Examining Episodes of Limited Diffusion: The Politics of Embryonic Stem Cell Research

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Abstract

Despite many important advances in the study of policy diffusion, this research has overemphasized episodes of widespread adoption and underemphasized the rejection of innovations. This paper addresses that crucial gap in the existing scholarly literature by examining the politics of embryonic stem cell research in the American states. State officials had multiple policy options at their disposal, none of which gained widespread adoption. A systematic examination of bill introduction patterns between 1999 and 2008, however, suggests that this episode of non-diffusion was not due to a lack of awareness about these diverse options. Bill introduction, especially of proposals meant to facilitate the research, was widespread. The introduction of such enabling proposals was linked to strong state scientific capacity and a competitive political environment, while educational attainment and the state unemployment rate were linked to the introduction of enabling as well as restrictive legislation.

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Since the seminal research of Jack Walker and Virginia Gray was published in the late 1960s and early 1970s (Walker 1969; Gray 1973), the study of policy diffusion has constituted a key component of the state politics subfield of political science. At the state level, diffusion implies a process of learning or emulation during which decision-makers look to other states as potential models to be followed or avoided. The diffusion process has received heightened scholarly attention in recent years among state politics scholars and in various other subfields of political science. By examining this process for a wide range of phenomena in a variety of settings, scholars have produced numerous insights about the political forces that contribute to the spread of innovative political forms and policy ideas.

Despite many important advances in the study of policy diffusion, however, this research has not adequately addressed what Everett Rogers (1995, 100) has labeled the "pro-innovation bias of diffusion research" and characterizes as "one of the most serious shortcomings of diffusion research." Put simply, most analyses focus only on instances where a policy innovation or political form diffused successfully. Thus existing diffusion research lacks sufficient variation on the dependent variable. To construct a compelling account of how diffusion works political scientists must examine episodes both when a policy diffused and when it did not. Unfortunately, like diffusion scholars in other fields, political scientists have underemphasized the rejection or discontinuance of innovations and overemphasized episodes of widespread adoption.

Indeed, most research on policy diffusion among the American states emphasizes the state characteristics associated with the early adoption of these policies, an emphasis that blurs the crucial distinction between diffusion and adoption. Spread is an absolutely

critical component of any definition of diffusion (Strang and Soule 1998). Diffusion is about the movement of an innovation across jurisdictional boundaries, whereas adoption is the decision to establish a policy in an individual jurisdiction. Adoption is but one part of the larger diffusion process, albeit an important and interesting one (Karch 2007b, 56). In combination, the pro-innovation bias and the emphasis on the adoption decision that characterize most diffusion research renders it incomplete and implies that this literature does not reveal as much about the diffusion process as it might.

The tendency to study policy innovations and political forms that have achieved widespread acceptance does not necessarily grow out of a normative or intellectual stance that such diffusion is somehow desirable, yet it nonetheless prevents political scientists from answering crucial questions about the diffusion process. For example, the failure to adopt a particular innovation might be due to the fact that lawmakers are not aware of its existence. Such a dynamic implies a lack of information generation, a crucial element of the diffusion process. In fact, diffusion has been defined as the "process through which an innovation is communicated through certain channels over time among the members of a social system" (Rogers 1995, 11). Alternatively, officials in a particular state might have considered a policy innovation but chosen not to adopt it. Such a dynamic implies that the innovation achieved agenda status and was taken seriously as a potential option. Agenda setting has been a peripheral concern in most diffusion research, but achieving agenda status is a crucial component of diffusion because a policy innovation cannot be adopted without first moving onto the agenda and becoming an option that is seriously considered. One might even argue that the consideration of a given alternative indicates that it has, at least to a certain degree, diffused.

Diffusion studies which focus solely on the adoption decision cannot distinguish between the two scenarios outlined in the preceding paragraph, which seem to suggest the utility of devoting more attention to the different stages of the policymaking process. If the most influential political forces vary across these stages, then the standard approach to the study of diffusion may underestimate the impact of certain forces and overestimate the impact of others. Examining a wider range of outcomes will enable scholars to focus more intently on different diffusion mechanisms and to understand whether and how their impact varies across stages of the policymaking process.

Examining instances where a policy innovation did not diffuse widely therefore represents a necessary complement to existing diffusion research. In addition, it provides an analytical opportunity to move beyond the traditional focus on the adoption decision by incorporating information about the policymaking process into the study of diffusion (Balla 2001, 223). Looking beneath aggregate-level patterns of innovation adoption will promote a better understanding of the decision-making that drives the diffusion process and illuminate the behavior of the individuals who actually make the decisions in which we are interested. Assessing episodes of non-diffusion also poses an analytical challenge, however, because "an unsuccessful diffusion effort does not leave visible traces that can be very easily reconstructed" (Rogers 1995, 104-105). The yes-no question of whether a policy innovation was adopted seems more analytically tractable than does the question of why another program did not achieve widespread adoption at the state level.

