Role-Play Simulations: A Tool for Transformative Civic Education and Engagement Around Science-Intensive Environmental Issues

By

Danya Lee Rumore

Master of Science, Environmental Management and Geography
University of Auckland
Auckland, New Zealand (2010)

Bachelor of Science, Environmental Science and Natural Resources Economics
Oregon State University
Corvallis, Oregon (2007)

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Department of Urban Studies and Planning
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Certified by

Professor Lawrence Susskind
Department of Urban Studies and Planning
Dissertation Supervisor

Accepted by

Professor Lawrence J. Vale
Chair, PhD Committee
Department of Urban Studies and Planning
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ABSTRACT

This dissertation tests the effectiveness of tailored, science-based role-play simulations as a tool for transformative civic education and engagement around science-intensive environmental issues. I do so by studying the results of the New England Climate Adaptation Project (NECAP). NECAP was a two-year participatory action research project aimed at building the capacity of coastal New England communities to adapt to climate change while also testing the effectiveness of role-play simulations as a civic engagement tool. The project engaged 555 diverse stakeholders across four partner coastal New England municipalities in role-play simulation workshops. Data were collected through pre- and post-workshop questionnaires administered to all participants, follow-up interviews with 30 percent of participants from each workshop, and observation. Results show that, when used in a civic engagement context, role-play simulations can stimulate transformative learning about science-intensive environmental issues in the way the simulations are designed to. Participation in the NECAP simulations led to statistically significant increases in participant concern about local climate change risks, support for local adaptation action, and confidence in the prospects of effective local adaptation action. For many participants, the simulations also resulted in increased familiarity with and support for using the consensus building approach for local adaptation decision-making; increased empathy for different perspectives and interests related to adaptation; and generally enriched understanding of local climate change risks and adaptation options. Results were largely consistent across the four towns, as well as across people of different genders, age groups, income levels, education levels, and political viewpoints. The simulations had the greatest learning effect for people who came into the workshops being somewhat concerned about climate change risks. These findings suggest that role-plays are effective across diverse demographics, and that they may be particularly powerful for engaging people who are generally in the “undecided middle” in terms of their perspectives on the issue of interest. I conclude that tailored, science based role-play simulations do, in fact, offer a powerful approach for transformative learning and civic engagement around complex science-intensive environmental issues like climate change adaptation. I also explore the mechanism through which role-play simulations catalyze transformative learning.

Thesis Supervisor: Lawrence Susskind
Title: Ford Professor of Urban and Environmental Planning
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# ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CBA</td>
<td>consensus building approach</td>
</tr>
<tr>
<td>CBI</td>
<td>Consensus Building Institute</td>
</tr>
<tr>
<td>MIT</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>NECAP</td>
<td>New England Climate Adaptation Project</td>
</tr>
<tr>
<td>NERRS</td>
<td>National Estuarine Research Reserve System</td>
</tr>
<tr>
<td>PON</td>
<td>Program on Negotiation at Harvard Law School</td>
</tr>
<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Association</td>
</tr>
<tr>
<td>RPS</td>
<td>role-play simulation</td>
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<td>UNH</td>
<td>University of New Hampshire</td>
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CHAPTER 1: Introduction

The town of Atlantica has a problem. Over the past decade, the coastal New England community has been hit repeatedly with increasingly intense storms. These storms have caused significant damage to waterfront homes and business, affecting the community and local economy. Climate change projections indicate the town will become increasingly vulnerable as the sea level rises and more extreme storms occur. Some local officials are growing more and more concerned about the prospects for their small beachfront town; they would like their town to undertake a vulnerability assessment to better understand local climate change risks, and to develop adaptation strategies. However, local elected and appointed officials and the general public seem divided – and heatedly so – about whether climate change is real, whether it is a concern worth addressing, and what should be done about it. Afraid of public backlash and lawsuits, Atlantica’s concerned decision-makers and planners feel there’s nothing they can do but wait for the next storm to hit. In the meantime, new infrastructure and houses are being built on the waterfront, and the town’s vulnerability to sea level rise and flooding continues to increase.

Most people have never heard of Atlantica. This is not surprising given it is a fictional place. Although Atlantica itself is not real, this scenario is all too real for many coastal communities in the United States and elsewhere. Like this fabricated New England town,
communities across the world face widespread impacts from climate change that, if not prepared for and effectively managed, could have devastating effects within the century. Problematically, like Atlantica, few municipalities are taking meaningful action to prepare for the risks they face.

Preparing for and managing climate change risks – what is referred to as “climate change adaptation” – is a very tricky problem, one that requires collective risk management (Susskind 2010; Susskind and Rumore 2015). A first step in helping communities adapt is helping stakeholders and the general public understand the risks they face and what could be done to prepare for and manage these threats (Rumore 2015a). However, as with many other such science-intensive environmental problems, this has proven to be a challenge.

Science-based role-play simulations (RPSs), a type of experiential learning exercise or “serious game,” have been identified as a promising approach for educating and engaging decision-makers, stakeholders, and the public around climate change adaptation and other science-intensive environmental issues (Susskind 2010; Susskind and Paul 2010; Susskind and Rumore 2013). Serious games have long been touted as a valuable public educational tool. Yet, prior to this study, there was little if any rigorous research and empirical data to support or refute various assertions about the effectiveness or RPSs – or, for that matter, about serious games of any kind – as a civic engagement tool.

It has also been suggested that role-play simulations can cultivate transformative learning – i.e., learning that results in shifts in perspectives and mental models (Chen and
Martin 2015). Although the promise of role-play simulations as a transformative learning tool is clear, this theory similarly has yet to be backed by substantive empirical evidence.

This dissertation addresses these two connected gaps by testing the effectiveness of science-based RPS exercises as a tool for transformative civic education and engagement, particularly in the context of science-intensive environmental issues. As part of this, I examine the mechanisms through which role-plays catalyze transformative learning. I also analyze whether certain kinds of people are notably more or less affected by participation in role-play exercises. I do so by studying the results of the New England Climate Adaptation Project (NECAP), a two-year participatory action research project that aimed to build the capacity of coastal New England communities to adapt to climate change while testing the effectiveness of role-play simulations as a civic education and engagement tool (see Susskind et al. 2015; Rumore 2014).

Based on the findings from NECAP, I argue that tailored, science based role-play simulations do, in fact, offer a powerful approach for civic education and engagement around complex science-intensive environmental issues like climate change. More specifically, I show that role-play simulations can stimulate transformative learning and affect perspective shifts in the way they are designed to. My data suggest they do this, at least in part, by helping participants suspend disbelief and engage with issues more openly, encouraging them to look at issues from a different perspective, engaging them in mock collaborative problem solving, and creating a space for people to learning from and with other community members. NECAP results further suggest that RPSs are likely to be effective across demographic categories such as gender, age, income level, education level, and political viewpoint. Data also indicate they are likely to be particularly
effective in engaging people who generally fall into the “undecided middle” in terms of their perspectives on the issue of interest (e.g., people who are somewhat but not very concerned about climate change risks).

This chapter provides context for the rest of the dissertation. I first discuss why climate change adaptation is so challenging and why there is a need for new education and engagement tools to help communities grapple with contested science-intensive issues such as climate change adaptation. I then explain why role-play simulations offer a promising approach for meeting this need. I conclude by providing a summary of my findings and an overview of the rest of the dissertation.

1.1. The Adaptation Challenge

Climate scientists widely agree that climate change risks are no longer avoidable (IPCC 2014; Solomon et al. 2009; Wigley 2005). Indeed, climate change impacts are already occurring in regions throughout the world. As the United States National Climate Assessment released in May 2014 put it, “climate change, once considered an issue for a distant future, has moved firmly into the present” (USGCRP 2014).

For coastal areas, climate change risks include sea level rise, increased storm intensity, subsidence and shoreline erosion, saltwater intrusion into freshwater wetlands, new disease vectors, and more extreme temperature events (IPCC 2014; USGCRP 2014). Such impacts, when and where they occur, will pose considerable challenges to the economic, social, and environmental wellbeing of communities.

To prevent catastrophic damage down the line, experts increasingly suggest that precautionary measures aimed at reducing municipal vulnerability and enhancing local resilience ought to be underway in all at-risk coastal areas in the United States and
elsewhere. More specifically, they advise that efforts to prepare for climate change risks should be incorporated into all current land use planning, infrastructure investment, habitat preservation and restoration, emergency preparedness, and storm water and pollution control efforts in potentially affected coastal regions (Rosenzweig et al. 2010; Tobey et al. 2010; Susskind 2010; USGCRP 2014).

While the need for climate change adaptation is widely recognized by academics and increasingly by public officials in at-risk communities, very few cities and towns along the U.S. coast – other than major metropolitan areas such as New York City and San Francisco – have begun to take action to prepare for climate change (Adger, Agrawala, and Mirza 2007; Ford, Berrang-Ford, and Paterson 2011; NRC 2010). Indeed, few communities have moved beyond what Moser and Ekstrom (2010) refer to as the understanding phase of adaptation to the planning phase, and even fewer have moved to implementation.

The lack of adaptation action is by no means surprising. Preparing for and managing climate change risks is a difficult collective risk management challenge (Susskind 2010; Susskind and Rumore 2015). It requires making public decisions amid considerable uncertainty. It also necessitates coordination among diverse stakeholders, including state and local public officials, private property owners, and natural resource users, among others. In many situations, adaptation decisions will require difficult tradeoffs among competing interests (Rumore 2015; Few, Brown, and Tompkins 2007; Bedsworth and Hanak 2010; Susskind 2010; Mazmanian, Jurewitz, and Nelson 2013; USGCRP 2014).
Adaptation efforts are further complicated by the fact that climate change is a “wicked” problem – a problem that, as described by Rittel and Webber (1973), has no clear definition, no stopping rule, and no definitive solution. Adapting to climate change’s impacts will require continuous attention. Adaptation is a moving target, necessitating ongoing learning, monitoring, adjustment, and renegotiation of objectives (Susskind 2010; Moser and Boykoff 2013; Susskind and Rumore 2015). Thus, effectively managing climate change risks requires a high level of “response-ability” – the ability to collectively respond to changing conditions as they emerge (Collins and Ison 2009).

Further adding to the challenge, various stakeholders in communities throughout the U.S. and internationally – including local elected and appointed officials, federal and state agency personnel, environmental advocacy group members, business owners, and private property owners – disagree about whether climate change is a pressing problem and whether remedial or anticipatory actions ought to be taken in the near term. One need only read the news to get a sense of how polarized the “debate” about climate change has become (see McClelland 2015; Hoffman 2015). Even where stakeholders generally agree that climate change risks ought to be addressed, they attach different levels of priority to specific adaptation options. This lack of agreement about climate change adaptation is further complicated by the fact that many communities in the U.S. and elsewhere lack the scientific information they need to make informed, long-term planning decisions; the capacity to incorporate climate change adaptation into on-going infrastructure and land use planning; or the political will to act (Few, Brown, and Tompkins 2007a; Few, Brown, and Tompkins 2007b; Susskind 2010; Moser and Ekstrom 2010; Anguelovski and Carmin 2011).
To effectively adapt, communities will need to generate widespread support for difficult decisions in the face of uncertain science and differing stakeholder perspectives. They will also need to undertake innovative approaches to municipal and regional planning, as well as to collaboratively and adaptively respond to climate-related risks as they emerge. Consequently, climate change adaptation is, in many ways, an unprecedented planning challenge (Susskind 2010; Moser and Boykoff 2013; Susskind and Rumore 2015).

To help overcome the obstacles they face and catalyze efforts to prepare for and manage climate change risks, it has been suggested that coastal communities ought to develop a shared awareness of climate change risks and possible adaptation strategies, as well as a collective commitment to undertake action and engage in joint problem-solving (Rumore 2015a). In light of this, many scholars agree that new approaches for educating stakeholders about climate change risks and building shared commitments to risk management strategies are required (Few, Brown, and Tompkins 2007a; Few, Brown, and Tompkins 2007b; Moser and Boykoff 2013; Susskind 2010).

1.2. A Need for New Education and Engagement Tools

The complexity of the climatic system and the ubiquity of climate change impacts make climate change adaptation a very difficult planning challenge. However, it is not so different from numerous other science-intensive environmental planning issues – ranging from water resources management to decisions about energy development – in which uncertainty, diverse interests, and complex scientific and technical information are all at play.
In the context of climate change and various other science-intensive environmental issues, commentators have long recognized the need to bridge scientific knowledge and action (Brunner et al. 2005; Cash et al. 2003; Clark et al. 2011; Jacobs, Garfin, and Henart 2005; NRC 2009). A key part of this, it has been suggested, is better communicating complex scientific ideas to decision-makers, stakeholders, and the public, and helping people understand the risks they face and how they might respond to them (Yohe and Oppenheimer 2011; Moser and Boykoff 2013; Lebel et al. 2013; Roser-Renouf et al. 2014). In the words of (Lubchenco 1998: 495), a past Administrator of the National Oceanographic and Atmospheric Administration, we need to improve our ability to communicate “the certainties and uncertainties and seriousness of different environmental or social problems, providing alternatives to address them, and educating citizens about the issues.”

Cognitive science, social psychology, and communications research have shown that the lack of public and decision-maker understanding about science-intensive environmental issues like climate change adaptation is not just a knowledge deficit problem (Hoffman 2015). Further, research shows that people’s preconceptions about complex science-intensive environmental issues like climate change and a variety of social forces tend to get in the way of their taking effective risk management action (Hoffman 2015; Kahan et al. 2012; Moser 2009). Hence, communicating the seriousness of environmental problems and catalyzing action involves more than just informing people about an issue; it requires getting through to people in a way that affects their perspective about the issue. As Senge (1990), Heifetz (1994), and others have pointed out and as is explored further in the following chapter, changing perspectives is about
changing hearts and minds – a process that some commentators refer to as “transformative learning” (Cranton 2002; Mezirow 1991; Mezirow 2000).

In sum, the need for new education and engagement tools that better connect science to action and help decision-makers, stakeholders, and the public understand the risks they face and ways to address them has long been recognized. Yet the question still looms: what kinds of stakeholder and civic education and engagement tools can accomplish these ends?

1.3. **Role-Play Simulations: A Promising Tool for Transformative Civic Education and Engagement?**

Susskind (2010) and Susskind and Paul (2010) suggest that tailored, science-based role-play simulations provide a useful tool for stakeholder and public education and engagement around climate change adaptation and other science-intensive planning issues. Accordingly, Susskind and his research team at the MIT Science Impact Collaborative have developed role-play simulations designed to educate stakeholders about climate change risks and engage them in adaptation planning (SIC 2015).

As discussed in the next chapter, role-play simulations have a number of strengths as an adult education and engagement tool. In addition to being game-like and thus entertaining, they can provide for experiential and immersive learning; create a safe space for experimentation and creative problem solving; foster perspective taking and empathy; and engage people in interactive learning and dialogue. It has been suggested that, by blending experiential learning with problem-solving based learning, role-play simulations can cultivate deeper, transformative learning, getting through to people and shifting
perspectives about issues in ways that more traditional forms of education fail to do Chen and Martin (2015).

In light of their educative strengths, role-play simulations have gained traction as a useful experiential learning technique (Innes and Booher 1999a; MaKinster 2010; McLaughlin, Doezema, and Sklar 2002; Susskind and Corburn 1999; Stokes and Selin 2014) and have been used in a variety of environmental management contexts (Bousquet et al. 2002; CBI 2011; D’Aquino et al. 2003; Dray et al. 2006; Pahl-Wostl and Hare 2004). However, the effectiveness of RPS exercises as a tool for civic education and engagement around complex science-intensive environmental issues such as climate change adaptation has yet to be demonstrated empirically. Similarly, while the potential of role-plays to cultivate transformative learning has been identified, this has not been systematically tested, in a civic education context or otherwise. Therefore, as Chen and Martin (2015, 98) say:

measuring the strength and the transformative aspects of role play simulations is essential to understanding how they impact perspective change and reflection. Because there is currently a lack of research into using role play simulations in transformative learning, we cannot say with certainty that they do in fact actually promote transformative learning.

1.4. Research Questions and Approach

In light of the paucity of empirical research, there is a need for rigorous analysis of the effectiveness of role-play simulations as a tool for (1) civic education and engagement around complex science-intensive issues such as climate change adaptation, and (2) transformative learning. Responding to these gaps in our understanding, I address the following three research questions in this dissertation:
1. **Question 1 (Q1):** To what extent are tailored science-based RPS exercises an effective tool for changing perspectives and attitudes (i.e., transformative learning) around complex science-intensive environmental issues in a civic and stakeholder engagement setting?

2. **Question 2 (Q2):** If tailored science-based RPS exercises are an effective tool for transformative learning in a stakeholder and civic engagement setting, what is the mechanism through which they cultivate this change in perspectives and attitudes? More specifically, do the unique qualities of role-play simulations—e.g., their ability to engage participants in suspending disbelief and taking on assumed perspectives—catalyze this transformative learning?

3. **Question 3 (Q3):** When used for civic education, do tailored, science-based RPS exercises affect all types of people similarly, or do they affect different kinds of people in different ways? More specifically, how are different kinds of people affected by the workshop, and what does this say about whether RPSs are more appropriate for engaging certain categories or demographics of people?

To answer these questions, I analyze data collected by the New England Climate Adaptation Project, a project that, as aforementioned, aimed to test the effectiveness of RPS as a public education and engagement tool while enhancing the readiness of four coastal communities to adapt to climate change.

NECAP was a collaboration among the MIT Science Impact Collaborative, the Consensus Building Institute (CBI), the National Estuarine Research Reserve System (NERRS), and four coastal New England municipalities—Barnstable, Massachusetts;
Cranston, Rhode Island; Dover, New Hampshire; and Wells, Maine. The project started in fall 2012 and ended in fall 2014. In collaboration with local partners, NECAP staff developed a tailored, science-based role-play simulation exercise for each of the four partner municipalities. Each simulation was based on and included actual downscaled climate change projections for the municipality. The simulations were also informed by the findings of in-depth interviews with local stakeholders and were designed to model realistic local political tensions. During the course of six months, 110 to 170 people in each partner town (555 across all towns) were engaged in playing the local simulation through a series of workshops. Each of the workshops intentionally engaged a cross-section of residents, public officials, and other key stakeholders with the intent of sharing scientific information and generating a shared understanding among the public and decision-makers about their risk management options (for more information about NECAP, see Chapter 3 and Rumore 2014; Susskind and Rumore 2013; Susskind and Rumore 2015).

Research data were collected via pre-workshop and post-workshop questionnaires administered to all participants; in-depth follow-up interviews with 20 to 30 percent of participants from each workshops four to six weeks after each event; notes collected during the workshops; and ongoing observations of subsequent policy and planning actions in each community. In this dissertation, I draw on and analyze all of these sources of data – particularly workshop participant pre- and post-workshop questionnaires and follow-up interviews – to answer the questions laid out above.
1.5. Hypotheses

I put forward the following three hypotheses in response to my three research questions. Since I am using the data from NECAP to test my hypotheses, the hypotheses are contextualized in relationship to what the NECAP role-play simulations and workshops were designed to achieve. Each of these hypotheses and the rationale behind them are explained in greater depth in Chapter 3.

1. Hypothesis 1 (H1): Participation in tailored, science-based RPS exercises in a civic engagement setting can change perspectives and attitudes (i.e., result in transformative learning) about complex science-intensive environmental issues in the ways the simulations are designed to. In the context of the NECAP, I hypothesized that, based on what the games modeled, participation in the simulations would result in the following perspective shifts: (1) increased concern about local climate change risks; (2) increased sense of local responsibility for preparing for climate change risks and support for municipal action; (3) increased confidence in the prospects of effective local adaptation action; (4) increased familiarity with and support for the consensus building process – i.e., a facilitated multi-stakeholder negotiation process for decision-making – around climate change adaptation; and (5) increased empathy for and understanding of diverse interests and perspectives. See Table 1.1.
Table 1.1: What the NECAP role-play simulations model and the related perspective shifts they aim to achieve

<table>
<thead>
<tr>
<th>What the NECAP RPSs model</th>
<th>Anticipated perspective shift (i.e., learning outcome)</th>
</tr>
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<tbody>
<tr>
<td>Climate change presents considerable local risks for coastal communities</td>
<td>Increased concern about local climate change risks (&quot;concern&quot;)</td>
</tr>
<tr>
<td>The decisions communities make today will affect their vulnerability or resilience to local climate change risks</td>
<td>Increased sense that municipality should take action on climate change adaptation in the near future (&quot;should act&quot;)</td>
</tr>
<tr>
<td>There are actions communities can take now to prepare for climate change risks, despite uncertainty</td>
<td>Increased confidence that municipality can effectively respond to climate change risks despite climatic uncertainty (&quot;confidence&quot;)</td>
</tr>
<tr>
<td>The consensus building approach offers a way to reach informed agreement in the face of uncertainty</td>
<td>Familiarity with and support for a consensus building approach to adaptation decision-making (&quot;support for CBA&quot;)</td>
</tr>
<tr>
<td>Many stakeholders need to be involved in adaptation planning, and they have different (but equally valid) perspectives that need to be considered</td>
<td>Increased empathy for and understanding of different perspectives and interests (&quot;empathy&quot;)</td>
</tr>
</tbody>
</table>

2. **Hypothesis 2 (H2):** I hypothesized that role-play simulations can catalyze transformative learning through engaging participants in: (1) suspending disbelief, (2) perspective taking, (3) collaborative problem solving, and (4) learning together. More specifically, and as further explained in Chapter 3, I hypothesized that experiencing one or more of these things can result in the type of “disorienting event” that has been argued to be critical for stimulating transformative learning. See Figure 1.1.
3. **Hypothesis 3 (H3):** I hypothesized that the effects of the RPS will be largely similar across genders, age groups, education levels, political affiliation, and income levels – at least among those who choose to attend the workshops. Although I did not anticipate there would not be any striking differences across demographic groups, I postulated that participants’ perspectives on climate change coming into the workshop would influence how they are affected by the RPS exercise.

**1.6. Research Objectives and Motivation**

I had a number of aspirations in undertaking this research. First, I wanted to advance our understanding of whether and how role-play simulations and other serious games can
catalyze more effective risk management efforts in the face of climate change. In so doing, I aimed to enhance our knowledge of whether and how people learn from role-play simulations and what this might mean for their usefulness as a civic engagement tool. In undertaking the broader NECAP effort, I also hoped to contribute to theory-building and improvements in planning practice, particularly around questions of how we can help communities address the challenges presented by climate change and engage in more collaborative risk management.

1.7. Overview of Finding
As I show in Chapter 4, Chapter 5, and Chapter 6, quantitative and qualitative data from NECAP provide evidence that role-play simulations can stimulate desired transformative learning around science-intensive environmental issues in a civic education and engagement context. More specifically, results suggest that, for a statistically significant number of workshop participants, participation in the NECAP role-play simulations resulted in increased concern about local climate change risks; increased sense of need for local adaptation action; and increased confidence in the prospects of effective local action. Quantitative data also show that, following the workshop, the significant majority of participants were supportive of a consensus building-like approach to adaptation planning. Further, qualitative data show that increased empathy and understanding of different perspectives and interests as they relate to climate change adaptation was a key learning for the strong majority of participants. Participation in the simulations also enriched the majority of participants’ understanding of climate change risks, possible adaptation strategies, and what collective management of climate change risks will entail.

NECAP results show that the simulations can catalyze transformative learning
across different genders, ages, education levels, income levels, and political viewpoints. While data show that the simulations can have important transformative learning effects for participants of all levels of pre-existing concern coming into the workshop, they also suggest that the exercises are particularly impactful for people who are in the “undecided middle” or concerned but not yet fully alarmed about an issue such as climate change.

NECAP results show a very strong correlation between (1) participants suspending disbelief, really playing the simulation, and assuming the perspective of the role they were assigned, and (2) their experiencing transformative learning. Engaging in mock collaborative problem solving and learning with and from others were also strongly correlated with participants’ experiencing transformative learning. In light of the fact that engaging participants in suspending disbelief, perspective taking, mock collaborative problem solving, and learning together are unique and integral elements of role-play simulations (see Chapter 2), this finding speaks to the particular value of this kind of exercise as a tool for transformative learning in a civic engagement context.

My findings provide evidence that tailored, science-based role-play simulations offer a unique and valuable approach for civic education and engagement around complex science-intensive environmental issues like climate change. The results of this study further indicate that such exercises can usefully engage people from diverse demographics and that they may be particularly impactful for engaging people who are in the “undecided middle” in terms of their perspectives on the issue. That said, the findings from NECAP also make clear that transformative shifts are likely to be modest in nature, rather than radical, and that not all participants – even those who fully engage with the simulation and assume the role they are assigned – will experience transformative
learning. Further, our experience with NECAP indicates that when used as a general civic education and engagement strategy, role-play simulation workshops are likely to attract people who are already relatively concerned and likely to support action on the issue of interest. In light of such caveats and considerations, I make a number of suggestions about how role-play simulations can be most effectively used as a civic and stakeholder engagement tool in my conclusion chapter.

1.8. Dissertation Overview

In the following chapter (Chapter 2), I provide an overview of role-play simulations and explain why they hold promise as an approach for public education, civic engagement, and transformative learning. I also describe the early pilot efforts that informed this study. Chapter 3 elaborates on the research approach I used, offering an in-depth explanation of NECAP, the role-play simulations and how they were created, and my data collection approach. In Chapter 3, I also explain my hypotheses and provide an overview of how data were analyzed to test these hypotheses. Chapter 4 addresses my first research question, providing a detailed explanation of how data were analyzed to test my first hypothesis and what I discovered about the effectiveness of the role-play simulations as a tool for kindling transformative learning. Chapter 5 addresses my second research question, explaining the way data were analyzed and my findings about the mechanisms through which transformative learning occurred. In Chapter 6, I tackle my third research question, describing the way in which data were assessed to investigate the extent to which different groups of people were affected by the role-play simulations, my findings, and what my findings mean for the usefulness of RPS exercises in a civic education and engagement context. My final chapter, Chapter 7, ties together all of my research results.
to offer conclusions about the strengths and limitations of role-play simulations as a civic education and engagement approach. In the final chapter, I also share lessons learned about designing and using tailored, science-based role-play simulations, discuss opportunities for future use of RPSs, and sketch several lines for further research.
CHAPTER 2: Role-Play Simulations – A Tool for Transformative Civic Education and Engagement around Complex Science-Intensive Environmental Issues?

“I hear and I forget. I see and I remember. I do and I understand.”
-Confucius

The potential of games as a teaching and engagement tool has long been recognized. Indeed, serious games – games designed with the main purpose of educating players – have been used for diverse education and engagement purposes ranging from training management students about system dynamics (Sterman 1992) to educating students and decision-makers about water and sustainability issues (Learmonth et al. 2011) to teaching the general public about climate change (Wu and Lee 2015).

Susskind and others (Susskind 2010; Susskind and Paul 2010; Susskind and Rumore 2013) have theorized that tailored, science-based role-play simulations (RPSs) – a particular type of serious games – could be particularly effective for educating and engaging stakeholders and the public around complex science-intensive environmental issues such as climate change adaptation. Based on decades of using RPSs to train people in the techniques of multiparty negotiation, Susskind (2010: 227) suggests RPS exercises can:

- convey a great deal of scientific or technical information to non-expert publics in a story-like form and introduce them to the dynamics of collaborative adaptive management by involving them in mock decision-making that mimics the political realities they will actually face.

If employed correctly, he posits, RPSs can be used to build widespread political support
for managing collective risks, such as those posed by climate change, by increasing public familiarity with climate adaptation and tools for making collective decisions amid uncertainty.

Along similar lines, others have argued that RPSs have considerable potential to allow for transformative learning – i.e., learning that results in reflection on, questioning of, and often altering of basic assumptions and beliefs (Chen and Martin 2015). Based on their potential to for transformative learning, Chen and Martin (2015) suggest such exercises could powerfully contribute to adult environmental education aimed at behavior change. While they – like Susskind (2010), Susskind and Paul (2010) and Susskind and Rumore (2013) – see great potential for RPSs as an education and engagement tool for deeper learning, they importantly note that this potential has yet to be systematically tested.

Building on these two connected threads of thinking, this chapter provides an overview of RPSs and explains why such exercises are thought to hold potential as a tool for supporting transformative learning and educating and engaging stakeholders and the public around complex science-intensive environmental issues. I conclude by explaining why more research is needed and laying out my research questions.

2.1. **Role-Play Simulations: The Promise of the Approach**

RPSs are a type of serious game in which participants assume realistic but fabricated roles and engage face-to-face in mock group decision-making (Schenk and Susskind 2014). They provide for active learning, engaging students in “learning by doing” and then reflecting upon the experience (Paschall and Wüstenhagen 2012; Chen and Martin 2015). Such simulations have been used in many disciplines and educational contexts to
promote cognitive, emotional, and skill-based learning (Grant 2006; Rao and Stupans 2012; Tyson and Janine 2006; Chen and Martin 2015). For example, they have been used for science education (Aubusson et al. 1997; MaKinster 2010; Stokes and Selin 2014), professional training (Hardoff and Schönnmann 2001), emergency-preparedness training (McLaughlin, Doezema, and Sklar 2002) and negotiation training (Susskind and Corburn 1999). People have also begun to experiment with RPS exercises in the context of environmental management (Bousquet et al. 2002; CBI 2011; D’Aquino et al. 2003; Dray et al. 2006; Pahl-Wostl and Hare 2004).

RPSs combine elements of experimental learning with a problem-solving approach (Chen and Martin 2015). As a result, they have a number of strengths that make them appealing as a tool for raising public awareness, concern, and support for action around complex science-intensive issues such as climate change adaptation.

**Experiential and immersive learning**

An experiential learning tool, role-play simulations provide “immersive” learning (Pine and Gilmore 1999). While traditional modes of teaching actively engage the mind and encourage the absorption of information, what is known as “absorptive learning,” such approaches tend to disconnect participants from the subject matter they are learning about (Pine and Gilmore 1999). Immersive learning is achieved when teaching is combined with the feeling of actually “being there” (Gordon, Schirra, and Hollander 2011).

Like other forms of experiential learning, RPS exercises create an opportunity for participants to engage in what Kolb (1984) has described as the experiential learning cycle. Building on the theories of Dewey, Lewin, and Piaget, Kolb (1984) depicts
experiential learning as a cycle consisting of four distinct states: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The cycle is completed when active experimentation feeds back into future concrete experiences (see Figure 2.1).

Figure 2.1: Experiential learning cycle, modified from Kolb (1984)

In this process of looped learning, learners have an experience, reflect on this experience, learn from this experience, and then implement what they have learned. The cycle then begins again. In an RPS, for example, participants may approach the simulated problem in a certain way and then realize this approach is unlikely to help resolve the challenge put before them; they can then reflect on what approach might be more effective and conceptualize why; and then they can experiment with this new approach—all within the experience of the simulation. The debriefing discussion following the role-play simulation, a key part of the experience, allows for further reflective observation and
abstract conceptualization. This may then translate into future experimentation with new approaches and ways of thinking about issues (Susskind and Corburn 1999).

Cognitive science and risk perception research has shown that experiential and immersive learning approaches are more likely to affect people’s perceptions of risks and related behaviors than traditional ways of conveying analytical information (Marx et al. 2007). This is important for education aimed at helping people understand environmental concerns, such as the risks posted by climate change. As Marx et al. (2007: 56) explain in the context of climate change education and engagement:

Vicarious experiential information in the form of scenarios, narratives, and analogies can help the public and policy makers imagine the potential consequences of climate variability and change, amplify or attenuate risk perceptions, and influence both individual behavioral intentions and public policy preferences.

In other words, not only can immersive and experiential learning approaches provide for looped learning; they can also help bring risks and complex concerns home for people and help them really grasp the kinds of risks and concerns they actually face.

*Process-based knowledge*

In part due to their experiential and immersive qualities, RPSs can teach process-based knowledge while enhancing and reinforcing content-based knowledge (Susskind and Corburn 1999; McLaughlin, Doezema, and Sklar 2002; MaKinster 2010; Stokes and Selin 2014). For example, Stokes and Selin (2014) found that the participation in the Mercury Game – a science-based RPS focused on international mercury treaty negotiations – not only helped university students better understand technical information about mercury’s environmental impacts, but it also introduced them to the ways in which
science and policy interact in international environmental negotiations. Such research suggests that RPSs are useful for introducing participants to scientific and technical concepts, such as about climate change risks, while helping them try to integrate this information with decision-making processes, such as in making decisions about how a community can collectively manage climate-related risks.

Along similar lines, RPS exercises provide an opportunity to experientially introduce participants to decision-making approaches and techniques, such as those that may be useful for making collective risk decisions. For example, the simulations used by the MIT Science Impact Collaborative (SIC 2015) and the Program on Negotiation at Harvard Law School (PON 2015) – which build on a growing body of multiparty dispute resolution theory (see Susskind and Crump 2009) – engage groups of people in the process of negotiated decision-making (see Susskind and Corburn 1999). It has been suggested that RPSs could also be used to help people become familiar with approaches such as scenario planning and joint fact finding, which could be helpful for adaptation decision-making (Susskind 2010; Schenk and Susskind 2014).

**Safe space for experimentation and creative problem solving**

RPSs provide a safe space in which participants can experientially explore new ideas and possible courses of action, engage in creative dialogue, and free themselves from certain real world constraints (Innes and Booher 1999; MaKinster 2010). Like other simulations, they provide a “learning laboratory” or “microworld” (see Senge and Sterman 1992). Similar to flight simulators, they can allow participants to experiment with new ways of responding to challenges and handling problems, without real world ramifications.
By immersing participants in an unfamiliar group decision-making situation and exposing them to new decision-making approaches, multi-stakeholder RPSs give people a chance to try out possible ways of using what they know to collectively solve a problem. In doing so, RPSs allow participants to learn by trial and error. According to Innes and Booher (1999: 2), this can “help participants learn to respond to unexpected and complex possibilities, and to produce innovative strategy.” For example, RPS exercises can engage participants in thinking about what it would be like to be a community facing serious climate change impacts and what kinds of creative strategies and approaches might be appropriate for making community-wide adaptation decisions despite scientific uncertainty and differing stakeholder perspectives and interests.

Through creating a safe space for experimentation and engaging people in simulated group decision-making, RPSs can encourage participants to critically examine their existing perspectives and understandings, as well as those of their peers; to creatively problem-solve; and to develop a more robust understanding of abstract concepts (Innes and Booher 1999; MaKinster 2010).

*Perspective taking and empathy*

Unlike most other types of serious games, such as computer simulations, RPS exercises require participants to adopt a role and then to engage in face-to-face group problem solving from the perspective of this adopted role. Taking on a role requires significant personal investment as participants try to understand and emulate the nature, thinking, beliefs, and perspectives of their assigned character (MaKinster 2010). This often results in what has been referred to as “perspective-taking,” or the ability to identify and
empathize with the role and related perspective one has assumed (Yee and Bailenson 2006; Gordon, Schirra and Hollander 2011).

Engaging with other roles in simulated problem solving can also challenge participants to appreciate the fact that people’s views, even those that are radically different from their own, are often well-founded. Understanding the rationale and reasons behind other viewpoints can enhance empathy for and appreciation of the need to consider different interests and concerns (Gordon, Schirra, and Hollander 2011). RPS exercises, therefore, may not only help participants engage with challenging and complex issues, such as what it will be like to make decisions about climate change adaptation despite uncertainty and differing stakeholder perspectives and interests; they may also help participants better appreciate different perspectives on the issue, and gain empathy for diverse interests and concerns.

Fun and engaging education

Importantly, like other serious games, RPSs are novel, interesting, and engaging. Serious games and other forms of “edutainment” are increasingly being used for adult education around the world because, as McGonical (2011: 3) says:

The real world just doesn’t offer up as easily the carefully designed pleasures, the thrilling challenges, and the powerful social bonding afforded by virtual environments. Reality doesn’t motivate us as effectively. Reality isn’t engineered to maximize our potential. Reality wasn’t designed from the bottom up to make us happy.

Because they are fun, interesting, and novel, serious games can bring new people to the table – such as people who do not feel strongly about whether climate change is a risk for their community. They can also help people engage with issues that may otherwise seem
too mundane (such as municipal planning) or too abstract or overwhelming (such as climate change adaptation).

*Interactive learning and dialogue*

Importantly, when organized and run effectively, RPS events have the potential to engage large numbers of community members in learning new concepts and methods *together* and *from each other* in a safe space. While all serious games can provide various forms of edutainment, RPSs are unique in their ability to model and allow participants to experience face-to-face community problem-solving (Innes and Booher 1999; Susskind 2010). They engage groups of people together in the process of experiential learning and bring people from different perspectives and backgrounds together in conversation about common issues (Stokes and Selin 2014).

The post-exercise debriefings also create an opportunity for facilitated, in-person dialogue with other participants. Dialogue has been shown to help groups of people foster relationships, trust, and mutual understanding. It can also valuably help diverse stakeholders build consensus about possible courses of action (Wondolleck and Yaffee 2000; Innes and Booher 2003; Healey 1997; Susskind and Cruishank 1987; Innes and Booher 1999). Hence, the debriefing following an RPS exercise (which is typically considered an integral part of, not separate from, the RPS experience) is an enormously important learning opportunity (Susskind and Corburn 1999) – one that many other serious games, particularly those that are online, do not provide.

In sum, RPSs can provide a valuable conversation starter and a safe space in which people can talk about tough social issues, and they can catalyze and support
productive dialogue about challenging topics, such as climate change adaptation. As a result, they may be able to depoliticize issues and help people move beyond their positions and assumptions to instead focus on the problems they collectively face and how to collectively address these challenges.

2.2. A Tool for Transformative Learning?

In light of their fun, immersive, and experiential qualities, their ability to teach process as well as substance, and their potential to engage people in dialogue and learning together, RPS exercises have powerful potential to foster what have been referred to as “transformative learning.” Below, I explore the theory behind transformative learning and why RPSs hold promise for cultivating it.

2.2.1. Overview of transformative learning

By the time they reach adulthood, people have ingrained mental models – what some people refer to as theories in use (Argyris and Schön 1996) or frames of reference (Mezirow 1991; Mezirow 1997). These mental models guide people’s responses and interpretations of situations, and influence how people behave (Carroll, Sterman, and Marcus 1998). The term "mental models" has been used in many ways (Gentner and Stevens 1983; Jungermann and Thuring 1988; Morecroft and Sterman 1994; Rouse and Morris 1986; Senge 1990); however, mental models can basically be understood as “the causal understandings people have about how a system works, the scripts they use to guide conduct and behave appropriately in various situations, and the deeply embedded cultural assumptions that condition behavior, attitudes, and perception” (Carroll, Sterman, and Marcus 1998: 100). Mental models, according to Carroll, Sterman, and Marcus
(1998: 100) must be understood as consisting of “beliefs and understandings at all levels of analysis: individuals ‘have’ mental models, but portions of these mental models are shared across workgroups and professional specialties, and embedded in organizational or national culture.”

Importantly, people’s mental models and related behaviors do not always align with their “espoused theories” – i.e., what people say they know or value (Argyris and Schön 1996; see also Senge 1990; Mezirow 1991; Mezirow 1997; Sterman 1994). For example, an individual may say they are concerned about sea level rise, but still may choose to build on the waterfront in a zone that climate change projections suggest will be impacted in the near future.

Additionally, individually and collectively held mental models are often not well suited to help individuals, organizations, and communities meet the challenges they face (Heifetz 1994; Senge 1990; Carroll, Sterman, and Marcus 1998; Sterman 1994). To illustrate in the context of climate change adaptation: research suggests that many people do not see climate change as an issue that will affect their community in the reasonably near future; do not think other people in their community are concerned about climate change risks; do not think there is anything their municipality can or should do to prepare for climate-related risks; and/or are looking to the national government or individuals, rather than to their municipal governments, as primarily responsible for adapting (Rumore 2015a). These kinds of mental models may inhibit effective local climate change risk management efforts, rather than supporting effective responses (Moser 2009).

Since people’s mental models influence their behaviors and responses to issues, catalyzing individual and social behavior change may require helping people reflect on
and shift their perspectives and assumptions. In contrast to simply learning about concepts or mastering information, the process of altering mental models and frames of reference requires a deeper form of learning – what has been described as “transformative learning” (Mezirow 1991; Mezirow 1997) or “double loop learning” (Argyris and Schön 1996).

By its very nature, transformative learning is a concept that is specifically relevant to adult, higher, and continued education (Taylor 2007). According to (Mezirow 2000: 4), transformative learning involves “becoming critically aware of one’s own tacit assumptions and expectations and those of others and assessing their relevance for making an interpretation of the ongoing social narratives.” He suggests, “we transform our frames of reference through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based” (Mezirow 1997: 7).

This kind of transformative learning can result in what the ancient Greeks referred to as metanoia, which broadly means “changing one’s mind” (Senge 1990). Through transformative learning and the metanoia it results in, Senge (1990: 14) explains, “we recreate ourselves…we reperceive the world and our relationship to it.” According to (Sterman 1994: 296), “As our mental models change, we create different decision rules and change the strategy and structure of our organizations.” Such learning, he further suggests, “involves new articulations of our understanding, or reframing of a situation, and leads to new goals and new decision rules, not just new decisions” (Sterman 1994: 296).

According to Nieto and Bode (2007), transformative learning involves
experiences that change people’s views of the world, which then can empower them to take action to improve their surroundings and their place therein. This process of transformative learning can be triggered when a person is faced with an event or occurrence that challenges their worldview, and can be continued through periods of self-reflection (Cranton 2002; Kitchenham 2008). As Chen and Martin (2015: 89) explain, “At the heart of transformative learning theory is a significant shift, via disorienting event, in the foundational assumptions that underlie an individual’s worldview.”

Further unpacking the notion of transformative learning, Cranton (2002: 66) suggests that the transformative learning typically involves the following elements:

- An activating event that exposes an inconsistency between what a person has assumed to be true and what they just been experienced, heard, or read;
- Recognizing and articulating underlying assumptions that have been uncritically assimilated and are largely unconscious;
- Critical self-reflection – i.e., questioning and examining where one’s assumptions came from, the consequences of holding them, and why they are important;
- Being open to alternative viewpoints;
- Engaging in discourse in which evidence is weighed, arguments are assessed, alternative perspectives are explored, and knowledge is constructed by consensus;
- Revising assumptions and perspectives to make them more open and better justified in light of what one has learned; and
- Behaving, talking, thinking, and otherwise acting in a way that is congruent with transformed assumptions or perspectives.
Cranton (2002: 66) notes: “There are no particular teaching methods that guarantee transformative learning.” She suggests, however, that a necessary ingredient of transformative learning is to create an environment or occurrence that challenges people’s beliefs, assumptions, and perspectives while providing a sense of safety, support, and learner empowerment.

