact Report," 2017, https://www.nasa.gov/sites/default/files/atoms/files/economic_impact_mobile_508_2017.pdf.
[21]National Aeronautics and Space Administration, "Economic Impact Study of NASA in Florida Fiscal Year 2017," 2018, https://kscpartnerships.ksc.nasa.gov/About-Us/Economic%20Impact%20Study%20of%20NASA%20in%20Florida.

to public opinion. Machay and Steinberg in their analysis of economic impacts on legislative behavior in regard to NASA explicitly make the argument that "Because the public lacks strong and clear opinions on space policy funding, individual members of Congress would be hard pressed to act as delegates for their constituents."[22] As an alternative, according to Machay and Steinberg, legislators are likely to rely on economic cues and benefits that NASA is likely to bring. They do find incidental support for this idea, but do not consider public opinion, instead building a model around jobs and economic opportunism. These findings might also stem from the generally limited attention that space policy gets from American policymakers and political leaders. Handberg has argued that space generally represents only a "tertiary" policy concern, whereas Johnson-Freese argues that "Space has rarely been a political priority for Congress."[23] With such little sustained attention on space, there are few consistent and widely shared cues for policymakers to follow, leaving members of Congress to consider both the lack of open public support but also the need for economic development. This research, then, is a step in identifying whether there are any significant differences in support for space funding in the South compared to the rest of the country.

Hypotheses and research design

Given the research detailed above, the basic hypothesis to be considered here is that individuals located closer to NASA centers will be more likely to support space exploration. Living near a NASA center should give an individual greater exposure both to what NASA does and the impact that NASA has on their community. As previous research has shown, this should translate into greater support for NASA itself.

In order to test this basic hypothesis, data on an individual's support for NASA and their location is needed. As noted above, consistent and long-term sources of public opinion on NASA are absent making the GSS the best option from which to obtain the information. The pitfall, however, is that the GSS does not ask any questions directly about NASA; instead, they ask respondents if they believe spending on space exploration is too little, too much, or about right. In order to use this question, we must assume that those who support space activities would also be willing to spend more on space exploration, an assumption also made by Whitman Cobb and Steinberg.[24] Additionally, the GSS only publicly provides data on a respondent's census region and not state.

[22]Martin Machay and Alan Steinberg, "Influence of Industry on Legislative Behavior toward NASA," *Astropolitics* 13 (2015): 209.

[23]Handberg, "The Fluidity of Presidential Policy Choice"; Joan Johnson-Freese, "Congress and Space Policy," in *Space Politics and Policy: An Evolutionary Perspective*, ed. Eligar Sadeh (Dordrecht: Kluwer Academic Publishers, 2002), 80. See also Howard McCurdy and Roger Launius, *Spaceflight and the Myth of Presidential Leadership* (Urbana: University of Illinois Press, 1997).

[24]Whitman Cobb, "Who's Supporting Space Activities?"; Steinberg, "Space Policy Responsiveness"

As such, a better operationalization of the basic hypothesis is that individuals who live in a region which has a NASA center are more likely to believe that there is too little money spent on space exploration. Given the concentration of NASA centers in the South and their economic impact, a secondary hypothesis is that individuals in Southern regions will be particularly more supportive of increased funding for NASA.

Dependent variable

Since 1972, the GSS has been administering regular opinion polling across a range of political and social issues in the United States. As part of the battery of questions, they ask respondents whether they believe spending is about right, too much, or too little across various policy issues. Beginning in 1973, GSS asked respondents about funding for the space exploration program with responses available for 1973 to 1978, 1980, 1982 to 1991, 1993, 1994, and every other year following. Beginning in 1984, the GSS added a second version of the question which changed space exploration program to simply space exploration. Question wording has been widely recognized as a possible influence on respondents' answers.[25] In fact, NORC, the survey administrator, made the wording changes for a number of policy areas as a means of testing the effects of labeling in the mid-1980s.[26] In a subsequent analysis utilizing responses from 1984, 1985, and 1986, Rasinski finds that some differences did result from the wording changes but no statistically significant variations were found with regards to the space exploration/space exploration program questions.

The GSS has continued to ask both versions of the question since the 1980s giving us a larger pool of data to examine. Figure 3 presents the percent who responded that there was too little spending in each of the question versions. Although the long-term trend is the same for each response, and the correlation coefficient between the two is quite high at 0.961, fewer people responded that there was too little spending on space exploration in general as opposed to the space exploration program. This phenomenon brings up two questions: (1) why is there a difference in responses between space exploration and space exploration program; and (2) which version of the question to use for analysis?

As to the first question, it is difficult to speculate on why the gap exists without further probing and survey data. In looking at the phrases themselves, they do evoke different images. "Space exploration program" seems to bring to

[25]Howard Schuman and Stanley Presser, "Question Wording as an Independent Variable in Survey Analysis," *Sociological Methods and Research* 6, no. 2 (1977): 151-70. George F. Bishop, Robert W. Oldendick, and Alfred J. Tuchfarber, "Effects of Question Wording and Format on Political Attitude Consistency," *The Public Opinion Quarterly* 42, no. 1 (1978): 81-92. Jonathon P. Schuldt, Sara H. Konrath, and Norbert Schwarz, "'Global Warming' or 'Climate Change'?: Whether the Planet is Warming Depends on Question Wording," *Public Opinion Quarterly* 75, no. 1 (2011): 115-24. Herbert Asher, *Polling and the Public: What Every Citizen Should Know* (Thousand Oaks, CA: CQ Press, 2012).

[26]Kenneth A. Rasinski, "The Effect of Question Wording on Public Support for Government Spending," *The Public Opinion Quarterly* 53, no. 3 (1989): 388-94.