This paper examines the politics of embryonic stem cell research in the American states. While this controversial issue has been on the radar screen in the United States for over a decade, relatively few states have taken a definitive stance in either support of or

opposition to such research. As of January 31, 2008, seven states had provided financial and political support for stem cell research, three states had made the research legal but offered no funding, and six states had restricted the research (Vestal 2008). It is difficult to argue that a particular policy stance toward embryonic stem cell research had diffused widely. Rather than focusing on the adoption decision, however, this paper uses patterns of bill introduction at the state level to examine the political dynamics behind this episode of non-diffusion.

The Politics of Embryonic Stem Cell Research

In November 1998, James Thomson and his research team at the University of Wisconsin, Madison announced that they had isolated stem cells from human embryos (Thomson et al. 1998). Biologists hailed their work as a scientific breakthrough because embryonic stem cell lines, unlike adult stem cells usually derived from bone marrow and umbilical cord blood, are "undifferentiated" or "pluripotent." This characteristic means that embryonic stem cells have the ability to form any type of cell found in the body and are not programmed to be specific to the brain, the heart, the skin, or other bodily tissues. This versatility makes embryonic stem cells a powerful tool for biological research, with some scientists predicting that they will be instrumental in developing treatments for a variety of health problems.[1]

In addition to their scientific potential, however, embryonic stem cells also raise numerous legal and ethical questions. Observers recognized these competing imperatives

[1] Mintrom (2009) provides a more comprehensive overview of recent scientific developments in stem cell research and the controversial nature of this work.

as soon as Thomson's team announced its accomplishment (Marshall 1998). The issue of embryonic research has been inextricably linked to the issue of abortion ever since the U.S. Supreme Court issued its landmark *Roe v. Wade* decision in 1973, and this linkage is especially strong when government funding of such research is at issue (Wertz 2002). As a result, the 1973 ruling "provided a durable backdrop for legislative controversy around embryo and stem cell research after 1998" (Banchoff 2005, 228). The ethical issues that arise in the context of embryonic stem cell research resonate with the broader debate over abortion. Individuals who believe that embryos have intrinsic value from the moment of conception regard using an embryo to derive stem cells as morally objectionable. These moral objections are frequently framed in religious terms, which helps explain why those with strong ties to religious institutions, such as regular church attendees, are less likely to support the research (Nisbet 2005). To some extent, the debate over embryonic stem cell research is really a debate over competing frames, as opponents emphasize the moral questions and the link to abortion and supporters emphasize the promise of therapies and economic development.

The national government has waded into the ongoing battle over embryonic stem cell research intermittently since 1998. The issue received limited media attention until the summer of 2001, when it "reached the top of the U.S. political agenda" (Nisbet 2004, 132). Scientists and other research advocates urged President George W. Bush to lift the long-standing moratorium on using cells from human embryos in projects funded by the national government, whereas opponents argued that it would be morally wrong for the government to support such research. In a nationally televised address on August 9, 2001, the president announced a compromise solution that limited federal funds to research that

used only existing stem cell lines. Research advocates viewed this stance as excessively restrictive, whereas research opponents objected to its ethical implications. In 2006, the Stem Cell Research Enhancement Act would have allowed taxpayer-funded research on stem cell lines derived from embryos slated for destruction by fertility clinics. It received bipartisan congressional support and was eventually presented to President Bush, causing him to issue his first veto after more than five years in office. Nearly three years later, in March 2009, President Barack Obama issued an executive order revoking the policy set in place by his predecessor. The primary objective of this order was to expand support of embryonic stem cell research by the National Institutes of Health (NIH).

Various scientific and political developments also affected the public debate over embryonic stem cell research. In 2004 and 2005, a prominent researcher in South Korea claimed to have created human embryonic stem cells through cloning, but his research was determined to be fraudulent and *Science* unconditionally retracted his two landmark papers. The production of induced pluripotent stem cells from human cells in 2007 was a second important scientific development because it led some observers to speculate that researchers would soon be able to obtain pluripotent stem cells without the controversial use of embryos. In the political arena, initiative campaigns in California in 2004 and in Missouri in 2006 heightened the salience of embryonic stem cell research in those states and received significant media attention.