In understanding mental models and transformative learning, it is critical to note that people have a tendency to default to “defensive behaviors” or “defensive routines” when their mental models are being questioned. Sterman (1994: 313) explains:

We use defensive routines to save face, assert dominance over others, make untested inferences seem like facts, and advocate our positions while appearing to be neutral. We make conflicting, unstated attributions about the data we receive, fail to distinguish between the sense data of experience and the attributions and generalizations we readily form from them. We avoid publicly testing our hypotheses and beliefs, and avoid threatening issues. Above all, defensive behavior involves covering up the defensiveness and making these issues undiscussable, even when all parties are aware they exist.

Such defensive routines are typically quite subtle and are often “cloaked in apparent concern and respect for others” (Sterman 1994: 313). Problematically, according to Sterman (1994: 313), such behavior:

prevents learning by hiding important information from others, avoiding public testing of important hypotheses, and tacitly communicating that we are not open to having our mental models challenged. Defensive routines often yield “groupthink” (Janis 1982), where members of a group mutually reinforce their current beliefs, suppress dissent, and seal themselves off from those with different views or possible disconfirming evidence. Defensive routines ensure that the mental models of team members remain hidden, ill formed, and ambiguous. Thus learning by groups can suffer even beyond the impediments to individual learning.
Efforts aimed at affecting transformative learning at the individual and group level must account for the fact that such defensive responses are common, and find ways to get people beyond the tendency to default to this mode.

2.2.2. Role-play simulations and transformative learning

Role-play simulations – through providing a challenging but safe environment for people to experientially reflect on their assumptions and perspectives, and fostering dialogue about different viewpoints and considerations – have considerable potential to cultivate transformative learning (Chen and Martin 2015). As Chen and Martin (2015) suggest, role-play simulations allow adult learners to benefit from hands-on experience and experimentation, acting as a laboratory for social phenomenon (see also Asal 2005). When well constructed and well conducted, they can replicate real-life dilemmas and challenges and evoke strong emotional responses, while maintaining a safe space for exploration. This can push participants to reflect on their perspectives and assumptions and to consider other ways of thinking about problems and decision-making contexts.

Similarly, in modeling a realistic problem-solving situation involving many different stakeholder perspectives and interests, RPSs require individuals to consider and reflect on the diverse viewpoints on the issue – including those that differ considerably from their own or that they had previously not been aware of. Further, RPSs typically ask participants to take on a perspective other than their real life viewpoint, compelling them to look at the issue through a different standpoint and set of interests. According to Mezirow (1997), this kind of engagement with different viewpoints on the same issue allows students to better understand and appreciate the fact that there are multiple perspectives on real-world experiences and situations. This experience can help
participants critically reflect on and question their worldviews, creating the kind of “disorienting event” or “activating event” that transformative learning theorists such as Cranton (2002) and Mezirow (1991, 1997) indicate is necessary for transformative learning to occur (Chen and Martin 2015).

Role-play simulations also involve reflection, both during the simulation as participants reflect on their actions in the context of the simulation, and during the debriefing, when participants are asked to reflect collectively and intentionally on their experience, what they took away from it, and what relevance this might have for their real lives. This built-in reflection allows participants to observe and critically consider their behavior and the overall experience, as well as to do so among other people with diverse perspectives and experiences. This kind of collective and critical reflection “can be an eye-opening experience” (Chen and Martin 2015: 93).

Multi-stakeholder RPS exercises such as those used by the MIT Science Impact Collaborative and the Program on Negotiation at Harvard Law School impel students to engage with the notion of interdependency in collective problem solving. This can importantly contribute to transformative learning since, according to Prakash and Waks (1985: 88), transformative learning can be enhanced by recognition that “‘each person’s good depends on the common good.’” In other words, as Chen and Martin (2015: 93) put it, “Each individual’s experience must be validated, but individuals must also recognize the value and realness that, in fact, others have a perspective, potentially different from theirs, that must be acknowledged.”

Reflecting on all of this, Chen and Martin (2015) suggest that RPS exercises have considerable potential for transformative learning, particularly around adult
environmental and sustainability education. Others have made similar claims. For example, Innes and Booher (1999: 10) suggest that role-play games are “transformative in that they change the players, how they see the world, and what they will do in it.” As noted above, Susskind (2010) and Susskind and Paul (2010) have hypothesized that such simulations could alter participants’ perspectives and attitudes about science-intensive environmental issues, such as climate change adaptation; while they do not specifically refer to transformative learning as the goal, the fundamental theory is that RPSs can change people’s minds about issues and increase support for action – a transformative learning objective.

2.3. The MIT Science Impact Collaborative’s Pilot Efforts

Recognizing the potential of RPSs as a tool for transformative civic education and engagement – one that could help stakeholders and members of the general public better understand and grapple with tough environmental issues such as climate change – the MIT Science Impact Collaborative developed and pilot-tested a number of science-based RPSs centered on climate change adaptation. The goal of these efforts was broadly to help participants better understand the climate-related risks their community faces and what could be done to prepare for and manage them, as well as to familiarize participants with the dynamics of collective risk management. Rather than simply seeking to inform people about climate change risks, the intent of these efforts was to shift attitudes and perspectives – to help people question their long held beliefs and envision new ways of planning and working together to joint problem solve (Susskind and Paul 2010; Susskind and Rumore 2013).

These efforts included the state-sponsored Building Coast-Smart Communities
effort in Maryland in 2010, in which a tailored role-play simulation was used to engage more than 170 mayors, county commissions, environmentalists, business leaders, and state officials in an interactive summit about community-level responses to climate risks such as sea-level rise and storm surges that threaten the state’s coast (Susskind and Paul 2010). On a smaller scale, MIT staff ran a series of role-play simulation workshops in the Massachusetts communities of Amesbury, Newburyport, and New Bedford during 2011 and 2012 (see Rumore 2012). Role-play simulations were also used as part of the Local Communities Adapting to Climate Change course developed by the CBI in coordination with the Lincoln Institute for Land Policy as a way to introduce course participants to scenario planning (CBI 2015).

Observational and preliminary research evidence from these efforts reinforced the hypothesis that RPSs could be a valuable tool for helping stakeholders and members of the public better understand climate change risks and grapple with the complexity of adaptation. As Susskind and Paul (2010: 3) wrote about the Building Coast-Smart Maryland workshop:

When the [role-play] game was over, participants said that the experience helped them understand the policy choices they face and an approach that could help them navigate these choices. Given the diversity of perspectives at their tables – both in real life and in the game – participants also came away with a clear sense that collaborative decision making, though difficult, was possible.

Similarly, I found in a small pilot study in New Bedford that participating in the RPS exercise and follow-on debriefing conversation increased stakeholders’ understanding of: (1) the need for collective action; (2) the different perspectives and interests in their community; and (3) ways of moving forward with adaption despite uncertainty and
differing perspectives within their community (Rumore 2012). Participants also indicated that the RPS workshop made them really think about the implications of climate change for New Bedford, which most of them previously had not. For example, participants said of the RPS workshop:

    The most useful thing I took away from the workshop was the knowledge that all of the departments really need to work together to adapt to climate change. We heard from a developer that was very adamant about what he wanted to do, and that is generally what we hear from developers, and I think that was really helpful. And it was good to have the different parties present… The most important thing we took away from it was the fact that we can’t act singly; we have to act as a whole (Participant from the New Bedford Conservation Commission).

    It totally changed my perspective on what options are available for the city to use in preparing for climate change and also it sort of gave me an appreciation for just how difficult of a process this is going to be when they do actually engage with planning for climate change (Participant from a environmental consulting firm working for the City of New Bedford).

    Such pilot efforts reinforced the hypothesis that RPS exercises could be a useful tool not only for educating stakeholders and the public about complex environmental and social issues, but also for changing perspectives and attitudes about climate change adaptation – i.e., for transformative learning – in a civic education and engagement context. Additionally, through these early efforts, we learned a number of important lessons about designing and using RPS exercises for civic education and engagement. These included (1) the importance of tailoring RPS exercises to convey local, real world
scientific information such as climate change projections and to model relevant socio-political dynamics for the community they are being used for; and (2) the value of engaging diverse stakeholders together in the simulation experience, so as to allow people to interact with other real world perspectives on the issue and to cultivate dialogue among people with many different viewpoints (see Rumore 2012).

2.4. Research Questions
While pilot efforts reinforced the promise of the approach, the effectiveness of tailored, science based RPSs as a stakeholder and civic engagement tool – for climate adaptation or otherwise – had not been systematically tested prior to the New England Climate Adaptation Project. Additionally, although the potential of RPSs to affect transformative learning and to promoting meaningful and lasting environmental and sustainability behavior change in adult learners had been identified (Chen and Martin 2015), their effectiveness as a tool for transformative learning had not been rigorously studied – in a traditional education setting or otherwise. The studies that had been done on the transformative learning effects of role-plays provided support for the hypothesis that they can affect meaningful learning and perspective shifts. Yet, all of these studies were small scale and lacked in rigor. They were also typically classroom based (e.g., Paschall and Wüstenhagen 2012). Thus, as Chen and Martin (2015) suggest, more research on the effectiveness of RPS exercises for shifting perspectives and attitudes is needed. Based on their assessment of research on RPSs for transformative learning, Chen and Martin (2015: 98) conclude:

measuring the strength and the transformative aspects of role play simulations is essential to understanding how they impact perspective change and reflection. Because there is currently
a lack of research into using role play simulations in transformative learning, we cannot say
with certainty that they do in fact actually promote transformative learning.”

In sum, it is clear that role-play simulations have the potential to affect transformative learning, to do so around complex environmental issues, and to do so in a civic education and engagement context. However, more rigorous research is needed to substantiate these claims, not to mention to shed light on the mechanism through which they foster transformative learning (if they do so) and to provide insight into the kind of people they are more or less likely to affect.

To address these gaps in our understanding, this dissertation tackles the overarching question:

**Question 1 (Q1):** To what extent are tailored science-based RPS exercises an effective tool for changing perspectives and attitudes (i.e., transformative learning) around complex science-intensive environmental issues in a civic and stakeholder engagement setting?

If RPSs offer an effective tool for transformative learning in a civic engagement context, this raises the question:

**Question 2 (Q2):** What is the mechanism through which they cultivate this change in perspectives and attitudes? More specifically, do the unique qualities of role-play simulations – e.g., their ability to engage participants in suspending disbelief and taking on assumed perspectives – catalyze this transformative learning?

If RPSs are effective for supporting transformative learning in a civic engagement context, an additional important question emerges:
Question 3 (Q3): When used for civic education and engagement, do tailored, science-based RPS exercises affect all types of people similarly, or do they affect different kinds of people in different ways? More specifically, how are different kinds of people affected by the workshop, and what does this say about whether RPSs are more appropriate for engaging certain categories or demographics of people?

In the next chapter, I explain how I address these questions by drawing on data collected through the New England Climate Adaptation Project, a project that centered on using and testing tailored, science-based RPSs for stakeholder and civic education and engagement around climate change adaptation. I also explain the hypotheses I put forward in response to each of these research questions.
CHAPTER 3: Research Approach, Methods, and Hypotheses

To provide a big enough data set to explore the questions laid out in the previous chapter, it was necessary to engage a large number of people in playing tailored, science-based role-play simulations. To do this, as well as to provide support for coastal New England communities grappling with the challenge of climate change adaptation, the MIT Science Impact Collaborative undertook the New England Climate Adaptation Project (NECAP) in 2012. In this chapter, I build on the broad overview of NECAP presented in Chapter 1 to further explain the project and the rationale behind it. I then explain the role-play simulations designed for NECAP and the workshops through which people in each of the NECAP partner towns and cities were engaged in the NECAP simulations. Following this explanation of NECAP and the role-play simulations and workshops, I put forward hypotheses in response to my research questions; these hypotheses are situated within the particular context of the simulations designed for and used in NECAP. I conclude by describing my data collection and analysis approach and explaining how I sought to test my hypotheses. In the remaining chapters, I examine what data collected through NECAP say about the effectiveness of RPS exercises as a civic education and engagement tool for complex science-intensive environmental issues, such as climate change adaptation.

3.1. Overview of the New England Climate Adaptation Project

NECAP was a two-year participatory action research project aimed at testing the effectiveness of science-based role-play simulations as a civic education and engagement
tool while simultaneously seeking to enhance local readiness to adapt (see Rumore 2014; Susskind and Rumore 2013; Susskind et al. 2015). The project was a collaboration among the MIT Science Impact Collaborative, the not-for-profit Consensus Building Institute (CBI), the National Estuarine Research Reserve System (NERRS), and four partner coastal New England municipalities: Barnstable, Massachusetts; Cranston, Rhode Island; Dover, New Hampshire; and Wells, Maine. Text Box 3.1 provides an overview for each of these municipalities.

NECAP was funded by the NERRS Science Collaborative, a National Oceanic and Atmospheric Administration (NOAA)-supported organization that puts NERRS-based science to work for coastal communities. NECAP began in August 2012 and ended in December 2014. A timeline for the project is provided in Figure 3.1.

![Figure 3.1: New England Climate Adaptation Project timeline](image-url)
**Text Box 3.1: NECAP Partner Municipalities**

**Barnstable, Massachusetts**

The Town of Barnstable, Massachusetts, is home to about 45,000 people. It is the largest town, both in size and population, on Cape Cod. It is also the county seat of Barnstable County, which encompasses the entirety of Cape Cod. The median household income in Barnstable is approximately $54,000 and the median age is 49. The town is 89% White, 3% Black or African American, 3% Latino or Hispanic, 1% Asian, and 1% Native American.

Situated about halfway along the arm of Cape Cod and with 170 miles of coastline, Barnstable is highly vulnerable to climate change impacts, including sea level rise and damage associated with intensified and more frequent storms. Further, while Barnstable has a fairly diversified economy, tourism and maritime industries both play key roles. The future of these industries relies greatly on the protection of Barnstable’s ecology, natural resources, beaches, and coastal infrastructure, all of which are also threatened by the impacts of climate change.

In Barnstable, our NERRS partner was the Waquoit Bay Reserve and our municipal partner was the Town of Barnstable Growth Management Department.

**Cranston, Rhode Island**

With a population of about 80,000, Cranston is the third largest city in the state of Rhode Island. The city is located along the Narragansett Bay and is part of the greater Providence metropolitan area. A number of small and medium-sized businesses support the local economy, which consists primarily of retail, healthcare, social assistance, and professional, scientific and technical services. The median household income in Cranston is approximately $59,000 and the median age is 41. The city is 82% White, 11% Latino or Hispanic, 5% Black or African American, 5% Asian, and less than 1% Native American.

In addition to its location on the Narragansett Bay, Cranston is bordered by the Pawtuxet River to the south and is intersected by the Pocasset and Meshanticut Rivers. The city therefore faces climate change risks associated with sea level rise, riverine flooding, intensified and more frequent storms, and damages to coastal infrastructure. Devastating effects from floods in 2010, as well as the projected frequency of similar events as a result of climate change, have heightened the awareness and concern of city staff and officials.

In Cranston, our NERRS partner was the Narragansett Bay Reserve and our municipal partner was the City of Cranston Planning Department.
Dover, New Hampshire

Dover, New Hampshire, is located within the coastal Piscataqua River watershed. The population of the town is about 30,000, making Dover the largest community in the New Hampshire seacoast region. Dover was also the fastest growing community in New Hampshire between 2000 and 2010. The median household income in Dover is approximately $60,000 and the median age is 37. The city is 91% White, 5% Asian, 2% Latino or Hispanic, 2% Black or African American, and less than 1% Native American.

Given its coastal situation and proximity to the Cochecho and Bellamy Rivers, Dover is at risk from climate change-related risks associate with sea level rise, increased riverine flooding, and impacts from intensified storms. Increased riverine flooding, however, is expected to be the greatest climate change risk facing Dover. Flooding along the rivers could impact surrounding residences, businesses, and ecosystems, including the Bellamy River Wildlife Management Area and Bellamy Reserve.

In Dover, our NERRS partner was the Great Bay Reserve and our municipal partner was the City of Dover Planning Department.

Wells, Maine

Situated on the southern coast of Maine, Wells is home to a little less than 10,000 people. However, as a popular beach vacation spot, the population of the community more than triples during the summer and the fall. The median household income in Wells is $62,000 and the median age is 48. The town is 99% White, and less than 1% Latino or Hispanic, Asian, Black or African American, and Native American.

Wells is home to an ecologically diverse estuary. The estuary and the town’s barrier beaches give the town a unique ecological setting and have spurred key industries in Wells such as tourism, commerce, and commercial fishing. Wells faces considerable climate change impacts associated with sea level rise, intensified storms, and heightened flooding, and will have to confront the potentially negative impacts on such changes on its economy and fragile estuary.

In Wells, our NERRS partner was the Wells Reserve and our municipal partner was the Town of Wells Town Manager’s Office.
Core project staff included faculty and graduate students from MIT, stakeholder engagement and consensus building specialists from CBI, Coastal Training Program Coordinators from four partner NERRS reserves (Waquoit Bay Reserve in Massachusetts; Narragansett Bay Reserve in Rhode Island; Great Bay Reserve in New Hampshire; and Wells Reserve in Maine), and technical climate change experts at the University of New Hampshire (UNH). As the Project Manager and Collaboration Lead, I was responsible for project implementation and facilitating coordination and communication among project partners and local stakeholders.

The partner municipality in each state was selected by the local Coastal Training Program Coordinator based upon the following criteria: we wanted to work with (1) small to midsized (i.e., population of approximately 10,000-100,000 people) coastal towns and cities that (2) were not taking noticeable action to adapt and where (3) local planners and decision-makers were willing and able to participate fully in the project. In each partner town or city, we worked directly with local public officials, most of whom were local planners (see Text Box 3.1.). For each municipality, one MIT graduate student was matched up with the local Coastal Training Program Coordinator and municipal partners.

The first goal of the project was to assess local climate change risks and adaptation options for each community. During the first year of the project, our technical climate change experts at UNH produced downscaled climate change projections for each of our four partner sites. This included generating projections of average temperature and extreme temperature events, precipitation and extreme precipitation events, and sea level rise. Based on the best available scientific techniques, these projections provide as clear a
picture as current science can offer of what the future climate will be like. MIT staff worked with technical climate change experts and municipal partners to translate the projections into a Summary Risk Assessment for each site. Each Summary Risk Assessment explains how projected climate changes could affect the municipality, providing a broad-brush evaluation of key local risks and potential adaptation options. See Russo, Rumore, and Kirshen (2015) for more information about the NECAP Summary Risk Assessments.

Another important early step was to understand the social landscape in each community. To help with this, MIT staff conducted a stakeholder assessment in each municipality during the first six months of the project. This involved interviewing approximately 20 key stakeholders in each municipality to gather information on local awareness of and concern about climate change risks and thoughts about adaptation options. Interviewees included local and regional elected officials, planners, emergency management personnel, business owners, and environmental group representatives, among others. During these interviews, stakeholders were shown the climate change projections for their city or town and asked to comment. The interview results were anonymized and used to prepare a written Stakeholder Assessment report. Interviewees were given a chance to review the assessment report for accuracy and completeness prior to its finalization. Once completed, the Stakeholder Assessments reports were shared with project partners and other officials in each town. See Rumore (2015) for more information about the Stakeholder Assessment process and findings.

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1 A stakeholder assessment is similar to a conflict assessment, as described by Susskind and Thomas Larmer (1999). We use the name stakeholder assessment, rather than conflict assessment, in situations where there is not a pre-existing conflict. See also Schenk (2007).
A key intent in producing the Summary Risk Assessments and Stakeholder Assessments was to inform the design of a science-based RPS tailored to each site. MIT staff members experienced in RPS design created the exercises. Local partners helped to test and refine each simulation. The process through which the NECAP simulations were designed and tested is discussed in the following section.

Once the simulations were finalized, the research-intensive part of the project began. Between the months of June and December 2013, the project team successfully ran seven or eight workshops in each city or town. Our local municipal project partners officially sponsored the workshops. During each workshop, participants – who ranged from local and state public officials to members of the general public – engaged in the role-play simulation and a follow-up conversation about local climate change risks and what their community should do to prepare (see overview of role-play simulation roles and issues in Appendix A and workshop debriefing protocol in Appendix B). Through the workshops, NECAP engaged 115 to 170 participants in playing the RPS in each site, for a project total of 555 workshop participants. During the workshops, each participant was asked to complete before-and-after questionnaires (see workshop questionnaires in Appendix C). About five weeks after each workshop, MIT staff conducted follow-up one-hour interviews with 20 to 30 percent of the participants; the semi-structured protocol used for interviews is included in Appendix D. The RPS workshops and data collection approach are further explained below.

In May 2013, prior to the workshops, NECAP commissioned a randomized professional telephone poll in each municipality. This public opinion poll captured public sentiments in each community before our intervention, providing a community-wide
baseline against which to assess the representativeness of our workshop participants in each site. In May 2014, we commissioned a follow-up telephone poll by the same polling company to get a sense of where people in each of these communities were at in their thinking a year later. The questionnaires used for the 2013 and 2014 public opinion poll are included in Appendix E.

Toward the end of the NECAP effort, we conducted a final debriefing workshop in each partner town. These final debriefing workshops gave us a chance to share our findings with local officials in each municipality and to engage them in a dialogue about what they might do to build on the momentum created by the project. At each final workshop, our NECAP climate change experts explained the findings of the local Summary Risk Assessment and how they produced climate change forecasts for each town. They also described what further risk and vulnerability analyses might entail. At these debriefing workshops, MIT staff summarized our key findings from the local public opinion polling, Stakeholder Assessment, and RPS workshops. MIT and CBI staff, with the help of local partners, then facilitated a discussion about how each community might build on NECAP to advance local efforts to prepare for and manage climate change-related risks. The final debriefing workshops in all towns included the same general components, but they were also tailored to the needs and context of each community.

3.2. The NECAP Simulations

Four new role-play simulations were developed for NECAP, one for each partner town or city. We intentionally tailored the simulations for each community to build on the actual local climate change risk information generated by the Summary Risk Assessments. Each town’s simulation was also designed to reflect local political dynamics and concerns,
drawing on the results of the local Stakeholder Assessment.

To provide a safe space for participants to engage openly, each of the simulations uses the scenario of a fabricated town – one that, by design, is very similar to (and includes real world climate change projections for) the community it was created for. For example, the simulation for the Town of Wells, Maine, takes participants to the hypothetical town of Launton. Like Wells, Launton is a small beachfront New England town that is largely reliant on summer tourism for its economy and faces increasing risk from coastal storms and sea level rise (see Text Box 3.2).

Each of the NECAP simulation includes seven roles: six stakeholder roles and a neutral facilitator role. The stakeholder roles in each community’s simulation were intentionally designed to capture and reflect the interests and perspectives of local stakeholders, as identified through the Stakeholder Assessment process. The goal in constructing the simulations was to create a scenario and set of roles that were relevant, realistic, and representative for each site, while allowing participants to engage openly, take on roles other than their real life roles, leave behind their real world constraints, and as Innes and Booher (1999: 20) say, “check their guns at the door.” An overview of our four simulations is provided in Text Box 3.2. More information about the roles, issues, and options built into each of the four simulations is provided in Appendix A. The simulation mechanics are described further in the following section.

As summarized in Table 3.1, the NECAP role-play simulations were designed to convey the following key learning objectives: (1) climate change presents considerable local risks for coastal communities; (2) the decisions that communities make today will affect their vulnerability or resilience to local climate change risks; (3) there are actions
that communities can take now to prepare for climate change risks despite uncertainty; (4) many stakeholders need to be involved in adaptation planning, and these stakeholders have different (but equally valid) perspectives that need to be considered; and (5) the consensus building approach offers a way to reach agreement about how to manage climate change risks in the face of uncertainty. These learning objectives were based on a theory of what it will take for communities to effectively engage in adaptation, which is elaborated and explained in Susskind et al. (2015).

<table>
<thead>
<tr>
<th>Key learning objectives of the NECAP role-play simulations</th>
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<tbody>
<tr>
<td>Climate change presents considerable local risks for coastal communities</td>
</tr>
<tr>
<td>The decisions communities make today will affect their vulnerability or resilience to local climate change risks</td>
</tr>
<tr>
<td>There are actions communities can take now to prepare for climate change risks, despite uncertainty</td>
</tr>
<tr>
<td>Many stakeholders need to be involved in adaptation planning, and they have different (but equally valid) perspectives that need to be considered</td>
</tr>
<tr>
<td>The consensus building approach offers a way to reach informed agreement in the face of uncertainty</td>
</tr>
</tbody>
</table>

The NECAP simulations were designed to challenge participants to work together to reach agreement about what the town in the scenario should do to prepare for climate change risks. The instructions encourage participants to take the scientific climate projections provided into account in their group decision-making.

One goal of the simulations was to model the important role that everyday planning decisions will play in preparing for and managing climate change risks (see Susskind and Rumore 2015). Hence, each of the simulations centers on the kinds of typical investments and regulatory and development decisions communities have to make every day, but raises the question of whether and how to proceed in the face of climate change.
change-related risks.

Many commentators such as Innes and Booher (2010) and Susskind (2010) suggest that more collaborative and adaptive decision-making are necessary for planning amid uncertainty and complexity, as in the case of adaptation. All of the simulations developed for NECAP, therefore, model a facilitated multi-stakeholder negotiation, or consensus building, approach to decision-making (see Susskind and Cruishank 1987), with the goal of familiarizing participants with how a facilitated collaborative decision-making process might look, feel, and work. The simulations seek to introduce participants to the kinds of tradeoffs that may be inevitable in adaptation decision-making – e.g., short term gains may impose long-term costs and investments that favor one group may eliminate the possibility of doing what others think is most important. At the same time, they aim to help participants consider the possibility that different stakeholder perspectives do not always create a zero-sum “win-lose” game. In other words, they are designed to expose people to the kinds of tensions that are inherent in deciding how to adapt, while simultaneously demonstrating how collaboration can lead to mutual-gain, win-win, or no-regrets solutions. As part of this, there are possible options and strategies build into the simulations that will “create value” (see Susskind 2014) as long as participants take account of the interests of others and do not just try to maximize their own advantage.

The simulations provide participants with a defined problem and a bounded set of policies, programs, and projects to consider. At the same time, participants are permitted to invent additional options and are encouraged to be creative while staying consistent with their confidential instructions. The games are therefore very structured but, at the
same time, inherently open-ended. They do not lead to any preordained outcome; rather, a number of results are equally plausible. When participants discuss outcomes at the end of the simulation, they quickly realize that it was not the structure of the game that dictated the result their table reached. Rather, it was the way in which people played their roles and tried (or did not try) to take account of the interests of others and the interest of the community as a whole. This can be an important learning moment.

MIT staff experienced in RPS design spearheaded the creation of the exercises. Local partners participated actively in formulating and testing each simulation, weighing in on the specific planning decisions that should be featured in each game and making sure that the confidential instructions for each role would ring true for people in their community.

The involvement of local partners in the development and refining of the simulations was critical. To illustrate: communities near Barnstable on Cape Cod, Massachusetts, are struggling with wastewater management and nitrogen runoff into waterways. These problems are likely to only get worse as sea levels rise and more severe storms occur. MIT staff thought we should focus the Barnstable RPS on what to do about investing in and regulating the design of new wastewater systems in light of climate change-related risks. However, given the already heated controversy surrounding the wastewater management issue (independent of any concern about climate change), our partners in Barnstable felt strongly that we should focus the RPS more broadly on the problem of coastal flooding. They wanted to avoid the NECAP workshops getting mired in acrimonious debate about wastewater issues instead of getting people talking about climate-related risks. In retrospect, this was a wise choice. The RPS we designed focused
broadly on coastal flooding issues and provoked a very useful discussion about climate change risks – one that, as we learned from follow-up interviews and our final debriefing workshop in Barnstable, continued well after the game concluded.

As the summary of the NECAP role-play simulations in Text Box 3.2 shows, all four exercises ended up focusing on flooding in one way or another. This is not surprising in light of the fact that coastal and riverine flooding are the most serious and visible climate change-related risks for most coastal New England communities. In Barnstable and Wells, sea level rise and storm surge are predominant concerns; hence, the RPS exercises for these towns centered on possible ways of addressing coastal flooding. Cranston and Dover tend to experience flooding mainly associated with their rivers. The simulations for these two communities therefore focus on addressing riverine flooding issues.

3.3. NECAP Workshops and Simulation Mechanics

In each of our partner communities, the NECAP team hosted seven or eight role-play simulation workshops between the months of June and December 2013. Each workshop was intended to engage a diverse range of local and regional stakeholders in playing the town’s RPS exercise and a follow-on debriefing conversation. The workshops each lasted about 2.5 hours.²

Upon arrival, participants were given a packet of workshop materials. This included a welcome letter, a participant consent form, general instructions and confidential role-specific instructions for the simulation, and a pre-workshop

² In Barnstable, after the first workshop, we increased the amount of time for workshops to three hours whenever possible, since the role-play simulation developed for Barnstable seemed to require a bit more time to complete.
questionnaire (i.e., the “pre-questionnaire”) and post-workshop questionnaire (i.e., the “post-questionnaire”). Workshop questionnaires are provided in Appendix C. Participants were asked to fill out the participant consent form and pre-questionnaire first thing, and then to begin reading the simulation materials. They were instructed to not look at or fill out the post-questionnaire until after the exercise; the materials in the packet were arranged to avoid participants accidentally seeing or completing the post-questionnaire prior to the end of the workshop.

Workshop participants were all given the same general instructions for their town’s simulation. These general instructions lay out the scenario of the simulation and the specific decision-making problem to be discussed. They include background information about and a map of the hypothetical town the scenario is based on, and a short description of the other stakeholders involved. The general instructions for each simulation also include a brief summary of local climate change projections and risks for the community in the scenario; this information was based on the Summary Risk Assessment for the town the RPS was created for. Additionally, they include a table laying out the broad benefits and costs of the various adaptation approaches that are up for discussion in the simulation.

Each workshop participant was also given role-specific confidential instructions for the role they were assigned. These role-specific instructions explain the role the participant will play, spelling out this role’s perspectives on each issue being discussed and the rationale behind this perspective. They also explain how this role “feels” about the climate change forecasts (i.e., takes them at face value, is skeptical about their usefulness or accuracy, or disbelieves them entirely) and how this influences the kinds of
decisions they think are acceptable.

The facilitator role for each table was almost always intentionally assigned to either a NECAP staff member or to workshop participants we knew had some facilitation experience or training. The facilitator role was written to allow any participant to take on this position. However, our aim was to fill this role with someone we had confidence would facilitate a productive conversation and help people stay on track and in their roles throughout the simulation exercise.

All of the roles other than the facilitator role were assigned randomly but with the general intent of assigning people roles that were different than their real life roles.

Once all roles had been assigned and the tables were all filled, NECAP staff officially welcomed everybody to the workshop and provided a 15-minute overview of the NECAP effort, the workshop agenda, and the RPS exercise. Following the introduction, participants had approximately 30 minutes to read and familiarize themselves with the simulation materials, as well as to ask clarifying questions.

Participants then had 60 minutes to play the simulation. During the 60-minute simulation, participants were instructed to assume the role they had been assigned and to work together to reach agreement on the issues put before them. As part of this, they were asked to “stay in role” for the duration of the exercise and to proceed only in ways that were consistent with the personality and underlying interests spelled out in their confidential instructions.

At the end of the simulation, participants were asked to return to their real life roles and were brought back together as one big group (except for in two workshops, where we had a large enough attendance that we split participants into two separate
Participants were then engaged in a 30-minute facilitated debriefing. The debriefing, which was facilitated by MIT, CBI, or NERRS staff, asked participants to reflect on the simulation experience and to tie their experiences back to reality. For example, they were asked to reflect on what the experience made them think their town should do, if anything, to address climate change risks. The debriefings were semi-structured, but generally followed the same protocol, which is included in Appendix B.

At the very end of each workshop, participants were asked to complete the post-questionnaire. They were also encouraged to suggest other people they thought should be invited to future workshops, as well as to visit the NECAP website for more information (including the local Stakeholder Assessment, Summary Risk Assessment, and results of the 2013 town-wide public opinion poll for their municipality).

In all four municipalities, the NECAP team hosted an initial RPS workshop targeted largely at key officials and local leaders, including those who had been interviewed as part of the Stakeholder Assessment. We wanted to familiarize officials and key actors with the simulation and to make sure they were not blindsided when they started to hear about the workshops or read about them in the local newspaper. Although they were targeted at key stakeholders, these first workshops were open to the general public. After that, we focused on engaging as diverse and wide-reaching a group of participants in each workshop as we could attract. As further explained in Rumore (2015a, 2015b), the aim was to bring together opinion leaders in each community – ranging from local elected and appointed officials, business owners, heads of environmental organizations, and representatives of civic groups – with members of the general public to foster shared learning, dialogue, and mutual understanding.
Workshops were organized, advertised, hosted, and conducted in coordination with our local NERRS and municipal partners. We also worked with other local groups (such as community colleges and hospital groups) in each municipality to co-host workshops. With the help of a variety of local partners, we were able to recruit a more diverse group of participants than we would have been able to attract on our own. Workshop outreach included email notices and announcement distributed through local listservs; notices posted in local newsletters; flyers posted in public spaces; and word-of-mouth.

Workshops were held in a variety of venues, ranging from National Estuarine Research Reserve facilities and local government offices to senior centers. We hosted a couple workshops at local restaurants and breweries to encourage more diverse participation; this strategy proved quite successful. Snacks were provided at all workshops.

Throughout the process, local NERRS and town partners proved enormously valuable in organizing events and attracting participants. Without their participation and support, we would not have been able to achieve our objective of engaging over 100 individuals at each site, which was necessary for rigorous statistical analysis.

We successfully engaged a project total of 555 individuals – 170 in Cranston, 150 in Barnstable, 120 in Dover, and 115 in Wells – through our RPS workshops. Participants ranged from public officials, to community activists, to residents who had never been involved in any town-sponsored event before. The demographics of workshop participants are discussed in the following chapter.
3.4. Hypotheses

As noted in the last chapter, the research questions driving this research were:

1. *Question 1 (Q1)*: To what extent are tailored science-based RPS exercises an effective tool for changing perspectives and attitudes (i.e., transformative learning) around complex science-intensive environmental issues in a civic and stakeholder engagement setting?

2. *Question 2 (Q2)*: If tailored science-based RPS exercises are an effective tool for transformative learning in a civic engagement context, what is the mechanism through which they cultivate this change in perspectives and attitudes? More specifically, do the unique qualities of role-play simulations – e.g., their ability to engage participants in suspending disbelief and taking on assumed perspectives – catalyze this transformative learning?

3. *Question 3 (Q3)*: When used for public education, do tailored, science-based RPS exercises affect all types of people similarly, or do they affect different kinds of people in different ways? More specifically, how are different kinds of people affected by the workshop, and what does this say about whether RPSs are more appropriate for engaging certain categories or demographics of people?

Based on the theory and research discussed in the last chapter and the learning objectives of the NECAP RPS exercises, I put forward the following hypotheses in response to each of these questions.

1. *Hypothesis 1 (H1)*: Participation in tailored, science-based RPS exercises in a civic engagement setting can change perspectives and attitudes (i.e., result in
transformative learning) about complex science-intensive environmental issues in the ways they are designed to.

The NECAP games were designed based on a normative theory of what it will take for communities to be ready to adapt to climate change (as elaborated and explained in Susskind et al. 2015); what the games were designed to model and the related perspective shifts they aimed to affect are shown in Table 3.2.

Table 3.2: What the NECAP role-play simulations model and the related learning objectives (i.e., perspective shifts) they aimed to achieve

<table>
<thead>
<tr>
<th>What the NECAP RPSs model</th>
<th>Anticipated learning objectives (i.e., perspective shifts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change presents considerable local risks for coastal communities</td>
<td>Increased concern about local climate change risks (&quot;concern&quot;)</td>
</tr>
<tr>
<td>The decisions communities make today will affect their vulnerability or resilience to local climate change risks</td>
<td>Increased sense that municipality should take action on climate change adaptation in the near future (&quot;should act&quot;)</td>
</tr>
<tr>
<td>There are actions communities can take now to prepare for climate change risks, despite uncertainty</td>
<td>Increased confidence that municipality can effectively respond to climate change risks despite climatic uncertainty (&quot;confidence&quot;)</td>
</tr>
<tr>
<td>The consensus building approach offers a way to reach informed agreement in the face of uncertainty</td>
<td>Familiarity with and support for a consensus building approach to adaptation decision-making (&quot;support for CBA&quot;)</td>
</tr>
<tr>
<td>Many stakeholders need to be involved in adaptation planning, and they have different (but equally valid) perspectives that need to be considered</td>
<td>Increased empathy for/understanding of different perspectives and interests (&quot;empathy&quot;)</td>
</tr>
</tbody>
</table>

My aim was to test whether participation in the role-play simulations would achieve the perspective shifts desired by the game designers, not to justify or test the appropriateness of these learning objectives. Therefore, I hypothesized that participation in the NECAP simulations would result in the following perspective shifts, or transformative learning effects: (1) increased concern about local climate change risks; (2) increased sense of local responsibility for preparing and support for
municipal action; (3) increased confidence about the prospects of effective local adaptation action; (4) familiarity with and support for the consensus building process – i.e., a facilitated multi-stakeholder negotiation process for decision-making – around climate change adaptation; and (5) increased empathy for and understanding of diverse interests and perspectives.

2. **Hypothesis 2 (H2):** Based on the theory discussed in the previous chapter, I hypothesize that role-play simulations help catalyze transformative learning through creating a “disorienting event” or “activating event” – i.e., an experiences that challenge an individual’s worldview. Such an event, transformative learning theory tells us, helps people critically reflect on their perspectives and assumptions, consider other ways of thinking about problems and decision-making contexts, and potentially reconfigure their mental models. I hypothesize that RPSs create such a disorienting or activating event through the interconnected “transformative elements” of engaging participants in:

   a. **Suspending disbelief:** Role-plays create a virtual “safe space” and “sandbox” in which participants can suspend disbelief and play with tough issues. Theory suggests this can help people suspend their judgments, critically reflect on their assumptions, and be more open to considering new viewpoints and possibilities related to the issue at hand.

   b. **Perspective taking:** Role-plays can foster perspective taking through pushing participants to take on another role and to problem solve from this perspective.
Theory suggests that this can help participants understand the interest and viewpoints of others, and critically reflect on their own assumptions.

c. **Collaborative problem solving**: Role-play simulations can immerse participants in mock collaborative problem solving, putting them in a realistic decision making situation in which diverse stakeholder representatives must constructively work together to address the issue at hand. Theory suggests this can help participants gain appreciation for other viewpoints on the issue, critically reflect on their own assumptions, and envision new ways of framing problems and thinking about solutions.

d. **Learning together**: Role-plays create a forum for dialogue and interactive learning, both during the exercise and during the follow-up debriefing, and can engage participants in learning together and from each other. Theory suggest this can push participants to test their assumptions against those of others, help them gain appreciation for other ways of seeing and framing problems, and generate mutual understanding.

All of these four “transformative elements” are fundamental to the kind of multi-stakeholder negotiation role-play simulations used in NECAP. They are also interconnected – e.g., suspending disbelief is often a precursor to perspective taking in the simulation; perspective taking is often necessary for participants to really engage in collaborative problem solving within the context of the simulation; and all of these elements are connected to participants’ experience of learning together and from each other. I theorize that experiencing any of these elements may be sufficient to create a disorienting or activating event and thus affect transformative learning.
That said, it is entirely possible, that certain transformative elements – or certain combinations of these elements – are more important for transformative learning than others. Figure 3.2 provides a diagram of my hypothesized mechanism for transformative learning from role-play simulations.

![Diagram of hypothesized mechanism through which transformative learning from role-play simulations occurs](image)

**Figure 3.2: Diagram of hypothesized mechanism through which transformative learning from role-play simulations occurs**

3. **Hypothesis 3 (H3):** In response to my third research question, I hypothesize that the effects of the RPS will be largely similar across genders, age groups, education levels, political affiliations, and income levels – at least among those who choose to attend the workshops.
If anything, one might hypothesize that those who identify as politically conservative would be less likely to attend the workshops and also less likely to be affected by the workshops, as climate change has largely been pegged as a liberal and environmental issue. That said, the RPS games are designed to model how everyone is affected by climate change risks, including businesses and economic interests, which are typically prioritized by conservatives. It therefore seems reasonable to assume that people of all political affiliations will experience transformative learning effects related to concern, should act, and the other variables of interest.

Additionally, one might theorize that people of lesser education would be more affected than people of higher levels of education. Social psychology and cultural cognition research has also shown that people of greater education tend to be more polarized in their views; for example, people with higher levels of education are more likely to have strongly formed opinions about climate change (Kahan et al. 2012). While the RPS exercises involve technical information and thus could be less accessible to people with lower education levels, one might anticipate that – if anything – people with less education would be more likely to engage in really playing the game and be open to learning, as long as they have enough comfort to really play the game.

While such differences in the effect of the RPS are entirely plausible, I did not anticipate there would be any striking differences among how different demographics of NECAP workshop participants would be affected – in part because participants were self selecting, and we would assume that people who would choose to come to
the workshops would have at least a basic interest in or curiosity about the issue being discussed and a willingness to fully participate.

Although I did not anticipate there would not be any striking differences across demographic groups, I did hypothesize that participants’ perspectives on climate change coming into the workshop would influence how they were affected by the RPS exercise. More specifically, I hypothesized that, using the general idea and typologies of “Global Warming’s Six Americas” (see Leiserowitz et al. 2011, 2013, 2015):

1. People who enter the workshop already being “alarmed” (i.e., very concerned about local climate change risks) are not likely to be considerably affected. Extrapolating off of the Global Warming’s Six Americas categorizations to refer more specifically to attitudes toward adaptation, I here define “alarmed” as being very concerned about local climate change impacts, having thought substantially about whether and how localities should prepare, and being actively supportive of local adaptation action. My hypothesis is that such people have already, to use the colloquial phrase, “drunk the Kool Aid” and thus may either feel they have nothing to gain and therefore not engage, or simply have already thought about these things to the point that there is not much to learn. That said, it is plausible that the role-play would increase alarmed participants’ confidence in their town’s ability to act, empathy for other perspectives, and support for and the consensus building approach – at least for alarmed participants who are able to suspend disbelief, take on their assigned role, and really engage with the simulation.
2. **People who enter the workshops being “dismissive” are unlikely to be greatly affected.** The Global Warming’s Six Americas defines people who are dismissive as being “very certain that global warming is not occurring” (Leiserowitz et al. 2013: 6). People who fall into this categorization typically “regard the issue as a hoax and are strongly opposed to action to reduce the threat” and often take political action to oppose action on climate change (Leiserowitz et al. 2013: 6). It seems likely that people who come into the workshops with a strong belief that climate change is not happening are unlikely to suspend their judgments and engage in the ways that, as noted in the last chapter, seem to be critical for transformative learning. Therefore, I hypothesized that such people are not likely to be significantly affected in a transformative way and that if they were, the learning effects would be latent – such as the planting of seeds of concern – and not evident through questionnaires and interviews.