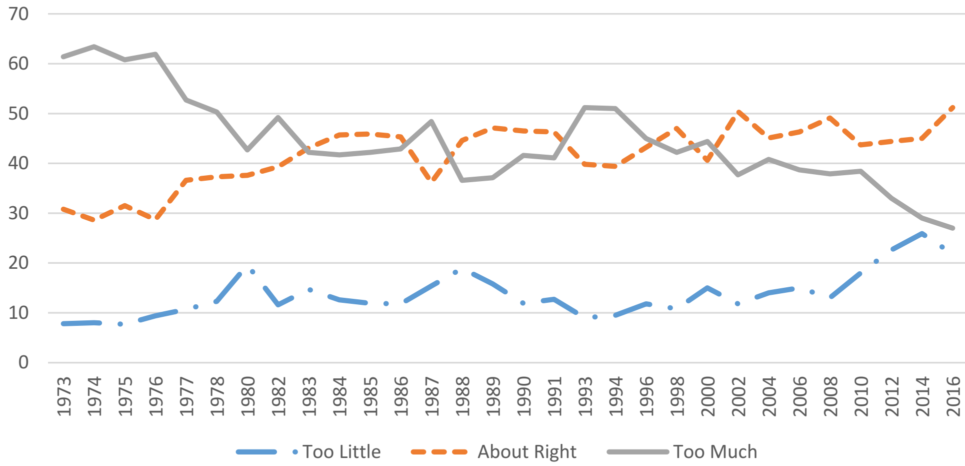

Figure 3. Percent responding "too little" to GSS space questions, 1984–2016.

mind NASA itself, but does not distinguish between NASA's human and scientific exploration programs. "Space exploration" is a more general abstraction or aspiration. What is interesting is that space exploration as an ideal would seem to attract more people to it and yet the GSS responses show quite the opposite. Overall, more people were willing to spend more on space exploration program compared to space exploration.

Answering the second question regarding which version to use is more difficult, particularly given the question of regional support. Figures 4 and 5 present box plots representing the range for each region of the percent of people who responded "too little"; space exploration program is Figure 4 and space exploration is Figure 5. The range of responses by region are quite variable across regions and across the two question versions. For example, in Figure 3, the percentage of respondents answering "too little" ranges from 9% in 1974 to 30.2% in 1987; for the space exploration version, Pacific ranges from 9.6% in 1993 to 29.1% in 2014. When these figures are plotted as they are in Figure 6, the differences become more apparent; in 2006, 21.1% of Pacific respondents answered "too little" to the space exploration program question whereas only 14.2% responded "too little" to the space exploration version. There are similar differences to be found in each of the nine regions. In other words, results for the question under study here, whether individuals in regions with NASA centers favor greater spending on space, could plausibly be different depending on which version of the GSS question is used. Zaller has observed that such polling instability is likely when respondents are unfamiliar with the topic being asked about or have limited knowledge about it.[27] Because it would take a more detailed survey to truly understand what is driving the variability, the following analyses are performed separately for both of the question versions.

[27]Zaller, *The Nature and Origins of Mass Opinion*

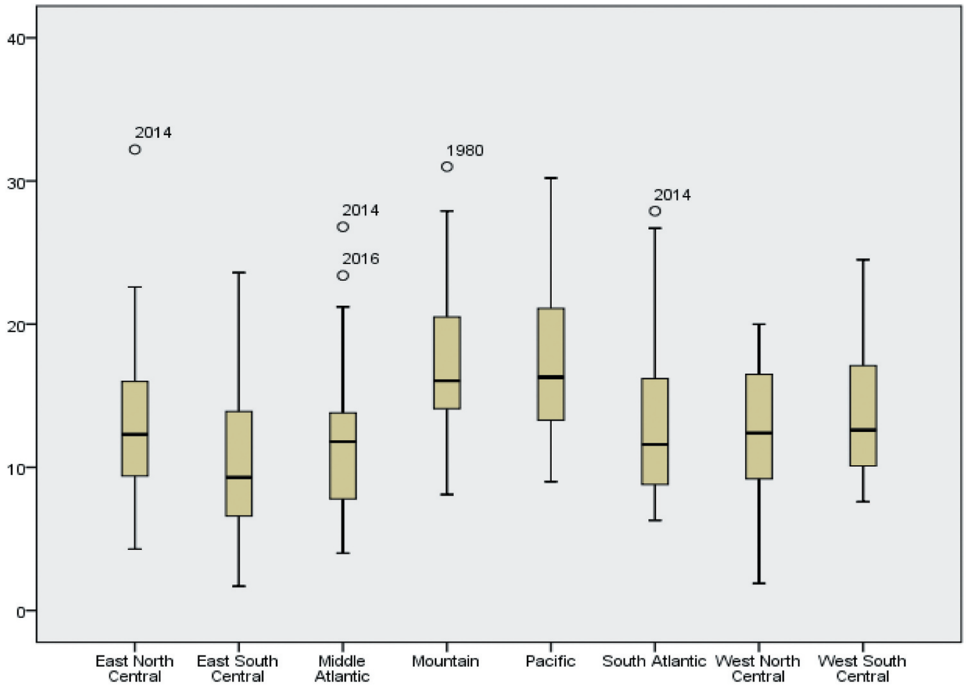

Figure 4. Percent responding too little box plot by region, space exploration program, 1973–2016.