While all of the preceding developments were important, this paper is concerned with the introduction of embryonic-stem-cell-related legislation at the state level. State policymakers, like their counterparts at the national level, have multiple policy options at their disposal. On the one hand, they can pass enabling legislation that either permits

such research or dedicates government funding to it. On the other hand, they can pass restrictive legislation that bans either the research itself or government funding of it. A striking element of the state-level debate over embryonic stem cell research, however, is that, as was mentioned earlier, relatively few states took a definitive stance on the issue through January 2008. At that time, only seven states had provided financial and political support for stem cell research, only three states had made the research legal but offered no funding, and only six states had restricted the research (Vestal 2008). Developments in this policy arena therefore represent an episode of non-diffusion, as a relatively small number of states endorsed any of the available policy alternatives.

The absence of widespread adoption represents an analytical opportunity. More specifically, the limited diffusion of stem-cell-related policies might have been due to a number of different causes. State officials might not have known much about this policy arena or their potential options, they might have been aware of the ongoing controversy surrounding embryonic stem cell research and chosen to steer clear of the debate because it did not offer them any electoral payoff, or they might have actively considered stem-cell-related bills but not enacted them. The only way to evaluate these possibilities is to examine information about the agenda-setting process at the state level. If the absence of adoptions were due to a lack of awareness or a desire to steer clear of controversy, then we would expect that the various policy options were considered in relatively few states. If proposals were introduced in most states but failed to navigate the legislative process, on the other hand, then it would suggest that the limited diffusion was not due to a lack of awareness of the issue. Although agenda setting has been a peripheral concern in most diffusion research, it seems essential to understanding the dynamics of policymaking in

this particular case. More generally, it promises to shed light on examples of relatively limited diffusion.

Systematically assessing the agenda-setting process requires the development of a proxy that indicates whether an issue has achieved agenda status. This paper utilizes bill introduction as its proxy, an approach that has also been used to assess the agenda-setting impact of such factors as the increased presence of women and minorities in legislatures (Bratton and Haynie 1999; Saint-Germain 1989; Thomas and Welch 1991).[2] It treats bill introductions as the "visible traces" of unsuccessful diffusion efforts (Rogers 1995, 105) and assumes that embryonic stem cell research has moved onto the agenda when a state official introduces a bill addressing the topic. Bill introduction is a reasonable proxy for agenda status because it suggests that lawmakers are paying attention to, aware of, and interested in the topic. It may also imply that the interest groups and other "outsiders" who work closely with lawmakers possess similarly high levels of awareness and interest.

State legislative Web sites represent a potentially rich data source for state politics research, and this paper uses them to develop its measure of recent state-level activity on embryonic stem cell research. It gathers information on the timing and the extent of bill introduction using policy-relevant keyword searches. The specific phrase used to gather the relevant bills was "stem cell."[3] In some states, this search term returned information about committee reports and amendments; such information was discarded to ensure that each individual proposal was counted only once. These searches generated a data set of

[2] This article generally refers to "bill" introduction, but it is important to note that the data set also includes any stem-cell-related resolutions that were introduced in state legislatures during the period under study. The data set includes 387 bills and 78 resolutions. Whenever this article uses the term "bills," it is referring to the entire universe of bills and resolutions.

[3] The keyword search used "stem cell" rather than "embryonic stem cell" because the controversy over embryonic stem cell research often invokes a larger debate over other forms of research. Opponents who are motivated by their concerns about the relationship between the research and abortion sometimes frame research on adult stem cells as a compromise option that severs this link.

465 bills that were introduced in state legislatures between 1999 and 2008.[4] The data set provides a reasonable measure of the agenda status of embryonic stem cell research in the American states.

In order to assess the content of state political agendas, the 465 bills in the data set were coded for their stance toward embryonic stem cell research. This paper focuses on four types of bills, two of which enable the research and two of which restrict it. Table 1 provides descriptive information about the four types of proposals and their timing. The first type of enabling legislation includes proposals that contain a specific statement of support for embryonic stem cell research or that allow such research to take place within the state. A total of 90 proposals fall into this category. The second category of enabling legislation includes proposals that either dedicate public funds or allow public funds to be dedicated to embryonic stem cell research. This category includes 115 proposals, which makes it the most common of the four types of proposals considered in this paper. The first type of restrictive legislation includes proposals that contain a ban on public funding for embryonic stem cell research, and a total of 17 proposals fall into this category. The second type of restrictive legislation includes proposals that specifically ban embryonic stem cell research within the state. This category includes 24 proposals.[5]

(Insert Table 1 about here)

[4] In a small number of cases, state legislative Web sites either did not permit a keyword search or did not provide bill introduction information throughout the entire period examined in this paper. State legislative libraries were contacted to collect the missing data. The search term also returned dozens of proposals in Virginia that were ultimately discarded. Many of them amended state employee health insurance coverage requirements, which included a mandate for "stem cell support" for breast cancer. Others addressed the definition of biotechnology equipment for the purpose of local taxation. All proposals that contained these fleeting references to stem cells but left existing treatment of the topic intact were discarded.