3. **People who fall into more of the “undecided middle” category – i.e., people who are concerned, cautious, or doubtful – will be most affected by the simulations.** Extrapolating off of the Global Warming’s’ Six Americas categorizations to more specifically related to climate change adaptation, I use the term “concerned” to refer to people who are concerned about global climate change but have thought little about local impacts and/or are not actively involved in adaptation; I use the term “cautious” to refer to people who think global climate change may be occurring but are not convinced it is human caused and who have not really thought about local impacts; and I define “doubtful” as people who are uncertain whether global warming is occurring and believe that if it is happening, it is
attributable to natural causes, not human activities. It seems plausible that people who are more undecided in their thinking about climate change and who have given it less thought than the alarmed and dismissive types of people will be less firmly set in their pre-existing beliefs (either about whether and how their town should adapt, or that climate change is not happening) and thus will be more open to learning and really engaging with the simulation experience.

In testing these hypotheses, I also aimed to provide insight into the strengths and weaknesses of RPSs as a public education and engagement tool; to improve our understanding of when and where they are more or less appropriate and effective as an engagement strategy; and to generate lessons learned about how to effectively design and use RPSs for public education and engagement around climate change adaptation and other complex science-intensive environmental issues.

3.5. Data Collection
To test these hypotheses, data were collected in a number of ways. As previously noted, pre-workshop and post-workshop questionnaires were administered to all participants. These included Likert scale and multiple-choice questions aimed at benchmarking and tracking changes in levels of participant understanding of and perspectives about local climate change risks and possible responses. The post-workshop questionnaire also included two open-ended prompts: (1) “Did you learn something from the exercise that you might be able to apply to your own decisions?” and (2) “Please write a few lines describing your reaction to the exercise and anything else you’d like to share with us about this experience.” Additionally, to allow for the comparison of our workshop
populations to the population of each town, the questionnaires included a number of questions assessing demographics of the participants. Pre-workshop and post-workshop questionnaires are included in Appendix C.

All but a handful of participants who attended the workshops filled out both the pre-workshop and post-workshop questionnaires. A number of questionnaire sets had to be discarded because they were either missing a pre- or post-questionnaire or one of the questionnaires were incomplete. In all, we collected a total of 510 complete questionnaire sets.

Data were also gathered through direct observation of the workshops and detailed notes taken by NECAP staff during the 30-40 minute debriefing discussion at each workshop. The debriefing asked participants to reflect on their experience during the simulation and to connect this experience back to real life (see debriefing questions in Appendix B). Participant responses to these questions and other participants’ comments during the debriefings provided for a rich dataset on how different people interacted with the simulation and each other, and on what they took away from the experience.

Four to six weeks after each workshop, follow-up interviews were conducted with 20 to 30 percent of the workshop participants. Interviewees were selected to represent a diverse range of stakeholders and experiences. The semi-structured interviews were conducted by either an MIT graduate student researcher or me, and lasted for approximately 30 minutes. During interviews, participants were asked to reflect on the RPS, the workshop experience, and what stood out for them as surprises or lessons. The intent of these interviews was to capture a sense of what the lasting effects of the simulation and workshop were and to probe why and how learning did or did not happen.
in a way that the pre- and post-questionnaires could not. Interviews were conducted with a total of 140 workshop participants. The semi-structured protocol used for follow-up interviews is included in Appendix D.

As previously noted, municipality-wide public opinion data was collected through a public opinion poll conducted in May 2013. This public opinion poll, which was conducted by a professional telephone polling company, involved a landline telephone survey of 100 randomly selected residents in each NECAP partner community. Poll respondents were asked a subset of the workshop questionnaire questions (see public opinion poll questionnaires in Appendix F). The public opinion poll data provided a benchmark against which to assess the comparability of our workshop participants to the general public in terms of perspectives and attitudes about climate change risks and adaptation. A follow-up public opinion poll was conducted in each town in 2014; the data from the 2014 public opinion poll was not integral to this dissertation, but key findings from the poll are discussed in Rumore (2015a).

Worth note, and as I will indicate throughout the following chapters, data collection in NECAP was not specifically aimed at testing the hypotheses laid out in this chapter; instead, these research instruments were aimed at more broadly assessing the impacts of the RPS experience on participants understanding of and support for local adaptation action (the findings of which are reported in Susskind et al. 2015). While the data available are enormously useful for answering my research questions and testing my hypotheses, this is an important limitation that has to be considered when making sense of results, particularly the results for Question 2 and Question 3. For example, as I note in Chapter 5 on the mechanism through which transformative learning is catalyzed, there
were no questions on the interview protocol that were specifically aimed at getting people to reflect on the “transformative elements” of suspending disbelief, engaging in collaborative problem solving, and learning together. Therefore, it is likely that the incidences of interviewees actually experiencing these elements is under represented in my data. This does not interfere with my ability to rigorously test my hypotheses, but it does limit what I can say from results. Notes about the limitation of what I can say based on the data collected through NECAP are made throughout the following chapters, where relevant.

It is also important to note that the entire process of running NECAP and all of our data collection was a team effort. MIT graduate and undergraduate research assistants, as well as other NECAP staff and partners, were integral to all parts of completing the project and gathering all of the data described above. This dissertation research would not have been possible without the contributions of the entire NECAP team.

3.5. Data Analysis

NECAP employed two PhD candidates to manage the data collected through the project (Tijs van Maasakkers in 2012-2013 and Ella Kim in 2013-2014). With their help and the oversight of Ezra Glenn, an analytical advisor for the project, we created and maintained a FileMaker Pro online database. Graduate and undergraduate student researchers entered the quantitative results from the pre-workshop and post-workshop questionnaires into this database. With the help of Ellen Czaika, a PhD candidate in the Engineering Systems at MIT, I analyzed the pre- and post-workshop quantitative data using standard statistical hypothesis testing techniques. The statistical analyses used to test my hypotheses and the assumptions behind these analyses are explained further in the following chapters and
detailed in Czaika and Rumore (2015). The interpretation of these statistics is entirely my own.

Masters in City Planning and undergraduate student researchers at MIT transcribed qualitative data from the workshop debriefing notes, write-in questions on the post-questionnaires, and follow-up interviews. Using NVivo software, I coded this qualitative data and analyzed it for key themes. The way in which qualitative data was coded and analyzed to test my hypotheses is discussed further in the following chapters.

The 2013 public opinion poll conducted in each town before the project provided baseline data for assessing the representativeness of the workshop population in each town to the municipality’s population as a whole in terms of perspectives and sentiments. The workshop population for each site was compared to census data to evaluate representativeness in terms of demographic factors such as age, gender balance, and educational level.

I examined data in aggregate (i.e., all data from across the four towns) and for each community separately. Looking at the data in aggregate provides a sense of how participants, at large, are affected by the simulation; it also allows for a larger sample size and therefore more statistical rigor. Looking at each of the towns individually, on the other hand, allows me to situate workshop results within the context of each particular community and context. I also looked for similarities and differences across the four communities. This kind of comparative case study analysis allows for what (Yin 2003: 27) calls a “replication of logic.” As such, it is useful both for testing theoretical propositions and for theory building.

In the following three chapters, I further explain how exactly data were analyzed
to get at the questions and theories I was seeking to address, and examine what the NECAP data say in response to each of my questions and hypotheses. In the final chapter, Chapter 7, I stitch together my findings to put forward key conclusions and recommendations, share lessons learned, and make recommendations for future research.
CHAPTER 4: Results for Hypothesis One – The Effectiveness of Role-Play Simulations as a Transformative Civic Education and Engagement Tool

The first, overarching question this dissertation seeks to answer is:

*Question 1 (Q1): To what extent are tailored science-based RPS exercises an effective tool for changing perspectives and attitudes (i.e., transformative learning) around complex science-intensive environmental issues in a civic and stakeholder engagement setting?*

In response to this question, I have put forward the following hypothesis:

*Hypothesis 1 (H1): Participation in tailored, science-based RPS exercises in a public setting can change perspectives and attitudes (i.e., result in transformative learning) about complex science-intensive environmental issues in the ways the simulations are designed to.*

I draw on the data collected through NECAP to test this hypothesis.

As explained in the previous chapter, the NECAP games were designed to achieve a number of learning objectives, which are based on a normative theory of what it will take for communities to be ready to adapt to climate change, as elaborated in Susskind et al. (2015). Specifically, they were intended to increase participants’ (1) concern about local climate change risks; (2) sense that municipalities should take action on climate change adaptation in the near future; (3) optimism that municipalities can effectively respond to climate change risks despite uncertainty; (4) familiarity with and support for a consensus building approach to adaptation decision-making; and (5)
understanding of and empathy for different perspectives (see Table 4.1). My intent was to test whether the simulations were effective in shifting participant perspectives in the ways intended by the game designers, not to justify or test the normative objectives of the games. I therefore test the efficacy of the NECAP simulations against their intended learning objectives, which I refer to in shorthand, respectively, as: concern; should act; confidence; support for CBA; and empathy.

Table 4.1: Explanation of what the NECAP RPSs model and anticipated perspective shifts

<table>
<thead>
<tr>
<th>What the NECAP RPSs model</th>
<th>Anticipated perspective shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change presents considerable local risks for coastal communities</td>
<td>Increased concern about local climate change risks (&quot;concern&quot;)</td>
</tr>
<tr>
<td>The decisions communities make today will affect their vulnerability or resilience to local climate change risks</td>
<td>Increased sense that municipality should take action on climate change adaptation in the near future (&quot;should act&quot;)</td>
</tr>
<tr>
<td>There are actions communities can take now to prepare for climate change risks, despite uncertainty</td>
<td>Increased confidence that municipality can effectively respond to climate change risks despite climatic uncertainty (&quot;confidence&quot;)</td>
</tr>
<tr>
<td>The consensus building approach offers a way to reach informed agreement in the face of uncertainty</td>
<td>Familiarity with and support for a consensus building approach to adaptation decision-making (&quot;support for CBA&quot;)</td>
</tr>
<tr>
<td>Many stakeholders need to be involved, and they have different (but equally valid) perspectives that need to be considered in adaptation planning</td>
<td>Increased empathy for/understanding of different perspectives and interests (&quot;empathy&quot;)</td>
</tr>
</tbody>
</table>

In testing whether the NECAP games were effective in shifting perspectives in the way they were intended to do so, I draw on data from the NECAP workshop before-and-after questionnaires, as well as qualitative data collected through follow-up interviews. More specifically, I use the questionnaire questions and qualitative data listed in Table 4.2 to test whether anticipated shifts occurred as a result of participation in the simulations.
As indicated below in Table 4.2, I look at quantitative shifts in concern, should act, and confidence both in terms of:

1. “General shifts” – i.e., did people move in the intended direction along the 1 to 5 Likert scales provided; and

2. “Transformative shifts” – i.e., did people move over a certain threshold of concern, sense that their town should act, and confidence, as explained below.

a. *Concern:* Participants were asked “How concerned are you about the impact a change in the climate might have on your town?” on the pre-workshop and post-workshop questionnaires. They were given a Likert scale of response options, with 1 being not at all concerned, 3 being somewhat concerned, and 5 being very concerned. While any shift toward greater concern is a positive learning effect based on what the role-play modeled, I am particularly interested in moving participants above the “somewhat concerned” threshold to being concerned or very concerned. In analyzing the data for a “transformative shift” in concern, I therefore analyze whether the role-play was successful in moving people who indicated a 1 to 3 in initial concern to a 4 to 5 in post-workshop concern.

b. *Should act:* Participants were asked “How significant do you think climate change should be in your town’s planning and decision-making over the next ten years?” on the pre- and post-workshop questionnaires. They were provided a 1 to 5 Likert scale of response options, with 1 being not at all significant, 3 being somewhat significant, and 5 being very significant. Any shift upwards in sense of how significant action should be is a positive
learning effect based on what the role-play modeled. However, I am particularly interested in moving participants from thinking that adaptation should be not at all to somewhat significant to instead thinking it needs to be significant or very significant. Thus, in looking at “transformative shift,” I analyze whether the role-play was successful in moving participants who selected a 1 to 3 for this question on the pre-questionnaire to instead choosing a 4 or 5 on the post-questionnaire.

c. **Confidence:** On the pre- and post-workshop questionnaires, participants were asked, “How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future will be like?” They were provided a 1 to 5 Likert scale of response options, with 1 being not at all confidence, 3 being somewhat confident, and 5 being very confident. Any shift toward greater confidence following the workshop is a positive learning effect based on what the role-play modeled. That said, I am particularly interested in moving people from being not at all or not very confident to having some confidence that their town can act. Whereas the threshold for concern and should act is above “somewhat,” confidence is different; being “somewhat confident” is a healthy response, and I would anticipate that few people are very confident that their town can effectively respond. For those who are very confident coming into the workshop, it seems plausible that the workshop would help them realize how difficult adaptation will be and, thus, lead to a decrease in confidence. In light of this, I am particularly interested in moving people from being not at all or a not very
confident to being at least somewhat confident. I therefore analyze whether participants who start as a 1 or 2 for initial confidence move to a 3 to 5 for post-workshop confidence.

Table 4.2: Anticipated perspective shifts and data used to analyze whether these shifts occurred

<table>
<thead>
<tr>
<th>Anticipated perspective shift</th>
<th>Questionnaire question or other data indicative of shift</th>
</tr>
</thead>
</table>
| Increased concern about local climate change risks ("concern")                            | “How concerned are you about the impacts a change in the climate might have on your town?”  
|                                                                                             | a) General shift along 1-5 Likert scale                                                                                   |
|                                                                                             | b) Transformative shift from 1-3 to 4 or 5 on Likert scale                                                                |
| Increased sense that municipality should take action on climate change adaptation in the near future ("should act") | “How significant do you think addressing climate change risks should be in your town’s planning in the next 10 years?”  
|                                                                                             | a) General shift along 1-5 Likert scale                                                                                   |
|                                                                                             | b) Transformative shift from 1-3 to 4 or 5 on Likert scale                                                                |
| Increased confidence that municipality can effectively respond to climate change risks despite uncertainty about climate change risks ("confidence") | “How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?”  
|                                                                                             | a) General shift along 1-5 Likert scale                                                                                   |
|                                                                                             | b) Transformative shift from 1-3 to 4 or 5 on Likert scale                                                                |
| Support for a consensus building approach to adaptation decision-making ("support for CBA") | “Do you think your town should use a decision-making process like that modeled in the exercise to reach agreement about how your town should respond to possible climate change impacts?”  
|                                                                                             | a) Descriptive statistic using categorical data                                                                            |
| Increased understanding of and empathy for different perspectives and interests ("empathy") | Qualitative data from follow-up interviews                                                                               |

The statistical analysis results discussed in this chapter are all taken from Czaika and Rumore (2015). The interpretation of the results is entirely my own.

Statistical analysis for general quantitative shifts was done using a Wilcoxon signed-rank test. The Wilcoxon signed-rank test is a non-parametric statistical hypothesis test that is used in place of a students paired t-test for dependent samples when the distribution of differences between pairs are not normally distributed. While the
differences between participants’ pre- and post-questionnaires were more normally distributed than might have initially been assumed, they are still skewed, making a Wilcoxon a more appropriate test. Like the students paired t-test, the Wilcoxon ranked signed test looks specifically at individual shifts – not shifts in aggregate means – so as to illuminate whether, on average, participants are shifting in their responses, and whether this shift is, on average, positive or negative. The assumptions made in using the Wilcoxin signed-rank test are:

1. *Data are paired and come from the same population* – NECAP pre- and post-workshop data are paired, and they are analyzed based on aggregate (all workshop) or town (all workshops from a given town) populations.

2. *Each pair is chosen randomly and independently* – NECAP participants were not randomly selected from the towns at large; instead, people self-selected to attend. Therefore, I have to situate my findings within the context of the population of people who are likely to choose to attend a municipal workshop on climate-related risks, and cannot generalize to town populations at large. However, within the population of people who would choose to attend such a workshop, participants can be considered to be randomly selected and independent.

3. *The data are measured at least on an ordinal scale (i.e., cannot be nominal)* - Likert scale data is ordinal, and therefore fits this requirement.

Transformative shifts were statistically analyzed using a McNemar’s test. McNemar’s test, which is similar to a contingency test, is used in the analysis of matched binary data. McNemar’s test can determine whether an intervention results in a
statistically significant effect, when binary measures are being used, as in the case of my transformative learning measures. The assumptions behind McNemar’s test are:

a. Sample data consist of matched pairs - NECAP pre- and post-workshop data are paired.

b. Sample data have been randomly selected – as noted above, NECAP participants were not randomly selected from the towns at large, since people self-selected to attend. However, within the population of people who would choose to attend a municipal workshop on climate-related risks, participants can be considered randomly selected.

c. The frequency count can be organized into a 2x2 table in which there are two variables (in my case, before and after the simulation) and each has two categories (0 or 1, according to my transformative shift designation).

To provide context for workshop findings, I explain the NECAP workshop participant demographics below. I then examine data from all four towns combined, which I refer to as the “aggregate data.” This is followed by analysis of the findings for each of the four towns independently to assess whether findings were notably different in different sites and, if so, why.

4.1. Workshop Demographics

The NECAP workshops aimed to engage a diverse range of community members in each municipality, including decision-makers, key stakeholder representatives, and members of the general public. The demographic breakdown for workshop participants is included in Appendix F. Here, I explain the extent to which our workshop population was
representative of – and how it differed from – the municipal populations at large. I also explain how our workshop populations differed across towns. This demographic breakdown provides useful context for the findings discussed in this chapter and the following two chapters.

### 4.1.1. Representativeness of towns at large

To analyze how representative the NECAP workshop populations were of the general population in each community, workshop demographics were compared to census data from each community. In general, workshop participants in all sites were similar demographically to the general population of the towns except that they were, on average, a bit older, somewhat better off, and had a slightly higher level of education (see Blizzard 2014; Curti 2014; Patel 2014; Stein 2014).

To get a sense of how similar or different workshop participant attitudes were as compared to the town at large, participant responses for substantive questions on the workshop pre-questionnaires were contrasted against 2013 NECAP public opinion poll responses for the same questions; this was done for each community (see workshop data and public opinion poll data in Appendix G). Our comparison suggests that workshop participants were somewhat more likely to identify themselves as politically liberal (as compared to or independent or conservative) and to be affiliated with an environmental organization of some kind than the general public in their town. They were also, on average, somewhat more concerned about local climate change risks than the general population (see Table 4.3). Much the same, they were somewhat more inclined to say that adaptation should be important or very important in their town’s planning over the next
ten years. See Blizzard 2014, Curti 2014, Patel 2014, and Stein 2014 for more details. Since workshop participants were self-selected, these trends were not surprising.

Table 4.3: Comparison of aggregate workshop population to the general public in our four partner towns in terms of concern about local risks, political viewpoint, and environmental group affiliation. See Appendix G for town-specific demographic data

<table>
<thead>
<tr>
<th>How concerned are you about the possible impacts a changing climate might have on your town?</th>
<th>Aggregate 2013 Public Poll</th>
<th>Aggregate 2014 Public Poll</th>
<th>Aggregate Workshop Pre-Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all concerned</td>
<td>13%</td>
<td>14%</td>
<td>2%</td>
</tr>
<tr>
<td>2</td>
<td>13%</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>3 - Somewhat concerned</td>
<td>33%</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td>4</td>
<td>18%</td>
<td>18%</td>
<td>28%</td>
</tr>
<tr>
<td>5 - Very concerned</td>
<td>23%</td>
<td>23%</td>
<td>32%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How would you describe your political viewpoint?</th>
<th>Conservative</th>
<th>Liberal</th>
<th>Independent</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate 2013</td>
<td>22%</td>
<td>21%</td>
<td>50%</td>
<td>7%</td>
</tr>
<tr>
<td>Aggregate 2014</td>
<td>21%</td>
<td>23%</td>
<td>51%</td>
<td>6%</td>
</tr>
<tr>
<td>Aggregate Workshop Pre-Survey</td>
<td>14%</td>
<td>45%</td>
<td>36%</td>
<td>5%</td>
</tr>
</tbody>
</table>

| Do you belong to any non-profit groups that regularly advocate on behalf of environmental conservation and/or protection? | No | Yes, a national group | Yes, a local group | Yes, other |
|---|---|---|---|
| Aggregate 2013 | 74% | 9% | 12% | 5% |
| Aggregate 2014 | 84% | 7% | 6% | 3% |
| Aggregate Workshop Pre-Survey | 57% | 19% | 16% | 8% |

Worth note, during the NECAP workshops some participants expressed concern that we were preaching to the choir, since our workshop participants were, on average, more concerned than the general public. However, as one project partner aptly pointed out: “the choir isn’t singing, so perhaps they need to be preached at.” Indeed, as I explain in (Rumore 2015b) the goal behind the workshops was to “get the choir singing” – and, to extend the metaphor, to get them singing from the same sheet of music. In other words, one of the objectives behind NECAP was to engage community members who were somewhat concerned about climate change but not pushing for or supportive of adaptation action, and to generate shared understanding about local risks and support for
adaptation action among these folks. Additionally, a key goal of the project was to engage decision-makers and key actors in each community in conversation with each other and the general public. The fact that the overall group of 100-170 workshop participants in each community was a bit more liberal, a bit more environmentally oriented, and a bit more worried about climate change than the population in general was in line with our expectation. It was also in line with our intentions of fostering the kinds of interaction I argue in (Rumore 2015a) can enhance community-wide readiness to engage in collective risk management. This is particularly true in light of the fact that there was substantial diversity in the population we engaged in each municipality, even though our workshop population was not perfectly representative of the municipal populations at large (see the Appendix F for workshop participant demographic data).

4.1.2. Comparison of demographics across towns

The workshop populations in all four towns were similar in many respects, with participants in each community reflecting the general trend of being somewhat more likely to identify themselves as politically liberal, to be affiliated with an environmental organization of some, and to somewhat more concerned about local climate change risks than the general population in their town. Since, as noted above, workshop participants were self-selected, these trends were not surprising.

It is important to note the Barnstable workshop population stood out from the workshop populations in other towns in that the people we engaged in Barnstable were, on average, notably more aware of and concerned about climate change adaptation and more involved in environmental issues than the workshop populations in the three other towns. For example, 42 percent of Barnstable workshop participants indicated they were
very concerned about the possible impacts a changing climate might have on their town, compared to the four-town average of 32 percent (see Figure 4.1 below). Similarly, 54 percent of Barnstable workshop participants indicated that they belong to an environmental group, compared to the four-town average of 43 percent. Further, the significant majority of follow-up interviewees from Barnstable indicated that they directly worked on or often thought about climate change. Since Barnstable participants were already quite high on the concern and should act scales coming into the workshop, this may help explain why – as explained below – the effect of the workshops on Barnstable participants, while following similar trends to the effects on participants in other towns, was less strong than in other communities. As a result, some of the findings that were statistically significant in the three other municipalities were not significant in Barnstable. This higher level of concern and sense of should act was also seen among the general population of Barnstable in the 2013 public opinion poll findings (see Blizzard 2014 and public poll data in the Appendix G).

4.2. Findings for Aggregate Data

Below, I examine the findings from the aggregate workshop data (i.e., data from all four towns combined) in terms of the five perspective shifts the NECAP games were designed to affect: concern, should act, confidence, support for CBA, and empathy. I look at findings both in terms of general shift and transformative shift. For each indicator of interest, I also provide aggregate public opinion poll results from 2013 and 2014 to provide a sense of how workshop participant perspectives compared to the perspectives of the general population of the four towns.
4.2.1. Shift in concern

On the pre- and post-workshop questionnaires, participants were asked “How concerned are you about the impacts a change in the climate might have on your town?” As noted above, participants came into the workshops somewhat more concerned, on average, than the public in their towns at large. Of the 499 participants who responded to this question on both the pre-workshop and post-workshop questionnaires, the majority of the participants (60 percent) said they were already concerned or very concerned prior to the workshop, with 28 percent saying they were concerned (a 4 on the Likert scale) and 32 percent saying they were very concerned (a 5 on the Likert scale); see Figure 4.1a. In contrast: about 40 percent of all public opinion poll respondents in both 2013 and 2014 said they were concerned or very concerned (see Figure 4.1b).

Following the simulation, there was a general increase in participant concern, with the number of participants saying they were very concerned increasing to 40 percent and the number saying they were concerned increasing to 38 percent (see Figure 4.1a). The number of participants who experienced a general increase in concern following the workshop was statistically significant (p<0.0001). This gives us confidence that many participants did, in fact, experience an increase in concern.

In terms of transformative shift: as noted above, about 60 percent of participants were already over the threshold of interest (indicated by the blue lines on Figure 4.1a) prior to the workshop. Following the workshop, the number of participants who were over the threshold of interest increased to 76 percent. The number of participants experiencing a transformative shift was statistically significant (p<0.0001), giving us
confidence that many participants did experience a transformative shift, at least according to the metrics I have laid out.

How concerned are you about the possible impacts a changing climate might have on your town?

Aggregate Workshop Survey Results

<table>
<thead>
<tr>
<th>Post-survey</th>
<th>18%</th>
<th>39%</th>
<th>40%</th>
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<tbody>
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<td>3%</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre-survey</th>
<th>30%</th>
<th>27%</th>
<th>32%</th>
</tr>
</thead>
<tbody>
<tr>
<td>9%</td>
<td>2%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.1a: Comparison of participant concern before and after workshop for aggregate data, with transformative threshold marked in blue

How concerned are you about the possible impacts a changing climate might have on your town?

AGGREGATE OPINION POLL RESULTS

<table>
<thead>
<tr>
<th>2014</th>
<th>13.7%</th>
<th>9.6%</th>
<th>35.4%</th>
<th>18.1%</th>
<th>23.2%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>13.2%</td>
<td>13.3%</td>
<td>32.9%</td>
<td>17.8%</td>
<td>22.8%</td>
</tr>
</tbody>
</table>

Figure 4.1b: Public opinion poll results for concern, aggregated across all four towns
While both the general and transformative shifts were statistically significant, it is important to note that the magnitude of individual shifts was, on average, very modest, with most participants who shifted increasing by only one point on the Likert scale. Also, many participants did not change in their concern, and there were 37 people who indicated lower concern following the workshop (almost always one point lower on the Likert scale, although three people who said very concerned originally decreased to a somewhat concerned following the workshop). Additionally, 108 participants experienced increased concern as a result of the simulation that put them over the concern threshold of interest (i.e., they went from a 1-3 to a 4 or 5); however, 13 people went the opposite direction, decreasing in their concern rating from a 4 or 5 to a 3. See Table 4.4, which shows the number of participants who selected a certain level of concern after the workshop (post concern) based on their level of concern prior to the workshop (pre-concern). To illustrate the data in Table 4.4: of the nine people who selected a 1 (not at all concerned) for concern prior to the workshop, six people chose a 1 for concern after the workshop, two people selected a 2 for concern after the workshop, and one person selected a 5 for concern after the workshop.

Table 4.4: Number of participants who selected a certain level of concern after the workshop (post concern) based on their level of concern prior to the workshop (pre-concern). Boxes shaded in grey show the number of participants who stayed the same in their level of concern prior to and following the workshop.

<table>
<thead>
<tr>
<th>All Towns</th>
<th>Post-concern</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-concern</strong></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>
4.2.2. Shift in should act

Participants were asked “How significant do you think addressing climate change risks should be in your town’s planning in the next 10 years?” on both their pre-workshop and post-workshop questionnaires. As noted above, workshop participants were somewhat more supportive of town action coming into the workshop than were members of the general public in the NECAP partner towns. Prior to the workshops, the strong majority of NECAP participants (82 percent) said they think addressing climate change risks should be significant or very significant in their town’s planning and decision-making over the next ten years (see Figure 4.2a). In comparison, 57 percent of public opinion poll respondents in 2013 and 54 percent of poll respondents in 2014 said they think addressing climate change risks should be significant or very significant in their town’s planning over the next ten years (see Figure 4.2b).

Following the workshop, there was a general increase in participants sense of should act, with the number of people saying addressing climate change risks should be significant or very significant in their town’s planning increasing to 94 percent. The number of participants who experienced a general shift toward increased sense of should act was statistically significant (p=0.004). The number of participants who experienced a “transformative shift” – i.e., shift from selecting 1-3 to selecting 4-5 on Likert scale – was also statistically significant (p=0.003). The transformative threshold is indicated by the blue lines on Figure 4.2a.
Figure 4.2a: Comparison of participant sense of should act before and after the workshop for aggregate data, with transformative threshold marked in blue

Figure 4.2b: Public opinion poll results for should act, aggregated across all four towns
As with concern, it is important to note that the magnitude of individual shifts was, on average, very modest, with participants typically increasing by only one point on the Likert scale. Additionally, many participants did not shift in their sense of should act, and there were 43 few people who indicated a lower sense of should act following the workshop; most of these people were people who had said 5 (very significant) on their pre-survey and selected a 4 (significant) on their post-survey. See Table 4.5, which shows the number of participants who selected a certain level of should act following the workshop (post-should act) based on their level of should act prior to the workshop (pre-should act).

Table 4.5: Number of participants who selected a certain level of should act after the workshop (post-should act) based on their level of should act prior to the workshop (pre-should act). Boxes shaded in grey show the number of participants who stayed the same in their level of should act prior to and following the workshop

<table>
<thead>
<tr>
<th>All towns</th>
<th>Post-should act</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-should act</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

4.2.3. Shift in confidence

Pre-workshop and post-workshop questionnaires asked participants “How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?” In stark contrast to participants’ generally high level of concern and sense of should act coming into the workshop, prior to the workshop, only 11 percent of participants said they were confident or very confident about their town’s ability to effectively respond to climate change risks despite
uncertainty. Another 47 percent said they were somewhat confident (see Figure 4.3a). Workshop participants’ levels of confidence were similar to that of the general population of these four towns; as shown in Figure 4.3b, about 20 percent of all public opinion poll respondents said they were confident or very confident in 2013 and 2014, and an additional 36 percent in 2013 and 44 percent in 2014 said they were somewhat confident.

Following the workshop, there was a general increase in participant confidence, with the percentage of participants saying they were confident or very confident increasing to 19 percent and those saying they were somewhat confident increasing to 52 percent (see Figure 4.3a). The number of participants who showed an increase in confidence due to the workshop was statistically significant (p<0.0001), giving us confidence that many participants did indeed experience an increase in confidence. The number of participants who experienced a “transformative shift” – i.e., shift from selecting 1 or 2 to selecting 3 to 5 on the Likert scale – was also statistically significant (p<0.0001). The blues lines on Figure 4.3a delineate the transformative threshold for confidence.

As with concern and sense of should act, the magnitude of individual shifts in confidence was, on average, very modest, with participants generally increasing by only a point on the Likert scale. Many participants did not shift in their level of confidence, and 55 people showed a decrease in confidence. See Table 4.6, which shows the number of participants who selected a level of confidence after the workshop (post-confidence) based on their level of confidence prior to the workshop (pre-confidence).

It is worth note that the decrease in confidence some participants experienced may not be a negative learning outcome. While the NECAP RPS exercises aim to increase
optimism about the prospects of effective adaptation by showing participants everyday planning approaches that can be used to increase municipal resilience and introducing decision-making approaches that can assist with adaptation planning, it is possible that participation in the simulation helped many people realize how challenging adaptation will be. The reason for individual shifts upward or downward in confidence merits further exploration through additional pairing of quantitative and qualitative workshop data.

Figure 4.3a: Comparison of participant confidence before and after the workshop for aggregate data, with transformative threshold marked in blue.
How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

AGGREGATE PUBLIC OPINION POLL RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Pre-confidence</th>
<th>Post-confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>67</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 4.3b: Public opinion poll results for confidence, aggregated across all four towns

Table 4.5: Number of participants who selected a certain level of confidence after the workshop (post-confidence) based on their level of confidence prior to the workshop (pre-confidence). Boxes shaded in grey show the number of participants who stayed the same in their level of should act prior to and following the workshop.

4.2.4. Support for the consensus building approach

On the post-workshop questionnaire, participants were asked “Do you think your town should use a decision-making process like that modeled in the exercise to reach agreement about how your town should respond to possible climate change impacts?” Since this question was only asked following the workshop and was not asked during the 2013 or 2014 public opinion poll, I cannot compare post-workshop results to pre-workshop results or the public opinion poll results.
Following the workshop, the strong majority of participants (79 percent) were supportive of their town using a CBA-like process (i.e., “a process like that modeled in the exercise”) to reach agreement about how to respond to climate change risks. Many of these people (35 percent of people who responded to this question) were both supportive and optimistic that their town might do something like this in the near future. Slightly more people (37 percent of people who responded to this question) were supportive but pessimistic or skeptical that their town would actually do something like this in the near future. Interestingly, 7 percent of people said their town already is using a consensus building-like approach; this is curious in that, to the best of my knowledge, no process like this had been undertaken in any of our partner towns at that time. See Figure 4.4.

Although there was very strong support for a consensus building-like approach for town decision-making about climate change adaptation following the workshop, the fact that many people are pessimistic about the prospects of this happening any time soon is an important finding. Additionally, I cannot say whether the workshop shifted people’s perspectives on this topic, only that they left the workshop indicating high levels of support. It is also important to note that the options provided to participants included more positive (yes) than negative (no) options, which may have skewed responses toward a positive response.
4.2.5. *Shift in empathy*

There were no questions on the workshop questionnaires that specifically explored participants’ sense of empathy for and understanding of other people’s interests and perspectives related to climate change adaptation. Therefore, I draw on qualitative data from follow-up interviews to analyze learning and shifts related to empathy.

As discussed further in the next chapter and Appendix H, interviews were coded for signs of significant perspective change and transformative learning related to concern, should act, confidence, support for CBA, and empathy. In terms of empathy, the strong majority (upwards of 70 percent) of follow-up interviewees show notable signs of
increased empathy and understanding for different interests and concerns. I identified 70 of the 140 follow-up interviewees as showing clear signs of transformative learning related to increased empathy (i.e., a significant shift in perspective related to empathy for and understanding of other concerns and interests). Representative quotes from follow-up interviews are shown below.

“I played that business role, and because we were talking about whether people should have barriers, whether we should keep barriers, that whole discussion...I had never really thought about those things from individual property owner and business [perspective]. It brought home some things that I had never personalized. That’s definitely – I guess it gave me more sympathy or compassion toward views that I had sort of dismissed” (Barnstable participant).

“The variety of stakeholders that tend to get affected by it, their varied interests – you know, I knew it at the back of my mind, but to really get into a role-play situation and that role-play be so realistic...it was definitely an eye-opener. Something that I kind of sort of knew in the back of my mind kind of became very apparent” (Cranston participant).

“That was probably the biggest eye opener for me, just the different considerations. Not only from the people that we were role-playing. I think that it was just all the facets of government, just citizenry. Just people’s lives that can be affected by the change in climate, meaning greater floods, runoff, all that we’ve discussed at the table” (Dover participant).

“I think the major thing [I took away from the workshop] is the complexity of the problem, the number of different shareholders and stakeholders there are that should be involved in it. And that each of them has legitimate concerns about their particular part of the town” (Wells participant).
4.2.6. Additional finding: Enriched understanding

An additional funding related to the above five indicators of interest: the strong majority of interviewees show notable signs of generally enriched understanding about climate change risks and what adaptation will entail. For example, participants indicate the workshop made them think of aspects of climate change risks and adaptation they hadn’t thought of before, it clarified their thinking about climate change risks and adaptation, it gave them a better appreciation of things that need to be considered when making adaptation decisions, and other things of this nature. In the process of coding interviews for variables of interest (see Appendix H), I identified 81 of the 140 interviewees as having experienced transformative learning around enriched understanding, and a handful more as having experienced at least notable learning around enriched understanding.

The below quotes from follow-up interviews in each town give a sense of the kinds of enriched understanding experienced by interviewees.

“The whole thing about the barriers, the sea walls – I had no idea what a negative impact sea walls could have. That was not something I was ever aware of. So that was very interesting to learn about that. Because, you know, you think ‘Build a fortress and it will be fine!’ – And it’s not [laughing]” (Barnstable participant).

“It [the simulation] pointed out the complexity of the issue. It’s not just that the bay is going to be 12 inches deeper. How it affects things like housing, department of transportation, roads and bridges, and I’m sure schools. It touches everyone in one way or another. And that was certainly pointed in the role-play: you had representatives of lots of diverse interest groups” (Cranston participant).
“I think it made me think about all the different aspects that are to be considered, like the politics of it all. So I think it was interesting in that way to me. It was a little enlightening from that perspective” (Dover participant).

“It made me think a lot more about the complexity of having to prepare - not just that we have to build some levees or some dikes, but something that’s going to affect every part of the town system and structure” (Wells participant).

4.3. Findings by Town

Below, I examine my research findings for Hypothesis 1 by each town individually. For each town, I provide context, then examine the data, and conclude by reflecting on nuances in the findings for each site. As I show, the trends that were seen in the aggregate data – i.e., increased concern, increased sense of should act, increased confidence, broad support for CBA, increased empathy, and enriched understanding – were also seen in each of the NECAP towns, although to varying degrees and with some important nuances. I provide local public opinion poll results for each variable to allow for comparison of the workshop population to the general population of the town.

4.3.1. Barnstable

In Barnstable, we collected a total of 131 complete questionnaire sets and conducted a total of 38 follow-up interviews. As noted in the discussion of workshop demographics above, Barnstable was a bit of an outlier among our four towns in that participants in Barnstable were notably more concerned and supportive of town action on adaptation prior to the workshop than were participants in the other three towns. Barnstable participants were similar to participants in other towns in terms of level of confidence
prior to the workshop. According to our public opinion poll, Barnstable residents at large were more concerned and supportive of town action on adaptation than the general public in our other three towns. That said, Barnstable workshop participants were somewhat more concerned about climate change risks and supportive of action than the general population of their town (see Figure 4.5a and 4.5b and Figure 4.6a and 4.6b). Blizzard (2014) provides more context and additional NECAP findings for Barnstable.

Data show that, on average, the workshop resulted in increased concern (Figure 4.5a), sense that the town should act (Figure 4.6a), and confidence (Figure 4.7a) among Barnstable participants. While there was a general positive trend for all three of these indicators, the number of participants in Barnstable who experienced a positive general shift was only statistically significant for increase in confidence (p=0.0473); it was not statistically significant for concern or should act (although the shift in concern was statistically significant at the 95 percent confidence level if using a students paired t-test, a more powerful but less robust test). Hence, my data suggest that the simulation increased sense of concern and sense of should act for many participants in Barnstable, but we have confidence that the simulation increased confidence among Barnstable workshop participants. As with all towns, participant shifts on all three indicators were, on average, modest; many of participants did not shift at all, and those who did generally only did so by one point on the Likert scale.

In terms of transformative learning, the number of participants who experienced a transformative shift was statistically significant for concern (p=0.026), should act (p=0.046), and confidence (0.018). This is somewhat surprising in light of the fact that many people were already over the threshold of interest, particularly for should act, and likely
is reflective of the larger sample size in Barnstable, which allows for statistical significance to be more readily detected.

**How concerned are you about the possible impacts a changing climate might have on your town?**

_Barnstable Workshop Survey Results_

<table>
<thead>
<tr>
<th></th>
<th>Precipitation Increase</th>
<th>Higher Sea Levels</th>
<th>Greater Frequency of Storms</th>
<th>More Frequent Wildfires</th>
<th>More Intense Heat Waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-survey</td>
<td>2%</td>
<td>12%</td>
<td>36%</td>
<td>47%</td>
<td>3%</td>
</tr>
<tr>
<td>Post-survey</td>
<td>6%</td>
<td>21%</td>
<td>28%</td>
<td>42%</td>
<td>3%</td>
</tr>
</tbody>
</table>

*Figure 4.5a: Comparison of Barnstable participants’ concern before and after workshop, with transformative threshold marked in blue*

**How concerned are you about the possible impacts a changing climate might have on your town?**

_Barnstable Public Opinion Poll Results_

<table>
<thead>
<tr>
<th></th>
<th>Precipitation Increase</th>
<th>Higher Sea Levels</th>
<th>Greater Frequency of Storms</th>
<th>More Frequent Wildfires</th>
<th>More Intense Heat Waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>14%</td>
<td>8%</td>
<td>30%</td>
<td>22%</td>
<td>26%</td>
</tr>
<tr>
<td>2013</td>
<td>11%</td>
<td>9%</td>
<td>36%</td>
<td>14%</td>
<td>29%</td>
</tr>
</tbody>
</table>

*Figure 4.5b: Barnstable public opinion poll results for concern*
Figure 4.6a: Comparison of Barnstable participants’ sense of should act before and after workshop, with transformative threshold marked in blue

Figure 4.6b: Barnstable public opinion poll results for should act
How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

Barnstable Workshop Survey Results

Post-survey
- 10% Not at all confident
- 24% Not confident
- 50% Somewhat confident
- 13% Confident
- 3% Very confident

Pre-survey
- 15% Not at all confident
- 29% Not confident
- 44% Somewhat confident
- 10% Confident
- 2% Very confident

Figure 4.7a: Comparison of Barnstable participants’ confidence before and after the workshop, with transformative threshold marked in blue

How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

Barnstable Public Opinion Poll Results

2014
- 22% Not at all confident
- 17% Not very confident
- 38% Somewhat confident
- 14% Confident
- 9% Very confident

2013
- 26% Not at all confident
- 18% Not very confident
- 30% Somewhat confident
- 13% Confident
- 13% Very confident

4.7b: Barnstable public opinion poll results for confidence
Following the workshop, 74 percent of participants in Barnstable were supportive of CBA. However, most of these people (41 percent of all people who responded to this question) were supportive but skeptical that a CBA-like process for adaptation decision-making would happen any time soon (Figure 4.8).

*Figure 4.8: Barnstable participants’ support for CBA following the workshop*

Many follow-up interviewees in Barnstable show signs of increased empathy, although increased empathy was less of a theme in Barnstable interviews than in other towns, with only 14 of the 38 interviewees from Barnstable being marked as experiencing
transformative learning related to empathy. It is important to note that this may reflect lower incidence of increased empathy, or it may simply be the reflection of a lower quality of interviews; as discussed further in the following chapter, I had notably less rich interview data from Barnstable and Cranston, which may have limited the kinds of transformative learning effects I was able to detect in the qualitative data from these two towns. Enriched understanding was a common theme among Barnstable interviewees, with 22 of the 38 interviewees showing signs of transformative learning around enriched understanding.