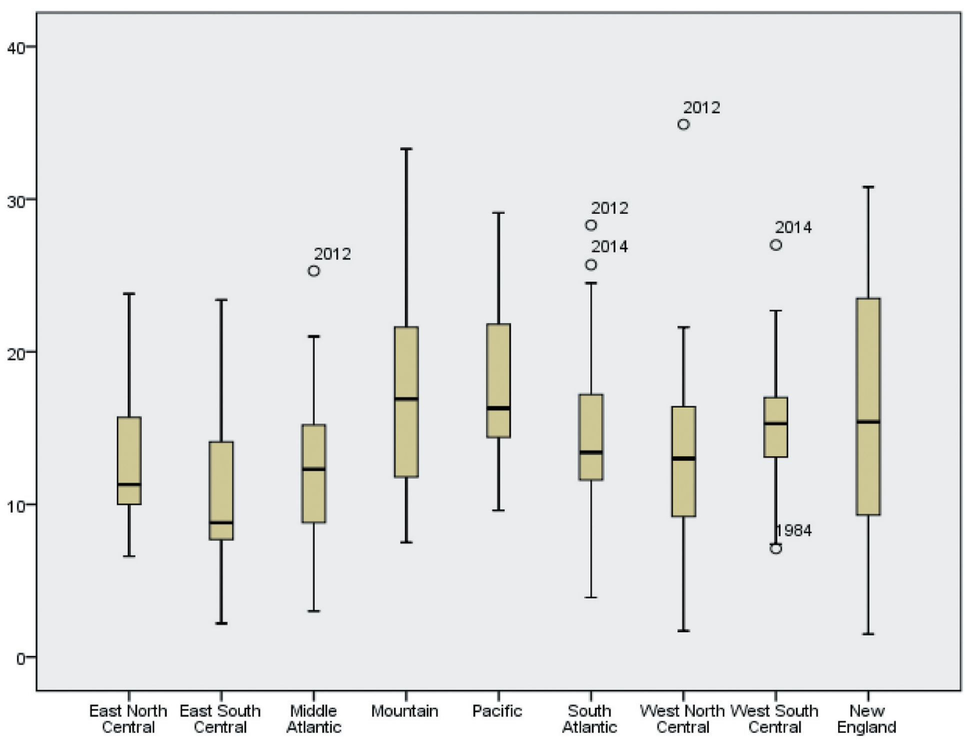

Figure 5. Percent responding too little box plot by region, space exploration, 1984–2016.

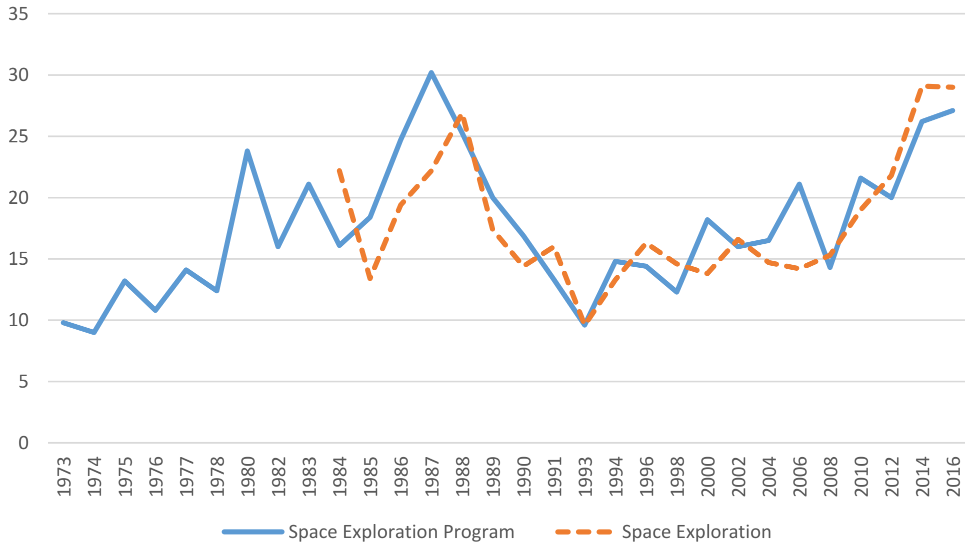

Figure 6. Percent responding too little in Pacific region.

Because both questions are ordinal in nature, I have transformed the data into a binary dummy variable focusing just on respondents who say there is too little spending; too little spending equals 1, and responses that spending is about right or too much are 0. While combining the about right and too little categories is logical, focusing just on those respondents who said too little is a more conservative approach given the assumption that is being made that belief there is too little spending equates with support for NASA and/or space exploration. This approach also allows for a binary logistic regression, which reports on the odds of each independent variable increasing or decreasing the likelihood of a response of too little spending. This analysis pools respondents from each year to perform an individual-level analysis as the hypothesis is focusing on individual-level attitudes.

Independent and control variables

The main independent variable is region with the GSS collecting data on the region in which the respondent lives. These regions, the states within them, and the NASA centers present in each are listed in Table 1 Because the statistical method to be utilized is binary logistic regression and including a nominal variable such as region would be difficult to interpret, separate analyses are performed by region.[28]

[28]One additional option would be to perform one model with nine different regional dummy variables. This approach was tried but it reduced the degrees of freedom significantly and coefficients for the regional variables varied a great deal depending on which regions were included in any given analysis with some even changing directions. As a result, the more conservative approach was taken in performing nine different models that focused on one region at a time.

Table 1. U.S. census regions and NASA installations.