[5] The total number of proposals in the four categories does not equal 465 because many proposals do not fall into one of the four categories. For example, more than one-third of the proposals would either create a commission to study the feasibility of embryonic stem cell research in the state, mention stem cells in the context of economic development or medical research without taking a clear stance on embryonic stem cell research, attempt to encourage the collection of umbilical cord blood as a source of stem cells, or provide support solely for adult stem cell research without mentioning embryonic stem cell research.

The descriptive data in Table 1 suggest three broad conclusions about the timing and amount of state-level activity related to embryonic stem cell research. First, the total number of bills introduced suggests that the relatively limited diffusion of these policies was not due to a lack of awareness about them. Across the four categories, a total of 246 bills were introduced during the period under study. It is important not to overestimate the significance of this count, which includes five legislative sessions for fifty states, but clearly these data suggest at least a general awareness among state officials of the policy options available to them. Second, state officials introduced five times as many enabling proposals as restrictive proposals. This striking ratio might suggest that the introduction of legislation represented a reaction against the restrictive national policy. State officials in favor of publicly-funded embryonic stem cell research might have viewed the national policy as a failure to act and viewed themselves as filling a vacuum. The third pattern in Table 1 provides very tentative support for that particular hypothesis. The overwhelming majority of the proposals were introduced in 2003 or later, which might suggest that state officials waited for the national government to act and introduced stem-cell-related bills when they found its actions sufficient.[6] While the exact meaning of the patterns in Table 1 is open to interpretation, they surely suggest that further analysis is necessary.

Explaining Patterns of Bill Introduction

Aggregate patterns of bill introduction suggest that the limited diffusion of stem-cell-related policies cannot be attributed to a lack of awareness about them. During the

[6] President Obama's recent executive order represents an opportunity to test this hypothesis systematically because it altered the general direction of national policy. Such a study lies beyond the scope of this paper.

five legislative sessions under study, enabling proposals were introduced in 33 states and restrictive proposals were introduced in 18 states. Rarely, however, were these proposals adopted. The widespread consideration but limited adoption of stem-cell-related policies reaffirms an emerging theme in recent policy diffusion research, namely, that the causal mechanisms that place a policy innovation on the political agenda may not be the same forces that spur officials to adopt it (Haider-Markel 2001; Karch 2007a; Mintrom 1997, 2000). The remainder of this paper seeks to isolate the political forces that contributed to the introduction of either enabling or restrictive stem-cell-related proposals. It attempts to account for cross-sectional variation in the number of such bills in a given state during a given legislative session. Thus the unit of analysis is the state-session. Furthermore, it relies on the categorization scheme described in the preceding section to investigate the factors contributing to the introduction of different types of proposals.

The outcome of interest is an event count because the number of bills introduced during a legislative session is a non-negative and integer-valued variable. Event count models have not been used often in the study of diffusion, which tends to rely on a yes-no measure of program adoption, but they are appropriate in this context because they allow us to assess the overall extent of proposal introduction. To account for overdispersion, a negative binomial model is used to assess the determinants of agenda intensity.[7] States remain in the analysis throughout the entire period under study, regardless of whether any legislation has been introduced.[8] The models examine the relationships between agenda intensity and several independent variables that seem especially relevant to developments

[7] For a detailed discussion of the usefulness and the mechanics of the negative binomial model in diffusion research, see Boehmke (2009) and Boehmke and Witmer (2004).

[8] There are 235 observations in each of the models. Religious affiliation data are not available in Alaska or Hawaii, and political competition data are not available for the nonpartisan legislature in Nebraska.

in this policy area or that existing diffusion research has linked to the adoption decision in other contexts. The following paragraphs describe each of these potential influences in greater detail.