4.3.2. Cranston

We collected a total of 155 complete questionnaire sets from Cranston and conducted 38 follow-up interviews. Cranston was similar to Dover and Wells in terms of participant perspectives coming into the workshops, in that Cranston participants were, on average, a little more concerned and supportive of action than the public in Cranston at large (see figures below). Patel (2014) provides more context and additional NECAP findings for Cranston.

Data show a general trend toward increased concern (Figure 4.9a), sense of should act (Figure 4.10a), and confidence (Figure 4.11a) among Cranston participants as a result of the workshop. The number of participants who increased in concern (p = 0.002), sense that the city should act (p = 0.0365), and confidence (p=0.0047) in Cranston were all statistically significant. Therefore, we have confidence that participants in Cranston did, in fact, experience increased concern, sense of should act, and confidence as a result of the workshops. As with all towns, the shifts were modest and there were many participants who did not shift on these indicators.
The number of participants in Cranston experienced a transformative shift was also significant for concern (p<0.001), should act (p=0.037), and confidence (p=0.007). The transformative threshold is indicated in blue on the below figures.

**Figure 4.9a:** Comparison of Cranston participants’ concern before and after workshop, with transformative threshold marked in blue

**Figure 4.9b:** Cranston public opinion poll results for concern
Figure 4.10a: Comparison of Cranston participants’ sense of should act before and after workshop, with transformative threshold marked in blue

How significant do you think addressing climate change risk should be in your town’s planning and decision making over the next ten years?

CRANSTON PUBLIC OPINION POLL RESULTS

Figure 4.10b: Cranston public opinion poll results for should act
How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

Cranston Workshop Survey Results

<table>
<thead>
<tr>
<th></th>
<th>Post-survey</th>
<th>Pre-survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all confident</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Not confident</td>
<td>24%</td>
<td>37%</td>
</tr>
<tr>
<td>Somewhat confident</td>
<td>52%</td>
<td>44%</td>
</tr>
<tr>
<td>Confident</td>
<td>16%</td>
<td>9%</td>
</tr>
<tr>
<td>Very confident</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Figure 4.11a: Comparison of Cranston participants’ confidence before and after the workshop, with transformative threshold marked in blue

How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

Cranston Public Opinion Poll Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Not at all confident</th>
<th>Not very confident</th>
<th>Somewhat confident</th>
<th>Confident</th>
<th>Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>35%</td>
<td>14%</td>
<td>43%</td>
<td>3%</td>
<td>8%</td>
</tr>
<tr>
<td>2013</td>
<td>20%</td>
<td>28%</td>
<td>35%</td>
<td>12%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Figure 4.11b: Cranston public opinion poll results for confidence
Support for CBA among Cranston workshop participants following the workshop was very high, with 86 percent of participants saying they think their town should use a process like that modeled in the exercise to make adaptation decisions. However, almost half of these people (41 percent of all participants who responded to this question) were supportive but skeptical that it would happen any time soon. See Figure 4.12.

Do you think your town should use a decision-making process like that modeled in the exercise to reach agreement about how your town should respond to possible climate impacts?

**CRANSTON WORKSHOP AFTER SURVEY RESULTS**

No, this wouldn’t be helpful 1%
Not sure 8%
Other 4%
Yes, and it already is 8%
Yes, but it isn’t realistically going to happen any time soon 41%
Yes, and I could see it happening soon 38%

*Figure 4.12: Cranston participants’ support for CBA following the workshop*

Increased empathy and understanding of other interests and concerns was a notable theme in the majority of Cranston follow-up interviews, with over 40 percent of interviewees showing signs of transformative learning around empathy. Interviewees also
commonly showed signs of experiencing enriched understanding as a result of the simulation: 17 of the 38 Cranston interviewees were identified as experiencing transformative learning around enriched understanding.

4.3.3. Dover

We collected a total of 115 complete questionnaire sets and conducted 35 follow-up interviews in Dover. Dover was similar to Cranston and Wells in terms of participant perspectives coming into the workshops; participants were, on average, a little more concerned and supportive of action than the general public in Dover. See figures below. Stein (2014) provides more context and additional NECAP findings for Dover.

Participants in Dover show the same general trends as participants in other towns, with many increasing in concern (Figure 4.13a), sense of should act (Figure 4.14a), and confidence (Figure 4.15a). The number of participants who increased in concern (p=0.002) and confidence (p= 0.005) as a result of the workshop was statistically significant; the number of participants who shifted in should act was not. As with all towns, many participants did not shift in their responses, and those who did typically experienced modest shifts.

As with Wells (see below), the number of participants in Dover who experienced a transformative shift in concern (p<0.0001) and confidence (p=0.002) was statistically significant. The transformative shift for should act was not, which is not surprising, as most participants were already over the should act threshold prior to the workshop (see Figure 4.14) and the workshop population for Dover was notably smaller than the population of Barnstable and Cranston, making it harder to detect statistical significance. The transformative threshold is indicated in blue on the below figures.
Figure 4.13a: Comparison of Dover participants’ concern before and after workshop, with transformative threshold marked in blue

Figure 4.13b: Dover public opinion poll results for concern
Figure 4.14a: Comparison of Dover participants’ sense of should act before and after workshop, with transformative threshold marked in blue.

Figure 4.14b: Dover public opinion poll results for should act.
How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

**Dover Workshop Survey Results**

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Not very</th>
<th>Somewhat</th>
<th>Confident</th>
<th>Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-survey</td>
<td>7%</td>
<td>15%</td>
<td>54%</td>
<td>21%</td>
<td>3%</td>
</tr>
<tr>
<td>Pre-survey</td>
<td>11%</td>
<td>24%</td>
<td>54%</td>
<td>10%</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Figure 4.15a:** Comparison of Dover participants’ confidence before and after the workshop, with transformative threshold marked in blue

---

How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

**DOVER PUBLIC OPINION POLL RESULTS**

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Not very</th>
<th>Somewhat</th>
<th>Confident</th>
<th>Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>17%</td>
<td>12%</td>
<td>56%</td>
<td>4%</td>
<td>11%</td>
</tr>
<tr>
<td>2013</td>
<td>20%</td>
<td>21%</td>
<td>42%</td>
<td>7%</td>
<td>10%</td>
</tr>
</tbody>
</table>

**Figure 4.15b:** Dover public opinion poll results for confidence
Following the workshop, 79 percent of participants in Dover were supportive of CBA. Many of these people (30 percent of all people who responded to this question) were supportive but skeptical that their town would undertake a process like this any time soon; however, the majority of people who were supportive of CBA (41 percent of all people who responded to this question) were more optimistic. See Figure 4.16.

Increased empathy was a notable theme in the majority of Dover follow-up interviews, with two-thirds of interviewees in Dover showing signs of a transformative shift in thinking around empathy. Enriched understanding was even more notable among interviewees, with almost 70 percent of interviewees from Dover being identified as experiencing transformative learning around enriched understanding.

**Do you think your town should use a decision-making process like that modeled in the exercise to reach agreement about how your town should respond to possible climate impacts?**

![Dover Workshop After Survey Results](image)

*Figure 4.16: Dover participants’ support for CBA following the workshop*
4.3.4. Wells

In Wells, we collected a total of 110 complete questionnaire sets and conducted 29 follow-up interviews. Wells was similar to Cranston and Dover in terms of participant perspectives coming into the workshops, in that participants were, on average, a little more concerned and supportive of action than the general public in Wells. See figures below. Curti (2014) provides more context and additional NECAP findings for Wells.

Similar to the other three towns, participants in Wells increased in concern (Figure 4.17a), sense of should act (Figure 4.18a), and confidence (Figure 4.19a). As with all towns, the shifts were modest, and many participants did not shift on all or any indicators. The number of participants who shifted in confidence (p=0.0072) was statistically significant at the 95 percent confidence level; the shift in concern (p=0.078) was statistically significant at the 90 percent confidence level. The number of participants who shifted in should act was not statistically significant. In making sense of these statistics, it is important to recognize that Wells was the smallest workshop population of all four towns; the lack of statistical significance for confidence, despite the fact that many people shifted on this front, may in part reflect this smaller sample size. We have the greatest confidence around the observed increase in confidence, but the data suggest that many participants in Wells also increased in sense of concern and should act.

Like Dover, the number of participants in Wells who experienced a transformative shift in concern (p=0.001) and confidence (p=0.004) was statistically significant. The number of participants who experienced a transformative shift for should act was not statistically significant, which is not surprising in light of the fact that most

---

3 The shift in concern in Wells was statistically significant at the 95 percent confidence level if using a students paired t-test, a more powerful but less robust test than Wilcoxin signed rank test.
participants (over 85 percent) were already over the should act threshold (see Figure 4.18a). Also, as with Dover, the workshop population was smaller, making it more difficult to detect statistical significance. The transformative threshold is indicated in blue on the below figures.

After the workshop, 72 percent of Wells participants were supportive of CBA. These people were relatively evenly split between being supportive but skeptical that it would happen any time soon (32 percent of all participants who responded to this question) and being supportive and more optimistic (31 percent of all participants who responded to this question). See Figure 4.20.

As in Dover and Cranston, increased empathy was a notable theme in the majority of Wells follow-up interviews, with over 60 percent of interviewees showing signs of a transformative shift in thinking around empathy. Similarly, a little more than 60 percent of interviewees in Wells showed transformative learning around enriched understanding.
Figure 4.17a: Comparison of Wells participants’ concern before and after workshop, with transformative threshold marked in blue

Figure 4.17b: Wells public opinion poll results for concern
Figure 4.18a: Comparison of Wells participants’ sense of should act before and after workshop, with transformative threshold marked in blue

Figure 4.18b: Wells public opinion poll results for should act
How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

**Wells Workshop Survey Results**

**Post-survey**
- Not at all confident: 5%
- Not confident: 24%
- Somewhat confident: 51%
- Confident: 19%
- Very confident: 1%

**Pre-survey**
- Not at all confident: 8%
- Not confident: 36%
- Somewhat confident: 47%
- Confident: 7%
- Very confident: 2%

*Figure 4.19a: Comparison of Wells participants’ confidence before and after the workshop, with transformative threshold marked in blue*

**How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?**

**Wells Public Opinion Poll Results**

<table>
<thead>
<tr>
<th>Year</th>
<th>Not at all confident</th>
<th>Not very confident</th>
<th>Somewhat confident</th>
<th>Confident</th>
<th>Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>25%</td>
<td>16%</td>
<td>37%</td>
<td>8%</td>
<td>14%</td>
</tr>
<tr>
<td>2013</td>
<td>22%</td>
<td>21%</td>
<td>34%</td>
<td>15%</td>
<td>8%</td>
</tr>
</tbody>
</table>

*Figure 4.19b: Wells public opinion poll results for confidence*
Figure 4.20: Wells participants’ support for CBA following the workshop

4.4. Summary of Findings

In summary, the key findings as they relate to hypothesis 1 are:

1. The simulations were effective in shifting perspectives in the way they were intended to:

On average, participation in the workshop resulted in an increase in participant concern, sense that their town should act, and confidence in town action. Across the aggregate data, these shifts were statistically significant in terms of both: (1) general shift (participant
shifts along the 1-5 Likert scale); and (2) “transformative shift” (participant shifts over the threshold established for each question).

In understanding these aggregate findings about increased concern, should act, and confidence, it is important to note that the majority of people were already relatively concerned and supportive of local action coming into the workshops. In part as a result of this, many people did not shift on some or any of the indicators of interest. Where people did shift, these shifts were very modest; people generally most moved up a point on the Likert scale. Additionally, some people moved down on the scale.

Following the workshops, the strong majority of participants were supportive of a consensus building approach to making adaptation decisions in their communities. However, many of these people (about half in most towns) were skeptical about the prospects of this actually happening any time soon.

Participation in the workshop also resulted in increased empathy and understanding of different interests and concerns. By town, anywhere from one third of participants (Barnstable) to two thirds of participants (Dover and Wells) showed signs of transformative learning in this regard.

Generally enriched understanding was also a very common theme in qualitative data, with the strong majority of participants across towns noting that participation in the workshop increased their understanding of the risks and challenges their community faces, what can be done about them, possible solutions, and/or other such elements of adaptation.
2. *Perspective shifts were generally similar across towns*

Trends seen in the aggregate data were also seen in each of the towns. In each town, we saw an increase in participant concern, sense that town should act, and confidence, as well as high levels of support for CBA and signs of increased empathy. Enriched understanding was also a strong theme across all towns.

As discussed above, there were some differences among town findings in terms of statistical significance of quantitative findings and the magnitude of qualitative findings. While these differences are worth noting, they generally seem to reflect:

a. *Differences in the “starting point” of participants.* For example: coming into the workshops, people in Barnstable were already much higher on the indicators of interest (e.g., the strong majority of people already thought their town should act); therefore, while there was an upward shift on these indicators, we see less statistical significance than in other towns. Additionally, in all towns, the strong majority of people were already above the should act transformative threshold. This helps explain why the general and transformative shifts for should act were not statistically significant in many towns, although they were statistically significant across the aggregate data from all towns.

b. *Different population size.* Larger sample sizes allow for greater detection of statistical significance, and we see this in the NECAP workshop data. For example: even though the increase in concern in Wells was similar to the shift seen in Cranston and Dover, it was not statistically significant, which seems to be – at least in part – the result of a smaller sample size. With a more powerful statistical test (the students paired t-test), this shift shows up as statistically
significant. Additionally, when lumped together into the larger dataset, these findings become statistically significant, giving us greater confidence that the shifts seen were in fact changes in participant perspectives and not just noise in the data.

4.5. Conclusions

To recap, the first question I sought to answer in this dissertation is:

**Question 1**: To what extent are tailored science-based RPS exercises an effective stakeholder and public engagement tool for changing perspectives and attitudes (i.e., transformative learning) around complex science-intensive environmental issues?

In response to this question, I hypothesized that tailored, science-based RPS exercises are an effective tool for shifting the perspectives and attitudes of stakeholders and members of the general public in the way the exercises are meant to do so. In the context of NECAP, more specifically, I hypothesized that participation in the RPS exercises would: (1) increase concern about local climate change risks; (2) increase sense that the municipality should take action in the near term; (3) increase confidence in the prospects of local adaptation action; (4) foster support for the consensus building approach; and (5) increase empathy for and understanding of other interests and concerns.

Evidence from NECAP suggests that RPS exercises, when used in a stakeholder and public engagement context, can be effective for changing perspectives and attitudes about science-intensive environmental issues in the way they are designed to do so. The climate change adaptation simulations used in NECAP increased participant concern about climate change risks, sense of need for near-term local government action to respond to these risks, confidence in local collective ability to manage these risks,
support for a consensus building approach to making collective risk management decisions, and empathy and understanding for other interests and concerns. Participation in the NECAP role-play simulations also generally enriched many participants’ understanding of climate change risks, adaptation options, and what adaptation will entail.

Evidence also suggests that RPSs can result in transformative shifts in perspectives, particularly for participants who are not already over the threshold of interest (e.g., people who are not already notably concerned about climate change risks or do not already think their town should act). Qualitative data suggests that RPSs can affect transformative shifts around increased empathy and enriched understanding about issues, even for those who are already concerned about risks and supportive of action to manage them.

The consistency of these findings across our four communities suggests they are reasonably generalizable, at least to other coastal New England communities. Based on these findings, we have reason to believe that – in New England communities and probably in communities elsewhere in the United States – well designed and carefully conducted tailored science-based RPSs can be a valuable education and engagement tool for stakeholders and members of the public.

That all said, there are a number of caveats and limitations that have to be considered in making sense of these results. First, my evidence suggest that shifts in perspectives are likely to be modest, although they can be more notable for participants who are less well versed in the issues being discussed. Additionally, our experience with NECAP indicates that RPS workshops are likely to predominantly attract people who are already concerned and supportive of action. While this may be sufficient for affecting
desired stakeholder and public education goals, it is worth noting that much more focused, strategic, and rigorous outreach and engagement approaches will likely be needed if the aim of an effort is to engage a more diverse cross-section of the public. This issue and related considerations are discussed further in the following chapters.

It is also important to note that the persistence of perspective shifts was not quantitatively measured in this study, although (as discussed further in the next chapter) follow-up interviews suggest that many participants experienced lasting perspective changes and learning effects. More research on the persistence of perspective changes may be merited. Additionally, the extent to which these shifts will lead to action or behavior change was not assessed through this study. Further research is required to get at this question.

In summary, NECAP data suggest that participation in the RPS exercises can affect desired shifts in perspectives. This raises the question: what is the mechanism through which this transformative learning occurs? More specifically, what is it about the role-play exercises that cultivates perspective shifts and transformative learning? This question and what the findings from NECAP have to say about it are the focus of the next chapter.
CHAPTER 5: Results for Hypothesis Two – The Mechanism Through Which Role-Play Simulations Catalyze Transformative Learning

The second question this dissertation set out to answer was:

*Question 2 (Q2):* If tailored, science-based RPS exercises are an effective tool for transformative learning in a stakeholder and civic engagement context, what is the mechanism through which they cultivate this change in perspectives and attitudes?

As discussed in Chapter 2, theory tells us that transformative learning is catalyzed by experiences that challenge an individual’s worldview – what is referred to as an “activating event” or “disorienting event.” Building on this, I have hypothesized that role-play simulations can affect transformative learning in a civic engagement context by creating such an event, helping stakeholders and members of the general public to critically reflect on their perspectives and assumptions, consider other ways of thinking about problems and decision-making contexts, and potentially reconfigure their mental models.

I hypothesized that RPSs create such a disorienting event by engaging participants in:

1. *Suspending disbelief;*
2. *Perspective taking;*
3. *Collaborative problem solving; and*
4. *Learning together*
These four interconnected elements of role-plays, which I here refer to as the “transformative elements” of RPSs, are fundamental to the kind of multi-stakeholder negotiation role-play simulations used in NECAP. My hypothesis is not that participants must experience all of these transformative elements, or even multiple elements, to experience transformative learning; rather, I theorize that experiencing any of these elements may be sufficient to create a disorienting event for participants, helping them to critically reflect on, question, and potentially revise their assumptions and underlying mental models, such as about the extent to which climate change adaptation is an urgent problem and what should be done about it (see diagram of hypothesized mechanism through which transformative learning occurs from RPSs in Figure 5.1). It is highly
plausible, however, that certain transformative elements – or certain combinations of these elements – are more important for transformative learning than are others. This is part of what I sought out to explore in testing this hypothesis.

To test my hypothesis about the mechanism through which role-plays affect transformative learning, I draw on data collected through NECAP. More specifically, I draw heavily on the follow-up in-depth interviews conducted with 20 to 30 percent of all NECAP workshop participants to examine:

1. The extent to which transformative learning is evident among the participants who were interviewed five to six weeks after the workshops (which is when interviews were conducted) and what kinds of transformative learning are most evident;
2. Whether participants experience the elements I have laid out (i.e., suspending disbelief, perspective taking, collaborative problem solving, and learning together); and
3. Whether there appears to be a relationship between experiencing my hypothesized transformative elements and experiencing transformative learning. More specifically:
   a. Whether there is a correlation between an individual experiencing the elements I have laid out and their experiencing transformative learning;
   b. Whether there is correlation between experiencing a certain type of transformative element and experiencing certain kinds of perspective shifts;
c. Whether certain transformative elements or certain combinations of transformative elements seem to matter more than others in terms of affecting transformative learning.

In addressing these questions, it is important to note that the data at my disposal will not allow me to determine causality – i.e., I cannot deduce whether experiencing a certain transformative element causes transformative learning in general or whether it results in a certain kind of transformative learning. I can, however, analyze the extent to which relationships and correlations exist.

As noted in Chapter 3, questionnaire and interview questions were not designed to specifically answer questions about the mechanism through which transformative learning occurred. Since the data collection instruments (the questionnaires and interview protocol) were not designed with this question and hypothesis specifically in mind, I cannot clearly and definitively assess the exact number of people who did or did not experience each of these transformative elements. I can and do, however, assess whether participants clearly did or did not experience my hypothesized transformative elements and whether this does – or does not – correspond with whether they experienced transformative learning and what kinds of transformative learning (if any) they experienced.

Below I explain my findings for each of the three sub-questions laid out above. I conclude by explaining my overall findings about the mechanism through which transformative learning occurs from RPS exercises in a civic engagement context.
5.1. Do Interviewees Show Signs of Transformative Learning?

In order to draw on NECAP follow-up interview data to test my hypothesized mechanism for transformative learning, a key first question that must be addressed is: to what extent is transformative learning evident in follow-up interviewees and what kind of transformative learning, if any, did they experience? By identifying which interviewees clearly did – and did not – experience transformative learning, I can then analyze whether there is any correlation between (1) experiencing the transformative elements of role-plays I have hypothesized could lead to transformative learning and (2) whether an individual did or did not experience transformative learning.

To get at this first question, I coded interviews in NVivo, a qualitative data analysis software, for the transformative learning indicators of interest – concern, should act, confidence, support, empathy, and enriched understanding (as described in Chapter 4). I initially coded all interviews for signs of learning around each of these indicators of interest. Once I had completed the initial coding of all interviews, I went back through each interview and identified whether the individual showed signs of transformative learning (i.e., significant perspective shifts) around any of these six variables. Individuals who were identified as clearly experiencing transformative learning around one or more of the learning indicators of interest were marked as “Yes TL.” Interviewees who showed no strong signs of transformative learning were marked as “No TL.” For the strong majority of participants, it was clear whether they had experienced a significant – even if subtle – shift in perspective or thinking about the indicators of interest, or whether they had not. For those who showed notable signs of a perspective shift but where it was not clear that transformative learning had occurred (which was often the result of lower interview quality), I marked participants as “Maybe TL.” The Yes TL, No TL, and
Maybe TL classifications were mutually exclusive. My interview coding approach is explained in depth in Appendix H.

The numbers of participants I identified as Yes TL, Maybe TL, and No TL – by town and in aggregate – are shown in Table 5.1

<table>
<thead>
<tr>
<th>Town</th>
<th># of interviews</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>No TL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>38</td>
<td>16</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Cranston</td>
<td>38</td>
<td>13</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Dover</td>
<td>35</td>
<td>21</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Wells</td>
<td>29</td>
<td>17</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Aggregate total</td>
<td>140</td>
<td>67</td>
<td>22</td>
<td>51</td>
</tr>
</tbody>
</table>

As Table 5.1 shows, the proportion of interviewees who showed signs of transformative learning strong enough to be categorized as Yes TL ranged from a little less than 34 percent of interviewees in Cranston and 42 percent in Barnstable to about 60 percent in both Wells and Dover. This rate of transformative learning is reflective of but somewhat higher than the rate of perspective shifts identified by my quantitative analysis of questionnaire data, as discussed in Chapter 4. This is likely reflective of (1) the fact that questionnaires are not particularly well suited to pick up subtle but potentially important perspective shifts, such as a deeper understanding of an issue and what it might mean for one’s community, and (2) the most frequent kinds of transformative learning experienced by participants were related to empathy and enriched understanding, which were not evaluated by the questionnaires.

The notably lower rate of transformative learning among Cranston and Barnstable participants compared to Wells and Dover participants is somewhat consistent with the
quantitative findings discussed in the previous chapter. Workshop questionnaire data suggest that participants in Barnstable were generally more concerned and supportive of action coming into the workshop than were participants in other towns. Thus, they arguably had less to learn, at least in terms of the key learning objectives of the simulation, which may help explain the lower rate of transformative learning identified among interviewees.

Participants in Cranston, on the other hand, were relatively similar to participants in Dover and Wells in terms of their perspectives coming into the workshops, and – as discussed in the last chapter – workshop questionnaire data suggest that Cranston participants experienced perspective shifts similar to the shifts experienced by participants in Dover and Wells. We would therefore expect at least reasonably similar levels of transformative learning among interviewees across these three towns.

The interviewees in Cranston seem to be somewhat skewed toward participants who were already more concerned and supportive of action coming into the workshop; this may help explain the lower rate of detected transformative learning. Based on my experience coding interviews from these four towns, I also suspect that a certain amount of transformative learning in the Barnstable and Cranston interview populations went undetected due to much lower quality and richness of interviews for these two towns. In NECAP, a particular MIT graduate was assigned to each community, and this particular person conducted most of the follow-up interviews for the town they were working with. The interviews for Dover and Wells were consistently and notably more rich and skillfully conducted than the interviews for Cranston and Barnstable. For example, there are many instances in the Barnstable and Cranston interviews where it seems like a
participant is starting to reflect meaningfully on their experience but the interviewer moves on to the next question without following up or creating space for the participant to continue their reflection; in such situations, interviewers in Wells and Dover usually provided participants more space to elaborate, or explicitly asked them things such as “can you explain that more?” While this does not influence how I analyze data, it is important to recognize that rate of transformative learning may have been somewhat higher in the Barnstable and Cranston populations than is reported here. Additionally, this speaks to the importance of skillful interviewing – i.e., interviewing that can elicit thoughtful reflection and help interviewees fully communicate their thoughts while not leading them to desired responses – in this kind of research. More training of staff for this purpose would have been beneficial.

Interviews were coded for transformative learning around each variable of interest (i.e., concern, should act, confidence, support for CBA, empathy, and enriched understanding). Table 5.2 shows the counts of the different kinds of transformative learning experienced by participants for each town, based on what was detectable from interviews.

Table 5.2: Breakdown of the number of participants who showed signs of experiencing transformative learning around each of the indicators of interest, by town and in aggregate. Yes TL and Maybe TL numbers from Table 5.1 included for comparison.

<table>
<thead>
<tr>
<th>Town</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>TL Concern</th>
<th>TL Should Act</th>
<th>TL Confidence</th>
<th>TL CBA</th>
<th>TL Empathy^</th>
<th>TL Enriched Underst.^</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>16</td>
<td>4</td>
<td>1</td>
<td>13</td>
<td>1</td>
<td>6</td>
<td>14</td>
<td>22</td>
</tr>
<tr>
<td>Cranston</td>
<td>13</td>
<td>6</td>
<td>9</td>
<td>8</td>
<td>3</td>
<td>6</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Dover</td>
<td>21</td>
<td>5</td>
<td>13</td>
<td>17</td>
<td>4</td>
<td>11</td>
<td>22</td>
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<tr>
<td>Wells</td>
<td>17</td>
<td>7</td>
<td>12</td>
<td>17</td>
<td>5</td>
<td>9</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Aggregate total</td>
<td>66</td>
<td>22</td>
<td>35</td>
<td>55</td>
<td>13</td>
<td>32</td>
<td>70</td>
<td>81</td>
</tr>
</tbody>
</table>

^ The people in the Maybe TL category typically showed signs of transformative learning around empathy and enriched understanding, but these signals were not strong enough for me to definitively consider these people as clearly experiencing transformative learning. This explains why there are more people marked at TL empathy and TL enriched understanding than there are people who were marked as Yes TL.
As noted above, *enriched understanding* – broadly understood as an enhanced understanding of climate change risks and adaptation, greater appreciation for what adaptation will entail, and better understanding of options and considerations (see discussion about this in Chapter 4) – was by far the most common form of transformative learning. This was true across towns, although it was on par with transformative learning about empathy in Wells. Since enriched understanding was, by itself, often not sufficient for me to mark an individual as having experienced transformative learning significant enough for them to be categorized as Yes TL, the number of participants who showed signs of transformative learning around enriched understanding (81 across all towns) exceeds the number of people I marked as Yes TL (66 across all towns).

The below quotes illustrate the kinds of learning participants experienced around enriched understanding:

“The idea that we [local public officials] should do nothing – I think that idea has gone away. You know, I think we do in fact need to have this on our radar, we need to start thinking about how we’re going to work toward possible solutions: where we build things, how we build things. All those kinds of things, I do think, we need to be mindful of them. I don’t know that we really were, previously. That’s just me. Other people in other departments like Growth Management could be, but we haven’t been” (Barnstable participant, Town of Barnstable public official).

“It changed my perspective, because I didn’t know very much before, so it educated me on the priorities, such as moving the public works, the pumping stations, things like that, just to get prepared – putting in zoning regulations for certain areas and encouraging alternative
development. That’s something I hadn’t really considered it very much in depth” (Cranston participant, City of Cranston elected official).

“[The simulation] made me a little more aware of the wide variety of impact it could have on different groups…I never would have thought before of how climate change could affect the chamber of commerce but it can because it could affect local business” (Dover participant, City of Dover public official).

“Even though I think of myself as knowledgeable about the basics of climate change, I hadn’t really considered the process of actually decision-making in communities and figuring out what to do. It was really valuable for me to see that it’s not easy. There are lots of different opinions. Although I had heard a lot of the terms used before, like buy-back programs, I hadn’t sat down to think what that actually involved, what it truly meant. It was really valuable to go through that process as one of these characters and learn about that complexity” (Wells interviewee, educator and Wells resident).

The second most frequent type of transformative learning experienced by interviewees in all towns was associated with empathy. This typically showed up as participants noting the workshop gave them a better understanding of different people’s perspectives and increased their appreciation for the diversity of people and interests that need to be accounted for in adaptation decision-making. Like enriched understanding, signs of transformative learning around empathy were not always sufficient to clearly indicate an individual had experienced transformative learning; therefore, the number of people marked for TL empathy (70 across all towns) is a little higher than the total
number of people identified as having experienced transformative learning (66 across all towns).

The below quotes give a sense of the kinds of learning participants experienced around empathy:

“Because I had to play a different role and saw different roles, I became a little bit more aware than I was before of the necessity for bringing people together of different – not different viewpoints on climate change, they all think climate change is important – but different viewpoints on how climate change needs to be dealt with…I think that we need to, we need to start engaging more in dialogue with people who belong to the chamber of commerce, and business people, and all the people concerned with it to try to locate what the issues are, what is going, what of climate change is going to hit them hardest and where you can talk with them to get them to see there are some things they need to be concerned about even if they don’t initially think so” (Barnstable participant, Cape Cod resident).

“I feel like I really got into that role of the homeowner who’s been there and doesn’t want to leave, and that was fun. It did make me feel a little more sensitive to those issues, the people who, you know, really do want to stay in their community. And it’s not that I was insensitive before, but that you have to be really careful about those things. … I’m a little bit more sympathetic now, I think, to those challenges” (Cranston participant, graduate student).

“It probably helped to reinforce my concern and it gave me a better understanding of how local governments – what they have to do to deal with the changes. I have never been involved in really, like, local governments, and how policy needs to change and the process of how you get people to start thinking about the future and, say, putting some planning into
place. So I guess in terms of the workshop, what it made me aware of is how difficult that is – living in a democratic society” (Dover participant, educator and Dover resident).

“I didn’t realize, like, it affects the water, the people who live on the water, and how they’d have to move, which would affect other people. I didn’t realize how much was involved and how many people would be affected by it” (Wells interviewee, undergraduate student).

After enriched understanding and empathy, the frequency of different kinds of transformative learning experienced by participants is more variable among the different towns, although there was consistently a higher detection rate for each kind of transformative learning in Dover and Wells than there was in Barnstable and Cranston.

Across the aggregate data from all towns, transformative learning around should act was the third most frequently experienced type of perspective change. Transformative learning around should act was not necessarily – or frequently, for that matter – a shift in people going from thinking their town shouldn't act to it should; to the contrary, the majority of interviewees (like the majority of all workshop participants, see Chapter 4) came into the workshop thinking, at least to some extent, that their town should take action to adapt to climate change. Instead, transformative learning around should act was typically related to a change in interviewees’ perspectives and attitudes related to how the town should act. This included things such as appreciating that adaptation is largely a local issue, better understanding the range of people who need to be involved in local action, and increased sense of urgency for local action.

Some quotes that exemplify participant learning around should act include:
“Yes, I think it is definitely something [the Town of Barnstable government] should be involved in, and I don’t think that prior to it that was on my radar…for my staff…I think it also made them a bit more aware” (Barnstable participant, Town of Barnstable public official).

“Well I always thought, you know, it was a combination between federal, state, cities and towns [that should be responsible for climate adaptation]. But now that I look at it from a more overall perspective, it seems that cities and towns should be taking a lead on these things. Just because they understand the needs of their communities – they’re responding to complaints on a daily basis. They just have the knowledge of their community, and really what’s more important to their community. Though they may not have the resources” (Cranston participant, State of Rhode Island public official).

“Well I didn’t think about government’s role in this prior to that evening. I certainly have put some thought into it since. But again, I think it’s everybody’s responsibility. And I think it is the responsibility of local government to just make sure that people know they should be prepared. You can’t make anybody do anything, but they certainly need to know – there should be some preparedness to this issue” (Dover participant, Dover resident).

“Being the safety person in the role play, I was concerned about the evacuation. At the very least, there has to be plans in place to evacuate. We have a marsh that’s probably just almost the same level as the roads. At the very least, let’s get that road raised up a little higher. It could flood. And I’m sure, being a new resident, I don’t know the history of it, but there are things that can be done to ensure the safety of the residents on the town level. So [the simulation] really helped bring to light the possibility of that” (Wells participant, Wells resident).
Across the aggregate data, transformative learning around concern was next most frequently experienced type of transformative learning. People’s transformative learning around concern ranged from recognizing local climate change risks for the first time to experiencing an increased sense of urgency and importance of adaptation. The below quotes provide an example of the range of participant perspective shifts and learning related to concern. Only one participant from Barnstable was identified as experiencing transformative learning around concern, and there were not discrete quotes that clearly exemplified this person’s learning, so no quotes from Barnstable are included here.

“[The workshop] made me think a little bit more about the local town, the effects that it will have on the local town level, and in particular storm runoff and stuff like that, because it has been an issue in the past and I don’t think it’s something that’s being dealt with very strongly…I don’t really know how it’s being dealt with in my town” (Dover participant, graduate student).

“It literally brought it [climate change] home. For me, it made me think…we’re going to be underwater” (Wells participant, Wells resident).
Transformative learning around support for *consensus building* was next most frequently seen type of transformative learning across all interviewees. Learning about consensus building typically took the form of: new or greater appreciation of the fact that reaching agreement despite diverse interests and perspectives was possible, appreciation of the value of a neutral facilitator, and/or appreciation of the value of a structured and facilitated process for decision-making around complex issues like climate change adaptation. Quotes that illustrate participants’ learning around consensus building include:

“The fact that when you take the emotions out of it and you actually look at the data and stuff like that it definitely kind of opens up your mind to how to go about debating certain issues like that and it gets you thinking: should representatives of people be the ones that are having these discussions or should it be the people themselves that have their preconceived notions? It differently changed the way you think about how the decisions are made” (Barnstable participant, Town of Barnstable public official).

“I thought it was a really good activity to do—to be taken out of the role that I usually play, as well as try to figure out if there’s ways to come to some type of shared approach, or agreed-upon approach to move forward – that would try to meet the needs as many of the various interest groups” (Cranston participant, environmental advocate).

“When you read the different roles that were taken on by people – It needs to be a collaboration among all those types of people, rather than just the City Council, or just City Manager, or just one of those two and city staff. It needs to be more of a collaborative effort between all different types of folks” (Dover participant, City of Dover public official).
“I definitely think that having a facilitator there was good, having a facilitator there to maintain an unbiased view. And our facilitator did a very really good job of it. I think that if it was a real life situation it might be harder… it got intense [in my simulation group], because it’s hard because there’s no clear-cut answer, there’s only less negative. And it’s hard to know that everyone with each negative option is, which is why we kind of combined some together for a better option… more people were happy when we combine different options together” (Wells participant, undergraduate student).

The least most frequently identified kind of transformative learning of interest was that associated with confidence; this was true across the aggregate interview data and among interviewees for each town. In making sense of this, it is necessary to point out that interview protocols did not specifically have questions designed to elicit thoughts related to changes in confidence or optimism about town action. It is therefore not entirely surprising that transformative learning related to confidence was not a very common theme in interviews. The incidences where I was able to detect notably increased confidence among participants were generally situations in which, in the process of reflecting on the workshop, participants noted (without any prompt) that something about the workshop increased their sense that their town could and would act, their optimism that the town could actually do something meaningful, and things of this nature.

Often, participants indicated that the presence of their public officials at the workshops or the fact that their town was sponsoring the workshops was a source of increased confidence. Other participants noted that simply seeing that other people in their community were concerned gave them hope. Some people indicated that seeing the
kinds of realistic adaptation actions their town could take was also a source of optimism. In contrast, a couple participants who came into the workshop very concerned about climate change risks and supportive of action said the workshop made them realize how hard it was going to be, thereby decreasing their confidence; as noted in the last chapter, this is not necessarily a negative learning outcome, and the ways in which people’s confidence changed and the reasons behind this merit additional research.

Below are a couple quotes that express the diversity of participant perspective shifts (both positive and negative) around confidence:

“It makes me more depressed than ever [laughing]. I am trying to find a middle way for the public to come to grips with this and I thought the role playing was a fun way to put yourself in other people’s shoes” (Barnstable participant, relator).

“I walked away from it a little more hopeful that planners were maybe using a range of different techniques, and that maybe more people than I was aware of were taking it seriously from more than just an engineering perspective” (Cranston participant, State of Rhode Island public official).

“I think I came in skeptical, and I left skeptical. However, I think I was less skeptical leaving. So, you know, if I’m on a scale of 0 to 10, 0 being confident that things are going to change for the better and 10 being exceptionally skeptical, I probably came in as a 7 and I probably left as a 5. So it did have a positive impact in terms of my thinking about the possibilities for change, although I would emphasize that I am not even close to being a 3 or a 2 or a 1, at least in the short term, in anticipating positive change” (Cranston participant, Cranston resident and member of the Cranston Planning Commission).
“[The workshop] gave me some confidence that the city officials and citizens were really trying to engage in this. And that gave me some hope that Dover as a community can, you know, can actually do some good planning” (Dover participant, State of New Hampshire elected official).

“I walk around in my house and I’m involved in this all the time, and I walk around the house, going, we’re doomed, we’re all doomed, the planet is doomed, we’re all doomed... And I think role-playing is a really good way to process that denial and terror and fear. And be able to say: ‘Okay, I’ll put it out here, I’ll role play this, and maybe there is some hope here, and maybe we can do this.’ I think it’s a wonderful way” (Wells participant, Wells resident).

To summarize the above-discussed findings: transformative learning was detectable in a sizeable portion of the workshop interviewee population in each town (ranging from about 34 to about 60 percent of interviewees, just a little shy of 50 percent of all interviewees; see Table 5.1 above). The majority of transformative learning across all towns was associated with enriched understanding and empathy; transformative learning around the other indicators of interest was also frequently identified, although with varying rates across the communities. Since data were not collected specifically to get at whether certain kinds of transformative learning occurred, I cannot determine whether the simulations were more effective in catalyzing certain kinds of transformative learning over others. However, the data do provide strong reinforcing evidence that the simulations can and do result in transformative learning among participants, and that they can affect transformative learning around all of the indicators of interest: concern, sense
that the town should act, confidence, support for CBA, and empathy, as well as enriched understanding. Additionally, since interviews were conducted four to six weeks after the workshops, interview data suggest that many transformative learning effects persist, at least for a couple weeks following the experience.

5.2. Do Interviewees Show Signs of Experiencing the Transformative Elements of Role-Play Simulations?

Since transformative learning among participants was notable, the next question I need to answer in order to test my hypothesis is: Did participants experience the “transformative elements” I have laid out – i.e., suspending disbelief, perspective taking, collaborative problem solving, and learning together?

To do this, I coded interviews in NVivo for signs of participants experiencing suspending disbelief, perspective taking, problem solving, and/or learning together (see explanation of interview coding in Appendix H). I also identified participants who showed clear signs of not engaging with the simulation; the reasons for this lack of engagement varied from a handful of people who were invited by project partners and saw their role as being “to fill seats,” to a couple people who were clearly skeptical about whether climate change is occurring and came to voice their opposition to action on climate change. In total, the number of participants I marked as clearly not engaging ranged from 15 percent of interviewees in Barnstable and Cranston to 13 percent in Wells and 11 percent in Dover.

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4 Three of the six Barnstable interviewees who clearly did not engage were actively “dismissive” of climate change, to use the Six Americas (Leiserowitz et al. 2013) categorization of public opinions on climate change How these individuals interacted with the simulation and to what effect is discussed in Chapter 6.
In my interview coding, I made the interview codes “suspend disbelief” and “did not engage” mutually exclusive. However, these codes were not all-inclusive. Many people clearly fell into one or the other category, and were marked accordingly, but a large number of participants in each town did not clearly fall into one or the other category and were therefore not coded either way.

The numbers of people who I identified as having experienced each of the transformative elements, as well as the number of people who showed signs of clearly not engaging, are shown by town and in aggregate in Table 5.3 below.

Table 5.3: Number of people who experienced each of the transformative elements or did not engage, contrasted against the number of people marked as Yes TL – by town and in aggregate

<table>
<thead>
<tr>
<th>Town</th>
<th># of interviews</th>
<th>Yes TL</th>
<th>Suspend disbelief</th>
<th>Perspective taking</th>
<th>Problem solving</th>
<th>Learning together</th>
<th>Did not engage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>38</td>
<td>16</td>
<td>14</td>
<td>29</td>
<td>5</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Cranston</td>
<td>38</td>
<td>13</td>
<td>17</td>
<td>32</td>
<td>6</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Dover</td>
<td>35</td>
<td>21</td>
<td>21</td>
<td>32</td>
<td>8</td>
<td>19</td>
<td>4</td>
</tr>
<tr>
<td>Wells</td>
<td>29</td>
<td>17</td>
<td>18</td>
<td>26</td>
<td>12</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>Aggregate</td>
<td>140</td>
<td>73</td>
<td>70</td>
<td>119</td>
<td>31</td>
<td>55</td>
<td>20</td>
</tr>
</tbody>
</table>

As Table 5.3 shows, the strong majority of interviewees in each town show at least some signs of perspective taking, ranging from about 76 percent of interviewees in Barnstable to as much as 90 percent of interviewees in Dover. About 85 percent of total interviewees show signs of perspective taking.

Suspending disbelief was also a common experience, according to interview data. About half of all interviewees showed signs of suspending disbelief and really playing the game. This number ranged from a low of 37 percent of interviewees in Barnstable to a high of 62 percent of interviewees in Wells.
Not surprisingly, people who showed signs of perspective taking typically also showed signs of suspending disbelief; this makes sense in light of the fact that taking on a role and seeing the issue through this assumed lens typically goes along being willing to suspend disbelief. While people’s exact reasons for perspective taking and the strength of their perspective taking varied, it is clear that a large number of NECAP workshop participants experienced some amount of perspective taking as a result of the simulation. It is important to note that there was no specific question on the interview protocol that got at the topic of suspending disbelief; therefore, I had to infer whether participants really showed signs of playing and getting into the simulation from what they said in the course of responding to other interview prompts. As a result, the number of people who were identified as suspending disbelief likely underrepresents the actual incidence of suspending disbelief. Additionally, one of the most frequent ways I was able to determine whether an individual showed significant signs of suspending disbelief was in their response to being asked what role they played and how it felt to play this role. This helps explain the strong correlation between people I identified as engaging in perspective taking and those I identified as suspending disbelief, although it generally makes sense that there will be a correlation between suspending disbelief and perspective taking.