Region	Subregion	States	NASA centers
Northeast	New England	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	None
	Middle Atlantic	New Jersey, New York, Pennsylvania	None
Midwest	East North Central	Illinois, Indiana, Michigan, Ohio, Wisconsin	Glenn Research Center (OH); NASA Safety Center (OH); Plum Brook Station (OH)
	West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota	None
South	South Atlantic	Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, District of Columbia, West Virginia	Goddard Space Flight Center (MD); Goddard Institute for Space Studies (MD); Katherine Johnson IV & V Facility (WV); Kennedy Space Center (FL); Langley Research Center (VA); NASA Engineering and Safety Center (VA); NASA Headquarters (DC); Wallops Flight Facility (VA)
	East South Central	Alabama, Kentucky, Mississippi, Tennessee	Marshall Space Flight Center (AL); NASA Shared Services Center (MS); Stennis Space Center (MS)
	West South Central	Arkansas, Louisiana, Oklahoma, Texas	Johnson Space Center (TX); Michoud Assembly Facility (LA)
West	Mountain	Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming	White Sands Test Facility (NM)
	Pacific	Alaska, California, Hawaii, Oregon, Washington	Ames Research Center (CA); Armstrong Flight Research Center (CA); Jet Propulsion Laboratory (CA)

Variables other than region could also influence an individual's views on space spending. As Whitman Cobb showed, there are certain characteristics of space's "issue public."[29] These include age, political party, education, socioeconomic status, race, which was not included in the 2011 analysis, and gender. Each of these are included in models below. Age was measured using generational cohorts for the following years: 1883 to 1924, 1925 to 1945, 1946 to 1964, 1965 to 1986, and 1986 to 1998. For political party, I utilized GSS's Likert scale of 0–6 (0 being strong Democrat and 6 being strong Republican) and collapsed categories 0–2 to Democrat, 3 as independent, and 4–6 as Republican. Education is measured through four categories: less than a high school degree, high school degree, less than four years of college, and four or more years of college. Socioeconomic status can be measured several ways including income, but following Whitman Cobb, I utilize GSS's socioeconomic index which is then categorized into four equal categories: low SES, medium SES, medium-high SES, and high SES. Finally, GSS's race variable is included although the only options are white measured as 1, and black measured as 2.

[29]Whitman Cobb, "Who's Supporting Space Activities?"

Results

Given the analytical method and dependent variable involved, a total of 36 separate models were tested. Table 2 provides a listing of the models. Briefly, in addition to the coefficient produced in ordinary least squares regressions, binary logistic regression also produces an odds ratio, Exponent (b), which are easier to interpret because the coefficient is logged. "An odds ratio tells us by how much the odds of the dependent variable change for each unit change in the independent variable."[30] To save space in the data tables, only the Exponent (b) is reported for each variable but the figure can be transformed to give the percentage change in odds, which is used in the discussion below, for each variable by subtracting one and multiplying by 100. Thus, if the Exponent (b) is greater than 1, the percentage change in odds is positive but

Table 2. Regression models used.

		Independent variable(s)	Dependent variable
Basic Regional Binary Logistic Regressions	New England Middle Atlantic East North Central West North Central South Atlantic East South Central West South Central Mountain Pacific	Region	Space exploration program
Basic Regional Binary Logistic Regressions	New England Middle Atlantic East North Central West North Central South Atlantic East South Central West South Central Mountain Pacific	Region	Space exploration
Multivariate Logistic Regressions	New England Middle Atlantic East North Central West North Central South Atlantic East South Central West South Central Mountain Pacific	Region; generation; education; sex; party ID; race; SEI	Space exploration program
Multivariate Logistic Regressions	New England Middle Atlantic East North Central West North Central South Atlantic East South Central West South Central Mountain Pacific	Region; generation; education; sex; party ID; race; SEI	Space exploration

[30]Philip H. Pollock, *An SPSS Companion to Political Analysis* 4th ed. (Washington, DC: CQ Press, 2012): 208.

if it is less than 1, it is negative. For ease of explanation, I will first examine the results for "space exploration program" and then "space exploration."

Space exploration program

As a first cut for each question version, I tested a basic model with the too little spending dummy variable as the dependent and region as the sole independent variable. The results for this question version are in Table 3. Of note is that in almost every case, except for East North Central and West South Central, region is statistically significant though its effect is variable. For Middle Atlantic, West North Central, South Atlantic, and East South Central, being from one of those regions decreases the likelihood of an individual responding that there is too little spending; in one case, East South Central by as much as 28%. For the most part, these regions are a part of the South suggesting that support for more spending is lower in the South. On the other hand, being from New England, Mountain or Pacific regions increases the likelihood of a "too little" response with individuals from the Mountain region 49.6% more likely to believe there is too little spending.

The next step of the analysis is to incorporate the other demographic variables; Table 4 reports the results by region. While some of the regions do not remain statistically significant, the broader patterns remain: being in a southern region leads to a decreased likelihood of saying there is too little spending on the space exploration program. These results range from a 12.6% less chance in the South Atlantic region, which includes eight NASA facilities, to a 29.3% less chance in the East South Central region, which has three NASA facilities. On the other hand, being in the Mountain and Pacific regions amounts to a 33.7% and 34.8% increase in the chances, respectively, of a respondent saying there is too little spending.

To consider these results in context, the South Atlantic and Pacific regions are instructive. Residing in the South Atlantic region reduces the likelihood of responding there is too little spending by 12.6%, but several demographic variables have an even larger impact on respondents. This result is particularly surprising because based on NASA procurement dollars per capita, the South Atlantic region has typically received the largest amount, averaging 595 USD million per capita in NASA spending between 1997 and 2016 with the Mountain region coming in second at 439.05 USD million per capita.[31] Younger generations are significantly more likely to respond that there is too little spending; as you move from one older generation to one younger generation, the likelihood of a too little response increases by 19.6%. Greater education levels (35.3%) and a higher socioeconomic status (7.6%) also

[31]National Aeronautics and Space Administration, "Annual Procurement Reports," https://www.nasa.gov/office/procurement/annual-procurement-reports.