One potential influence on agenda intensity at the state level is the introduction of stem-cell-related proposals in neighboring states. Indeed, the neighboring state effect is a standard component of diffusion research (Berry and Berry 1990; Haider-Markel 2001; Mooney and Lee 1995). Most studies assume that the existence of a policy innovation in a neighboring state will positively affect the probability of program adoption; the agenda-setting process may be affected by a similar dynamic. The models therefore include the percentage of a state's neighbors in which stem-cell-related bills had been introduced prior to the year of measurement.[9] A second potential influence on state policymaking in this issue area has been termed "state scientific capacity" (Mintrom 2009). To varying degrees, states have promoted science and technology in efforts to attract federal research funds and generate economic growth. States with stronger infrastructures to support such efforts might be more likely to consider stem-cell-related legislation, especially enabling legislation. The models therefore include two proxies for state scientific capacity that were developed by Mintrom (2009). The first is a per capita measure of annual research funds received from the National Institutes of Health (NIH),[10] and the second is a count of the number of research universities in each state that were ranked in the top hundred in

[9] This measure was calculated using the neighboring state pairings described in Thomas J. Holmes, "The State Border Dataset," April 30, 1998, http://www.econ.umn.edu/~holmes/data/BORDLIST.html (accessed April 20, 2009). Separate scores were calculated for each of the outcomes of interest.

[10] Research funds data come from the National Institutes of Health's Research Portfolio Online Reporting Tools (http://report.nih.gov/award/trends/State_Congressional/StateOverview.cfm, accessed March 15, 2010). This information was modified to account for inflation. State population data come from the U.S. Census Bureau, "Population, population change and estimated components of population change: April 1, 2000 to July 1, 2009" (http://www.census.gov/popest/national/files/NST_EST2009_ALLDATA.csv, accessed March 15, 2010).

North America.[11] Individuals with strong ties to religious institutions are less likely to support embryonic stem cell research (Nisbet 2005), so the models include two measures of religious affiliation. These proxies for religiosity are the percentage of the population who identified themselves as Baptist or Catholic in a 2001 survey (Kosmin, Mayer, and Keysar 2001).[12] Since affiliated individuals may possess strong feelings about stem cell research, states with relatively religious populations may be likely to consider restrictive proposals. Given the historic link between stem cell research and the politics of abortion, the models also include an index of abortion restrictiveness (Guttmacher Institute 2010). This additive index indicates the presence or absence of six regulations.[13] The presence of many such regulations is expected to be positively associated with the introduction of restrictive stem cell research proposals.

In addition, the models include a variety of proxies for the general state political and economic context. Partisanship and political ideology are potentially relevant to the introduction of stem-cell-related legislation. Although support for embryonic stem cell research crosses party lines, Democrats are generally more supportive of providing public funds for such research. The proxy for partisanship is a dichotomous variable coded 1 if Democrats control both the governorship and the state legislature and 0 otherwise.[14] A similar logic explains the potential relationship between ideology and the introduction of

[11] These data rely on the academic rankings of world universities produced by the Institute of Higher Education, Shanghai Jiao Tong University (http://www.arwu.org/, accessed March 15, 2010). Mintrom (2009, 628) describes the benefits of this specific ranking in more detail.

[12] The estimates were available only for 2001, so the values used in the model are constant throughout the period under examination.

[13] The index considers the presence of the following regulations: a requirement that a licensed physician perform any abortion (38 states); a ban on "partial-birth" abortion (16 states); public funding of abortions is limited to cases of life endangerment, rape, or incest (33 states); a requirement that pre-abortion counseling include information on a potential link to breast cancer, fetal pain, negative psychological effects or ultrasound services (17 states); a waiting period after counseling (24 states); and a parental involvement requirement for minors (34 states). The values used in the models are constant throughout the period under examination and are based on data for 2010.

[14] The party control measure used here is an updated, annual version of the one presented in Klarner (2003).

stem-cell-related proposals, with liberals more likely to favor government support of such research. This paper's proxy is the estimate of citizen ideology developed by Berry et al. (1998).[15] Enabling proposals might be more likely to appear in states under Democratic control or in states with a liberal citizen ideology. One might also hypothesize that the officials who are most likely to introduce proposals surrounding this issue are those who are at the greatest risk of losing their seats or whose party is in danger of losing control of the legislature. The models therefore include a measure of party competition (Bibby and Holbrook 1999). In the context of embryonic stem cell research, educational attainment might be linked to a more favorable attitude toward science and a greater willingness to use public funds to support scientific research. High levels of educational attainment are therefore also expected to increase the probability that state officials introduce enabling legislation. This paper's proxy for educational attainment is the percentage of a state's population age 25 and over that had completed four or more years of college.[16] Finally, the state economic context might affect the introduction of stem-cell-related legislation. The models therefore include the state unemployment rate and the change in the state unemployment rate from one session to the next.[17] Elected officials in states with high unemployment rates might view embryonic stem cell research as a potential engine of economic development and therefore introduce enabling proposals. The link between the economic cycle and state government budgetary health suggests that a state with a rising unemployment rate may simply not be able to afford this sort of expenditure. The models also include a session count variable (i.e., "1" for 1999-2000, "2" for 2001-02, etc.) as a