*Learning together* was the next most frequently identified transformative element in each town, with anywhere from a low of 21 percent of interviewees in Barnstable to 54 percent of interviewees in Dover showing signs of having engaged in learning with and from other people in the workshop. There were no particular questions on the interview protocol that sought to elicit this information; therefore, most mentions of learning together were unprompted and/or emerged in the course of reflecting on their general
experience with the workshop. In light of this, it is highly possible that the experience of learning together was under observed and is therefore underrepresented in my data.

**Problem solving** was the least frequently reported transformative element but was still noted in each town, with anywhere from a low of 13 percent of interviewees in Barnstable to a high of 41 percent of interviewees in Wells mentioning that their group engaged in collaborative problem solving or that the workshop helped them see the value of collaborative problem solving. Again, there was no question on the interview protocol that sought to elicit information on this, so most mentions of this by participants were relatively unprompted and/or emerged in the course of reflecting on their general experience with the workshop. As with learning together, it is likely that the actual number of people who experienced collaborative problem solving through the simulation was higher than observed.

In sum, data from the follow-up interviews clearly suggest that a large number of participants experienced at least one if not multiple of the transformative elements I identified as potentially catalyzing transformative learning. Perspective taking and suspending disbelief are by far the most commonly detected transformative element in interviews, but evidence suggests that – at least to some extent – people also experiences learning together and collaborative problem solving through the workshop. For reasons explained above, it is highly possible that the incidences of interviewees experiencing learning together and collaborative problem solving, as well as suspending disbelief, were somewhat higher than reported here.
Interviewees were selected to represent a cross-section of workshop participants and include representatives from all workshops. Additionally, transformative learning trends seen in the interviewee population are generally reflective of the transformative learning trends seen in the workshop population at large, as indicated by the quantitative data discussed in the last chapter. It therefore seems reasonable to assume that interviewees’ incidence of experiencing the transformative elements of the role-play simulation is generally reflective of workshop participants at large.

5.3. To What Extent Is There a Relationship Between Experiencing the Transformative Elements and Experiencing Transformative Learning?

I have shown that data from NECAP provide evidence that (1) participants experienced transformative learning from participating in the role-play simulations (although to varying degrees, related to different things, and not always); and that (2) they also experienced the transformative elements of RPSs I hypothesized could affect transformative learning (although they do not always do so and they do so in differing ways).

I can therefore address the third sub-question I laid out in this chapter, which is: To what extent is there a relationship between experiencing the transformative elements I hypothesized could catalyze transformative learning and actually experiencing transformative learning? As noted above, I cannot demonstrate causality, but I can examine: (a) whether there is a correlation between an individual experiencing the elements I have laid out and their experiencing transformative learning; and (b) whether

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5 The one exception is one small workshop with students at a community college in Rhode Island; none of the students responded to our repeated request for an interview. Since this was a student-only workshop, we decided it was not critical to have one or two interviews from the workshop, although that would have been preferable.
there is correlation between experiencing a certain type of transformative element and experiencing certain kinds of perspective shifts.

My hypothesis is not that experiencing any particularly one of the transformative elements will necessarily lead to transformative learning; rather, I have hypothesized that experiencing any of these elements may affect transformative learning.

What the NECAP data have to say in response to each of these two sub-questions is explained below.

5.3.1. To what extent is there a correlation between an individual experiencing the transformative elements and their experiencing transformative learning?

To get at this first sub-question, I analyzed how many people who I identified as having experienced each transformative element (suspending disbelief, perspective taking, collaborative problem solving, and learning together) against how many of these people actually experienced transformative learning. Table 5.4 shows the results, displaying the number of people who experienced a particular transformative learning element against the number of these people who also experienced transformative learning (shown in brackets next to the sheer number of people who experienced the transformative learning element).

To illustrate the data shown in Table 5.4: In Barnstable, there were 38 total interviewees and 16 of these people I marked as showing clear signs of transformative learning (i.e., Yes TL); 14 interviewees in Barnstable showed signs of experiencing suspending disbelief and 8 of these people also showed signs of transformative learning; 29 interviewees in Barnstable experienced perspective taking, and 15 of these people also experienced transformative learning; 5 interviewees showed signs of problem solving and 4 of these people also showed signs of transformative learning; 8 interviewees showed
signs of learning together and 4 also showed signs of transformative learning; and 6 people clearly did not engage and none of these people showed signs of transformative learning.

Table 5.4: Number of people who experienced each of the transformative elements, contrasted with those who experienced these elements and also experienced transformative learning (in brackets)

<table>
<thead>
<tr>
<th>Town</th>
<th># of interviews</th>
<th>Yes TL</th>
<th>Suspend disbelief</th>
<th>Perspective taking</th>
<th>Problem solving</th>
<th>Learning together</th>
<th>Did not engage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>38</td>
<td>16</td>
<td>14 (8 TL)</td>
<td>29 (15TL)</td>
<td>5 (4 TL)</td>
<td>8 (4 TL)</td>
<td>6 (0TL)</td>
</tr>
<tr>
<td>Cranston</td>
<td>38</td>
<td>13</td>
<td>17 (11TL)</td>
<td>32 (13TL)</td>
<td>6 (4TL)</td>
<td>14 (6TL)</td>
<td>6 (0TL)</td>
</tr>
<tr>
<td>Dover</td>
<td>35</td>
<td>21</td>
<td>21 (16TL)</td>
<td>32 (21 TL)</td>
<td>8 (6TL)</td>
<td>19 (13TL)</td>
<td>4 (0TL)</td>
</tr>
<tr>
<td>Wells</td>
<td>29</td>
<td>17</td>
<td>18 (14TL)</td>
<td>26 (16TL)</td>
<td>12 (6TL)</td>
<td>14 (9TL)</td>
<td>4 (1 TL)</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>67</td>
<td>70 (49TL)</td>
<td>119 (65TL)</td>
<td>31 (20TL)</td>
<td>55 (32TL)</td>
<td>20 (1TL)</td>
</tr>
</tbody>
</table>

As the data shown in Table 5.4 demonstrate, there was a very strong correlation between experiencing *perspective taking* and experiencing transformative learning. In Cranston and Dover, every single person who I identified as experiencing transformative learning I also identified as having experienced perspective taking. In Barnstable and Wells, all but one person had this correlation, and in both cases I can explain why these people showed signs of transformative learning without perspective taking: the individual in Barnstable played the facilitator role, and therefore did not have a perspective to take on, and the individual in Wells indicates that he was very skeptical of the exercise and similarly shows signs of not engaging, however he shows clear signs of still having experienced perspective shifts as a result of engaging with others.

While there is a strong correlation between experiencing perspective taking and experiencing transformative learning, it is critical to note that many more people experienced perspective taking than experienced transformative learning. This suggests

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that perspective taking is strongly tied to the transformative learning effects of the RPS exercises, but that perspective taking will not necessarily lead to transformative learning. This makes sense in light of the fact that an individual may engage in perspective taking but may have already, to use the colloquial phrase, “drunk the Kool Aid” (i.e., may have come into the workshop concerned and supportive of local adaptation action) and thus have little to learn from the experience.

*Suspending disbelief* was also strongly correlated with transformative learning. As Table 5.4 shows, many of those who showed signs of suspending disbelief also showed signs of transformative learning – this was anywhere from a low of 57 percent in Barnstable to a high of 78 percent in Wells. In light of the fact that there is a strong relationship between whether an individual showed signs of suspending disbelief and perspective taking, it makes senses that suspending disbelief, like perspective taking, was strongly correlated with transformative learning. As with perspective taking, my findings suggest that suspending disbelief is not sufficient to result in transformative learning, but that there is a strong correlation between those who suspended disbelief and engaged with the simulation and those who experienced transformative learning.

*Problem solving*, too, was strongly correlated with transformative learning, with anywhere from 50 percent (Wells) to 80 percent (Barnstable) of those showing signs of problem solving also showing signs of transformative learning. As noted above, it is very plausible that the incidence of problem solving I identified from interviews was somewhat underreported. In light of this and the fact that the number of participants who showed clear signs of problem solving was considerably less than suspending disbelief and perspective taking, it is difficult to make any strong statements about this
transformative element. What I can say is that those people in my data set who experienced problem solving also had a high incidence of transformative learning.

*Learning together* was the transformative element with the least strong correlation to a participant experiencing transformative learning. That said, there was still a notable relationship between experiencing learning together and experiencing transformative learning. The proportion of interviewees who experienced learning together and also experienced transformative learning ranged from a low of 42 percent in Cranston to 68 percent in Dover. As with problem solving and as explained above, this learning element is almost certainly notably underrepresented. Therefore, I am limited in what I can say about this finding. However, from the data I have, it appears that learning together is also related to transformative learning, although it was less strongly correlated with transformative learning than the other three elements.

It is worth noting that our observation of the NECAP simulations and role-play simulations used in other contexts strongly suggests that the face-to-face element of the exercises is a key part of people’s learning experiences. Additionally, many interviewees indicated that they found the experience of playing the simulation with diverse community members to be very valuable. So, while my data to not show a strong incidence of participants experiencing learning together and show a less strong correlation between learning together and transformative learning, we have reason to believe that this aspect of the role-play experience is important. It therefore merits further exploration.

In sum, data suggest that, by themselves, none of these transformative elements are sufficient to guarantee transformative learning. However, among the 73 interviewees
who experienced transformative learning, all but two experienced at least one of the transformative learning elements, if not multiple elements. Additionally, among those who experienced each of the transformative elements of interest, a high number of these interviewees also experienced transformative learning. Hence, we have evidence to suggest that there is a very strong relationship between an individual’s experiencing the transformative elements I have identified and their experiencing transformative learning from the role-plays.

As explained above, the detection rate for the number of interviewees who experienced each of the transformative elements I am interested in is far from perfect; therefore, I cannot examine whether any of these transformative elements is, in and of itself, more effective for transformative learning than any other. I can only say that the four transformative elements and are highly correlated with transformative learning, and that I am able to detect a particularly strong relationship between perspective taking and transformative learning.

A valuable contrast: my data also clearly indicate that individuals who did not suspend disbelief and did not really “play” the game showed no signs of transformative learning. This gives a valuable counterfactual – while suspending disbelief, perspective taking, and playing the simulation may not be sufficient to drive transformative learning, it is clear that simply attending the workshop and not engaging is highly unlikely to cultivate transformative learning. While some people who clearly did not suspend disbelief and really engage seem to have done so because they came in already concerned and supportive of action, and thus felt like they did not have much to gain, other people of similar awareness and concern did effectively engage, and many took away
transformative learning – particularly around empathy and enriched understanding – as a result.

5.3.2. **To what extent is there a correlation between experiencing certain types of transformative elements and experiencing certain kinds of perspective shifts?**

A second sub-question that I need to answer to understand the relationship between the transformative elements of the RPS and transformative learning is: is there a correlation between experiencing certain transformative elements of the RPS exercise and experiencing a certain type of transformative learning. For example, one might hypothesize that people who experience perspective taking while playing the simulation are more likely to take away learning around empathy. While my data are not granular enough to allow me to say anything conclusive about this, they do allow me to broadly explore whether there are any particularly clear trends or correlations.

To analyze this, I have contrasted number of participants who experienced each transformative element against whether or not they experienced overall transformative learning as well as whether they experienced each of the different kinds of transformative learning I was looking for (i.e., concern, should act, concern, confidence, support for CBA, empathy, and enriched understanding). Table 5.5 below shows findings for individuals who experienced suspending disbelief; Table 5.6 shows findings for individuals who experienced perspective taking; Table 5.7 shows findings for individuals who experienced engaging in collaborative problem solving; and table 5.8 shows finding for individuals who experienced learning together. In each of the columns, I also include in brackets the total number of people who experienced the type of learning (e.g., Yes TL or TL Concern) regardless of whether they experienced the transformative element of interest to allow for easy comparison.
To illustrate how to interpret these tables: in Table 5.5, I show data for people who I identified as having suspended disbelief – by town and in aggregate. In the second column, I list the number of interviewees for each town who experienced suspending disbelief. In the third column, I show how many people who suspended disbelief also were marked as Yes TL. Below this, in brackets, I list the total number of interviewees who were marked for Yes TL. I then do the same in the following columns for Maybe TL and No TL. So, in Barnstable, there were 14 people who showed signs of suspending disbelief. Eight of these people were also marked as Yes TL, as compared to a total of 16 people in Barnstable who were marked as Yes TL; there was only one person who suspended disbelief and was marked as Maybe TL, as compared to the total of four people in Barnstable who were marked as Maybe TL; and there were 18 total people in Barnstable marked as No TL, of which 5 had showed signs of suspending disbelief.

The final six columns display how many people who suspended disbelief showed signs of each kind of transformative learning of interest, above the total number of people who experienced that kind of transformative learning, which is in brackets. So, in Barnstable, there was one person who showed signs of transformative learning around concern, but no one who showed signs of suspending disbelief also showed signs of transformative learning around concern. There were 13 people total who showed signs of transformative learning around should act in Barnstable, and 5 of these people also showed signs of suspending disbelief.

I explain the findings for each transformative element separately below, then reflect on key findings across all four transformative elements.
5.3.2.1. Discussion of suspending disbelief

As discussed above, a sizeable portion of the interviewees in each town who were identified as suspending disbelief were also identified as experiencing transformative learning (i.e., were marked as Yes TL). Table 5.5 shows that a notable percentage of those who experienced each kind of transformative learning also experienced suspending disbelief. There are no particularly striking trends, other than the fact that those who clearly showed signs of suspending disbelief showed transformative learning across all kinds of perspective shifts of interest, and that suspending disbelief correlated less strongly with transformative learning around empathy than with other kinds of learning.

Table 5.5: Number of people who showed signs of suspending disbelief AND each kind of TL (with the total number of people who experienced each kind of TL in brackets in each column)

<table>
<thead>
<tr>
<th>Town</th>
<th># who experienced element</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>No TL</th>
<th>TL Concern</th>
<th>TL Should Act</th>
<th>TL Conf.</th>
<th>TL CBA</th>
<th>TL Empathy</th>
<th>TL Enriched underst.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>14</td>
<td>8 (16)</td>
<td>1 (4)</td>
<td>5 (18)</td>
<td>0 (1)</td>
<td>5 (13)</td>
<td>1 (1)</td>
<td>4 (6)</td>
<td>7 (14)</td>
<td>10 (22)</td>
</tr>
<tr>
<td>Cranston</td>
<td>17</td>
<td>11 (13)</td>
<td>2 (6)</td>
<td>5 (19)</td>
<td>5 (9)</td>
<td>5 (18)</td>
<td>3 (3)</td>
<td>3 (6)</td>
<td>12 (16)</td>
<td>11 (17)</td>
</tr>
<tr>
<td>Dover</td>
<td>21</td>
<td>16 (21)</td>
<td>3 (5)</td>
<td>2 (9)</td>
<td>10 (13)</td>
<td>15 (17)</td>
<td>4 (4)</td>
<td>10 (11)</td>
<td>16 (22)</td>
<td>16 (24)</td>
</tr>
<tr>
<td>Wells</td>
<td>18</td>
<td>14 (17)</td>
<td>2 (7)</td>
<td>2 (5)</td>
<td>10 (12)</td>
<td>15 (17)</td>
<td>4 (4)</td>
<td>8 (9)</td>
<td>13 (18)</td>
<td>14 (18)</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>49 (67)</td>
<td>8 (22)</td>
<td>14 (51)</td>
<td>25 (35)</td>
<td>40 (55)</td>
<td>12 (13)</td>
<td>25 (32)</td>
<td>38 (70)</td>
<td>51 (81)</td>
</tr>
</tbody>
</table>

5.3.2.2. Discussion of perspective taking

As discussed above, the strong majority of interviewees showed signs of perspective taking, and but two interviewees who experienced transformative learning also had experienced perspective taking. Therefore, it makes sense that there is a very high correlation between experiencing perspective taking and experiencing each kind of
transformative learning (see Table 5.6). What is particularly striking is that over 90 percent of people who experienced each kind of transformative learning also experienced perspective taking; every person who experienced transformative learning around concern and support for CBA also experienced perspective taking. This further reinforces the finding that perspective taking (and probably suspending disbelief, which is often a precursor to perspective taking) seems to be a highly transformative part of the role-play simulation experience.

Table 5.6: Number of people who showed signs of perspective taking AND these each kind of TL (with the total number of people who experienced each kind of TL in brackets in each column)

<table>
<thead>
<tr>
<th>Town</th>
<th># who experienced element</th>
<th>Yes TL (with the total number of people who experienced each kind of TL in brackets)</th>
<th>No TL (with the total number of people who experienced each kind of TL in brackets)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
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<td>15 (16) 4 (4) 10 (18)</td>
<td>1 (1) 12 (13) 1 (1) 6 (6) 13 (14) 19 (22)</td>
</tr>
<tr>
<td>Cranston</td>
<td>32</td>
<td>13 (13) 6 (6) 13 (19)</td>
<td>9 (9) 8 (8) 3 (3) 6 (6) 16 (16) 17 (17)</td>
</tr>
<tr>
<td>Dover</td>
<td>32</td>
<td>21 (21) 4 (5) 7 (9)</td>
<td>12 (13) 17 (17) 4 (4) 11 (11) 20 (22) 23 (24)</td>
</tr>
<tr>
<td>Wells</td>
<td>26</td>
<td>16 (17) 6 (7) 4 (5)</td>
<td>11 (12) 15 (17) 5 (5) 9 (9) 17 (18) 17 (18)</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>65 (67) 20 (22) 34 (51)</td>
<td>33 (35) 52 (55) 13 (13) 32 (32) 66 (70) 76 (81)</td>
</tr>
</tbody>
</table>

5.3.2.3. Discussion of engaging in collaborative problem solving

As noted above, the number of interviewees who showed signs of engaging in collaborative problem solving was much lower than the number of interviewees who showed signs of perspective taking or suspending disbelief. Additionally, as also discussed above, I am concerned about the extent to which data accurately reflect the true rate of interviewees who experienced collaborative problem solving. The results displayed in Table 5.7 should be considered with these limitations in mind.
The data I have suggest a general correlation between experiencing collaborative problem solving and all types of transformative learning. There are no particularly striking patterns in the kinds of transformative learning experienced by those who clearly experienced collaborative problem solving, other than that the correlation is less strong than for the suspending disbelief and perspective taking.

Table 5.7: Number of people who showed signs of engaging in collaborative problem solving AND each kind of TL (with the total number of people who experienced each kind of TL in brackets in each column)

<table>
<thead>
<tr>
<th>Town</th>
<th># who experienced element</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>No TL</th>
<th>TL Concern</th>
<th>TL Should Act</th>
<th>TL Conf.</th>
<th>TL CBA</th>
<th>TL Empathy</th>
<th>TL Enriched underst.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
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<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(16)</td>
<td>(4)</td>
<td>(18)</td>
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<td>(13)</td>
<td>(6)</td>
<td>(1)</td>
<td>(14)</td>
<td>(22)</td>
</tr>
<tr>
<td>Cranston</td>
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<td>4</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>4</td>
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<tr>
<td></td>
<td></td>
<td>(13)</td>
<td>(6)</td>
<td>(19)</td>
<td>(9)</td>
<td>(8)</td>
<td>(3)</td>
<td>(6)</td>
<td>(16)</td>
<td>(17)</td>
</tr>
<tr>
<td>Dover</td>
<td>8</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(21)</td>
<td>(5)</td>
<td>(9)</td>
<td>(13)</td>
<td>(17)</td>
<td>(4)</td>
<td>(11)</td>
<td>(22)</td>
<td>(24)</td>
</tr>
<tr>
<td>Wells</td>
<td>12</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(17)</td>
<td>(7)</td>
<td>(5)</td>
<td>(12)</td>
<td>(17)</td>
<td>(5)</td>
<td>(9)</td>
<td>(18)</td>
<td>(18)</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>20</td>
<td>3</td>
<td>9</td>
<td>12</td>
<td>18</td>
<td>4</td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(67)</td>
<td>(22)</td>
<td>(51)</td>
<td>(35)</td>
<td>(55)</td>
<td>(13)</td>
<td>(32)</td>
<td>(70)</td>
<td>(81)</td>
</tr>
</tbody>
</table>

5.3.2.4. Discussion of learning together

The number of people who showed signs of learning together was higher than the number of people who showed signs of engaging in collaborative problem solving, but it was still notably lower than the number of people who showed signs of perspective taking and suspending disbelief. As with collaborative problem solving, I am concerned about the accuracy of the detection rate for learning together. These limitations need to be considered in making sense of the findings shown in Table 5.8.

The data I have suggest that there is a correlation between experiencing learning together and experiencing all kinds of transformative learning. The strength of the
correlation seems to be relatively consistent among different kinds of learning. In general, the relationship between experiencing learning together and experiencing the different kinds of transformative learning seems to be similar to findings for the other three transformative elements.

**Table 5.8 Number of people who showed signs of learning together AND each kind of TL (with the total number of people who experienced each kind of TL in brackets in each column)**

<table>
<thead>
<tr>
<th>Town</th>
<th># who experienced element</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>No TL</th>
<th>TL Concern</th>
<th>TL Should Act</th>
<th>TL Conf.</th>
<th>TL CBA</th>
<th>TL Empathy</th>
<th>TL Enriched underst.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
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<td>4 (16)</td>
<td>2 (4)</td>
<td>2 (18)</td>
<td>0 (1)</td>
<td>4 (13)</td>
<td>0 (1)</td>
<td>1 (6)</td>
<td>4 (14)</td>
<td>6 (22)</td>
</tr>
<tr>
<td>Cranston</td>
<td>14</td>
<td>6 (13)</td>
<td>2 (6)</td>
<td>6 (19)</td>
<td>3 (9)</td>
<td>3 (8)</td>
<td>1 (3)</td>
<td>3 (6)</td>
<td>7 (16)</td>
<td>8 (17)</td>
</tr>
<tr>
<td>Dover</td>
<td>19</td>
<td>13 (21)</td>
<td>3 (5)</td>
<td>3 (9)</td>
<td>8 (13)</td>
<td>12 (17)</td>
<td>4 (4)</td>
<td>8 (11)</td>
<td>14 (22)</td>
<td>14 (24)</td>
</tr>
<tr>
<td>Wells</td>
<td>14</td>
<td>9 (17)</td>
<td>3 (7)</td>
<td>1 (5)</td>
<td>6 (12)</td>
<td>8 (17)</td>
<td>2 (5)</td>
<td>6 (9)</td>
<td>10 (18)</td>
<td>10 (18)</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>32 (67)</td>
<td>10 (22)</td>
<td>12 (51)</td>
<td>17 (35)</td>
<td>27 (55)</td>
<td>7 (13)</td>
<td>18 (32)</td>
<td>35 (70)</td>
<td>38 (81)</td>
</tr>
</tbody>
</table>

In sum, data suggest that all four transformative elements correlate with the different kinds of transformative learning. Additional there are no patterns so striking as to make me think that experiencing certain kinds of transformative elements will necessarily results in certain kinds of transformative learning and not others, or that not experiencing certain kinds of transformative elements would preclude certain kinds of transformative learning effects.

### 5.4. Conclusions

The data and findings discussed in this chapter provide evidence in support of my hypothesis that role-play simulations can catalyze transformative learning through
engaging participants in suspending disbelief, perspective taking, collaborative problem solving, and learning together, and that they can do so in a civic education and engagement context.

The granularity of my qualitative data does not allow me to make any conclusive statements about whether any of these transformative elements are necessarily more important than others. What I can say is that evidence clearly suggests that a participant experiencing one or more of these transformative elements strongly correlates with the participant experiencing transformative learning, and that this correlation is not confined to any particular kinds of perspective shifts; rather, there is a relationship between experiencing each of the transformative elements and each of the perspective shifts that were of interest (i.e., transformative learning around concern, should act, confidence, support for CBA, empathy, and enriched understanding).

Perspective taking was by far the most commonly identified transformative element experienced by interviewees. Therefore, it makes sense that this was the most frequently identified transformative element among participants who experienced transformative learning; 65 interviewees of the 67 identified as having experienced transformative learning also were identified as having experienced perspective taking. The fact that 119 of the 140 total interviewees were identified as having experienced perspective taking makes this finding less striking, but it is still notable that there was an almost 100 percent correlation between experiencing transformative learning and having experienced perspective taking. As explained above, a key take away is that experiencing perspective taking through the role-play simulation is necessary for affecting transformative learning, but may not be sufficient.
Much the same, suspending disbelief and really engaging with the exercise – which, as I have explained, is in many ways fundamental to perspective taking – appears to be key for transformative learning from RPSs. As with perspective taking, though, it is not sufficient to catalyze transformative learning for all participants.

While the importance of engaging in collaborative problem solving and learning together are harder for me to evaluate due to their lower frequency and the fact they are likely underrepresented due to the data collection techniques, data clearly suggest these elements also contribute to – or at least are directly tied to – transformative learning from RPSs.

The NECAP data suggest that suspending disbelief, perspective taking, engaging and mock collaborative problem solving, and learning together are not sufficient, by themselves, to catalyze transformative learning for all participants. That said, my findings indicate that fully engaging with the simulation will have beneficial learning effects, transformative or otherwise, for the majority of participants.

These findings provide evidence that the unique qualities of role-plays are indeed valuable for transformative learning. Unlike many other education and engagement approaches, role-plays engage people in suspending disbelief, perspective taking, mock collaborative problem solving, and learning together. While I cannot prove causality, I can say that data from NECAP suggest that together or individually, these distinctive elements of role-plays do indeed create the kind of disorienting or activating event needed to catalyze transformative learning in a civic and stakeholder engagement context.

This chapter and the last chapter have shown that role-plays can affect transformative learning in a civic engagement setting, and have provided insight into the
mechanism through which they do so. This leads to my third question: Do role-plays catalyze transformative learning for all kinds of people, or are there striking differences in the kinds of people they affect? I take up this question in the next chapter.
CHAPTER SIX: Results for Hypothesis Three – Who Is Affected by the Role-Play Simulations and How

In the last two chapters, I have shown that tailored, science-based RPSs can catalyze the transformative learning effects they were intended to. Further, evidence suggests that transformative learning is catalyzed, at least in part, through RPS’s ability to engage people in suspending disbelief; perspective taking; mock collaborative problem solving; and learning together.

In this chapter, I build on these findings to explore what NECAP data say about my third research question, which is:

Question 3 (Q3): When used for civic education and engagement, do tailored, science-based RPS exercises affect all types of people similarly, or do they affect different kinds of people in different ways? More specifically, how are different kinds of people affected by the workshop, and what does this say about whether RPSs are more appropriate for engaging certain categories or demographics of people?

In asking this question, my goal is to assess whether role-plays appear to be particularly effective or ineffective for certain kinds of people. The question is not whether there were differences in how certain demographics were affected. What is of interest is whether these effects are notable enough to make us think that the tool is more or less appropriate for certain kinds of people, such as people of different genders or age groups.
In response to this question, I have hypothesized that the effects of the RPS will be largely similar across genders, age groups, education levels, political affiliation, and income levels – at least among those who choose to attend the workshops.

As I described in Chapter 3, it seems reasonable to hypothesize that those who identify as politically conservative might be less likely to both attend the workshops and to be affected by the workshops, as climate change has largely been pegged as a liberal and environmental issue. That said, the role-play simulations designed for NECAP model how everyone is affected by climate change risks, including businesses and economic interests, which are typically prioritized by conservatives. In light of this, it seems reasonable to assume that people of all political affiliations who self-select to attend the workshop will experience transformative learning effects related to concern, should act, and the other variables of interest.

Additionally, one might theorize that people of lesser education would be more affected than people of higher levels of education. Social psychology and cultural cognition research has shown that people with higher levels of education tend to be more polarized in their views about climate change (Hoffman 2015; Kahan et al. 2012). While the RPSs involve technical information and thus could be less accessible to people with lower education levels, I would anticipate that – if anything – people with less formal education would be more likely to engage in really playing the game and thus be more likely to learn from the experience, as long as they have enough comfort with the content of the simulations to really play the game.

Such differences in the effect of the RPSs on different demographics of people are entirely plausible. However, I did not anticipate any striking variations in how different
demographics of workshop participants would be affected. Since participants were self-selecting, my assumption was that workshop participants would, in general, at least have a basic interest or curiosity about climate change and/or climatic risks. As discussed in Chapter 4, our data show this to be the case. I further assumed that participants who were interested enough in climate change risks and adaptation to want to attend the workshops would be willing to fully participate and therefore take away some form of important and potentially transformative learning.

Although I did not anticipate there would be any striking differences across demographic groups, I did hypothesize that participants’ perspectives on climate change coming into the workshops would influence whether and how these people were affected by the RPS exercise. More specifically, I hypothesized that, as explained in in Chapter 2, using the general idea and typologies of “Global Warming’s Six Americas” (Leiserowitz et al. 2011; Leiserowitz et al. 2013):

1. People who enter the workshop already being “alarmed” (i.e., very concerned about local climate change risks) are not likely to be considerably affected.
2. People who enter the workshops being “ dismissive” are unlikely to be greatly affected.
3. People who fall into more of the “undecided middle” category – i.e., people who are concerned, cautious, or doubtful – will be most affected by the simulations.

Below, I explore what the NECAP data say about how the RPSs affected people of different (1) demographic groups and (2) levels of concern about climate change coming into the workshops and Global Warming’s Six Americas categorizations.
6.1. Demographic Analysis

In understanding whether and how people are affected by RPS exercises, it is important to consider whether certain demographics of people are more or less affected by the simulation experience. If we find that certain people are considerably more (or less) affected than others, this would influence our understanding of what audiences and contexts are most appropriate for use of RPS exercises. I therefore look at five main demographic distinctions – gender, age, education, political affiliation, and income level – to see if any striking differences in effects can be detected. To provide a sample size large enough for demographic analysis, I only look at data in aggregate and not by town.

Questionnaires administered to participants during the workshops included questions about demographics (see workshop questionnaires in Appendix C). To explore whether people of certain demographic groups were affected differently than others, this information was used to cross-tabulate participant responses against their demographics. I look at demographic trends related to shifts in concern, should act, and confidence, as well as support for CBA following the workshop. I do not look at demographic trends related to shifts in empathy, since the questionnaires did not include a question specifically related to empathy.

It is important to note that some amount of variation among demographic groups is to be expected simply as a result of the modest sample size (i.e., 510 before-and-after questionnaire sets total, which are then broken up into smaller subsets of demographic groups). As noted above, what is of interest here are striking differences that would suggest RPS exercises are either considerably more or less effective for people of certain demographic groups. I am not interested in small differences, regardless of whether they are statistically significant or not.
6.1.1. Gender

In all towns, workshop participants were evenly split in terms of gender. Of the 486 participants who indicated their gender on the questionnaires, 240 identified as male and 246 identified as female. See participant demographics in Appendix F.

On average, the women who participated were somewhat more concerned about local climate change risks coming into the workshop than were the men who attended, with 64 percent of women saying they were concerned or very concerned prior to the workshop, as compared to 54 percent of men. Women also experienced a slightly larger “transformative shift” than did men in terms of concern, with the number of people in the concerned or very concerned category increasing by 20 percent for women and 18 percent for men following the workshop. However, both men and women showed a strong general shift toward greater concern as a result of the workshop, and any difference in shift in concern was modest.

People of both genders showed generally similar trends toward increased sense of should act and confidence following the workshop. In terms of support for CBA following the workshop, men and women showed very similar levels of support, with those supportive of CBA being pretty evenly split between those who are more optimistic (33 percent of men and 36 percent of women) and those who are supportive but more pessimistic (38 percent of men and 35 percent of women).

In summary, while there was some difference between genders in terms of their perspectives coming into the workshops and their shifts as a result of the workshop, these differences are not so striking as to suggest RPSs are likely to have more or less effect on
individuals of either gender; rather, RPSs appear to be effective for people regardless of gender.

6.1.2. Age

These kinds of RPS simulations are designed for adult education. Therefore, we generally target the exercises towards people who are 18 or older, although they may also be appropriate for high school students who have taken advanced environmental science or policy classes. In the NECAP workshops, the youngest participants who completed questionnaires were 18 years old.

Workshop participants skewed toward older age groups. Of the 487 participants who indicated their age group, 30 percent said they were over 60 years of age; 23 percent said they were 50-59 years old; 12 percent said they were 40-49 years old; 15 percent said they were 30-39 years old; another 15 percent said they were 20-29 years old; and 4 percent said they were 19 years old and under (participants who were 19 and younger were mostly if not entirely college students). See participant demographics in Appendix F.

There is some variation in how people in different age groups were affected. Most notably, the simulation resulted in a slight decrease in support for town adaptation action among people in the 19 and under group; however, this slight decrease was the result of one person in this age group moving from a 4 to a 3 on the Likert scale for should act. In light of the very small sample size of the younger populations, and the resultant variation one individual person’s shift causes, it is not reasonable to draw any general conclusions about the meaning of this downward shift for people of this age group. This anomaly aside, the data generally show a trend toward people of all ages increasing in their level of concern, sense that the town should act, and confidence. Additionally, support for
CBA following the workshop was generally similar across age groups, although there was some variation among the extent to which people were optimistic or pessimistic about the prospects of CBA actually happening.

In sum, based on the NECAP data, there is no reason to believe that people of different ages will be affected in notably different ways by the simulation. To the contrary, the RPS appears to generally have been equally effective for people, regardless of age. While the simulation does not appear to be more or less appropriate for age groups, we do – as noted above – only recommend this kind of exercise for participants who are at least at a junior or senior level in high school with sufficient experience and knowledge to participate.

It is worth noting that our experience with NECAP suggests that older people may be more inclined to attend RPS workshops than are younger people. If attracting a more representative age group is the goal, more targeted and focused outreach strategies are likely needed.

### 6.1.3. Education

Workshop participants, on average, had a higher level of education than the general population of the four towns. Of the 494 participants who indicated their education level on their questionnaires, 48 percent said they have completed a graduate degree, 34 percent said they have completed a Bachelors degree, 14 percent said they have completed high school, and 4 percent said their highest level of education was “other,” which could mean an Associate degree or other kind of technical degree. Not a single NECAP participant indicated they had not at least complete high school. See participant demographics in Appendix F.
On average, participants with graduate educations came into the workshops notably more concerned (68 percent were concerned or very concerned) than those with Bachelors degrees (59 percent were concerned or very concerned). People with Bachelors degrees were, in turn, considerably more concerned than those with just high school educations (30 percent of whom were concerned or very concerned) coming into the workshop. In light of these different starting points, it is not entirely surprising that at the education level increased, the number of people who experienced a transformative shift in concern (i.e., a move from a 1-3 on the Likert scale to a 4 or 5) decreased, since many people of higher levels of education were already over the threshold. That said, there was a notable shift toward increased concern across all education levels, with those who said they have graduate degrees still being the most concerned (79 percent concerned or very concerned) following the exercise. There was also general trend toward increased sense of should act and confidence across education levels, although there was some difference in the amount of shift. Support for CBA was similar across all education levels.

As with previously discussed demographics, while there were some minor differences in the starting perspectives and shifts of participants across education levels, none of these variations were striking enough to suggest that the simulation is likely to be significantly more or less effective for people with any particular education level. Rather, it appears to be effective across all education levels from high school up. It is worth noting that, since there is no data for people who have not completed a high school education, I cannot say anything about that demographic.
6.1.4. Political affiliation

Participants were more likely to identify as politically liberal (as compared to independent or conservative) than the general population in the towns. Of the 487 participants who indicated their political viewpoint, 45 percent of the identified as liberal, 36 percent identified as independent, and 14 percent identified as conservative. This skew towards more liberal participants is not entirely surprising; in light of the fact that liberals tend to be more concerned about climate change than are people of other political affiliations, it makes sense that they would be more likely to self-select to attend than would people of other political viewpoints. See participant demographics in Appendix F.

As might be expected, participants who identified as liberal were notably more concerned about local climate change risks coming into the workshop (72 percent were concerned or very concerned) than those who identified as independent (51 were concerned or very concerned) or conservative (39 percent were concerned or very concerned). Interestingly, conservatives experienced the greatest transformative shift in concern, with an additional 21 percent saying they were concerned or very concerned following the workshop. Conservatives also experienced the greatest transformative shift in confidence due to the workshop. It is important to note that this can, at least in part, be explained by the fact that there were many more conservatives below the transformative thresholds for these indicators coming into the workshop than there were liberals or independents. Additionally, there was a general trend toward increased concern among people of all political viewpoints, and any variation in these shifts was not so notable so as to suggest there is a significant difference in how people of political viewpoints are affected by the simulation. In general, people of all political affiliations also experienced
an increase in their sense of should act and confidence. Support for CBA following the workshop was very similar across political viewpoints.

In sum, we have no reason to believe that the simulation is particularly more or less effective for people of any particular political affiliation. While the workshops might appeal to different demographic groups, particularly those who align with the topic (in this case, liberals, who are more likely to be concern about climate change), evidence suggests that people who attend are likely to experience positive shifts as a result of the workshop, regardless of political ideology. It is worth noting, however, that if the goal is to attract participants who are more representative of the larger population in terms of their political affiliation, more strategic and targeted outreach may be necessary.

6.1.5. Income level

Participants were, on average, somewhat more affluent than the population of the towns at large. See participant demographics in Appendix F.

Across all income levels, there was a general increase toward greater concern, sense of should act, and confidence following the workshop. There were no differences that were notable enough to suggest that the RPSs affect participants of any income levels significantly more or less than others, particularly given the small sample size of people in each income level. Based on our data, the RPS seems to be effective across all income levels, and there is no reason to think that the RPSs will affect people of different incomes differently. That said, it is important to note when considering the effect of the simulations on people of different income levels that the four communities we worked with in NECAP, as with many coastal New England communities, are less socio-economically diverse than many communities throughout the U.S. Additionally, our
workshop population skewed toward people of higher income levels. While the effect of the simulation was similar across workshop participants of all income levels, it is plausible that the effectiveness of simulations in more socio-economically diverse populations will be different. The effectiveness of role-play simulations in more socio-economically diverse communities merits more research.

6.2. Prior Concern and Six Americas Categorizations Analysis

As discussed above, I hypothesized that people’s attitudes toward climate change coming into the workshop would, at least to some extent, influence how they were (or were not) affected by the RPS exercise. Below, I look at this in two complementary ways. First, I cross-tabulate participants’ questionnaire responses against their concern coming into the workshop (as indicated on their pre-workshop questionnaire); this allows me to assess whether, across all workshop participants, there was any correlation between people’s level of concern coming into the workshop and differences in perspective shifts. I then use interview data to analyze the extent to which interviewees who I identified as alarmed, concerned, cautious, or dismissive (according to the Six Americas categorizations I described above and in Chapter 3) experienced transformative learning, and whether there were notable differences among the learning across these categories of people.

6.2.1. Pre-concern cross-tabulation of questionnaire data

To take a first cut at whether participants’ perspectives on climate change coming into the workshop was related to the kinds of perspective shifts they experienced, I cross-tabulated participants level of concern about local climate change risks coming into the workshop (“pre-concern”) against participant’s perspective shifts. As with other
demographics, I can look at how concern correlates with shifts in concern, should act, and confidence, as well as support for CBA following the workshop, but not empathy, since questionnaires did not gauge participants’ shifts in empathy.

6.2.1.1. Shifts in concern

As Table 6.1 and Figure 6.1 below show, people who selected a 4 (concerned) or 5 (very concerned) on the Likert scale prior to the workshop tended to select the same answer for concern following the workshop. People who started as a 5 could not increase in concern, since very concerned was the strongest level of concern they could indicate on the questionnaire; therefore, it makes sense that most of these people stayed the same in their level of concern, although a couple selected lower (i.e., less concerned) responses on their post-workshop questionnaire.

While many people who selected a 4 on their pre-workshop questionnaire stayed the same, almost 30 percent of these people increased to a 5 on their post-workshop questionnaire. Of the people who chose a 2 (a little concerned) or 3 (somewhat concerned) on their pre-workshop questionnaire, there was a strong tendency to increase in concern following the workshop, with the majority of people increasing by at least one point, and many increasing by two points (and even three points for those who originally selected a 2 on the Likert scale). Of the 9 people who selected a 1 (not at all concerned) on their pre-workshop questionnaire, six stayed the same following the workshop, two people increased to a 2 (a little concerned) and one person jumped to a 5 (very concerned). It is possible that the person who went from a 1 to a 5 did so by accident, although the questionnaires were very clearly marked, making it unlikely that this was
unintentional, and this shift toward greater concern is consistent with this person’s responses to other questions on the questionnaire.

Table 6.1: Matrix showing number of participants who selected a certain level of concern after the workshop (post-concern) based on what they selected for concern prior to the workshop (pre-concern)- shaded boxes indicate people who stayed the same in their concern

<table>
<thead>
<tr>
<th>All Towns</th>
<th>Post-concern</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-concern</strong></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 6.1: Graphic representation of number of participants who indicated a certain level of concern following the workshop (pre-concern) in relationship to their level of concern prior to the workshop (post concern)
In sum, people who fell in the category of being a little concerned to concerned prior to the workshop appear to have experienced the greatest effect in terms of increased concern. Those who said they were not at all concerned generally remained not at all or minimally concerned, and those who were already very concerned generally stayed very concerned.

6.2.1.2. Shift in should act

Table 6.2 and Figure 6.2 below show how much people shifted upward or downward along the Likert scale for should act, based on what they selected for their concern prior to the workshop. As the table shows, people who selected a 3 (somewhat concerned) or 4 (concerned) in terms of concern prior to the workshop showed the greatest upward shift in terms of sense of should act. Those who indicated a 1 (not at all concerned) prior to the workshop did not really experience an increase in sense of should act, and those who indicated they were a little concerned (i.e., a 2 on the Likert scale) or very concerned (i.e., a 5 on the Likert scale) prior to the workshop showed some sign of increased sense of should act, but this was mostly counterbalanced by those in this category who decreased in their sense of should act. It is important to note that the strong majority of people who selected a 5 for pre-concern also selected a 5 for pre-should act, which helps explain why most of these people did not change in their should act rating following the workshop.