Table 3. Basic regional binary logistic regressions (space exploration program).

	Variables	Coefficient (SE)	Exp(b)	Percentage change in Odds
New England	Constant	−1.872 (0.016)***	0.154	–
	New England	0.166 (0.071)**	1.181	18.1
	Model Summary			
	Chi-Square = 5.247 (p = .022)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.000			
Middle Atlantic	Constant	−1.837 (0.017)***	0.159	–
	Middle Atlantic	−0.191 (0.047)***	0.826	−17.4
	Model Summary			
	Chi-Square = 16.992 (p = .000)			
	Cox-Snell R^2 = 0.001			
	Nagerlkerke R^2 = 0.001			
East North Central	Constant	−1.852 (0.018)***	0.157	–
	East North Central	−0.062 (0.041)	0.940	−6
	Model Summary			
	Chi-Square = 2.276 (p = .131)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.000			
West North Central	Constant	−1.851 (0.017)***	0.157	–
	West North Central	−0.197 (0.066)**	0.822	−17.8
	Model Summary			
	Chi-Square = 9.348 (p = .002)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.001			
South Atlantic	Constant	−1.844 (0.018)***	0.158	–
	South Atlantic	−0.108 (0.042)**	0.897	−10.3
	Model Summary			
	Chi-Square = 6.897 (p = .009)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.000			
East South Central	Constant	−1.845 (0.016)***	0.158	–
	East South Central	−0.328 (0.073)***	0.720	−28
	Model Summary			
	Chi-Square = 21.773 (p = .000)			
	Cox-Snell R^2 = 0.001			
	Nagerlkerke R^2 = 0.001			
West South Central	Constant	−1.868 (0.017)***	0.155	–
	West South Central	0.041 (0.055)	1.042	4.2
	Model Summary			
	Chi-Square = 0.536 (p = .464)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.000			
Mountain	Constant	−1.892 (0.017)***	0.151	–
	Mountain	0.403 (0.060)***	1.496	49.6
	Model Summary			
	Chi-Square = 42.516 (p = .000)			
	Cox-Snell R^2 = 0.001			
	Nagerlkerke R^2 = 0.002			
Pacific	Constant	−1.913 (0.017)***	0.148	–
	Pacific	0.332 (0.043)***	1.394	39.4
	Model Summary			
	Chi-Square = 55.778 (p = .000)			
	Cox-Snell R^2 = 0.002			
	Nagerlkerke R^2 = 0.003			

***$p < 0.000$, **$p < 0.05$.

increase the likelihood of a too little response. On the other hand, female respondents have a 61.9% less of a chance of responding too little. For the Pacific, the demographic variables are statistically significant to have similar strengths and this is generally true for all of the regional analyses,

Table 4. Multivariate binary logistic regression results, space exploration program.

	New England		Middle Atlantic		East North Central		West North Central		South Atlantic	
	Coefficient (SE)	Exp(b)	Coefficient (SE)	Exp(b)	Coefficient (SE)	Exp(b)	Coefficient (SE)	Exp(b)	Coefficient (SE)	Exp(b)
Constant	−1.654 (0.171)****	0.191	−1.627 (0.171)****	0.196	−1.632 (0.171)****	0.195	−1.639 (0.171)****	0.194	−1.632 (0.171)****	0.195
Region	0.056 (0.120)	1.058	−0.173 (0.080)	0.847	−0.067 (0.070)	0.935	−0.089 (0.099)	0.915	−0.134 (0.068)*	0.874
Generation	0.179 (0.031)****	1.196	0.178 (0.031)****	1.195	0.179 (0.031)****	1.196	0.179 (0.031)****	1.196	0.179 (0.031)****	1.196
Education	0.304 (0.035)****	1.355	0.304 (0.035)****	1.355	0.303 (0.035)****	1.355	0.304 (0.035)****	1.356	0.302 (0.035)****	1.353
Sex	−0.966 (0.054)****	0.381	−0.965 (0.054)****	0.381	−0.966 (0.054)****	0.381	−0.966 (0.054)****	0.381	−0.965 (0.054)****	0.381
Party ID	0.029 (0.029)	1.029	0.027 (0.029)	1.027	0.028 (0.029)	1.029	0.028 (0.029)	1.029	0.029 (0.029)	1.03
Race	−0.332 (0.056)****	0.718	−0.331 (0.056)****	0.718	−0.336 (0.056)****	0.715	−0.336 (0.056)****	0.715	−0.328 (0.056)	0.72
SEI	0.071 (0.028)**	1.079	0.073 (0.028)**	1.075	0.071 (0.028)**	1.073	0.071 (0.028)**	1.074	0.073 (0.028)***	1.076
Model Summary	Chi-Square = 610.799****		Chi-Square = 615.453****		Chi-Square = 611.514****		Chi-Square = 611.403****		Chi-Square = 614.528****	
	Cox-Snell R^2 = 0.044		Cox-Snell R^2 = 0.044		Cox-Snell R^2 = 0.044		Cox-Snell R^2 = 0.044		Cox-Snell R^2 = 0.044	
	Nagerlkerke R^2 = 0.082		Nagerlkerke R^2 = 0.082		Nagerlkerke R^2 = 0.082		Nagerlkerke R^2 = 0.082		Nagerlkerke R^2 = 0.082	