[15] An annual estimate was not available for 2007, so 2006 estimates were included. Updated estimates are available at http://www.uky.edu/~rford/Home_files/page0005.htm (accessed July 28, 2008).
[16] These data come from the U.S. Census, (http://www.census.gov/population/socdemo/educ-attn.html, accessed July 29, 2008). An annual estimate was not available for 2007, so 2006 estimates were included.
[17] These data come from the Bureau of Labor Statistics (http://www.bls.gov/lau, accessed March 25, 2010).

control for the passage of time. The temporal patterns described in Table 1, with the bulk of the bill introductions coming in 2003 or afterward, suggest that failure to include such a control will lead to biased estimates.

Results

Table 2 displays the results of event count models for agenda intensity for the two types of enabling proposals described in the preceding section and for a third model that considers the total number of enabling proposals. The results are presented as expected values rather than the coefficients of the initial analysis, and these expected values were derived by manipulating the quantity of interest and setting all continuous variables to their means and all dichotomous variables to their modes. For dichotomous variables such as unified Democratic government, the table displays the change in the expected number of bill introductions when the quantity of interest shifts from zero to one. For such variables as educational attainment, the table displays the change in the expected number of introductions when the quantity of interest shifts from one standard deviation below its mean to one standard deviation above its mean. The values were derived using the statistical simulation technique and computer software described in King, Tomz, and Wittenberg (2000), and the "confidence intervals" in Table 2 are [2.5%, 97.5%] of the posterior distributions. The substantive effect of the political factors examined in Table 2 might appear to be fairly limited, but it is important to remember that the average number of proposals introduced during a legislative session is less than one. A total of 90 bills supporting embryonic stem cell research were introduced during the period under study,

while a total of 115 bills either dedicating or permitting the dedication of state funds to the research were introduced.

(Insert Table 2 about here)

Several relationships displayed in Table 2 attain conventional levels of statistical significance. The second column of Table 2 displays the results of a model in which the outcome of interest is the number of proposals introduced during a legislative session that either include a specific statement of support for embryonic stem cell research or allow such research to take place within the state. There is a marginally significant and positive relationship between the introduction of such bills and the receipt of research funds from the NIH and between the introduction of supportive bills and political competition. The state unemployment rate has a positive and significant effect on the number of supportive bills introduced, which might suggest that lawmakers in states with struggling economies are more willing to consider such bills because they view embryonic stem cell research as a potential engine of economic growth. The third column of Table 2 displays the results of model in which the outcome of interest is the number of proposals introduced during a legislative session that either dedicate public funds or allow such funds to be dedicated to embryonic stem cell research. The presence of highly ranked research universities in a state has a marginally significant positive effect on the introduction of such bills, hinting at the importance of state scientific capacity. Political competition and state educational attainment each have a positive impact of the number of funding bills introduced, while the neighboring state effect achieves conventional levels of statistical significance but is unexpectedly negative. The direction of the neighboring state effect might suggest that state officials refrained from introducing such bills because developments in neighboring

states suggested that they were an electoral liability, but such a conclusion is necessarily speculative.

The final column of Table 2 displays the results for a model in which the outcome of interest is the total number of enabling proposals introduced during a given legislative session. This outcome is the sum of the number of supportive proposals and the number of funding proposals. State scientific capacity has a positive and significant effect on the total number of enabling proposals. When other independent variables are fixed at their central values, moving from a state with no highly-ranked research universities to a state with a high number of such universities leads to the introduction of 0.169 additional bills. Political competition, educational attainment, and the state unemployment rate also have a positive and significant effect on the introduction of enabling proposals. When other independent variables are fixed at their central values, moving from a less competitive to a more competitive state leads to the introduction of 0.172 additional bills, moving from a state with a relatively low level of educational attainment to a state with a relatively high level of educational attainment leads to the introduction of 0.330 additional bills, and the shift from a state with a relatively low unemployment rate to a state with a relatively high unemployment rate leads to the introduction of an additional 0.233 bills. The percentage of the state population that is Catholic has a marginally significant positive effect on the number of enabling bills introduced during a given session, and the existence of unified Democratic government has an unexpectedly negative significant effect.