In sum, data suggest that that people who are in the somewhat concerned to concerned category are likely to be most affected in terms of sense of should act. This likely reflects the fact that these people are generally more in the middle (i.e., less polarized) in terms of their sense that town action might be necessary, and are thus are more likely to being influenced in their perspectives on this issue.
Table 6.2: Matrix showing number of people who shifted upward or downward by a certain amount in their should act Likert scale response based on what they selected for concern prior to the workshop – shaded boxes indicate people who stayed the same in their should act rating; those to the left decreased in their sense of should act, those to the right increased in their sense of should act.

<table>
<thead>
<tr>
<th>All towns</th>
<th>Delta should act</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-concern</td>
<td>-3</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

**Figure 6.2: Graphic representation of the number of participants who shifted in their Likert scale response for should act by a certain amount in relationship to participants’ level of concern prior to the workshop (pre-concern)**

6.2.1.3. Shift in confidence

Table 6.3 and Figure 6.3 below show that following the workshop there was a notable increase in confidence among people in the 2 to 5 pre-concern categories. That said, within each of these categories, there were some people who indicated less confidence.
following the workshop. It is also important to note that the majority of people for all levels of concern coming into the workshop stayed the same in their confidence rating. Of the people who indicated they were not at all concerned about local climate change risks (i.e., chose a 1 on the Likert scale) prior to the workshop, a couple more people showed a decrease in confidence than showed an increase in confidence.

Table 6.3: Matrix showing the number of people who shifted upward or downwards by a certain amount in their Likert scale response for confidence based on what they selected for concern prior to the workshop - shaded boxes indicate people who stayed the same in their confidence rating; those to the left decreased in their confidence, those to the right increased in their confidence.

<table>
<thead>
<tr>
<th>All towns Delta confidence</th>
<th>Pre-concern</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>na</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>21</td>
<td>17</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>2</td>
<td>21</td>
<td>79</td>
<td>39</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>14</td>
<td>67</td>
<td>44</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>96</td>
<td>41</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Pre-Concern about Climate Change Risks Relative to Shift in Confidence

![Figure 6.3: Graphic representation showing the number of participants who shifted a certain amount in their Likert scale response for confidence in relationship to their level of concern prior to the workshop (pre-concern)](image_url)
In sum, the RPS workshop was similarly effective for increasing confidence among people who were a little to very concerned about climate change risks coming into the workshop.

The fact that the workshops did not increase confidence among participants who were not at all concerned about climate change risks prior to the workshop is quite interesting. Almost all people who were not at all concerned about local climate change risks coming into the workshop were very confident (a 5 on the Likert scale) in their town’s ability to respond. While there are only a few data points for people who were not at all concerned, the data I have suggest that the workshop made some of these people a little more concerned, a little more inclined to think their town should act, and a little less confident in their town’s ability to manage climate related risks. In other words, for at least for a couple people who came into the workshop being dismissive or doubtful about climate change, the workshop appears to have made them think climate change risks might be an issue worth addressing and helped them appreciate how difficult it will be to adapt.

6.2.2. Six Americas categorization analysis of interview data

The interview data allowed me to dig a little deeper and take a different cut at how people’s perspectives on climate change coming into the workshop did or did not correlate with how they were affected. While coding interviews, I categorized each person as “alarmed”, “concerned,” “cautious,” or “dismissive” based upon their concern about local climate change risks and support for local action coming into the workshops (none of the interviewees appeared to have been doubtful or disengaged prior to the
workshop). See text box 6.1 for an overview of how I categorized interviewees according to the Six Americas categories for the sake of this study.

**Text Box 6.1: Explanation of My Six Americas Categorizations of Interviewees**

*Alarmed:* I categorized people who, prior to the workshop, were clearly concerned about local climate change risks, had thought substantially about whether and how localities should prepare, and were actively supportive of local adaptation action as “alarmed.”

*Concerned:* I categorized people who, prior to the workshop, were concerned about climate change but had not thought substantially about local impacts and local adaptation efforts as “concerned.”

*Cautious:* I categorized people who, prior to the workshop, were somewhat aware that climate change may be happening but hadn’t thought much about it and/or were not certain it was an issue worth addressing or that it was human caused as “cautious.”

*Dismissive:* I categorized people who indicated they are certain global warming is not occurring and are opposed to climate change mitigation and adaptation action as “dismissive.”

For each town, I analyzed how many people who I identified as falling into each of these categories clearly experienced transformative learning (Yes TL), maybe experienced transformative learning (Maybe TL), or did not show signs of experiencing transformative learning (No TL). Below, I show the results by town (Tables 6.4, 6.5, 6.6, and 6.7) and aggregated across towns (Table 6.8). I then discuss my findings for each Six America categorization.

**Table 6.4: Number of Barnstable participants who experienced transformative learning (Yes TL), maybe experienced transformative learning (Maybe TL), or did not experience transformative learning (No TL) according to Six Americas categorizations**

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>No TL</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarmed</td>
<td>6</td>
<td>1</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Concerned</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Cautious</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dismissive</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 6.5: Number of Cranston participants who experienced transformative learning (Yes TL), maybe experienced transformative learning (Maybe TL), or did not experience transformative learning (No TL) according to Six Americas categorizations

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>No TL</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarmed</td>
<td>5</td>
<td>2</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>Concerned</td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Cautious</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Dismissive</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 6.6: Number of Dover participants who experienced transformative learning (Yes TL), maybe experienced transformative learning (Maybe TL), or did not experience transformative learning (No TL) according to Six Americas categorizations

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>No TL</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarmed</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Concerned</td>
<td>15</td>
<td>1</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Cautious</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Dismissive</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 6.7: Number of Wells participants who experienced transformative learning (Yes TL), maybe experienced transformative learning (Maybe TL), or did not experience transformative learning (No TL) according to Six Americas categorizations

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>No TL</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarmed</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Concerned</td>
<td>12</td>
<td>1</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Cautious</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Dismissive</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 6.8: Number of all workshop participants (aggregated across all four towns) who experienced transformative learning (Yes TL), maybe experienced transformative learning (Maybe TL), or did not experience transformative learning (No TL) according to Six Americas categorization

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Yes TL</th>
<th>Maybe TL</th>
<th>No TL</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarmed</td>
<td>19</td>
<td>11</td>
<td>35</td>
<td>65</td>
</tr>
<tr>
<td>Concerned</td>
<td>44</td>
<td>8</td>
<td>11</td>
<td>63</td>
</tr>
<tr>
<td>Cautious</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Dismissive</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

6.2.2.1. Alarmed

Interviewees who I identified as being already “alarmed” coming into the workshop experienced a notably lower incidence of transformative learning than those who came
into the workshops “concerned.” That said, many of these people did experience transformative learning, often in the form of increased empathy and enriched understanding (as discussed in the previous chapter). The percentage of interviewees who were alarmed coming into the workshop and who experienced transformative learning ranged from a high of 45 percent in Dover to a low of 20 percent in Cranston. Across interviewees from all towns, about 30 percent of interviewees who were alarmed prior to the workshop experienced transformative learning significant enough for me to identify them as Yes TL. Another 17 percent were identified as being Maybe TL.

6.2.2.2. Concerned

In all towns, there was a consistently high rate of transformative learning among those who came into the workshop falling in the “concerned” Six Americas category. This ranged from a high of 80 percent in Wells to a low of 58 percent of in Cranston. Across all towns, about 70 percent of interviewees who came into the workshop “concerned” experienced transformative learning strong enough for me to classify them as Yes TL. Another 13 percent were classified as Maybe TL. People who were concerned coming into the workshop experienced the highest rate of transformative learning.

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6 It is important to note that, as discussed in the last chapter, the interview data from Barnstable and Cranston was notably less rich than the interview data from Wells and Dover. While questionnaire data suggests that participant in Barnstable were more concerned and supportive of town action (i.e., more alarmed) than participants from the other three towns prior to the workshop, and more interviewees in both Barnstable and Cranston were classified as alarmed coming into the workshop than were participants in Wells and Dover, it seems likely that the rate of transformative learning in Barnstable and Cranston is somewhat under represented. See Chapter 5 for more information about this.
6.2.2.3. Cautious

There were only nine interviewees who I identified as being “cautious” coming into the workshop. Of these, four experienced transformative learning, three showed signs of maybe TL, and only two clearly did not experience transformative learning.

6.2.2.4. Dismissive

There were three interviewees who were classified as dismissive, all of whom attended the same workshop in Barnstable. These three provide a very interesting case study. Based on their interviews, it is clear that they all knew each other coming into the workshop. One is a local elected official (a selectwoman) for Barnstable. Online research revealed that at least one of these individuals is an active Tea Party affiliate.

On their workshop questionnaires, they all indicate they are not at all concerned about local climate change risks, that they do not think adapting to climate change should be significant in their town’s planning over the next ten years, and that they are very confident in their town’s ability to respond to climate-related risks. According to their questionnaire responses, the workshop did not affect any of their perspectives on these topics.

Interview data suggest that these three dismissive individuals talked together following the workshop and reinforced each other’s pre-existing mental models. For example, in their interviews, they all used strikingly similar language to explain their experience, with each of them saying they found it “manipulative” and a “total waste of time.” They all noted that their town does a great job of emergency management (such as responding to floods when they occur) and they do not see the need for their town to change anything.
Additionally, one of these three dismissive participants said she felt the role-play aspect of the workshop felt “foolish” and that she “didn’t feel treated like a human being.” She clearly rejected the scientific data provided in the simulation, saying that it represents the "opinion" of the scientists at University of New Hampshire. The other two seem to have felt similarly.

While these three dismissive interviewees do not provide a large enough sample to draw any sweeping conclusions, they do provide very valuable insight into how individuals who are truly dismissive of climate change are likely to interact with the role-play simulation – especially if they participate in the workshop with like-minded folks. None of them show signs of suspending disbelief and really engaging, nor do they show signs of perspective taking, engaging in collaborative problem solving, or learning with and from others. Instead, they show clear signs of engaging in the kinds of defensive behaviors discussed in Chapter 2.

Their experience suggests that, as I hypothesized, the RPS exercise is unlikely to directly catalyze transformative learning for those who are actively dismissive of the issue at hand – in this case, climate change skeptics. While it is very possible that the experience caused some cognitive dissonance and may plant seeds for learning, data suggest that, by themselves, the RPS workshops will not shift those who are dismissive of climate change to being concerned and supportive of adaptation action.

That said, as I noted above, among the few participants who were not at all concerned about climate change risks prior to the workshop and (as far as I can tell) did not attend the workshop with like minded people, there were signs of some shifts in perspectives (increased concern, increased sense of town should act, and a shift away
from being fully confident that their town can effectively manage risks). This may speak to the power of “groupthink” (see Janis 1982) in reinforcing mental models, and the correlated value of engaging people away from like-minded people if the goal is to help them question their mental models. Given the very small data set on people who were not at all concerned about climate change risks prior to the workshop, I can only theorize. However, these questions merit further research.

6.2.2.5. Doubtful and Disengaged

There were no interviewees who I identified as falling into the doubtful or disengaged Six Americas categories. Therefore, I cannot speak to the extent to which RPS exercises are likely to affect transformative learning in people within this categorization.

In summary, interviewees who I identified as coming into the workshop being concerned or cautious experienced the greatest rate of detectable transformative learning. Those who came in alarmed also experienced relatively high rates of transformative learning, although it was significantly lower than the rate for concerned and cautious participants. There were no interviewees who showed signs of being doubtful or disengaged; therefore, I cannot speak to how the workshop affected people with these particular perspectives on climate change coming into the workshops. Based on the small number of interviewees who fell into the dismissive category, the NECAP data suggests that role-play simulations are unlikely to catalyze visible (i.e., detectable by interviews and questionnaires) transformative learning for people who are actively opposed to an issue. However, as noted above, we have some evidence to suggest that participation in the
role-play could at least make people in the dismissive and/or doubtful camps question their mental models.

6.3. Other Findings About Who Was Affected and How

In the course of this study, a number of other factors emerged as important in terms of who was affected and how.

6.3.1. Suspending disbelief and perspective taking

Most prominently and as discussed in detail in the last chapter, there appears to be a very strong distinction between people who suspended disbelief, really played the simulation, and took on the perspective they were assigned and people who did not in terms of who experienced notable learning. Interview data suggest that people who did not suspend disbelief and really engage with the role-play basically “didn’t hear” what the RPS was conveying. These people seem to have left the experience with more or less the same mental models and understanding they came in with. However, even people who were in the alarmed category (i.e., already concerned and supportive of local action on adaptation) but suspended disbelief and really engaged often showed signs of transformative learning around empathy and enriched understanding, if not around concern, should act, confidence, and support for CBA.

It is worth noting that, while it may be difficult to get people who are likely to oppose local government action on adaptation to the workshops, our evidence suggests the simulations can be effective for these people, if they are willing to show up and suspend disbelief. To illustrate: there was one participant in Dover, a Dover resident, who other participants identified as tending to be very outspoken in opposing city actions
around climate change and related issues. This particular participant said of the simulation during the debriefing at the end of the workshop:

“It makes me appreciate the input of a lot of people...because that is what makes up a community, a lot of people playing different roles. It makes you more aware of wishing you could take this whole concept and put it to work throughout the whole community… I gained. I could see a couple of other people who were in the same room: they gained too.”

While there is no silver bullet that can make people suspend disbelief and really engage with the simulation, I think this finding drives home how important it is to create a welcoming environment that encourages people to really suspend disbelief, inhabit their assigned role, and seriously play the simulation. Based on my experience, a lot of this work can be done through creating an atmosphere for playing. To do this, I remind all participants prior to the simulation that everyone in the room is in the same boat – they have all come here to engage with this novel exercise – and that the exercise only really works if everyone plays their roles. I also ask participants in a lighthearted, humorous way to “suspend your judgments just for an hour, hard as it is!” I also welcome them to the fabricated world of the simulation by saying something like: “Ok, now let me welcome you all to Launton, a town that just happens to look and feel a lot like Wells, Maine.” Simple as these things may sound, I have found that setting the scene this way can normalize the simulation experience, help each person feel accountable to the rest of the people in the room, and encourage participants to suspend their disbelief, to really play, and to take on their assumed roles.

Ensuring enough preparation time is also critical, as it is much easier to inhabit a new role if you have had enough time to read your materials and think about the
perspectives you are being asked to represent. Additionally, as some interviewees noted, it is very hard to stay in role and really engage with your group if you are distracted by what is going on outside of your group; hence, ensuring a comfortable and not-distracting space for the simulations may alsovaluably contribute to people’s fully engaging and, thus, their likelihood of experiencing the transformative effects of the RPS.

6.3.2. Sufficient baseline knowledge

Interviews also illuminated the importance of participants having sufficient knowledge, familiarity, or at least general comfort with the issue being discussed to be able to fully engage with the simulation. For example, one participant from Wells indicated during her interview that she felt very insecure about her knowledge about climate change; this seemed to inhibit her ability to really suspend disbelief and get into the workshop. As she said:

“…other people that were there, I don’t know whether they’d gone through [the role-play simulation] before, they knew what to expect, they knew the terminology…I wasn’t familiar with what I was doing – I knew it had to do with climate, but it seemed like the people that were in there with me seemed to know more about the topic. Maybe they work down there, maybe they’ve had these conversations, maybe they know somebody that was on board there in the community…I was happy to be part of it, I was happy to go; it was something new for me. But I don’t have the knowledge, I don’t have the schooling. It wouldn’t be fair for my opinion to matter as much as somebody else’s that knows a lot more about this.”

One participant from Cranston noted that a person at her game table almost left during the simulation because this other participant did not feel she had the background
knowledge to really participate and therefore felt uncomfortable. As she said during her follow-up interview:

“In my group, there was one woman who was like ‘I don’t even know what all this means and what it’s about.’ And we were like ‘Don’t worry, like, we’re all here to have fun and learn a little bit more about what’s going on’…she almost got up to leave because she was, like, ‘I don’t even know what I’m supposed to do’ and she felt a little lost.”

This appears to have been an uncommon experience, which makes sense in light of the fact that most participants were relatively concerned and otherwise knowledgeable about climate change risks coming into the workshop. That said, it is an important reminder that people may enter the workshops with very different levels of background knowledge and comfort with the issues being discussed. As explained above, data from the NECAP workshops indicates that people with very different education levels and awareness of climate change risks can participate effectively in the simulation. However, given how important suspending disbelief and really engaging in the simulation appear to be for transformative learning to occur, it is important to ensure that participants feel comfortable engaging with the issues and options being discussed in the exercise.

In light of this, and the fact that one participant struggling to make sense of the simulation and to really play can detract from other participants’ experience, it is worth carefully thinking through how to introduce the simulation and making sure to spend sufficient time introducing the exercise and key concepts prior to the start of the workshop. Many participants suggested that giving people more time for to read and digest their simulation instructions would be helpful. Based on my experience working with simulations as well as some of the concerns participants raised, I would also suggest
that building in time for participants to prepare together with other people playing the same role at different tables could be enormously valuable; this would allow people to really think about their roles before engaging in the simulation; give them time to talk with others and ask questions (which might help even the playing field for participants who have less familiarity with the issues coming into the workshop); and would help people get in the spirit of their role and thus be more likely to really engage in the simulation and take on their assigned role’s perspective.

6.3.3. **Diversity of workshop participants**

Data from the workshops also suggests that there is great value in engaging diverse people together in the workshops. Many participants reflected on how much they learned from interacting with the diverse other people at the workshop and how interesting and valuable they found it to see colleagues, friends, local decision-makers, and other residents from their community together playing different roles. Additionally, interview data suggest that participants at workshops where the strong majority of participants were already alarmed coming into the workshop were less likely to really suspend disbelief, get into the simulation, and take away important learning.

While I cannot say anything conclusive about this, I can qualitatively say that workshops where there was a greater diversity of perspectives and participants represented appeared to result in more people suspending disbelief, taking on their assigned role’s perspective, engaging in collaborative problem solving, and learning together. As a result, as we would expect given the correlation between these transformative elements and transformative learning (see Chapter 5), there tended to be more participants experiencing transformative learning at these more diverse workshops.
The extent to which participant diversity matters for participant learning merits more research, and can be further explored through additional analysis of the NECAP data.

6.3.4. **Playing a different role**

Based on the interview data, it seems that people who played roles that are quite different from their real life roles showed more signs of transformative learning, on average, than people who played a role more similar to their real life role. That said, it is important to recognize that some people who were assigned roles very different from their real life interests and perspectives struggled to get into these new roles and/or did not suspend disbelief and take on the role they were assigned. Therefore, while assigning people to roles that are quite different from their real life roles is likely to be beneficial, is not a silver bullet; for this to help affect transformative learning, people still have to suspend disbelief and actually step into the shoes of the role they are supposed to be playing. Also, not everyone who played a role different from his or her real life role, even if they suspended disbelief and really played the simulation, experienced transformative learning.

There were only a handful of interviewees who played the facilitator role in the simulation. It is worth noting that these people typically did not show strong signs of perspective taking, which makes sense, as the people playing the facilitator role were not really asked to take on a perspective in the simulation. While these people showed some signs of learning, they did not typically show signs of transformative learning. This provides an additional reason to select staff members or other intentionally identified people to play the facilitator role in the simulations; not only will this help ensure that the facilitator can assist participants in effectively working through the simulation, but it
avoids certain participants potentially missing out on important learning opportunities by not taking on a stakeholder role in the simulation.

In sum, my analysis suggests that having people take on roles that are quite different from their real life roles can be beneficial for learning and raises concerns about whether playing the facilitator role is less likely to lead to learning. This merits further research, and additional analysis of the NECAP data could more systematically look into these questions.

6.3.5. Introverts versus extroverts

There were a number of interviewees who indicated they found the very idea of a role-play uncomfortable; some of these people said they would not have come to the workshop if they have not been personally invited to attend or encouraged to participate by their work. Many of these people said that some people would prefer to watch the simulation rather than to actually participate in the simulation. These people typically showed signs of being more “introverted” in their personalities (e.g., they gave short rather than verbose responses and they indicated that they found it uncomfortable to talk in front of others). Based on these few data points, I question whether people who are more extroverted are more likely to attend and more easily engage with RPS exercises than are those who are more introverted. While many of these potentially introverted participants still showed signs of transformative learning, this is a question that merits further investigation, as (1) people who are more introverted in personality may not choose to attend if they are truly uncomfortable with the notion of a role-play; (2) they may struggle to fully engage, which would limit their ability to learn and potentially disrupt the experience for others; and (3) there may be equally as effective and less
problematic ways for these people to engage with RPSs – such as through playing the role of an active observer, who then has to report out on the outcome of the game table. This is a particularly interesting question in light of the fact that we to assume when using RPSs for teaching that all students can and do engage equally as well with the exercises. This may not be the case, and thus merits more research for our understanding of how these exercises play out both in civic education settings and in more traditional classroom settings.

6.4. Conclusions

Based on the findings from NECAP, we have reason to believe that people of all genders, ages, levels of education, political viewpoints, and levels of income who choose to attend the role-play simulation workshops will be similarly affected by the experience. That said, it is important to note that people of certain demographics (in our case, older, more educated, more affluent, and more liberal) are likely to self-select to attend. While this is likely to be the case, we were pleased with the diversity of NECAP participants. Further, it may not be detrimental to attract a somewhat skewed sample of people – as noted in Chapter 4, some participants were concerned that the NECAP workshops were “preaching to the choir,” but the goal of NECAP was to “get the choir singing, and to get them singing from the same sheet of music.” Where more diverse participation is desired, more careful and focused outreach approaches (e.g., running simulations for specific groups and targeting outreach toward groups of interest) would be helpful.

It is also worth noting that, although the findings from NECAP suggest that the effectiveness of RPSs is likely to be similar for people of different demographics, the generalizability of my findings to municipalities and communities that are much more
socio-economically diverse than the towns and cities we worked with in NECAP may be limited. The effectiveness of RPSs as a civic engagement strategy in such communities merits additional research.

The effects of the simulation appear to have been very similar across demographics, but there were notable differences in effects on people based on their perspectives about climate change coming into the workshop. The greatest rate of transformative learning seems to have occurred among people who were concerned or cautious coming into the workshop. Based on this finding, we have reason to believe the simulations could be particularly powerful for people who generally fall into the “undecided middle” (or, at least, the not entirely decided middle). Many people who came into the workshop being already alarmed – i.e., very concerned about local climate change risks and supportive of local adaptation action – also experienced transformative learning, particularly around enriched understanding and increased empathy. Yet, there was a notably lower rate of transformative learning among this population than there was among people who were concerned or cautious prior to the workshop. People who were actively dismissive about climate change coming into the workshop appeared to be unlikely to really engage with the simulation; instead, evidence suggests people in the dismissive camp may revert to defensive behaviors, reinforcing their existing mental models. There is some evidence to suggest that engaging in the simulation could plant seeds of transformative learning for people who fall into the dismissive or doubtful camp, but data suggest they are unlikely to experience transformative learning that is clearly detectable.
Across all demographics and levels of concern coming into the workshop, the greatest indicator of whether individuals experienced transformative learning was whether they suspended disbelief and really took on the role they were assigned. People’s proclivity to suspend disbelief and really engage with the simulation may be, at least in part, tied to demographic factors and/or levels of concern coming into the workshops. Yet it is worth noting that emphasis should be put on structuring the simulation and workshop so as to encourage participants to really get into the simulation and to step into their assigned role. How the workshop is introduced, how much time participants have to prepare, and things of that nature – as indicated above and further discussed in the following chapter – may play a critical role in this.

In sum: The use of role-plays as a civic education and engagement approach writ large may be, at least to some extent, limited by the population the workshops are likely to attract. However, our evidence clearly suggests that it can cultivate important learning – including transformative learning – for diverse people, if they are willing to attend.

In the next and final chapter, I build on this the findings discussed in this chapter and the last two chapters to summarize what I see as the strengths and limitations of tailored, science-based role-play simulation exercises as a civic education and engagement approach. I also share a number of lessons learned for the design and use of RPS exercises in a civic engagement context. Finally, I put forward a number of suggestions for future research.
CHAPTER SEVEN: Conclusions, Lessons Learned, and Future Directions

This dissertation set out to test the effectiveness of tailored, science-based role-play simulations as a tool for transformative civic education and engagement, particularly in the context of science-intensive environmental issues. In so doing, I aimed to better illuminate the mechanisms through which role-plays catalyze transformative learning and to assess what kinds of people seem to experience the greatest learning effects from role-play exercises.

The results of NECAP show that tailored, science based role-play simulations can stimulate transformative learning and catalyze perspective shifts in the way they are designed to. In the context of NECAP, the simulations were designed to increase concern about local climate change risks, sense of need for town action on climate change adaptation, confidence in the prospects of effective local adaptation action, and empathy for other perspectives, as well as support for a consensus building approach to adaptation decision-making. As discussed in the previous chapters, data suggest the NECAP simulations were successful on all accounts.

Quantitative data show that participation in the simulations resulted in a statistically significant number of participants experiencing an increase in concern, sense that their town should act to adapt, and confidence in their town’s ability to effectively respond to climate change risks. The same upward trends were seen across all towns, although with some variation in statistical significance. Quantitative data also show high
levels of support for the consensus building approach as a way to make adaptation decisions following the workshop. These findings are reinforced by qualitative data from interviews. Interview data also show that, as a result of the workshops, many participants experienced valuable learning around increased empathy for different perspectives and interests as they pertain to climate change adaptation, as well as generally enriched understanding of climate change risks and adaptation. These findings are explained in depth in Chapter 4 and Chapter 5.

As discussed in Chapter 5, my findings indicate that role-play simulations foster transformative learning, at least in part, through helping participants suspend disbelief and engage more openly with difficult issues, take on a perspective other than their real life perspective, engage in mock collaborative problem solving, and learn with and from others. While the data from NECAP do not allow me to demonstrate causality, they provide reason to believe that these unique elements of role-plays help foster transformative learning. This suggests that role-plays, as a civic education and engagement tool, have an especial ability to stimulate transformative learning.

The results of NECAP indicate that when used for civic engagement, tailored, science-based role-play simulations are likely to be effective across demographic categories such as gender, age, income levels, education levels, and political viewpoints. NECAP data further suggest that RPSs may affect transformative learning for people who are already very concerned about an issue and supportive of action, particularly around increased empathy and enriched understanding. However, role-plays appear to be particularly effective in engaging the “undecided middle” – i.e., people who are a little or somewhat concerned about an issue like climate change but have not already formed
strong opinions. RPSs are likely to be less effective both in attracting and affecting transformative learning for people who are actively dismissive of an issue, such as people who disbelieve in climate change. These findings are the focus of Chapter 6.

Taken together, my results suggest that tailored, science-based role-play simulations offer a powerful approach for civic education and engagement around complex science-intensive environmental issues like climate change. It is important to note, however, that perspective shifts resulting from participation in the RPS are likely to be modest in nature, rather than radical. Further, not all participants – even those who fully engage with the simulation – will experience transformative learning. Our experience with NECAP also indicates that, when used as a general civic education and engagement strategy, role-play simulation workshops are likely to attract people who are already relatively concerned and supportive of action on the issue of interest. As such, the effectiveness of this approach for engaging diverse constituents may be limited, at least without additional and concerted outreach to attract a more varied crowd. It is also important to note that, while our results suggest RPS exercises can be effective across demographics, the impact of such exercises may be different in communities that are much more socio-economically diverse than those we worked with in NECAP.

Below, I build on my research findings to proffer a number of conclusions and recommendations. I first discuss a number of strengths and limitations of role-play simulations as a tool for civic education and engagement. I then put forward a some key lessons learned through NECAP, which I hope can inform future use and design of role-play simulations for civic and stakeholder engagement purposes. Finally, I conclude with my thoughts on directions for future work, research, and inquiry.
7.1. **Strengths**

Based on my findings and experience with NECAP, I see the following as some of the key strengths of tailored, science-based role-play simulations in a civic education and engagement context:

*A tool for increasing awareness of and concern about local environmental issues and risks:* My findings strongly suggest that tailored, science-based role-play exercises can valuably increase participants’ awareness of and concern about local environmental issues and risks, such as risks from climate change. Data from NECAP suggest they do this, at least in part, by helping participants leapfrog over debates about whether the risk is an issue worth discussing to instead focus on likely impacts and what can be done to address them. Further, as discussed in further detail in Rumore (2015b), many participants felt that the simulations “brought climate change home” and helped them to think about the local impacts, often for the first time. The inclusion of real-world local climate change projections appears to have played a key role in this, making the issue of climate change more salient for people and helping them grasp what climate change could mean for their community. As one Wells interviewee said: “It’s a global issue, but the workshop really helped bring it down to a local level, where I felt an impact and a concern on a personal level. And I think that was one of the biggest values I got out of it.” Additionally, although the strong majority of participants were already aware of and concerned about climate change risks prior to the workshop, people commonly reported experiencing an enhanced understanding of how their community could be affected and the diversity of impacts their community would likely incur from climate change, as well as a generally enriched understanding of what adaptation would entail. In the words of a
Dover participant, the workshop helped him realize “the vast amount of different areas that can be affected due to climate change,” and showed him “how climate change can have such an effect on even a small place like Dover.”

An important consideration that is discussed further below: our experience with NECAP indicates that what the role-play simulation models matters; if the game focuses on riverine flooding, people may walk away thinking mostly about this particular risk to their community. In light of this, it is important to use the post-exercise debriefing to expand the scope of concerns participants are thinking about, using the risk the role-play simulation focuses on as a point of departure.

A tool for building support for local action on science-intensive environmental issues:
Based on data from NECAP, we have reason to believe that well designed and carefully run RPS exercises can increase not only concern about environmental issues and risks, but that they can also increase support for local action to respond to and manage these concerns. Participants commonly indicated that the role-play exercise helped them think about the important role their local government will need to play in adapting to climate change. For instance, one Dover interviewee commented the workshop “opened my eyes as to the responsibility of local government and local organizations in the community… We can, as communities, control the climate change effects that are happening in our communities.” People also said that the simulation helped them better understand the kinds of local responses that would be required to effectively adapt. As one Cranston interviewee put it, the workshop made her “more aware of the different options that people are considering to mitigate the risks locally.” Participants also often noted that the
simulation expanded their idea of who will be impacted and who will need to be involved in community decision-making about how to manage climate change risks. In the words of a Wells participant, “[Before the workshop] I really thought it was up to the town agencies. And then, after the fact, I realized that it was really the people, because [the agencies] need feedback from the public.” Participants who were already concerned about climate change and supportive of action also often noted that the workshop helped them better appreciate what adaptation decision-making will actually entail. As a Wells participant said, “Even though I think of myself as knowledgeable about the basics of climate change, I hadn’t really considered the process of actual decision-making in communities and figuring out what to do.”

_A tool for enriching people’s understanding of complex science-intensive environmental issues:_ NECAP workshop participants commonly indicated the RPS enriched their understanding of local climate change risks, adaptation options, and the challenges inherent in collective risk management. This was true even for people who said they came to the workshop already concerned and supportive of adaptation action. As one interviewee in Cranston explained, “It’s a much more complex issue than I had really even thought. Everyone is touched by it, but everyone is not looking at _all_ of the issues.” Another Cranston interviewee, a city councilwoman and coastal property owner, said, “It helped me prioritize and see the whole picture of what the city is grappling with.” A wide range of participants from all municipalities echoed such sentiments. Based on NECAP findings, we have reason to believe that such simulations provide a powerful way to help
participants really understand the complexity of issues such as climate change and what will be involved in responding to them.

A tool for increasing empathy and understanding of diverse perspectives and interests: Increased empathy and understanding of diverse perspectives and interests was one of the key forms of transformative learning identified among interviewees from all towns (although to a lesser degree in Barnstable, which – as discussed in Chapter 5 – may reflect less rich interview data from that town). As one Dover interviewee said, “It was interesting to put myself in that position and see that there are alternative points of view and that people can have strong arguments for their own beliefs, even though they’re different from mine.” After playing the simulation, a Wells resident observed that “putting myself as a resident of a [coastal] home, I understand more why people would be unwilling to let go of their family house.” According to a Cranston participant, the simulation “really just opened up my eyes to the neighborhood association’s interests…I think I’ll have a different outlook as I work with partners like that in the future.” Another Cranston participant said, “I thought it was great because it provided me with an opportunity to think of other people’s perspectives. I had never really about the public works director…I’ve always been in the regulatory aspect.” Based on these kinds of participant experiences, we have reason to believe that role-play simulations – in a civic engagement setting or otherwise – can valuably enhance people’s appreciation of different viewpoints and concerns.
A tool for introducing and building support for collaborative decision-making approaches: My findings and our experience with NECAP suggest that role-play simulations can help participants become aware of and gain appreciation for more collaborative approaches for decision-making, such as the consensus building approach. Similarly, they can be used to experientially introduce people to what it is like to engage in such a process. According to one Cranston interviewee, a state public official, “Coming together with folks at the workshop reminded me of the importance of that – of the need to focus on bringing stakeholders to the table and getting as much discussion as possible.” A Wells interviewee said, “The workshop made me more aware of the fact that all citizens and more citizens should be taking a look at what’s going on and taking a role in it.” One interviewee, a planner at the Rhode Island Statewide Planning Program, said of the consensus building process modeled in the game, “I think it’s a very thoughtful way to figure out who needs to be the room. While it’s time-consuming and resource-intensive, it is a process that has a lot to offer.”

A tool for engaging people in learning together and from one another: Our experience suggests that role-plays, through bringing diverse people together to play and interact in a safe space, can create a valuable forum in which people can learn together and from one another. Indeed, many NECAP workshop participants said they found it valuable to interact with and learn from others. A number of interviewees said they would have liked to have had greater diversity of participants at the workshop so they could hear different perspectives. As noted in Chapter 5, we have reason to believe from our experience running RPS exercises in many different contexts that the face-to-face element of these
simulations and their ability to bring people together to learn with and from one another is a key part of their ability to affect transformative learning. This topic merits further investigation.

A conversation starter and forum for difficult conversations: In interviews, open-ended write-in responses on questionnaires, and workshop debriefings, many people said they thought the RPS provided a valuable conversation starter and that the workshops created a forum for difficult conversations. Some said that the RPS made it easier to have challenging conversations about climate risks and adaptation because people were one-step removed from the reality of the positions they actually represent. In the words of a Wells interviewee, “In a way, it made it easier, because I felt disconnected. No matter what I said it was okay, because I was this other person.” Another Wells interviewee said of the simulation, “It almost gives anyone permission to learn about it [climate change] without any pretentiousness . . . you could have people come together and process this stuff. It’s one step removed and it doesn’t become personal.” A Barnstable participation said of the RPS exercise, “It forces the communication to happen… If we sat down there without the role-playing, some ideas are thrown out there. But when we’re given that role-playing, whether you agree with it or not, it forces the subject matter to be put on the table. And it works.” Project partners and staff members also commonly reflected on the way in which the role-play simulations helped people leapfrog over the typical debate about whether climate change is happening to instead focus on managing local risks.

In sum, our experience and evidence suggest that RPS exercises can provide a valuable conversation starter for difficult conversations and that they can make tough
issues more discussable. In light of the importance of constructive dialogue in helping communities collaboratively problem solve (see Innes and Booher 2010), this may be one of the key benefits of such exercises.

An “entryway” for engagement: Many of our local partners felt that the role-play simulation workshops, as one partner put it, “created an entryway” for people who otherwise wouldn’t come to the table. This is an important finding since, as another NECAP town partner put it, it is “difficult to get even interested people to participate in civic forums on [planning issues].” Some project partners noted that a variety of people, including public officials, who had previously not participated in conversations about climate change risks came to the workshops and walked away with a much greater willingness to engage.

A focusing event: Our observations and data suggest that the role-play simulation workshops acted as what is referred to in the public policy literature as a “focusing event” (see Kingdon 1995; Birkland 1997; Birkland 2007). Focusing events are attention-grabbing events that play a key role in “advancing issues on the agenda” and which often provide “potential triggers for policy change” (Birkland 1998: 53). As Birkland (1998) explains, natural disasters and industrial accidents often act as focusing events, helping to ripen issues and get them on the political agenda.

The conventional wisdom in many coastal towns is that “it will take a storm” to catalyze adaptation efforts – and as Superstorm Sandy proved, a storm can be a very powerful focusing event. Our experience with NECAP suggests that widespread
engagement of community members in role-play simulations can also help to generate community-wide conversation about an issue, thereby proactively advancing the issue on the political agenda.

Many of our workshop participants – the vast majority of interviewees, in some towns – told friends and colleagues about the role-play simulation event. Many interviewees indicated that they talked about the experience with fellow community members. Our workshops also generated significant media attention, particularly in towns where our local partners actively encouraged members of the press to attend and participate in workshops. In light of the conversation about climate change risks and the social attention to the issue they helped create, the workshops “helped build momentum around adaptation planning, catalyzing interest and facilitating dialogue,” according to a project partner. Further, many of our municipal partners indicated that the workshops and broader NECAP project pushed them to put adaptation more squarely on their agendas. In the words of one NECAP town partner, a city planner: the project “got me out of my comfort zone to deal with an area of planning that is challenging.”

A tool for capacity building: NECAP staff and partners – including our municipal partners, our NERRS partners, and MIT graduate students researchers – were all integral to organizing and hosting the workshops. They often played the facilitator role in the simulations, and – after observing and being trained by MIT and CBI staff – they facilitated many of the workshop debriefings. Following the project, we commonly heard from NECAP partners and staff that the RPS workshop enhanced their “ability to facilitate tough conversations,” made them “more confident facilitating,” and improved
their “collaboration skills.” Additionally, project partners reported a greater appreciation for and ability to work with diverse perspectives as a result of the workshops. As one NERRS partner, who has been working with local governments for many years, said following the project: “I learned the value of being an objective and active listener – actually listening to what’s being said, not just the anger or contrary view.”

7.2. Limitations

In understanding the effectiveness of tailored, science-based role-play simulations and what they are likely to be most useful for, it is also important to consider the limitations and weaknesses of such exercises. Below, I share what I consider to be a couple of key limitations illuminated through NECAP:

The self-selection bias problem: As noted repeatedly throughout my discussion of findings, our experience with NECAP suggests that role-play simulation workshops are likely to appeal mainly to people who are already somewhat concerned about the issue at hand (in the case of NECAP, people who are concerned about climate change risks). If the goal of a civic education and engagement effort is to reach people who are not very aware of the issue, or people who are actively opposed to action on the issue, then much more strategic and focused outreach efforts, at a minimum, will be needed. Even if an effort is successful in engaging people with more diverse perspectives on the issue, it is likely that a role-play simulation approach will not be particularly effective in cultivating notable transformative learning among people who are actively dismissive of the issue. Different outreach and engagement approaches may be more appropriate for dismissive and disengaged populations.
Not the appropriate tool for all situations: Related to the above point, role-play simulation workshops are not the most appropriate tool – or even *an* appropriate tool – for civic engagement in all communities and all contexts. As one participant from Cranston well put it:

“It’s not one-size-fits-all. It depends on the community, it depends on whatever the nuances of the decision-making process are, or the level of knowledge they have available to them, or how much they thought of it… So every community and every point of the decision-making process within a community is going to be different. And there will be some [communities] where the role-play will be a great tool, and there may be some where it may not.”

Our findings across towns suggest that using role-play simulations for broad engagement and awareness raising around science intensive issues is likely to be particularly effective in communities that are in the early stages in their thinking and commitment to action on an issue. In a community like Barnstable, where decision-makers and key stakeholders are generally much farther along in their thinking about climate change, decision-support approaches that are more targeted toward actual action and decision-making may be more appropriate. RPSs may still have a valuable role to play in such efforts, such as in priming stakeholders and decision-makers to engage in actual collaborative decision-making (as further discussed below). However, such an approach would look very different from NECAP.

Not a stand-alone tool: Another critical consideration is that RPS exercises are not meant to stand-alone; to the contrary, my research and our experience with NECAP suggests that their power lies in providing a conversation starter as part of a wider engagement and
capacity building approach (see Rumore 2015b for more about this). Role-plays can immerse people in thinking about what it takes to make decisions about social and environmental problems in the context of complicated scientific information and diverse stakeholder perspectives. They can also provide a safe, fun, and engaging space in which to do so. Yet, the impact of RPSs is likely to be limited unless they are embedded in a broader effort that can build on the momentum created by the exercises. Similarly, NECAP data suggest that the transformative learning that occurs through role-play simulations is often quite subtle. Whether this learning translates into behavior change will likely largely depend on the extent to which follow-up efforts create a space for participants to further reflect on their learning and translate it into action.

*RPSs are only as good as the entire event:* When using role-plays, it is critical to be mindful of the fact that the effectiveness of RPSs is largely dependent on the entire workshop or session in which they are used. The intellectual scaffolding that is – or is not – provided to participants through the introduction and debriefing of the simulation will heavily impact what is and is not learned. In the NECAP workshops, for example, we did not really focus on introducing the basic philosophy of consensus building and collaborative problem solving prior to the simulation. As a result, many participants emphasized that their group “compromised,” which is not exactly what we were trying to teach; instead, we wanted people to experience and learn about mutual gains negotiation and creating value through collaboration. While this does not detract from the overall value of what was learned, it does reinforce how important it is to use the workshop introduction and debriefing to help participants clarify their learning. To really capture
the value of a simulation, significant time and thought should be invested in planning the introduction and debriefing for the simulation. Additionally, although there is always a tradeoff to be made between keeping the workshops short enough that people will participate and leaving enough time to effectively introduce, run, and debrief the simulation, it is important to dedicate sufficient time during the workshop to the introduction and debriefing.

*RPSs will not necessarily lead to mastery of scientific and technical information:* NECAP data clearly suggest that tailored, science-based role-play simulations can valuably contribute to participants’ understanding of environment issues and risks, and do so in a way that increases support for action and enriches participant understanding. Similarly, my data suggest that the simulations helped introduce people to local climate change projections and allowed them to better appreciate the kinds of adaptation responses their community might consider. Yet, our findings from NECAP also clearly show that people typically did not engage with the technical risk assessment information provided to them in the simulation materials in more than a big picture or cursory way. Indeed, our observation of the simulations, debriefing notes, and interview data indicate that people focused almost entirely on negotiating what their community should do to respond to generally increasing risk of flooding rather than talking about the provided risk assessment information and what the different climate change scenarios should mean for decision-making. What seemed to matter to people was the story that was provided in the simulation – i.e., that different stakeholders were coming together to make adaptation decisions for a community that was already facing risks from flooding; that this risk was
projected to become notably worse do the climate change; that there were a number of adaptation options being considered; and that each role had preferences and interests as they pertained to the adaptation strategies, and reasons behind these preferences and interests.