	East South Central		West South Central		Mountain		Pacific	
Constant	−1.617 (0.171)****	0.198	−1.656 (0.170)****	0.191	−1.666 (0.170)****	0.189	−1.668 (0.171)****	0.189
Region	−0.346 (0.121)**	0.707	0.117 (0.087)	1.124	0.291 (0.093)***	1.337	0.298 (0.070)****	1.348
Generation	0.180 (0.031)****	1.197	0.178 (0.031)****	1.194	0.179 (0.031)***	1.196	0.180 (0.031)****	1.197
Education	0.299 (0.035)****	1.348	0.305 (0.035)****	1.357	0.300 (0.035)****	1.35	0.296 (0.035)****	1.344
Sex	−0.965 (0.054)****	0.381	−0.965 (0.054)****	0.381	−0.966 (0.054)****	0.38	−0.962 (0.055)****	0.382
Party ID	0.031 (0.029)	1.031	0.028 (0.029)	1.028	0.028 (0.029)	1.028	0.029 (0.029)	1.03
Race	−0.326(0.056)****	0.715	−0.336 (0.056)****	0.714	−0.329 (0.055)****	0.72	−0.346 (0.055)****	0.707
SEI	0.070 (0.028)**	1.073	0.071 (0.028)**	1.074	0.072 (0.028)**	1.075	0.071 (0.028)**	1.074
Model Summary	Chi-Square = 619.364****		Chi-Square = 612.330****		Chi-Square = 619.972****		Chi-Square = 628.123****	
	Cox-Snell R^2 = 0.045		Cox-Snell R^2 = 0.044		Cox-Snell R^2 = 0.045		Cox-Snell R^2 = 0.045	
	Nagerlkerke R^2 = 0.083		Nagerlkerke R^2 = 0.082		Nagerlkerke R^2 = 0.083		Nagerlkerke R^2 = 0.084	

****$p < 0.000$; ***$p < 0.001$; **$p < 0.05$; *$p < 0.10$.

albeit being from the Pacific increases the likelihood of a too little response by 34.8%. Of the demographic variables, the only one that is consistently insignificant across all models is party identification. This contradicts some previous research which suggested that Republicans might be more supportive of space funding.[32] It is also important to note that overall model fits are poor suggesting that there are other variables not included in the analysis that might be more important to explaining response patterns.

Space exploration

Table 5 displays the results of the basic model for the space exploration version of the GSS question. There are some interesting differences using this version of the question: here, only the Middle Atlantic, East North Central, East South Central, Mountain, and Pacific were statistically significant, though Mountain and Pacific were the only ones that increased the likelihood of a too little response. Being from one of the other regions decreased the likelihood of such a response with the effect varying from 31.2% in the East South Central to 14.8% in the East North Central. Also, in this question, being in the South Atlantic region appears to increase the chance of a too little response, rather than a decrease in the previous question, although the effect was not statistically significant.

Table 6 contains the results for the full model, which generally fall in line with the space exploration program question except that South Atlantic is not statistically significant (and if it was, is a slight positive contributor) and West South Central is now significant and increases the likelihood of a too little response by 23.6%. In looking closer at the South Atlantic and Pacific regions once again, in this version of the question, living in the South Atlantic region increases the likelihood of a too little response by 1.2%, while living in the Pacific increases the likelihood by 17.1%. For the Pacific, this likelihood is far less than the 34.8% response found in the first question version. Besides the regional differences, the demographic variables in both regional models are in sync with the findings in the previous question version. Younger individuals, those with more education, men, those with a higher socioeconomic status, and being white all increase the likelihood that individuals respond with too little spending and often, these effects are larger than the regional ones. Finally, party identification remains statistically insignificant.

[32]Whitman Cobb, "Who's Supporting Space Activities?"; Conley and Whitman Cobb, "Presidential Vision or Congressional Derision?"

Table 5. Basic regional binary logistic regressions (space exploration).

	Variables	Coefficient (SE)	Exp(b)	Percentage Change in Odds
New England	Constant	−1.757 (0.020)***	0.173	–
	New England	0.125 (0.086)	1.133	13.3
	Model Summary			
	Chi-Square = 2.063 (p = .151)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.000			
Middle Atlantic	Constant	−1.720 (0.021)***	0.179	–
	Middle Atlantic	−0.249 (0.061)***	0.780	−22
	Model Summary			
	Chi-Square = 17.664 (p = .000)			
	Cox-Snell R^2 = 0.001			
	Nagerlkerke R^2 = 0.001			
East North Central	Constant	−1.724 (0.021)***	0.178	–
	East North Central	−0.160 (0.053)***	0.852	−14.8
	Model Summary			
	Chi-Square = 9.442 (p = .002)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.001			
West North Central	Constant	−1.746 (0.020)***	0.174	–
	West North Central	−0.057 (0.075)	0.945	−5.5
	Model Summary			
	Chi-Square = 0.592 (p = .442)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.000			
South Atlantic	Constant	−1.760 (0.022)***	0.172	–
	South Atlantic	0.046 (0.048)	1.047	4.7
	Model Summary			
	Chi-Square = 0.893 (p = .345)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.000			
East South Central	Constant	−1.729 (0.020)***	0.177	–
	East South Central	−0.374 (0.089)***	0.688	−31.2
	Model Summary			
	Chi-Square = 19.383 (p = .000)			
	Cox-Snell R^2 = 0.001			
	Nagerlkerke R^2 = 0.002			
West South Central	Constant	−1.761 (0.020)***	0.172	–
	West South Central	0.102 (0.062)	1.107	10.7
	Model Summary			
	Chi-Square = 2.635 (p = .105)			
	Cox-Snell R^2 = 0.000			
	Nagerlkerke R^2 = 0.000			
Mountain	Constant	−1.770 (0.020)***	0.170	–
	Mountain	0.261 (0.072)***	1.299	29.9
	Model Summary			
	Chi-Square = 12.668 (p = .000)			
	Cox-Snell R^2 = 0.001			
	Nagerlkerke R^2 = 0.001			
Pacific	Constant	−1.789 (0.021)***	0.167	–
	Pacific	0.259 (0.053)***	1.296	29.6
	Model Summary			
	Chi-Square = 23.271 (p = .000)			
	Cox-Snell R^2 = 0.001			
	Nagerlkerke R^2 = 0.002			

***p < 0.000.

Assessment of hypotheses

To summarize these findings and assess how well the hypotheses hold up, Table 7 presents the different regions, the NASA centers in each, and the percentage change in odds for each question version taken from the

Table 6. Multivariate binary logistic regression results, space exploration.