Table 3 displays the results of event count models for agenda intensity for the two types of restrictive proposals described in the preceding section and for a third model that considers the total number of restrictive proposals. Like the results in Table 2, the results

in Table 3 are presented as expected values and were derived in the same manner. Some relationships displayed in Table 3 attain conventional levels of statistical significance, but overall the results are somewhat disappointing. The paucity of significant relationships may be due to the relatively small number of restrictive bills introduced during the period under study. Only 24 proposals banning embryonic stem cell research and 17 proposals banning public funding of such research were introduced. Even so, some of the results in Table 3 are noteworthy. The percentage of the population that is Baptist has a marginally significant positive effect on the number of research ban proposals introduced in a given state during a given legislative session. Unexpectedly, state educational attainment has a positive and significant effect both on the introduction of research bans and on the total number of restrictive proposals introduced. In combination with the results displayed in Table 2, this relationship suggests that states with more highly educated populations may be more aware of scientific developments and consequently more likely to consider their political implications. The state unemployment rate has a positive and significant effect on the total number of restrictive proposals introduced. While any interpretation of this somewhat unexpected result must be speculative, like the preceding claim regarding the effect of educational attainment, it might suggest that policymakers in states with higher unemployment rates are more likely to view embryonic stem cell research as a potential engine of economic growth and that this perception leads state officials on both sides of the issue to introduce legislation.

(Insert Table 3 about here)

In sum, the results displayed in Tables 2 and 3 illuminate the political forces that contribute to bill introduction and the content of state legislative agendas. As expected,

state scientific capacity, specifically the existence of highly-ranked research universities, appears to lead to the introduction of enabling proposals but to have no significant effect on the introduction of restrictive proposals. The same pattern exists for party competition, which also seems to contribute to the introduction of enabling bills but not restrictive bills. Two factors, educational attainment and the state unemployment rate, seem to contribute to the introduction of both enabling and restrictive legislation, suggesting that they foster a general awareness of developments in this policy arena.

Conclusion

While tentative, the preceding analysis suggests the usefulness of expanding the frame of analysis of policy diffusion research. Most existing studies ignore the agenda-setting process, which is a crucial oversight because a public policy cannot be adopted without first moving onto the agenda and becoming an option that is taken seriously. In the specific case of embryonic stem cell research, focusing on the agenda-setting process has the added advantage of enabling researchers to begin to address the "pro-innovation bias" that characterizes most of the existing literature. Although state officials had many policy options at their disposal in this context, none of them gained widespread adoption. In addition to isolating the political factors associated with the introduction of stem-cell-related proposals – including state scientific capacity, political competition, educational attainment, and the unemployment rate – the preceding analysis also illustrated the more fundamental point that the failure to adopt a policy innovation does not necessarily imply a lack of awareness about it. It therefore suggests that future diffusion research should

incorporate the agenda-setting process in a more systematic way. It is a crucial element of diffusion and of the policymaking process more generally.

The preceding analysis suggests other potential directions for future research. For example, a focus on the agenda-setting process and bill introduction patterns should not completely displace the more traditional focus on the adoption decision. The diffusion of embryonic-stem-cell-related policies was limited, but some states did adopt them. These episodes surely merit attention and a comparison with examples of bill rejection, either through case studies of individual states or through a quantitative analysis that utilizes the bill as the unit of analysis. Such an analysis will facilitate an evaluation of an emerging hypothesis in diffusion research that the political forces responsible for placing a policy innovation on the agenda differ from those that contribute to its adoption (Haider-Markel 2001; Karch 2007a; Mintrom 1997, 2000). In addition, comparing recent developments in the arena of embryonic stem cell research with other episodes of non-diffusion might further illuminate the obstacles that prevent state officials from endorsing new programs. While patterns of bill introduction seem like a promising approach to this question, taking a closer look at the information which state policymakers bring to bear on their decisions and the sources on which they rely for such information is also likely to prove productive (Mossberger 2000). Paying closer attention to episodes of non-diffusion and the different stages of policymaking will enable future diffusion research to look beneath aggregate-level adoption patterns and promote a better understanding of the decision-making which drives the diffusion process.