The fact that participants did not overtly focus on the technical risk assessment information provided in the simulation materials does not detract from the value of science-based role-plays as a tool for introducing participants to complex concerns and helping them understand these issues in such a way as to increase their awareness, concern, and buy in for responses. To the contrary, this finding speaks to the strength of role-plays: they engage people through a story-like form that conveys a considerable amount of information and meaning in a very digestible and manageable way. This finding does, however, indicate that where mastery of technical details (such as what the exact climate change projections for one’s town are or how a risk assessment is produced) is the goal, role-plays likely need to be used (and potentially designed) differently than they were in NECAP.

If mastery of technical information is a key aim in using a role-play simulation, participants will likely need significantly more preparation time to familiarize themselves with the technical details in their instructions prior to engaging in the simulation. I would further suggest building in time for participants to prepare together in same-role groups (i.e., groups of people who will be playing the same role at different tables) to allow people to discuss technical information and ask questions of each other prior to the simulation; this could encourage people to really engage with the technical information, as well as make sure people can get clarity from others if needed. I would also suggest
designing a simulation in such that technical details are integral to reaching any form of agreement. More time for game play will also likely be needed to allow participants more time to work through and make sense of the technical elements of the simulation. Finally, the debriefing should help participants reflect on and clarify the technical and scientific concepts and information they have hopefully learned. The Mercury Game (see Stokes and Selin 2014) provides a good example of a game that is designed to get participants to really engage with and gain some mastery of scientific and technical information.

*Significant skill, time, and energy are required to effectively design and use an RPS*: In thinking about the appropriateness, as well as the feasibility, of using tailored, science-based RPSs as a civic engagement tool, it is important to consider the time, energy, and experience that are required to develop and use such exercises. Designing a simulation requires a great deal of skill and experience. A poorly designed simulation is likely to frustrate participants and may have counter-productive effects. Creating a new simulation takes time. Preparing, testing and revising a scenario and game logistics could easily take several months.

For those who want to use a simulation without designing a new one, our NECAP exercises and numerous other RPSs for climate change adaptation and other issues are available online through the Program on Negotiation at Harvard Law School (www.pon.harvard.edu). All of the RPS exercises distributed by PON come with teaching notes that explain how they should be presented to public audiences. That said, effectively running a simulation is still a bit of an art and it requires proper preparation.
7.3. **Lessons Learned for Role-play Simulation Design and Use**

Since the way in which role-plays are designed and used is critical to their effectiveness, I share some lessons learned about creating and using role-plays below.

7.3.1. **Lessons learned for RPS design**

*Where possible, tailor RPSs to the specific context:* In NECAP, as well as in previous work using RPSs as a civic engagement tool (see, for example, Susskind and Paul 2010; Rumore 2012), we have consistently found that place- and issue-specific simulations are most powerful. When simulations work, they encourage residents and local leaders to grapple with the issues facing their community. Thus, the more accurately local issues and dynamics are presented, the better. In NECAP, the intentional similarities between the town in the RPS and the community it was designed for made it much easier for people to talk about the implications of the game for their town. I therefore suggest that, when possible, simulations should be tailored to the specific context in which they will be used. That said, RPSs inherently require substantial simplification of reality, so they will always be an abstraction, even when they are tailored to a specific context.

*RPSs do not have to be entirely tailored to be useful:* While our experience suggests that the more directly relevant a simulation is to the community or context in which it is being used, the better, this does not mean that it has to be literally designed for one and only one community. Every simulation focuses on a set of issues, and models certain dynamics. As long as these issues and dynamics are generally relevant to a community, the simulation is likely to be an effective conversation starter.
To illustrate: in NECAP, people who participated in our workshops from outside the region – especially college students from other parts of the country and even internationally – all reported the same learning effects as residents from the towns the simulations were designed for. Similarly, when we ran the Shoreham simulation (designed for Barnstable) in communities all over Cape Cod, Massachusetts, we found that it was similarly effective for people in other places as it was for Barnstable residents. Even if the scenario in a simulation is not exactly fitted to conform to a real-life context, a skilled facilitator can use it to trigger valuable dialogue by helping participants think about the ways the scenario is similar to and different from the situation their actual community faces.

*Simple but challenging is best:* During a simulation, participants can only grapple with a limited amount of new information. As a result, RPS designers have to make choices about what to emphasize and what to leave out. I advocate keeping simulations as simple as possible, while still using them to introduce new scientific and technical information and compelling people to think about diverse perspectives.

The simulation for Barnstable was more complex than the other three, requiring participants to address three separate issues, each of which posed a number of questions and choices (see Chapter 3 and Appendix A). In the first few Barnstable workshops, participants had a hard time completing the simulation in the time allocated. This left some people frustrated and fixated more on the problems with the simulation than the new information about local risks and responses we were trying to get across. Recognizing this, we allocated 75 minutes (rather than only an hour) for the simulation in
all of the remaining workshops in Barnstable. In contrast, the simulation for Wells focused on fewer issues, but still highlighted a very wide variation in stakeholder perspectives and conveyed local climate projections. This simulation proved effective in getting people to talk about local risks.

For anyone designing an RPS, I suggest focusing on the importance of a simulation as a conversation starter. It does not need to be a definitive primer on technical issues, nor does it need to get people thinking about all of the risks their community faces. If the simulation gets people thinking and kicks off a good conversation, the debriefing can be used to get people thinking about the implications of what they have learned from the game experience for their actual community, what other kinds of risks their town might face, and other forms of information that might be helpful.

*Keep your intended learning objectives front and center:* When designing, altering, or simply choosing a role-play simulation to use for an educational or engagement purpose, a necessary first step is to clarify what the purpose of the simulation is – i.e., what is it you are trying to achieve through using the simulation. In the case of NECAP, for example, our aim was to enhance the readiness of coastal communities to adapt to climate change by building public awareness of risks and support for adaptation action (see Susskind et al. 2015); we intended to use simulations to help with this.

Once the purpose is clear, the next step is to clarify the intended learning objectives of the simulation. In the case of NECAP, our intended learning objectives were (1) increased awareness of and concern about local climate change risks; (2) increased sense of need for local action; (3) increased sense of confidence in the
prospects of effective local action; (4) familiarity with and support for the consensus building process; and (5) increased empathy and understanding of other interests and concerns.

How a simulation is designed or altered, or how a simulation is chosen, should be a direct reflection of the purpose and intended learning objectives. While this sounds obvious, it is easy to lose sight of the purpose or to not be entirely clear about what it is you are trying to teach, which can lead to suboptimal game design or selection. As an example: while I think the NECAP games were amazingly successful in achieving their purpose, we could have done a better job of designing the games to model value creation and creative problem solving, rather than compromise (which is what many participants felt the game demonstrated). Additionally, if helping participants master scientific and technical details associated with local risks assessments – rather than broad exposure and familiarity with risk information and increased support for adaptation action – had been a goal, we would have designed the simulations and run the workshops somewhat differently.

*What you model matters:* One of the interesting and important findings of my analysis of NECAP data is that what you model in the role-play simulation matters. For example, if you introduce building new sea walls as a potential approach for dealing with sea level rise, you have to be prepared for some participants to walk away from the role-play simulation thinking this is an option worth considering. Similarly, participants may think their town should do something like the solution their group agrees on in the simulation. As one workshop participants said during a follow-up interview:
I had one of the [real life] selectman in my group – the town manager, they came around to what we came up with, our solution. [They said] ‘this sounds reasonable, we ought to look at doing something like this.’ I was kind of taken aback. It did have some ideas that beachfront owners could rebuild and stay but it also had that they should stormproof their houses by raising them or move their development rights to other places in town. Some solutions that I would not have thought would come out of it.

The fact that what simulations model may influence what participants think should happen in real life creates a valuable opportunity – this suggests that simulations can be used to expose people to realistic strategies their community might consider. However, it also creates a moral imperative: game designers must be mindful of the fact that what we write into simulations (or do not include) may leave an imprint on participants. This finding also reinforces the importance of the debriefing; during the debriefing, facilitators can help participants reflect on what kinds of strategies and agreements are likely to be beneficial for their community, what approaches might be problematic and why, and what issues and options were not discussed that probably should be.

*Where possible, engage local partners in designing and testing simulations:* Where role-plays are being used for civic engagement along the lines of NECAP, direct involvement of local partners in designing, testing, and refining exercises is important. The involvement of our local NECAP partners helped us determine which scenario would engage their community most effectively. As I noted in Chapter 3, dialogue among our MIT staff and our local partners in Barnstable led us away from a focus on how
wastewater systems could be affected by climate change. In light of the fact that wastewater is already a very controversial subject in the town, it was clear that making it the centerpiece of the game would likely inhibit people from engaging in an effective conversation about climate change risks, rather than help the do so. In Wells, by contrast, our local partners initially suggested we might not want to focus the game on vulnerable coastal properties, since this topic might be too contentious. After further discussion, though, we agreed that residents needed to confront this question. Such experiences highlight the value of co-creating RPSs to draw on local knowledge and highlight the right issues and problems.

7.3.2. Lessons learned for RPS workshops and logistics

Provide intellectual scaffolding for learning: As noted above, the intellectual scaffolding you do – or do not – provide for participants will influence what participants do or do not take away in terms of learning. I think providing sturdier intellectual scaffolding for NECAP workshop participants would have helped people walk away from the workshop with more concrete lessons learned. For example, we could have done a better job explaining the consensus building approach that the game was modeling. We could also have explained in more tangible terms how concerns about climate risks can and should be incorporated into all kinds of public and private day-to-day decision-making. We intentionally kept our introductions to the workshops very short, while trying to provide enough instruction for participants to feel confident that they could participate in the simulations effectively. In retrospect, I think it would have been beneficial to spend a little more time enumerating the most important lessons or learning points. For those using role-plays for civic engagement and learning, I suggest spending ample time
thinking about what kinds of intellectual scaffolding you need to provide through the introduction, debriefing, and other elements of the workshop and how to do this, as well as setting aside enough time during the workshop to convey what needs to be conveyed.

_The debriefing is absolutely critical:_ One point I cannot emphasize enough is that, when using a simulation as a teaching and engagement tool, the debriefing conversation that directly follows the exercise is absolutely critical. Our experience and past research (Susskind and Corburn 1999) show that it is in the debriefings that people really solidify and make sense of what they have learned. Additionally, without a focused, well-run debriefing, key lessons can be lost, and participants may even walk away with adverse learning effects – for example, participants in groups that are not able to reach agreement on a decision within the allocated time may feel frustrated with collaborative decision-making if they do not have a chance to reflect on why they didn’t reach agreement (and see that other groups did).

For those using simulations as an engagement tool, my advice is to leave as much debriefing time as possible. Having a skilled facilitator who is intimately familiar with the details of the RPS run the debriefing is also important. Significant thought should be put into the development of questions and prompts that will be used to guide the debriefing discussion.

_Set aside enough time:_ If we were to run the NECAP workshops again, I would recommend setting aside three hours (rather than two and a half) for introducing the workshop, running the simulation, and conducting the debriefing. As noted above, I feel
we could have done a better job of providing intellectual scaffolding to set people up to take away our intended learning objectives. I also think that more time for debriefing would have helped participants really clarify and solidify their learning from the experience. As indicated in Chapter 6, some participants also felt they needed more time to read their instructions and to prepare for the simulation. All of these things would have required extending the length of the workshops. There is always a tradeoff between setting aside enough time for the event to succeed and deterring people from participating by making the workshop too long; however, where possible, I suggest building in a little more rather than a little less time.

Assign people to roles that are different from their real life roles: NECAP workshop participants who played roles that are quite different from their real life roles seem to have experienced greater transformative learning than people who played roles more similar to their real life roles. While this merits more research, my experience and observation, as well as theory (see Chapter 2), strongly suggest that it is quite valuable for people to have to look at the issue at hand from another perspective. Although is not always possible to do so, I suggest putting effort into assigning people roles quite different from their real life perspectives whenever possible.

Importance of a skilled facilitator to run and debrief the event: Our experience with the NECAP workshops underscored the importance of having a skilled facilitator run the events, particularly the debriefings. Effective facilitation is especially important when dealing with potentially controversial issues, such as climate change. For example, in
Barnstable, we had a handful of participants who were dismissive of climate change and wanted to debate the science of climate change during one of our workshops (see Chapter 6). The workshop facilitator was able to at once make them feel heard, while also redirecting the group back to the topic at hand – i.e., discussing local climate-related risks and what the town can do to become more resilient. Without a skilled facilitator to keep the group on track, the debriefing could have easily become consumed by a discussion about whether climate change is happening or not. Formal facilitation training is very helpful. However, it is possible to train someone to effectively run RPS workshops and to lead the debriefings even if they do not have significant facilitation training.

Importance of facilitators at game tables: We wrote each simulation so that any person with basic facilitation skills could play the facilitator role built into each game. During NECAP workshops, we intentionally filled this role with project staff, NERRS partners, and participants we knew had facilitation experience whenever possible. For people who had not facilitated a role-play simulation before, it was a challenging assignment. We quickly augmented the preparatory materials we gave to anyone playing the role of a facilitator in the simulations, adding a 10-minute pre-simulation facilitator briefing session into our workshops. During this facilitator briefing session, NECAP staff quickly reviewed the responsibilities of the facilitator role and shared advice about how to help facilitate the simulation conversation. This facilitator briefing session was done before the RPS formally began, but after simulation facilitators had been given time to read the instructions for the simulation and their role. We found that the better prepared the game facilitators were, the more likely their groups were to reach agreement and take away the
intended lessons of the exercise. In light of our experience, I strongly suggest carefully planting and preparing simulation facilitators, whenever possible. As noted in Chapter 5, there is also some evidence to suggest that participants who play the facilitator role do not get the benefits of perspective taking, which is all the more reason to put a project partner or staff person in this role.

*Getting people to participate can be challenging:* We faced a serious challenge attracting our desired number (i.e., more than 100 at a minimum, 150 being preferable for statistical analysis) and diversity of workshop participants in each town. It took hard work and some experimentation to achieve these targets. We used multiple avenues to get the word out, including our partner organizations’ email lists, the email lists of other local organizations, flyers posted in public spaces and notices in local media, and word of mouth. We also recruited community organizations to co-host workshops with us, in the hope that they would urge their members to attend and spread the word. The co-host strategy was very effective in situations where co-hosts were committed to helping attract participants.

Based on our experience, I recommend the following strategies for RPS workshop outreach: (1) try to get local organizations to co-host workshops, but be sure that co-hosts know what they are getting into and that they are fully committed to helping with outreach; (2) when working with local partners, be very clear about the kinds of people and the numbers you are hoping to attract, and try to get local partners to do as much outreach as possible, since they know their communities best; (3) develop visually distinctive and aesthetically pleasing outreach materials that can be embedded in email
notices and used on event flyers; and (4) start early, devoting as much staff time as possible to workshop recruitment.

I also advocate for piloting different messages. We found, for example, that calling an RPS exercise a “simulation” or an “interactive exercise” rather than a “game” was much more compelling to most people. Local partners often have a sense of what seems to work in their communities, and can be very helpful in refining messaging. Similarly, we found that focusing outreach on concrete, tangible threats (“Come talk about local flood risks and how Cranston can respond”) rather than the broad topic of climate change (“Come talk about climate change and how Cranston can respond”) was much more effective. It took many months and a great deal of trial and error to refine our message, and the kinds of messaging that seemed to be most effectively varied somewhat by community.

Finally, it is important to think about the people you want to attract, and the time of day, locations, and other amenities (food, child care, etc.) that will make participation easiest and or most appealing for them. For example, we found that hosting a workshop at a local brewery and other well-liked establishments was one way to attract a more diverse crowd.

*Provide clear “next steps”:* The role-play simulation workshops engaged people, got them thinking about local risks and responses, and fostered a meaningful dialogue. However, I feel we could have done a better job capturing the momentum each workshop created by giving people more clear “next steps” at the end of the workshops. People needed some way to focus their energy and interest once the workshop was over. Leaving
people with the message that “your town will begin an adaptation planning process in a couple months and we will send you an email with more information about how to get involved” was appreciated, but it wasn’t enough.

Next steps could include anything from encouraging people to write letters to their public officials explaining their concern and support for adaptation efforts, to encouraging them to write a letter to the editor for their local newspaper sharing their thoughts about how important the issue is for their town, to organizing follow-up meetings with public officials that participants could attend to discuss adaptation approaches and related concerns. While leaving people with clearer next steps requires more careful coordination of follow-up plans with local agencies and elected officials, it is likely to help people translate the learning they have experienced into lasting perspective shifts and action.

Along similar lines, were we to run the workshops again, I would recommend providing a distinctive handout summarizing the local Risk Assessment results that each participant could take with them. We might have also encouraged our local partners to follow up with participants by sending emails highlighting relevant public meetings or opportunities for further involvement.

*The presence of local public officials can add substantial value:* The presence of local public officials at the NECAP workshops was quite valuable. It signaled to participants that their town was taking the issue seriously. Many people said the fact that their town officials were present and participating in NECAP increased their optimism that their town would actually take action to manage climate change risks. When using simulations
to build support for local action, I strongly suggest making sure that some high level elected and appointed officials attend all workshops – either as hosts or as participants.

Create a space that encourages people to play: Finally and very importantly: in light of my findings in Chapter 5, I think it is really important to set the scene and get people in the mood to play early on in the workshop. As I noted in Chapter 5, this may include things such as actively inviting participants into the fabricated world of the simulation (‘Now I’d like to welcome you all to Launton, a town that happens to feel a lot like Wells, Maine…’), reminding everyone that the experience of others depends on their suspending disbelief and really playing, and using humor to encourage everyone to really play (for example, by saying things such as “I know it’s hard to walk in someone else’s shoes for an hour, but we want you to really try”). Creating a welcoming and not distracting environment can also help participants really engage and get in the mood to play. Further, building in time prior to the simulation for participants to prepare with people who are playing the same role at other tables may be helpful for getting them ready and in the mindset of their assigned role.

7.4. Opportunities for Using Role-Play Simulations for Civic and Stakeholder Engagement

In reflecting on the strengths and limitations of role-play simulations, as well as lessons learned for simulation design and use, I see the following as particularly promising opportunities for using RPS exercises as a civic education and engagement tool:
A tool for transformative civic education and engagement around science-intensive environmental and social issues: My findings provide evidence that tailored, science-based role-play simulations do, as I hypothesized, offer a promising approach for educating and engaging decision-makers, stakeholders, and the public around climate change adaptation and other science-intensive environmental issues. They are likely similarly effective for a variety of other science-intensive public policy and planning issues.

A tool for priming the pump for collaborative decision-making: My findings suggest that, in addition to having great value as a civic education and engagement strategy, RPSs may be particularly well suited to prime people to actually engage in collaborative processes when complex science is at play. As discussed above, role-plays can increase concern about science-intensive issues and support for action; enrich participants’ understanding of complex issues; increase empathy for different perspectives and interests; familiarize participants with collaborative processes; engage participants in learning together and from one another; and start conversations about tough issues. In light of these strengths, they may be useful for engaging stakeholders and decision-makers prior to participation actual collaborative decision-making process. They could provide a “collaboration flight simulator.”

Since participants would be carefully selected to participate in role-plays if they were used this way, participant self-selection bias would not be an issue. Additionally, using RPS exercises in this way would allow the simulations to be run as part of half-day and even full-day workshops, providing more time for thoroughly introducing and
debriefing the exercise. Having more time to engage participants would also allow for greater integration of scientific and technical details into the simulated decision-making process. Since such a process would be intended to lead into actual collaborative decision-making or other similar processes, such an approach would – by its very design – capture and build on the momentum created by the role-play simulation experience in a way that is difficult to do in a more general awareness-building effort such as NECAP.

A tool for teaching collaborative problem-solving in a traditional education environment:
Based on my findings and experience with NECAP, I also see great potential for using science-based RPS exercises as a tool for teaching college students (and potentially advanced high school students) about collaborative decision-making, particularly in the context of complex science-intensive public policy issues. If used in this way, they could introduce adult learners to approaches such as consensus building, while helping them gain familiarity with the social and policy implications of science. I see great potential for these kinds of exercises to be integrated into both science and policy classes at the undergraduate and graduate level – not just for teaching negotiation and dispute resolution, but also as part of standard curricula. See Stokes and Selin (2014) for an example of the use of science-based role-play simulations in a college education context.

Combining role-play with models and computer simulations: Another very promising avenue for using role-play simulations in a civic engagement context is to combine face-to-face RPS exercises with computer simulations that can provide real-time feedback to inform simulated decision-making. One of the limitations of traditional multi-stakeholder
negotiation simulations like those used in NECAP is their lack of feedback on decisions. Reaching agreement is the goal; participants do not get any feedback on whether the agreement they reached was effective, efficient, and/or otherwise desirable. Computer simulations along the lines of those used by John Sterman at MIT can create a “microworld” that “compresses time and space, allowing managers to experience the long-term, system-wide consequences of decisions” (Senge and Sterman 1992: 138). Integrating such simulations into face-to-face role-plays like those used in NECAP may be helpful for moving participants through the experiential learning cycle discussed in Chapter 2; having real-time feedback on decisions can better allow participants to reflect on their decisions, learn from the experience, and then try new actions based on what they have learned (from the real time feedback), all within the context of the same simulation.

While adding a computer simulation or some other form of real-time feedback into a RPS may be helpful for participant learning, it is important to emphasize that my findings suggest that the face-to-face element of role-plays is enormously valuable. Hence, I suggest that face-to-face role-play should be the core of any hybrid role-play and computer simulation approach.

7.5. Directions for Future Research
In many ways, I feel I have only scratched the surface of the NECAP results. Beyond simply allowing us to explore whether tailored science-based RPS exercises can be effective for civic engagement and transformative learning, this data will allow us to explore many interesting and important nuances, such as:
To what extent does playing a role significantly different from one’s real life role matter for transformative learning?

Do people who play the facilitator role experience the same kind of learning, less learning, or different learning than people who play stakeholder roles in the simulation?

Does the diversity of participants at a workshop matter for participant learning? Does greater diversity lead to a more or less rich learning experience?

Does what happens in one’s game group matter for learning? For example, does having a participant in a group who does not really suspend disbelief and/or does not really engage affect other group members’ learning? Do people in groups that really engage in value creation and creative problem solving learn more or have a more transformative experience?

To what extent does the quality of the introduction and/or debriefing matter? Is this a key determinant of learning?

I anticipate further exploring the NECAP data to begin to explore these kinds of nuances, which will help us better understand and target the use of RPS exercises for civic education and engagement.

Beyond further exploring the NECAP data, there are a number of research questions and directions for future inquiry that emerge from this study.

First off, this study did not quantitatively measure the persistence of participants’ perspective shifts, although follow-up interviews suggest that many participants experienced perspective changes and learning effects that lasted for at least a couple weeks after the event. More research on the persistence of perspective changes is merited.
On a related note, the extent to which transformative learning experienced by NECAP participants will actually lead to action or changes in behavior was not assessed through this study. Future research should explore the extent to which the kinds of perspective shifts created by the simulations do – or do not – lead to action, as well as what kinds of follow-up efforts are needed to translate such learning into actual behavior change. Follow-up research on NECAP workshop participants could provide insight into questions of both the persistence of perspective shifts and the extent to which transformative learning from RPSs does or does not translate into action and behavior change.

While this study has shed some light on the mechanism through which RPSs catalyze transformative learning in a civic engagement context, more rigorous study that is designed to illuminate causality is merited.

Additionally, a very valuable line of research would be to compare role-play simulations to other approaches for civic engagement, as well as to use a control group. This would valuably illuminate the effectiveness of this approach in contrast to other potential civic education and engagement approaches.

The effectiveness of role-play simulations in affecting transformative learning among more socio-economically diverse communities also merits additional research. While data from NECAP suggest that, at least within coastal New England communities, the effects of the simulations are likely to be similar across demographics, these findings may or may not be generalizable to much more ethnically and economically diverse municipalities.
I also feel there is great potential for advancing our methods for measuring transformative learning – in the context of learning from role-play simulations and collaborative processes and otherwise. While I have confidence in the data collection methods used in NECAP (questionnaires, follow-up interviews, and observation), it would be valuable to experiment with using approaches such as cognitive mapping (see for example Senge and Sterman 1994) to elicit and portray the mental models of individuals and groups before and after an intervention, such as participation in a role-play simulation. Social psychology and related fields may have other useful approaches, such as decision-making exercises, that could also advance our ability to really measure and make sense of transformative learning.

A rather fine-grained but yet interesting question that emerged from the NECAP data is whether people who are more introverted in personality (such as according to a Myers Briggs like personality test) interact differently with role-play simulations than do people who are more extroverted in personality. More specifically, based on reading through all of the NECAP interviews, I hypothesize that introverts are less likely to choose to participate in an RPS, and that they may have a harder time really getting into the exercise than do extroverts. If this is the case, this may influence how we use these exercises in a civic engagement and classroom setting, and is therefore worth further investigation.

Finally, and I think most interestingly, the findings from my analysis of NECAP data have piqued my interest in the potential of tailored, science-based RPS exercises as a way to prime the pump for collaborative problem solving and increase stakeholder readiness to engage in collaborative decision-making processes. I am quite curious about
the extent to which RPSs can build the readiness and capacity of stakeholders and decision-makers to actually participate in collaborative processes, and anticipate doing research on this in the near future. I am also very interested in the potential of such exercises to teach traditional higher education students about the science-policy interface and to familiarize students with more collaborative approaches for decision-making around complex public policy issues. Further, as noted above, I see great potential for combining multi-stakeholder negotiation exercises with computer simulations as a way to embed real-time feedback into the mock collaborative decision-making process. Based on my findings, I believe that all of these directions for the use of RPS exercises for civic engagement are exciting and merit further research.

7.6. Concluding Thoughts
While many questions remain and merit additional research, my findings provide evidence that tailored, science-based role-play simulations offer a valuable approach for communicating complex scientific ideas to decision-makers, stakeholders, and the public, and helping people understand the risks they face and how they might respond to them. Further, my results show such simulations can successfully introduce participants to collaborative decision-making approaches and bring together diverse stakeholders to talk about difficult issues. As such, they offer a valuable tool for building the capacity of communities to collaboratively address the science-intensive environmental issues and risks they collectively face.
# APPENDIX A: Overview of New England Climate Adaptation Project Role-Play Simulation Roles and Issues

## Shoreham Game – Barnstable, Massachusetts

<table>
<thead>
<tr>
<th>Role title</th>
<th>Role description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Town Manager</td>
<td>The Assistant Town Manager oversees budgeting and finances in the town. The Town Manager has been concerned about covering the cost of much-needed improvements for aging infrastructure while keeping taxes as low as possible.</td>
</tr>
<tr>
<td>Town Planner</td>
<td>The Town Planner is in charge of long-range planning through the Planning Department, which oversees implementation of Shoreham’s Master Plan and enforces zoning requirements. The Town Planner is very concerned about coastal flooding and is excited to have help from climate change advisors from nearby Brackley College.</td>
</tr>
<tr>
<td>Association to Protect Shoreham County, Executive Director</td>
<td>The Association to Protect Shoreham County is a well-known environmental group that has worked hard to improve water quality in the region’s rivers and ponds and to conserve wetlands. Recently, the Association has raised opposition to coastal armoring in neighboring towns.</td>
</tr>
<tr>
<td>Shoreham Chamber of Commerce, Executive Director</td>
<td>The Shoreham Chamber of Commerce represents over 300 businesses, about a third of which are tourism-related. Quite a few are located on the water, and even more are located in Shoreham’s downtown business district, about half of which is in the 500-year floodplain. The director owns a private marina and boat repair shop in Shoreham Harbor. The marina suffered some damage in the most recent storm, yet the director remains skeptical of Brackley College’s climate change projections.</td>
</tr>
<tr>
<td>Shoreham Realty, Owner</td>
<td>The owner of Shoreham Realty focuses on high-value residential property along the town’s waterfront. Only a few of these property owners are active in town government, and Shoreham Realty often finds itself representing their interests (as a sizeable portion of the town’s tax base) in town politics.</td>
</tr>
<tr>
<td>Shoreham Shores Civic Association, President</td>
<td>Shoreham Shores is a middle-class neighborhood made up of single-family homes, over half of them located on or near the waterfront. The Civic Association has been quite vocal in its opposition to property tax increases, though some of its members have become increasingly worried about damage to their homes as a result of coastal flooding.</td>
</tr>
<tr>
<td>Facilitator</td>
<td>For this final meeting, the Assistant Town Manager invited a trained facilitator—someone entirely neutral—to help with the discussion and keep the parties engaged. Everyone has agreed that having a facilitator from the local college will be beneficial to the group’s discussion.</td>
</tr>
</tbody>
</table>
### Issues

#### Adaptation Options

<table>
<thead>
<tr>
<th>1 – Flood Protection Infrastructure</th>
<th>1.1 – Do nothing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.2 – Create a town-wide buy back program for coastal armoring</td>
</tr>
<tr>
<td></td>
<td>1.3 – Mandate that all armored properties remove armoring within two years</td>
</tr>
<tr>
<td></td>
<td>1.4 – Allow properties in vulnerable zones to armor their coastline</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2 – Flood-proofing</th>
<th>2.1 – Do nothing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.2 – Require homes and businesses in the 100-year floodplain to flood-proof.</td>
</tr>
<tr>
<td></td>
<td>2.3 – Offer flood-proofing subsidies to homes and businesses in the 100-year floodplain.</td>
</tr>
<tr>
<td></td>
<td>2.4 – Require homes and businesses in the 500-year floodplain to flood-proof.</td>
</tr>
<tr>
<td></td>
<td>2.5 – Offer flood-proofing subsidies to homes and businesses in the 500-year floodplain.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 – Land Use Management</th>
<th>3.1 – Do nothing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.2 – Reduce future development in the 100-year floodplain through new zoning regulations</td>
</tr>
<tr>
<td></td>
<td>3.3 – Reduce future development in the 500-year floodplain through new zoning regulations</td>
</tr>
<tr>
<td></td>
<td>3.4 – Apply for state/federal funds to buy back impacted properties in the 100-year floodplain</td>
</tr>
</tbody>
</table>

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**Milton Game – Cranston, Rhode Island**

<table>
<thead>
<tr>
<th>Role title</th>
<th>Role description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning Director</td>
<td>The Planning Director oversees all planning effort in Milton, including zoning code updates, master plan updates, and preparation of the hazard mitigation plan.</td>
</tr>
<tr>
<td>Public Works Director</td>
<td>The Public Works Director maintains Milton’s infrastructure, including its stormwater system, wastewater system, and roads. The Director is trained as a civil engineer and has worked in Milton for 25 years.</td>
</tr>
<tr>
<td>Executive Director, Community Action Partners</td>
<td>Community Action Partners is a not-for-profit social service organization that serves the needs of Milton’s low-income residents with health programs, job training programs, and childcare.</td>
</tr>
<tr>
<td>President, Chamber of Commerce</td>
<td>The Chamber of Commerce represents the business community in Milton. The President wants to make sure that Milton remains a “business-friendly” city with low taxes and minimal regulations.</td>
</tr>
<tr>
<td>Chairperson, Geneva Heights Neighborhood Association</td>
<td>Geneva Heights is a working and middle class neighborhood in the lower Granite River area. About 6% of the neighborhood is located in the 100-year floodplain and about 15% of the neighborhood is located in the 500-year floodplain. Several homes were badly damaged in the last flood.</td>
</tr>
<tr>
<td>Executive Director, Alliance for Watershed Health</td>
<td>The Alliance for Watershed Health is a long-time environmental advocacy group focused on improving the ecology of Granite River. The Executive Director and Alliance for Watershed Health have been actively pursuing opportunities for restoration projects along the Granite River.</td>
</tr>
<tr>
<td>Facilitator</td>
<td>The Task Force invited a trained, neutral facilitator to help move the discussion along and keep the parties engaged. Everyone has agreed to work with this facilitator.</td>
</tr>
<tr>
<td>Issues</td>
<td>Adaptation Options</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------</td>
</tr>
<tr>
<td>1 – Managing flood risks in the Lower Granite River area</td>
<td>1.1 – Do nothing</td>
</tr>
<tr>
<td></td>
<td>1.2 – Floodwalls</td>
</tr>
<tr>
<td></td>
<td>1.3 – Flood-proofing buildings</td>
</tr>
<tr>
<td></td>
<td>1.4 – Flood-proofing infrastructure</td>
</tr>
<tr>
<td></td>
<td>1.5 – Buy-back program for properties in the floodplain</td>
</tr>
<tr>
<td>2 – Managing growth in Northern Milton</td>
<td>2.1 – Do nothing</td>
</tr>
<tr>
<td></td>
<td>2.2 – Incorporate low impact development into city planning regulations</td>
</tr>
<tr>
<td></td>
<td>2.3 – Purchase of development rights program</td>
</tr>
</tbody>
</table>

**Northam Game – Dover, New Hampshire**

<table>
<thead>
<tr>
<th>Role title</th>
<th>Role description</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Engineer</td>
<td>All subdivision plans have to be reviewed by the City Engineer before they can be approved. He or she also approves all city-led construction projects. The Engineer is highly pragmatic and wants to be sure the city is prepared to implement any changes it approves.</td>
</tr>
<tr>
<td>Planning Director</td>
<td>Northam’s Planning Director has been eager to incorporate climate change into the city’s planning for a long time, but there has not been enough political will to do so until now. The Planning Director played a strong role in determining which Advisory Committees would meet, and in what order.</td>
</tr>
<tr>
<td>Public Works Director</td>
<td>The Public Works Director oversees all of the city’s infrastructure construction and maintenance. He or she has been complaining for years that the city’s stormwater system is failing and underfunded. His or her biggest concern about climate change is the potential impact on the aquifer and drinking water.</td>
</tr>
<tr>
<td>Resident</td>
<td>The Resident has lived in Northam for 45 years and has been active in civic affairs most of that time, particularly in the last decade. He or she is a fiscal conservative and skeptical about concerns related to climate change. The Planning Director asked the Resident to participate to represent taxpayers and private citizens in the process.</td>
</tr>
<tr>
<td>Chamber of Commerce President and Developer</td>
<td>The Chamber President is a long-time resident and developer in Northam. He or she is known for being an amiable but unyielding negotiator. Some of Northam’s oldest and most respected businesses are members of the Chamber and count on the President to represent their interests.</td>
</tr>
<tr>
<td>Conservation Commission Chair</td>
<td>The Conservation Commission is responsible for developing, protecting, and supporting the natural resources of Northam and for promoting awareness of conservation practices and policies throughout the city. The Conservation Commission Chair was the person who demanded that Northam request the climate change impacts study from Sharpton College, and has been the most vocal supporter of the Planning Department’s effort to incorporate climate change into its Master Planning.</td>
</tr>
<tr>
<td>Facilitator</td>
<td>The Planning Board invited a trained, neutral facilitator to help move the discussion along and keep the parties engaged. Everyone has agreed to work with this facilitator.</td>
</tr>
<tr>
<td>Issues</td>
<td>Adaptation Options</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1 – Precipitation data and projections: Which climate change projections should engineers be required to use when designing stormwater infrastructure?</td>
<td>1.1 – No new requirement. Engineers continue to use the state’s data from 1960-2010</td>
</tr>
<tr>
<td></td>
<td>1.2 – Change the regulation to require all new stormwater infrastructure designs to use Sharpton College's &quot;better case&quot; scenario climate change projections</td>
</tr>
<tr>
<td></td>
<td>1.3 – Change the regulation to require all new stormwater infrastructure designs to use Sharpton College’s &quot;worse case&quot; scenario climate change projections</td>
</tr>
<tr>
<td>2 – Stormwater management: How much stormwater should developers be required to manage on-site?</td>
<td>2.1 – No change to the regulation. Developers continue to be responsible only for the difference between the amount of stormwater the site currently generates and what it will generate after their project is complete.</td>
</tr>
<tr>
<td></td>
<td>2.2 – Require developers to calculate the total amount of stormwater their design will produce in comparison to the amount of stormwater the site could manage if it were land in its natural state. Require low-impact development to manage the difference on-site.</td>
</tr>
<tr>
<td>3 – Timing: If there are any changes to the regulation, when should they go into effect?</td>
<td>3.1 – Immediately, except all development applications that have already been approved</td>
</tr>
<tr>
<td></td>
<td>3.2 – Sometime in the next six months</td>
</tr>
<tr>
<td></td>
<td>3.3 – At the same time the Master Plan update is complete (in one year)</td>
</tr>
</tbody>
</table>

**Launton Game – Wells Maine**

<table>
<thead>
<tr>
<th>Role title</th>
<th>Role description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town Planner</td>
<td>The Town Planner oversees all planning efforts in Launton including zoning code revisions and updates to the Comprehensive Plan. S/he is knowledgeable about climate risks to the community and the environment and is focused on Launton’s long-term environmental and fiscal health. The Town Planner wants to reach an agreement that allows Launton to begin to reduce risks now, before the consequences of inaction get worse.</td>
</tr>
<tr>
<td>Emergency Management Director</td>
<td>The Town’s Emergency Management Director is very concerned about the impact of extreme weather events on coastal neighborhoods and infrastructure – not just flooding but also heat waves and power outages from storms. The Director wants to ensure that evacuation procedures are in place to protect residents and visitors in an emergency. There has been increasing pressure on the emergency management budget because Launton has recently experienced so many serious storms.</td>
</tr>
<tr>
<td>Town Councilor</td>
<td>The Town Council representative is especially concerned about protecting the town’s economy and way of life. The Councilor is acutely aware that the majority of the town’s year-round, voting residents do not live near the coast and are reluctant to spend money protecting expensive vacation homes. However, s/he understands how important coastal businesses and tourism are to the town’s economy and tax base.</td>
</tr>
</tbody>
</table>
Executive Director of the Great Coast Regional Land Trust

A non-profit that has been operating in Launton for over ten years, the Land Trust is dedicated to preserving undeveloped land and helping monitor beach and water quality. The Executive Director of the Land Trust is particularly concerned about the health of the marsh ecosystem and wants to stop sprawling development in inland watersheds. S/he is on the Task Force because the Land Trust has been a valuable partner in helping the town with land conservation and environmental monitoring.

Executive Director of the Launton Chamber of Commerce

The Chamber’s mission is to advance business interests in Launton. Many of the Chamber’s members do not believe that climate change is a serious threat. They are more concerned with the day-to-day challenges of running their businesses and do not support new regulations on new development or tax increases.

Chairperson of the Brewer’s Cove Neighbors Association

The Association is comprised of homeowners who live along the coast. Some members are skeptical about climate change, but they all know that some parts of the neighborhood are now at risk from storms. Many of the Association’s members are not year-round residents and do not vote in the town. They do have political clout, though, because they pay so much in taxes. Other Association member families have lived in Brewer’s Cove for generations and are deeply attached to the neighborhood.

Facilitator

The Task Force invited a trained, neutral facilitator to help move the discussion along and keep the parties engaged. Everyone has agreed to work with this facilitator.

<table>
<thead>
<tr>
<th>Issues</th>
<th>Adaptation Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Reducing risk to existing coastal development</td>
<td>1.1 – Pursue seawall strategy (Protect)</td>
</tr>
<tr>
<td></td>
<td>1.2 – Expand flood-proofing ordinance to the 500-year flood plain (Accommodate)</td>
</tr>
<tr>
<td></td>
<td>1.3 – Buyback program for at-risk development (Retreat)</td>
</tr>
<tr>
<td>2 – Reducing risk associated with future coastal development</td>
<td>2.1 – Focus on upgrading coastal infrastructure (Protect)</td>
</tr>
<tr>
<td></td>
<td>2.2 – Encourage new development inland (Retreat)</td>
</tr>
<tr>
<td></td>
<td>2.3 – Encourage new development inland, combined with a town conservation plan (Retreat)</td>
</tr>
</tbody>
</table>
APPENDIX B: Workshop Debriefing Protocol

NECAP workshop debriefing questions/prompts:

1. Ask for a very quick report-out on outcomes from the different tables:
   • Note if the outcomes were diverse or similar
     o Comment on the fact that everyone had the same instructions, but they reached different solutions. This shows that what each town does will have to be appropriate for the people, resources, etc. that town has.
   • If the facilitator had a hard time: reflect on how a trained facilitator may help with this process and comment on the fact that this is a lot to cover in an hour; real decisions like this take much more time.

2. Substance: What did you learn about climate change adaptation or making public decisions about climate-related risk management?

3. Empathy: What did it feel like to walk in someone else’s shoes?

4. Collaboration: People had different perspectives and interests – did you try to create a solution that worked for everyone? How? How did that work out?

5. Connecting the simulation back to real life questions:
   • What struck you as very real or relevant to towns like yours?
   • Should your town or others on the coast be concerned about climate change? Why?
   • How should your town make decisions?
   • What are some next steps your town might take?
APPENDIX C: Pre-Workshop and Post-Workshop Questionnaires

NECAP Before-Survey

Please fill out this survey before you play the Adaptation Game. Take as much time as you need to thoroughly read and respond to questions. All information you provide will remain confidential. Please circle one answer unless otherwise specified.

Thank you!

1. Do you ever think about whether a change in the climate could affect your community?
   a. Yes, often
   b. Every once in a while
   c. I have once or twice
   d. No, not really

2. How concerned are you about the possible impacts a changing climate might have on your town?
   
   1 - 2 - 3 - 4 - 5
   Not at all concerned Somewhat concerned Very concerned

3. What do you think the most significant impacts of a change in the climate might be for your community? (Please select up to 3 options)
   a. There will be no significant impact
   b. Increased flooding risk
   c. More severe storms
   d. Increased need for air conditioning or home cooling
   e. Increased poverty
   f. Health impacts
   g. Ecosystem impacts
   h. Higher taxes
   i. Impacts on infrastructure
   j. Other: __________

4. If the climate is changing, who do you think should be responsible for preparing for the possible impacts this might have on your community? (Please select up to 3 options)
   a. Individuals
   b. Neighborhoods
   c. Businesses
   d. The City/Town government
   e. The state government
   f. The national government
   g. Other: __________

5. To what extent do you agree with the following: When making decisions today, decision-makers in my town should take into account scientific projections about what the climate might be like in 50 years.
   