	New England		Middle Atlantic		East North Central		West North Central		South Atlantic	
	Coefficient (SE)	Exp(b)	Coefficient (SE)	Exp(b)	Coefficient (SE)	Exp(b)	Coefficient (SE)	Exp(b)	Coefficient (SE)	Exp(b)
Constant	−1.994 (0.169)****	0.136	−1.959 (0.169)****	0.141	−1.958 (0.170)****	0.141	−1.989 (0.169)****	0.137	−1.995 (0.170)****	0.136
Region	0.015 (0.118)	1.015	−0.240 (0.080)***	0.787	−0.135 (0.070)*	0.873	−0.039 (0.097)	0.962	0.012 (0.065)	1.012
Generation	0.193 (0.030)****	1.213	0.191 (0.030)****	1.211	0.193 (0.030)****	1.213	0.193 (0.030)****	1.213	0.193 (0.030)****	1.213
Education	0.316 (0.035)****	1.372	0.316 (0.035)****	1.371	0.316 (0.035)****	1.372	0.317 (0.035)****	1.372	0.316 (0.035)****	1.372
Sex	−0.870 (0.053)****	0.419	−0.870 (0.053)****	0.419	−0.870 (0.053)****	0.419	−0.870 (0.053)****	0.419	−0.870 (0.054)****	0.419
Party ID	0.035 (0.029)	1.036	0.032 (0.029)	1.033	0.035 (0.029)	1.036	0.026 (0.029)	1.036	0.035 (0.029)	1.035
Race	−0.259 (0.053)****	0.772	−0.255 (0.053)****	0.775	−0.265 (0.053)****	0.768	−0.260 (0.053)****	0.771	−0.259 (0.053)****	0.772
SEI	0.096 (0.028)****	1.101	0.098 (0.028)****	1.103	0.094 (0.028)***	0.873	0.096 (0.028)****	1.101	0.096 (0.028)****	1.101
Model summary	Chi-Square = 563.440**** Cox-Snell R^2 = 0.040 Nagerlkerke R^2 = 0.074		Chi-Square = 572.837**** Cox-Snell R^2 = 0.041 Nagerlkerke R^2 = 0.075		Chi-Square = 567.276**** Cox-Snell R^2 = 0.040 Nagerlkerke R^2 = 0.074		Chi-Square = 563.587**** Cox-Snell R^2 = 0.040 Nagerlkerke R^2 = 0.074		Chi-Square = 563.457**** Cox-Snell R^2 = 0.040 Nagerlkerke R^2 = 0.074	
	East South Central		West South Central				Mountain		Pacific	
Constant	−1.967 (0.170)****	0.14	−2.007 (0.169)****			0.134	−1.999 (0.169)****	0.136	−2.002 (0.169)****	0.135
Region	−0.234 (0.118)**	0.791	0.212 (0.081)***			1.236	0.251 (0.095)***	1.286	0.158 (0.071)**	1.171
Generation	0.193 (0.030)****	1.213	0.191 (0.030)****			1.21	0.190 (0.030)****	1.209	0.194 (0.030)****	1.214
Education	0.312 (0.035)****	1.366	0.320 (0.035)****			1.377	0.314 (0.035)****	1.369	0.312 (0.035)****	1.367
Sex	−0.869 (0.053)****	0.419	−0.870 (0.053)****			0.419	−0.872 (0.053)****	0.418	−0.869 (0.053)****	0.42
Party ID	0.036 (0.029)	1.036	0.034 (0.029)			1.025	0.035 (0.029)	1.035	0.036 (0.029)	1.037
Race	−0.261 (0.053)****	0.77	00.264 (0.053)****			0.768	−0.255 (0.053)****	0.775	−0.265 (0.053)****	0.767
SEI	0.095 (0.095)***	1.1	0.095 (0.028)***			1.1	0.097 (0.028)****	1.101	0.095 (0.028)***	1.1
Model summary	Chi-Square = 567.549**** Cox-Snell R^2 = 0.040 Nagerlkerke R^2 = 0.074		Chi-Square = 570.008**** Cox-Snell R^2 = 0.041 Nagerlkerke R^2 = 0.075				Chi-Square = 570.102**** Cox-Snell R^2 = 0.041 Nagerlkerke R^2 = 0.075		Chi-Square = 568.285**** Cox-Snell R^2 = 0.040 Nagerlkerke R^2 = 0.074	

****p < 0.000; ***p < 0.001; **p < 0.05; *p < 0.10.

Table 7. Assessment of hypotheses.