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Table 1: Patterns of Bill Introduction, 1999-2008

Session	Proposals Supporting Research	Proposals to Fund Research	Proposals Banning Public Funding	Proposals Banning All Research
1999	0	0	0	0
2001	9	0	0	1
2003	19	10	2	4
2005	37	53	8	8
2007	25	52	7	11
Total	90	115	17	24

Table 2: Explaining Enabling Proposals, 1999-2008

Variable	Proposals Supporting Research	Proposals to Fund Research	Total Number of Enabling Proposals
Neighboring States	-0.028	-0.025**	0.039
	[-0.151, 0.097]	[-0.058, -0.004]	[-0.096, 0.186]
NIH Funding	0.122^	-0.010	0.066
	[-0.025, 0.294]	[-0.061, 0.032]	[-0.088, 0.234]
University Presence	0.064	0.036^	0.169**
	[-0.035, 0.178]	[-0.001, 0.101]	[0.043, 0.323]
Percent Baptist	-0.033	0.019	0.018
	[-0.241, 0.157]	[-0.060, 0.118]	[-0.222, 0.270]
Percent Catholic	0.134	0.028	0.187^
	[-0.050, 0.370]	[-0.039, 0.124]	[-0.026, 0.460]
Abortion Regulations	0.124	-0.001	0.095
	[-0.042, 0.325]	[-0.072, 0.071]	[-0.103, 0.327]
Democratic Control	-0.092	-0.023	-0.168*
	[-0.198, 0.029]	[-0.075, 0.024]	[-0.288, -0.043]
Citizen Ideology	0.009	0.026	0.004
	[-0.220, 0.241]	[-0.066, 0.154]	[-0.278, 0.289]
Political Competition	0.140^	0.043*	0.172*
	[-0.010, 0.300]	[0.002, 0.103]	[0.016, 0.342]
Educational Attainment	0.036	0.144**	0.330**
	[-0.164, 0.236]	[0.055, 0.290]	[0.126, 0.603]
Unemployment Rate	0.197*	0.025	0.233*
	[0.048, 0.386]	[-0.032, 0.094]	[0.060, 0.446]
Unemployment Change	-0.083	0.014	-0.024
	[-0.254, 0.078]	[-0.042, 0.091]	[-0.215, 0.182]
Session	0.393**	0.330**	0.758**
	[0.196, 0.673]	[0.175, 0.583]	[0.481, 1.160]
Number of Observations	235	235	235
Log Likelihood	-144.999	-120.163	-200.816
P > Chi-Squared	0.0000	0.0000	0.0000
Pseudo R-Squared	0.1636	0.3062	0.2398

Note: All tests of statistical significance are two-tailed. Standard errors in parentheses.
^ Significant at the .10 level * Significant at the .05 level ** Significant at the .01 level

Table 3: Explaining Restrictive Proposals, 1999-2008

Variable	Proposals Banning Public Funding	Proposals Banning All Research	Total Number of Restrictive Proposals
Neighboring States	-0.007	-0.004	-0.011
	[-0.058, 0.019]	[-0.017, 0.007]	[-0.046, 0.020]
NIH Funding	-0.016	-0.002	-0.016
	[-0.181, 0.069]	[-0.054, 0.040]	[-0.126, 0.053]
University Presence	0.017	-0.005	-0.005
	[-0.033, 0.179]	[-0.038, 0.019]	[-0.052, 0.045]
Percent Baptist	-0.006	0.024^	0.037
	[-0.164, 0.159]	[-0.002, 0.082]	[-0.024, 0.135]
Percent Catholic	0.007	-0.009	-0.002
	[-0.112, 0.148]	[-0.068, 0.042]	[-0.095, 0.090]
Abortion Regulations	0.025	-0.010	0.008
	[-0.035, 0.162]	[-0.059, 0.025]	[-0.065, 0.095]
Democratic Control	0.023	-0.008	-0.020
	[-0.053, 0.166]	[-0.036, 0.023]	[-0.074, 0.046]
Citizen Ideology	0.008	-0.033	-0.047
	[-0.124, 0.196]	[-0.117, 0.010]	[-0.172, 0.043]
Political Competition	-0.002	0.016	0.036
	[-0.079, 0.056]	[-0.008, 0.052]	[-0.015, 0.107]
Educational Attainment	0.011	0.028*	0.080*
	[-0.076, 0.145]	[0.009, 0.010]	[0.015, 0.192]
Unemployment Rate	0.015	0.017	0.074*
	[-0.026, 0.085]	[-0.007, 0.057]	[0.020, 0.160]
Unemployment Change	-0.016	0.025	0.002
	[-0.130, 0.015]	[-0.011, 0.090]	[-0.065, 0.076]
Session	0.087*	0.063**	0.203**
	[0.011, 0.299]	[0.019, 0.149]	[0.103, 0.378]
Number of Observations	235	235	235
Log Likelihood	-41.384	-45.962	-82.970
P > Chi-Squared	0.1531	0.0000	0.0000
Pseudo R-Squared	0.1796	0.3924	0.2297

Note: All tests of statistical significance are two-tailed. Standard errors in parentheses.
^ Significant at the .10 level * Significant at the .05 level ** Significant at the .01 level