Region	Subregion	NASA centers	Space Exploration Program percentage change in odds	Space Exploration percentage change in odds
Northeast	New England	None	5.8	1.5
	Middle Atlantic	None	−15.3	−21.3***
Midwest	East North Central	Glenn Research Center (OH); NASA Safety Center (OH); Plum Brook Station (OH)	−6.5	−12.7*
	West North Central	None	−8.5	−3.8
South	South Atlantic	Goddard Space Flight Center (MD); Goddard Institute for Space Studies (MD); Katherine Johnson IV & V Facility (WV); Kennedy Space Center (FL); Langley Research Center (VA); NASA Engineering and Safety Center (VA); NASA Headquarters (DC); Wallops Flight Facility (VA)	−12.6*	1.2
	East South Central	Marshall Space Flight Center (AL); NASA Shared Services Center (MS); Stennis Space Center (MS)	−29.3**	−20.9**
	West South Central	Johnson Space Center (TX); Michoud Assembly Facility (LA)	12.4	23.6***
West	Mountain	White Sands Test Facility (NM)	33.7***	28.6***
	Pacific	Ames Research Center (CA); Armstrong Flight Research Center (CA); Jet Propulsion Laboratory (CA)	34.8****	17.1**

****$p < 0.000$; ***$p < 0.001$; **$p < 0.05$; *$p < 0.10$.

multivariate logistic regression models. Even if the findings are statistically insignificant, the direction of each coefficient remains the same across both question versions except in the South Atlantic region. This suggests that though the magnitude may vary with each version of the question, they generally provide the same directional findings.

In terms of the hypotheses, we can consider that regions with NASA installations in them are more likely to respond that there is too little spent on space exploration (see Table 1). There are six regions with NASA installations and of those six, half show a positive influence (West South Central, Mountain, and Pacific) and half shown a negative one (East North Central, South Atlantic, and East South Central). A corollary to this hypothesis is that respondents in regions without a NASA center will have a decreased likelihood of responding there is too little spending; of the three regions without NASA centers, two do indeed show a negative impact (Middle Atlantic and West North Central) where one has a positive but statistically insignificant impact (New England). The findings accord with the hypothetical influence in five out of nine regions lending tentative support to this hypothesis.

The second hypothesis is that Southern regions, because of their deep historical and economic association with NASA, are likely to express greater support for increased funding. Of the three Southern sub-regions, two show a negative influence (South Atlantic and East South Central) and one a positive (West South Central). This is despite the flow of NASA dollars into the region shown in Figure 1. The results suggest that the Southern hypothesis is not supported. Thus, to the extent that region matters in supporting funding for space exploration, being from the South appears to be a negative influence.

Conclusions

Do individuals, particularly those in the South where NASA centers are concentrated and economic impact the largest, exhibit greater levels of support for space exploration? Of the six census regions with NASA centers, three of the regions have a negative impact on desire for greater space spending, two regions have a positive impact, and one other is positive. In two of the three Southern regions, location reduces the likelihood to believe more funding is needed. Perhaps what is more important to point out, however, is that other variables in the models, including education, age, gender, and race, generally show a greater influence on responses than region.

These findings posit implications for NASA and its political support. If we accept the argument that members of the Congress are likely to pay attention to constituency opinions based on the premise of reelection and if constituents express a more negative attitude towards space and NASA, NASA is unlikely to see major changes in funding or policy in the future barring any major policy crises.[33] While members of Congress, particularly from states and districts with NASA centers, including the South, are likely to continue to advocate for NASA activities because of the economic impact, there is no great push coming from voters to enhance NASA's budget or speed along its policy goals.

Additionally, given that some regions with NASA centers, Mountain and Pacific, show higher levels of "too little" responses, what is it about the Southern regions that generate such a response? This effect could be tied to the findings regarding demographic variables, including gender, race, and age. In the GSS data used, for example, women are the majority in each region but some regions have a wider gender gap. In the East South Central region, for example, where region has one of the biggest impacts, the gap between male and female respondents is 13.8%, whereas in the Pacific it is only four percent. If gender is such a significant determinant, regions with more women, or at least to the extent that they are over-represented in a sample, are likely to have lower opinions on space spending. While this suggests an additive relationship, age and race show a more interactive relationship with region.

[33]Wendy N. Whitman Cobb, *Unbroken Government: Success and the Illusion of Failure in Policymaking* (New York, Palgrave Macmillan, 2013).

There are limitations to the analysis presented here. First, the farther one moves out from a NASA center, direct experience with and connection to the installation is likely to decrease, and a regional designation, even at the sub-regional level, may be too general to capture attitudes relevant to the topic under consideration here. Two, the GSS question regarding funding for space exploration or the space exploration program may not be entirely appropriate. While it is rational to assume that believing that too little is spent equates with support, we cannot know how respondents interpreted the question and whether they interpreted it in this manner, particularly given that there is a general misunderstanding amongst the public regarding how much money NASA receives from the federal government. Finally, the saliency of space exploration in general is low meaning that survey responses are likely to be unstable over time or reflect low knowledge or interest in space in general.[34]

These results do suggest avenues for future research, two of which I believe are notable and important. One, the models have a low overall fit indicating that there are other factors that are more important in determining responses. Since the variables included here are demographic in nature, future research to pursue attitudinal determinants including general attitudes on the role of science, government spending in general, and the value of higher education is worthwhile. For example, if individuals value the role of science in society, they might be more willing to support NASA and space exploration than those who do not value it as highly. These types of attitudes could be important in distinguishing the South from other regions. Second, while it is generally understood there is a gender gap in science, technology, engineering, and math disciplines, understanding why there is such a large gender gap affecting spending attitudes toward space exploration should be intrinsically important to space supporters. To increase support for funding, to increase saliency, and to increase interest in space, women are an audience that need to be targeted; understanding causes of the gender gap are important in this regard.

Disclosure statement

No potential conflict of interest was reported by the author.

[34]Zaller, *The Nature and Origins of Mass Opinion.*