   1 - 2 - 3 - 4 - 5
   Totally disagree Neither agree nor disagree Strongly agree

PLEASE CONTINUE ON NEXT PAGE
6. What do you think local decision-makers should do now to address climate change, if anything? (Please select only the single most urgent option)
   a. Nothing
   b. There is nothing local decision-makers can do
   c. Wait to see what the impacts are and then act accordingly
   d. Build major new infrastructure
   e. Change the way they make everyday planning and infrastructure decisions
   f. Raise the taxes to cover the costs of responding to a changing climate
   g. Restrict development on the waterfront
   h. Other: ____________________________

7. How “risksy” do you think climate change is?
   
<p>| | | | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Very High</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

8. If the climate is changing, who do you think should help make decisions about how your town should respond? (Please select up to 3 options)
   a. Local elected officials
   b. Local government departments
   c. Local emergency management personnel
   d. Local businesses
   e. Homeowners and residents
   f. State government officials
   g. National officials
   h. Insurance companies
   i. Other: ____________________________

9. How should your town deal with development in areas that are at high risk from flooding or damage from major storms? (Please select up to 3 options)
   a. Nothing; this is the responsibility of land owners
   b. Stop continued development in high risk areas
   c. Move homes and buildings out of the floodplain and away from vulnerable coasts
   d. Invest in low impact, ecological solutions such as restoring flood plains
   e. Build flood and storm protection, such as sea walls and flood walls
   f. Require that homes in high-risk areas be prepared for risks, such as being built on stilts
   g. Other: ____________________________

PLEASE CONTINUE ON NEXT PAGE
10. What is most likely to prevent your community from taking action in relation to potential climate change risks? (Please select up to 3 options)
   a. Nothing; my community is prepared
   b. Lack of scientific information
   c. Lack of agreement about what actions to take
   d. Lack of funding or financial resources
   e. Lack of technical know-how/capacity
   f. Lack of public support
   g. Lack of political will
   h. Other: ______________

11. How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

   1 - Not at all confident
   2 - Somewhat confident
   3 - Very confident
   4 - Somewhat confident
   5 - Very confident

12. How important is it that residents, local groups, and businesses be involved in deciding how to respond to climate change risks?

   1 - Not at all important
   2 - Somewhat important
   3 - Very important
   4 - Not at all important
   5 - Very important

13. How significant do you think climate change should be in your town’s planning and decision making over the next ten years?

   1 - Not at all significant
   2 - Somewhat significant
   3 - Very significant
   4 - Not at all significant
   5 - Very significant

14. How significant do you think climate change will actually be in your town’s planning and decision making over the next ten years?

   1 - Not at all significant
   2 - Somewhat significant
   3 - Very significant
   4 - Not at all significant
   5 - Very significant

15. How did you first hear about this workshop? (Please select one option)
   a. From a friend
   b. Newspaper
   c. Email
   d. Flyer or public notice
   e. Other: ______________

PLEASE CONTINUE ON NEXT PAGE
16. Why did you choose to attend this workshop? (Please select the most important reason)
   a. Special invitation
   b. Curiosity
   c. Encouraged by a friend or colleague
   d. Concern about climate change risks
   e. I'm involved in climate change-related work
   f. Other: ____________________

17. Do you belong to any non-profit groups that regularly advocate on behalf of environmental conservation and/or protection?
   e. No
   b. Yes, a national group (like The Nature Conservancy or National Audubon Society, etc.)
   c. Yes, a local group (like a watershed alliance or local conservation committee, etc.)
   d. Yes, other: ____________________

18. What is your gender?
   a. Male
   b. Female

19. What is your age group?
   a. 19 or under
   b. 20-29
   c. 30-39
   d. 40-49
   e. 50-59
   f. 60+

20. How long have you been a member of this community?
   a. Less than 1 year
   b. 1-3 years
   c. 3-10 years
   d. 10-20 years
   e. 20+ years
   f. Other, ____________________

21. What seasons are you usually in residence in this town? (Please check all that apply)
   a. Year round
   b. Summer
   c. Autumn
   d. Winter
   e. Spring
   f. Holidays only
   g. I am here sporadically
   h. Other, ____________________
NECAP After-Survey

Please fill out this survey after the debriefing of the Adaptation Game has been completed.

Many of the questions are similar to the survey you took before playing the game, but slightly different. Please take as much time as you need to thoroughly read and respond to the questions. Your responses will remain confidential.

Thank you!
1. What table number were you sitting at: _______

2. Did the participants at your table reach an agreement?
   a. Yes, all six stakeholders reached consensus
   b. Yes, five out of six stakeholders agreed
   c. No, we did not reach agreement

3. Did the exercise affect your views about climate change?
   a. Yes
   b. Not really
   c. Not sure

4. Following the exercise, how concerned are you about the impacts a change in the climate might have on your town?
   1 - 2 - 3 - 4 - 5
   Not at all concerned - Somewhat concerned - Very concerned

5. To what extent do you agree with the following: When making decisions today, decision-makers in my town should take into account scientific projections about what the climate might be like in 50 years.
   1 - 2 - 3 - 4 - 5
   Totally disagree - Neither agree nor disagree - Strongly agree

6. Who do you feel should be responsible for preparing your town for the possible impacts of a changing climate? (Please select no more than 3)
   a. Individuals
   b. Businesses
   c. The state government
   d. Neighborhoods
   e. The national government
   f. Other: ____________________________
   g. The City/Town government

7. What do you think local decision-makers should do to address climate change, if anything? (Please select only the single most urgent option)
   a. Nothing
   b. There is nothing local decision-makers can do
   c. Wait to see what the impacts are and then act accordingly
   d. Build major new infrastructure
   e. Change the way they make everyday planning and infrastructure decisions
   f. Raise the taxes to cover the costs of responding to a changing climate
   g. Restrict development on the waterfront
   h. Other: ____________________________

PLEASE CONTINUE ON NEXT PAGE

3
8. If the climate is changing, who do you think should help make decisions about how your town should respond? (Please select up to 3 options)
   a. Local elected officials
   b. Local government departments
   c. Local emergency management personnel
   d. Local businesses
   e. Homeowners and residents
   f. State government officials
   g. National officials
   h. Insurance companies
   i. Other: ______________

9. How should your town deal with development in areas that are at high risk from flooding or damage from major storms? (Please select no more than 3)
   a. Nothing; this is the responsibility of land owners
   b. Stop continued development in high risk areas
   c. Move homes and buildings out of the floodplain and away from vulnerable coasts
   d. Invest in low impact, ecological solutions such as restoring flood plains
   e. Build flood and storm protection, such as sea walls and flood walls
   f. Require that homes in high-risk areas be prepared for risks, such as being built on stilts
   g. Other: ______________

10. If the climate is changing, what is most likely to prevent your community from taking action? (Please select no more than 3)
    a. Nothing; my community is not prepared
    b. Lack of scientific information
    c. Lack of agreement about what to do about it
    d. Lack of funding or financial resources
    e. Lack of technical knowledge/capacity
    f. Lack of public support
    g. Lack of political will
    h. Other: ______________

11. How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?
    1 - 2 - 3 - 4 - 5
    Not at all confident Somewhat confident Very confident

12. How important is it that residents, local groups, and businesses be involved in deciding how to respond to changing climate risks?
    1 - 2 - 3 - 4 - 5
    Not at all important Somewhat important Very important

PLEASE CONTINUE ON NEXT PAGE
13. How significant do you think climate change should be to be in your town’s planning and decision making over the next ten years?

1. Not at all significant 2. Somewhat significant 3. Very significant

14. How significant do you think climate change will actually be to be in your town’s planning and decision making over the next ten years?

1. Not at all significant 2. Somewhat significant 3. Very significant

15. Has your confidence in the ability of your town to prepare for the risks of a changing climate changed as a result of your participation in this exercise?

1. Less confident 2. No change 3. More confident

16. Do you think your town should use a decision-making process like that modeled in the exercise to reach agreement about how your town should respond to possible climate change impacts?

   a. Yes, and it already is happening soon  
   b. Yes, and I could see this happening soon  
   c. Yes, but it isn’t realistically going to happen any time soon  
   d. No, this wouldn’t be helpful  
   e. Not sure  
   f. Other:  

17. Which type of industry most accurately describes your primary field? (please select one):

   a. Agriculture, forestry, fishing and hunting, mining  
   b. Construction  
   c. Manufacturing  
   d. Wholesale trade  
   e. Retail trade  
   f. Transportation, warehousing, and utilities  
   g. Information  
   h. Finance and insurance, and real estate rental and leasing  
   i. Professional, scientific, and management and administrative services  
   j. Educational services, and health care and social assistance  
   k. Arts, entertainment, and recreation, and accommodation and food services  
   l. Public administration  
   m. Other:  

PLEASE CONTINUE ON NEXT PAGE
18. How would you describe your political views?
   a. Conservative
   b. Liberal
   c. Independent
   d. Other: ______________________

19. What is the highest level of education you have completed?
   a. No formal schooling completed
   b. High school graduate (or equivalent)
   c. Bachelor’s degree (BA, BS, AB, etc)
   d. Graduate degree (JD, MA, MSc, PhD)
   e. Other: ______________________

20. Could you estimate your household’s total income for the most recent calendar year?
   a. Less than $14,999
   b. $15,000 to $24,999
   c. $25,000 to $34,999
   d. $35,000 to $49,999
   e. $50,000 to $74,999
   f. $75,000 to $99,999
   g. $100,000 to $149,999
   h. $150,000 or more
   i. I’d rather not say

21. Did you learn something from the exercise that you might be able to apply to your own decisions?
   • Not really
   • Yes (please briefly explain): ________________________________

22. Please write a few lines describing your reaction to the exercise and anything else you'd like to share with us about this experience:

END OF SURVEY – THANK YOU FOR YOUR PARTICIPATION!
APPENDIX D: Semi-Structured Protocol for Workshop Follow-Up Interviews

NECAP Follow-up Interviews
Semi-Structured Interview Protocol

Permission
1. Would it be all right if I recorded this conversation? Yes  No
2. Do you give permission for your title, name or direct quotes to be used in our research report? Yes  No

Interview questions

1. Tell me a little bit about who you are and why you attended the [date and location] Workshop.
   a. What is your name, title, and organization
   b. How involved in [name of town/s] climate change planning/hazard mitigation
   c. What were you hoping to get from workshop?

2. Since participating in the workshop, have you talked with anyone (family, friends, colleagues) about the experience?
   a. What did you tell them?

3. Prior to the workshop, had you really thought about how climate change might affect [name of town/city]?
   a. How would you describe your concern about climate change impacts on [name of town/city] before the workshop
   b. Do you feel that the workshop changed your concern in any way? [Get them to elaborate on this]

4. Did you find the role-play simulation enjoyable? Interesting? How so?

5. Were the role you played and related interests similar or quite different from your real-life role and interests?
   a. How did it feel to “step into someone else’s shoes” for a while?

6. Prior to the workshop, whose would you have said should be directly involved in preparing for climate change? (e.g., individual property owners, the planning department, state agencies)
   a. Do you feel your participation in the simulation changed who you think should be involved? [Get them to explain]
   b. Who else do you think should have “been at the table” in the decision-making process we modeled in the exercise?

7. Do you feel that your participation in this simulation has changed your perspective on whether and how your community should plan for climate change?
   a. Can you explain what about the simulation led to this change?
b. How might this influence your involvement in your community going forward?

8. Did the simulation make you think differently in any way about the challenges and barriers that [name of town/city] and similar communities are likely to face in trying to prepare for and manage climate change risks?
   a. How do you think the simulation led to this change?
   b. Given what you just told me, what would you recommend your community do to plan for climate change? Why?

9. In the simulation, we modeled a process of facilitated problem-solving, which we call the consensus building approach. Do you think this sort of process might help your community or organization prepare for climate change impacts? Who should be involved, if so?

10. Is there anything else that you feel you have taken away from participating in the simulation? [Ask about climate change risks, engaging diverse stakeholders in planning, the consensus building approach, the challenges of making decisions in the context of uncertainty, etc]
    a. Please explain how the role-play simulation affected you in this way.
    b. Do you think that these lessons could easily be learned in other ways, or did you find the simulation to be particularly effective? Why?

11. Based upon your experience and the experience of your group, do you feel that role-play simulations would help your community learn about and plan for climate change? Would you recommend that your friends and colleagues participate in a workshop?
    a. How so? Why?

12. Is there anything else you would like to tell me about your participation in the role-play simulation?
    a. Was there anything you didn't like, things you particularly liked, things you thought were particularly interesting?

13. Are there any individuals or groups that you suggest we reach out to as potential participants or co-host organizations for future workshops?
APPENDIX E: Questionnaires for 2013 and 2014 Public Opinion Polls

Questions used for Triton Poll 1 (May 2013)

Introduction: This survey is being sponsored by the New England Climate Adaptation Project. The Project is under the auspices of the Consensus Building Institute (CBI), a Massachusetts based non-partisan, non-profit. Project team members include CBI staff, MIT graduate students and faculty, and others. The project is funded by the University of New Hampshire under a cooperative agreement with the National Estuarine Research Reserve Program. The purpose of the survey is to better understand citizen views related to local community planning and the potential risks of climate change. The survey sponsor does not lobby or advocate on behalf of any particular viewpoint on the subject of climate change. The survey results will only be used for academic research purposes and not for any political campaign or effort. All answers will be compiled in total and all responses held anonymous and confidential.

1. Do you ever think about whether a change in the climate could affect your community?
   a. Yes, often
   b. Every once in a while
   c. Have once or twice
   d. No, not really

2. How concerned are you about the possible impacts a changing climate might have on your town?
   1 - 2 - 3 - 4 - 5
   Not at all concerned  Somewhat concerned  Very concerned

3. What do you think the most significant impacts of a possible change in the climate might be for your community? (Please select up to 3 options)
   a. There will be no significant impact
   b. Increased flooding risk
   c. More severe storms
   d. Increased need for air conditioning or home cooling
   e. Increased poverty
   f. Health impacts
   g. Ecosystem impacts
   h. Higher taxes
   i. Impacts on infrastructure
   j. Other: ___________

4. If the climate is changing, who do you think should be responsible for preparing for the possible impacts this might have on your community? (Please select up to 3 options)
   a. Individuals
   b. Neighborhoods
   c. Businesses
   d. The City/Town government
   e. The state government
   f. The national government
   g. Other: ___________

5. To what extent do you agree with the following: When making decisions today, decision-makers in my town should take into account scientific projections about what the climate might be like in 50 years.
   1 - 2 - 3 - 4 - 5
   Totally disagree  Neither agree nor disagree  Strongly agree
6. How “risky” do you think climate change is:
   
   1 - Very High  2 - High  3 - Moderate  4 - Low  5 - Very Low

7. How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?
   
   1 - Not at all confident  2 - Somewhat confident  3 - Very confident

8. How important is it that residents, local groups, and businesses be involved in deciding how to respond to climate change risks?
   
   1 - Not at all important  2 - Somewhat important  3 - Very important

9. How significant do you think addressing climate change risk should be in your town’s planning and decision making over the next ten years?
   
   1 - Not at all significant  2 - Somewhat significant  3 - Very significant

10. How significant do you think climate change will actually be in your town’s planning and decision making over the next ten years?
    
   1 - Not at all significant  2 - Somewhat significant  3 - Very significant

11. What is your gender?
    a. Male  
    b. Female

12. What is your age group?
    a. 19 or under  
    b. 20-29  
    c. 30-39  
    d. 40-49  
    e. 50-59  
    f. 60+

13. How long have you been a member of this community?
    a. Less than 1 year  
    b. 1-3 years  
    c. 3-10 years  
    d. 10-20 years  
    e. 20+ years  
    f. Other, ________________________

14. What seasons are you usually in residence in this town? (Please check all that apply)
    a. Year-round  
    b. Summer  
    c. Autumn  
    d. Winter  
    e. Spring  
    f. Holidays only  
    g. I am here sporadically
h. Other, ________________

15. How would you describe your political viewpoint?
   a. Conservative
   b. Liberal
   c. Independent
   d. Other: ____________

16. Do you belong to any non-profit groups that regularly advocate on behalf of environmental conservation and/or protection?
   a. No
   b. Yes, a national group (like The Nature Conservancy or National Audubon Society, etc.)
   c. Yes, a local group (like a watershed alliance or local conservation committee, etc.)
   d. Yes, other: ________________

17. What is the highest level of education you have completed?
   a. No formal schooling completed
   b. High school graduate (or equivalent)
   c. Bachelor's degree (BA, BS, AB, etc)
   d. Graduate degree (JD, MA, MSc, PhD)
   e. Other: ________________

18. Could you estimate your household's total income for the most recent calendar year?
   a. Less than $14,999
   b. $15,000 to $24,999
   c. $25,000 to $34,999
   d. $35,000 to $49,999
   e. $50,000 to $74,999
   f. $75,000 to $99,999
   g. $100,000 to $149,999
   h. $150,000 or more
Questions for Triton Poll 2 (May 2014)

Introduction: This survey is being sponsored by the New England Climate Adaptation Project. The Project is under the auspices of the Consortium Building Institute (CBI), a Massachusetts based non-partisan, non-profit. Project team members include CBI staff, MIT graduate students and faculty, and others. The project is funded by the University of New Hampshire under a cooperative agreement with the National Estuarine Research Reserve Program. The purpose of the survey is to better understand citizen views related to local community planning and the potential risks of climate change. The survey sponsor does not lobby or advocate on behalf of any particular viewpoint on the subject of climate change. The survey results will only be used for academic research purposes and not for any political campaign or effort. All answers will be compiled in total and all responses held anonymous and confidential.

1. Do you ever think about whether a change in the climate could affect your community?
   a. Yes, often
   b. Every once in a while
   c. I have once or twice
   d. No, not really

2. How concerned are you about the possible impacts a changing climate might have on your town?
   1 - 2 - 3 - 4 - 5
   Not at all concerned Somewhat concerned Very concerned

3. Has your level of concern about the impacts climate change could have on your town shifted during the last year?
   1 - 2 - 3 - 4 - 5
   Significantly decreased Decreased No change Increased Significantly increased

4. (Skip question if respondent replied "no change" to Question 3) What was the primary cause of this shift in your concern about the possible impacts climate change could have on your town? (Please select one option)
   a. Natural weather event
   b. News story
   c. Local government action
   d. State or national government action
   e. The National Climate Assessment or another scientific report
   f. A personal or professional interaction
   g. Educational workshop or presentation
   h. School
   i. Other: ____________
5. What do you think the most significant impacts of a change in the climate might be for your community? (Please select up to 3 options, in rank order, starting with most important)
   a. There will be no significant impact
   b. Increased flooding
   c. Sea level rise
   d. More heat waves
   e. More severe storms
   f. Ecosystem impacts
   g. Infrastructure impacts
   h. Drought
   Other: __________

6. If the climate is changing, who do you think should be responsible for preparing for the possible impacts this might have on your community? (Please select up to 3 options, in rank order, starting with most important)
   a. Individuals
   b. Neighborhoods
   c. Businesses
   d. The City/Town government
   e. The state government
   f. The national government
   g. Other: __________

7. To what extent do you agree with the following: Preparing for climate change risks should be a priority for my town over the next decade.

   1 - 2 - 3 - 4 - 5
   Totally disagree Somewhat Neither agree Somewhat Strongly agree
disagree nor disagree agree

8. To what extent do you agree with the following: When making decisions today, decision-makers in my town should take into account scientific projections about what the climate might be like in 50 years.

   1 - 2 - 3 - 4 - 5
   Totally disagree Somewhat Neither agree Somewhat Strongly agree
disagree nor disagree agree

9. How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

   1 - 2 - 3 - 4 - 5
   Not at all confident Somewhat confident Very confident
10. If the climate is changing, what is most likely to prevent your community from taking appropriate action? (Please select up to 3 options, in rank order, starting with most important)
   a. Nothing; any community is prepared
   b. Lack of scientific information
   c. Uncertainty about what the future climate will be like
   d. Lack of agreement about what to do about it
   e. Lack of funding or financial resources
   f. Lack of technical know-how/capacity
   g. Lack of public support
   h. Lack of political will

11. How important is it that residents, local groups, and businesses be involved in deciding how to respond to climate change risks?
   1 - 2 - 3 - 4 - 5
   Not at all important  Somewhat important  Very important

12. How significant do you think addressing climate change risk should be in your town’s planning and decision making over the next ten years?
   1 - 2 - 3 - 4 - 5
   Not at all significant  Somewhat significant  Very significant

13. How significant do you think climate change will actually be in your town’s planning and decision making over the next ten years?
   1 - 2 - 3 - 4 - 5
   Not at all significant  Somewhat significant  Very significant

14. How willing would you be to pay slightly higher taxes so that your town can prepare for climate change risks? (Please select only one response)
   1 - 2 - 3 - 4 - 5
   Not at all willing  Somewhat willing  Very willing

15. What would make you more willing to pay slightly more in taxes so that your town can prepare for climate change risks? (Please select only one response)
   a. I am already very willing to pay slightly more for this purpose
   b. If my town got hit by a major storm or other climate disaster
   c. If I started seeing the impacts of climate change
   d. If I had more confidence in my town’s ability to effectively manage climate change risks
   e. If my voice was represented in my town’s decision-making about how to prepare
   f. If my town decision-makers included climate change preparations in everyday planning decisions
   g. I do not want to pay more taxes for this purpose
   h. Other: ___________
16. Over the last year, a handful of role-play workshops about possible local climate change risks were run in your town. Which of the following is true (select all that are true)?
   a. I did not know about this
   b. I read or saw something about this
   c. I heard something about this from a friend or acquaintance
   d. I attended a role-play simulation workshop
   e. I would have liked to attend a workshop, but did not
   f. I did not hear about these workshops, but would have been interested

17. What is your gender?
   a. Male
   b. Female

18. What is your age group?
   a. 19 or under
   b. 20-29
   c. 30-39
   d. 40-49
   e. 50-59
   f. 60+

19. How long have you been a member of this community?
   a. Less than 1 year
   b. 1-3 years
   c. 3-10 years
   d. 10-20 years
   e. 20+ years
   f. Other: ________________

20. What seasons are you usually in residence in this town? (Please check all that apply)
   a. Year-round
   b. Summer
   c. Autumn
   d. Winter
   e. Spring
   f. Holidays only
   g. I am here sporadically
   h. Other: ________________

21. How would you describe your political viewpoint?
   a. Conservative
   b. Liberal
   c. Independent
   d. Other: ________________

22. Do you belong to any non-profit groups that regularly advocate on behalf of environmental conservation and/or protection?
   a. No
   b. Yes, a national group (like The Nature Conservancy or National Audubon Society, etc.)
   c. Yes, a local group (like a watershed alliance or local conservation committee, etc.)
   d. Yes, other: ________________
23. What is the highest level of education you have completed?
   a. No formal schooling completed
   b. High school graduate (or equivalent)
   c. Bachelor's degree (BA, BS, AB, etc)
   d. Graduate degree (JD, MA, MSc, PhD)
   e. Other: ___________________

24. Could you estimate your household's total income for the most recent calendar year?
   a. Less than $14,999
   b. $15,000 to $34,999
   c. $25,000 to $34,999
   d. $35,000 to $49,999
   e. $50,000 to $74,999
   f. $75,000 to $99,999
   g. $100,000 to $149,999
   h. $150,000 or more
APPENDIX F: Overview of Workshop Participant Demographics

<table>
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<tr>
<th>Workshop Demographics</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
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<td>47%</td>
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<td>48%</td>
<td>53%</td>
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<td>53%</td>
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<tr>
<td>What is your age group?</td>
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<td>5%</td>
<td>0%</td>
<td>14%</td>
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<td></td>
<td>20-29</td>
<td>10%</td>
<td>22%</td>
<td>14%</td>
<td>13%</td>
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<td>30-39</td>
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<td></td>
<td>40-49</td>
<td>6%</td>
<td>12%</td>
<td>16%</td>
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<td></td>
<td>50-59</td>
<td>28%</td>
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<td>24%</td>
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<td>60+</td>
<td>41%</td>
<td>13%</td>
<td>32%</td>
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<td>39%</td>
<td>29%</td>
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<td>Other</td>
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<td>7%</td>
<td>6%</td>
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<td>20%</td>
<td>6%</td>
<td>25%</td>
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<td>Graduate degree (JD, MA, MSc, PhD)</td>
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<td>9%</td>
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<td>15%</td>
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<td>19%</td>
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<td>7%</td>
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<td>Summer</td>
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<td>3%</td>
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<td>I am here sporadically</td>
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<td>5%</td>
<td>14%</td>
<td>7%</td>
<td>5%</td>
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<tr>
<td>Which type of industry most accurately describes your primary field?</td>
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<td>1%</td>
<td>3%</td>
<td>5%</td>
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<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
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<td>1%</td>
<td>4%</td>
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<td>(please select one):</td>
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<td>Retail trade</td>
<td>Transportation, warehousing, and utilities</td>
<td>Information</td>
<td>Finance, insurance, and real estate rental and leasing</td>
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<table>
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<tr>
<th>Do you belong to any non-profit groups that regularly advocate on behalf of environmental conservation and/or protection?</th>
<th>No</th>
<th>Yes, a national group (like The Nature Conservancy or National Audubon Society, etc.)</th>
<th>Yes, a local group (like a watershed alliance or local conservation committee, etc.)</th>
<th>Yes, other</th>
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<td>16%</td>
<td>8%</td>
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<table>
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<tr>
<th>Could you estimate your household’s total income for the most recent calendar year?</th>
<th>Less than $14,999</th>
<th>$15,000 to $34,999</th>
<th>$25,000 to $34,999</th>
<th>$35,000 to $49,999</th>
<th>$50,000 to $74,999</th>
<th>$75,000 to $99,999</th>
<th>$100,000 to $149,999</th>
<th>$150,000 or more</th>
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<td>2%</td>
<td>3%</td>
<td>5%</td>
<td>22%</td>
<td>21%</td>
<td>20%</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>4%</td>
<td>23%</td>
<td>16%</td>
<td>21%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>3%</td>
<td>23%</td>
<td>10%</td>
<td>19%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>1%</td>
<td>4%</td>
<td>6%</td>
<td>9%</td>
<td>22%</td>
<td>22%</td>
<td>21%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>4%</td>
<td>3%</td>
<td>3%</td>
<td>6%</td>
<td>22%</td>
<td>17%</td>
<td>19%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Pre-Workshop Survey Results

<table>
<thead>
<tr>
<th>Q1: Do you ever think about whether a change in the climate could affect your community?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, often</td>
<td>65%</td>
<td>52%</td>
<td>51%</td>
<td>58%</td>
<td>56%</td>
</tr>
<tr>
<td>Every once in a while</td>
<td>28%</td>
<td>34%</td>
<td>41%</td>
<td>36%</td>
<td>35%</td>
</tr>
<tr>
<td>I have once or twice</td>
<td>4%</td>
<td>7%</td>
<td>6%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>No, not really</td>
<td>3%</td>
<td>7%</td>
<td>2%</td>
<td>2%</td>
<td>4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q2: How concerned are you about the possible impacts a changing climate might have on your town?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all concerned</td>
<td>3%</td>
<td>3%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>2</td>
<td>6%</td>
<td>12%</td>
<td>12%</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>3 - Somewhat concerned</td>
<td>21%</td>
<td>38%</td>
<td>30%</td>
<td>29%</td>
<td>30%</td>
</tr>
<tr>
<td>4</td>
<td>28%</td>
<td>25%</td>
<td>31%</td>
<td>26%</td>
<td>28%</td>
</tr>
<tr>
<td>5 - Very concerned</td>
<td>42%</td>
<td>23%</td>
<td>27%</td>
<td>38%</td>
<td>32%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q3: What do you think the most significant impacts of a possible change in the climate might be for your community? (Please select up to 3 options)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No significant impact</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Increased flooding risk</td>
<td>24%</td>
<td>26%</td>
<td>21%</td>
<td>25%</td>
<td>24%</td>
</tr>
<tr>
<td>More severe storms</td>
<td>21%</td>
<td>21%</td>
<td>20%</td>
<td>22%</td>
<td>21%</td>
</tr>
<tr>
<td>Increased need for air conditioning</td>
<td>2%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Increased poverty</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Health impacts</td>
<td>6%</td>
<td>9%</td>
<td>8%</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>Ecosystem Impacts</td>
<td>21%</td>
<td>14%</td>
<td>17%</td>
<td>20%</td>
<td>18%</td>
</tr>
<tr>
<td>Higher taxes</td>
<td>4%</td>
<td>6%</td>
<td>6%</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Impacts on infrastructure</td>
<td>16%</td>
<td>16%</td>
<td>17%</td>
<td>13%</td>
<td>16%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>0%</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q4: If the climate is changing, who do you think should be responsible for preparing for the possible impacts this might have on your community? (Please select up to 3 options)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals</td>
<td>15%</td>
<td>17%</td>
<td>15%</td>
<td>15%</td>
<td>16%</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>5%</td>
<td>7%</td>
<td>9%</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>Businesses</td>
<td>5%</td>
<td>5%</td>
<td>6%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>The City/Town government</td>
<td>26%</td>
<td>26%</td>
<td>28%</td>
<td>28%</td>
<td>27%</td>
</tr>
<tr>
<td>The state government</td>
<td>24%</td>
<td>26%</td>
<td>24%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>The national government</td>
<td>21%</td>
<td>19%</td>
<td>18%</td>
<td>20%</td>
<td>19%</td>
</tr>
<tr>
<td>Other</td>
<td>4%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>
### Pre-Workshop Survey

<table>
<thead>
<tr>
<th>Question</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5: To what extent do you agree with the following: When making decisions today, decision-makers in my town should take into account scientific projections about what the climate might be like in 50 years.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - Totally disagree</td>
<td>1%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>2</td>
<td>2%</td>
<td>4%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>3 - Neither agree nor disagree</td>
<td>9%</td>
<td>12%</td>
<td>9%</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>4</td>
<td>27%</td>
<td>36%</td>
<td>35%</td>
<td>37%</td>
<td>34%</td>
</tr>
<tr>
<td>5 - Strongly agree</td>
<td>60%</td>
<td>45%</td>
<td>52%</td>
<td>50%</td>
<td>52%</td>
</tr>
<tr>
<td>Q6: What do you think local decision-makers should do now to address climate change, if anything? (Please select only the single most urgent option)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nothing</td>
<td>2%</td>
<td>2%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>There is nothing local decision-makers can do</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Wait to see what the impacts are and then act accordingly</td>
<td>2%</td>
<td>6%</td>
<td>4%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Build major new infrastructure</td>
<td>2%</td>
<td>3%</td>
<td>0%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Change the way they make everyday planning and infrastructure decisions</td>
<td>75%</td>
<td>71%</td>
<td>84%</td>
<td>72%</td>
<td>75%</td>
</tr>
<tr>
<td>Raise the taxes to cover the costs of responding to a changing climate</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Restrict development on the waterfront</td>
<td>14%</td>
<td>12%</td>
<td>8%</td>
<td>16%</td>
<td>12%</td>
</tr>
<tr>
<td>Other</td>
<td>4%</td>
<td>4%</td>
<td>3%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Q7: How “risky” do you think climate change is?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very High</td>
<td>37%</td>
<td>28%</td>
<td>26%</td>
<td>41%</td>
<td>32%</td>
</tr>
<tr>
<td>High</td>
<td>43%</td>
<td>33%</td>
<td>38%</td>
<td>39%</td>
<td>38%</td>
</tr>
<tr>
<td>Moderate</td>
<td>16%</td>
<td>34%</td>
<td>31%</td>
<td>17%</td>
<td>25%</td>
</tr>
<tr>
<td>Low</td>
<td>2%</td>
<td>5%</td>
<td>5%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Very Low</td>
<td>3%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Q8: If the climate is changing, who do you think should help make decisions about how your town should respond? (Please select up to 3 options)</td>
<td>Barnstable</td>
<td>Cranston</td>
<td>Dover</td>
<td>Wells</td>
<td>Total</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Local elected officials</td>
<td>17%</td>
<td>14%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Local government departments</td>
<td>20%</td>
<td>20%</td>
<td>23%</td>
<td>16%</td>
<td>20%</td>
</tr>
<tr>
<td>Local emergency management personnel</td>
<td>14%</td>
<td>19%</td>
<td>16%</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>Local businesses</td>
<td>4%</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Homeowners and residents</td>
<td>19%</td>
<td>15%</td>
<td>19%</td>
<td>19%</td>
<td>18%</td>
</tr>
<tr>
<td>State government officials</td>
<td>14%</td>
<td>18%</td>
<td>16%</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>National officials</td>
<td>8%</td>
<td>8%</td>
<td>6%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Insurance companies</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q9: How should your town deal with development in areas that are at high risk from flooding or damage from major storms? (Please select up to 3 options)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing</td>
<td>2%</td>
<td>0%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Stop continued development in high risk areas</td>
<td>27%</td>
<td>28%</td>
<td>29%</td>
<td>27%</td>
<td>28%</td>
</tr>
<tr>
<td>Move homes and buildings out of the floodplain</td>
<td>9%</td>
<td>13%</td>
<td>6%</td>
<td>11%</td>
<td>10%</td>
</tr>
<tr>
<td>Invest in low impact, ecological solutions</td>
<td>29%</td>
<td>28%</td>
<td>30%</td>
<td>24%</td>
<td>28%</td>
</tr>
<tr>
<td>Build flood and storm protection</td>
<td>9%</td>
<td>11%</td>
<td>8%</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Require that homes in high-risk areas be prepared for risks</td>
<td>21%</td>
<td>17%</td>
<td>20%</td>
<td>22%</td>
<td>20%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>2%</td>
<td>4%</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q10: If the climate is changing, what is most likely to prevent your community from taking action? (Please select no more than 3)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Lack of scientific info</td>
<td>5%</td>
<td>8%</td>
<td>5%</td>
<td>9%</td>
<td>7%</td>
</tr>
<tr>
<td>Lack of agreement on what to do</td>
<td>24%</td>
<td>22%</td>
<td>25%</td>
<td>24%</td>
<td>24%</td>
</tr>
<tr>
<td>Lack of funding or financial resources</td>
<td>26%</td>
<td>30%</td>
<td>25%</td>
<td>24%</td>
<td>26%</td>
</tr>
<tr>
<td>Lack of technical know-how/capacity</td>
<td>8%</td>
<td>9%</td>
<td>7%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Lack of public support</td>
<td>16%</td>
<td>15%</td>
<td>20%</td>
<td>15%</td>
<td>16%</td>
</tr>
<tr>
<td>Lack of political will</td>
<td>19%</td>
<td>16%</td>
<td>15%</td>
<td>18%</td>
<td>17%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Barnstable</td>
<td>Cranston</td>
<td>Dover</td>
<td>Wells</td>
<td>Total</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------</td>
<td>----------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td><strong>Q11: How confident</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>are you that your</td>
<td>16%</td>
<td>8%</td>
<td>11%</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>town will be able to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>effectively respond</td>
<td>29%</td>
<td>37%</td>
<td>24%</td>
<td>36%</td>
<td>32%</td>
</tr>
<tr>
<td>to climate-related</td>
<td>43%</td>
<td>44%</td>
<td>54%</td>
<td>47%</td>
<td>47%</td>
</tr>
<tr>
<td>risks despite</td>
<td>10%</td>
<td>8%</td>
<td>11%</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>uncertainty about</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>what the future</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>climate will be</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>like?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Q12: How important</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>is it that residents,</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>local groups, and</td>
<td>2%</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>businesses be</td>
<td>14%</td>
<td>18%</td>
<td>12%</td>
<td>11%</td>
<td>14%</td>
</tr>
<tr>
<td>involved in deciding</td>
<td>27%</td>
<td>39%</td>
<td>33%</td>
<td>32%</td>
<td>33%</td>
</tr>
<tr>
<td>how to respond to</td>
<td>57%</td>
<td>38%</td>
<td>53%</td>
<td>55%</td>
<td>50%</td>
</tr>
<tr>
<td>climate change risks?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Q13: How significant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>do you think</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>addressing climate</td>
<td>2%</td>
<td>5%</td>
<td>4%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>change risk should</td>
<td>9%</td>
<td>20%</td>
<td>17%</td>
<td>11%</td>
<td>14%</td>
</tr>
<tr>
<td>be in your town’s</td>
<td>32%</td>
<td>37%</td>
<td>42%</td>
<td>40%</td>
<td>37%</td>
</tr>
<tr>
<td>planning and decision</td>
<td>54%</td>
<td>38%</td>
<td>37%</td>
<td>47%</td>
<td>44%</td>
</tr>
<tr>
<td>making over the next</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ten years?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Q14: How significant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>do you think climate</td>
<td>5%</td>
<td>11%</td>
<td>8%</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>change will actually</td>
<td>32%</td>
<td>33%</td>
<td>32%</td>
<td>39%</td>
<td>34%</td>
</tr>
<tr>
<td>be in your town’s</td>
<td>49%</td>
<td>39%</td>
<td>46%</td>
<td>39%</td>
<td>43%</td>
</tr>
<tr>
<td>planning and decision</td>
<td>12%</td>
<td>11%</td>
<td>11%</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>making over the next</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ten years?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Q15: How did you first</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hear about this</td>
<td>12%</td>
<td>36%</td>
<td>26%</td>
<td>16%</td>
<td>22%</td>
</tr>
<tr>
<td>workshop? (Please</td>
<td>4%</td>
<td>4%</td>
<td>1%</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>select one option)</td>
<td>56%</td>
<td>43%</td>
<td>25%</td>
<td>33%</td>
<td>35%</td>
</tr>
<tr>
<td><strong>Q16: Why did you</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>choose to attend this</td>
<td>9%</td>
<td>17%</td>
<td>12%</td>
<td>5%</td>
<td>11%</td>
</tr>
<tr>
<td>workshop? (Please</td>
<td>8%</td>
<td>8%</td>
<td>14%</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>select the most</td>
<td>11%</td>
<td>26%</td>
<td>18%</td>
<td>12%</td>
<td>17%</td>
</tr>
<tr>
<td>important reason)</td>
<td>40%</td>
<td>15%</td>
<td>33%</td>
<td>29%</td>
<td>28%</td>
</tr>
<tr>
<td></td>
<td>24%</td>
<td>22%</td>
<td>18%</td>
<td>19%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>8%</td>
<td>12%</td>
<td>5%</td>
<td>27%</td>
<td>13%</td>
</tr>
<tr>
<td>Q17: Do you belong to any non-profit groups that regularly advocate on behalf of environmental conservation and/or protection?</td>
<td>No</td>
<td>Yes, a national group (like The Nature Conservancy or National Audubon Society, etc.)</td>
<td>Yes, a local group (like a watershed alliance or local conservation committee, etc.)</td>
<td>Yes, other</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Barnstable</td>
<td>46%</td>
<td>23%</td>
<td>22%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Cranston</td>
<td>64%</td>
<td>18%</td>
<td>14%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Dover</td>
<td>58%</td>
<td>15%</td>
<td>16%</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>Wells</td>
<td>58%</td>
<td>22%</td>
<td>12%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>57%</td>
<td>19%</td>
<td>16%</td>
<td>8%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q18: What is your gender?</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Cranston</td>
<td>47%</td>
<td>53%</td>
</tr>
<tr>
<td>Dover</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Wells</td>
<td>47%</td>
<td>53%</td>
</tr>
<tr>
<td>Total</td>
<td>52%</td>
<td>48%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>0%</td>
<td>10%</td>
<td>14%</td>
<td>6%</td>
<td>28%</td>
<td>41%</td>
</tr>
<tr>
<td>Cranston</td>
<td>5%</td>
<td>22%</td>
<td>23%</td>
<td>12%</td>
<td>25%</td>
<td>13%</td>
</tr>
<tr>
<td>Dover</td>
<td>0%</td>
<td>14%</td>
<td>13%</td>
<td>16%</td>
<td>24%</td>
<td>32%</td>
</tr>
<tr>
<td>Wells</td>
<td>14%</td>
<td>9%</td>
<td>9%</td>
<td>14%</td>
<td>13%</td>
<td>39%</td>
</tr>
<tr>
<td>Total</td>
<td>4%</td>
<td>15%</td>
<td>15%</td>
<td>12%</td>
<td>23%</td>
<td>30%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q20: How long have you been a member of this community?</th>
<th>Less than 1 year</th>
<th>1-3 years</th>
<th>3-10 years</th>
<th>10-20 years</th>
<th>20+ years</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>5%</td>
<td>10%</td>
<td>15%</td>
<td>23%</td>
<td>44%</td>
<td>3%</td>
</tr>
<tr>
<td>Cranston</td>
<td>6%</td>
<td>8%</td>
<td>15%</td>
<td>20%</td>
<td>36%</td>
<td>15%</td>
</tr>
<tr>
<td>Dover</td>
<td>11%</td>
<td>9%</td>
<td>19%</td>
<td>19%</td>
<td>35%</td>
<td>7%</td>
</tr>
<tr>
<td>Wells</td>
<td>23%</td>
<td>11%</td>
<td>13%</td>
<td>20%</td>
<td>29%</td>
<td>4%</td>
</tr>
<tr>
<td>Total</td>
<td>10%</td>
<td>9%</td>
<td>15%</td>
<td>21%</td>
<td>36%</td>
<td>8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q21: What seasons are you usually in residence in this town? (Please check all that apply)</th>
<th>Year-round</th>
<th>Summer</th>
<th>Autumn</th>
<th>Winter</th>
<th>Spring</th>
<th>Holidays only</th>
<th>I am here sporadically</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>86%</td>
<td>3%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>Cranston</td>
<td>73%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
<td>14%</td>
</tr>
<tr>
<td>Dover</td>
<td>80%</td>
<td>3%</td>
<td>3%</td>
<td>2%</td>
<td>0%</td>
<td>1%</td>
<td>3%</td>
<td>7%</td>
</tr>
<tr>
<td>Wells</td>
<td>48%</td>
<td>8%</td>
<td>12%</td>
<td>10%</td>
<td>13%</td>
<td>1%</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>71%</td>
<td>4%</td>
<td>5%</td>
<td>4%</td>
<td>5%</td>
<td>0%</td>
<td>3%</td>
<td>8%</td>
</tr>
</tbody>
</table>
## Post-Workshop Survey Results

<table>
<thead>
<tr>
<th>Q2: Did the participants at your table reach an agreement?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, all six</td>
<td>33%</td>
<td>64%</td>
<td>69%</td>
<td>52%</td>
<td>55%</td>
</tr>
<tr>
<td>Yes, five out of six</td>
<td>51%</td>
<td>35%</td>
<td>14%</td>
<td>48%</td>
<td>36%</td>
</tr>
<tr>
<td>No</td>
<td>16%</td>
<td>2%</td>
<td>17%</td>
<td>0%</td>
<td>9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q3: Did the exercise affect your views about climate change?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>22%</td>
<td>39%</td>
<td>26%</td>
<td>31%</td>
<td>30%</td>
</tr>
<tr>
<td>Not really</td>
<td>72%</td>
<td>57%</td>
<td>68%</td>
<td>62%</td>
<td>64%</td>
</tr>
<tr>
<td>Not sure</td>
<td>6%</td>
<td>4%</td>
<td>6%</td>
<td>7%</td>
<td>6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q4: Following the exercise, how concerned are you about the possible impacts a changing climate might have on your town?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all concerned</td>
<td>3%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>2</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>3 - Somewhat concerned</td>
<td>12%</td>
<td>22%</td>
<td>21%</td>
<td>17%</td>
<td>18%</td>
</tr>
<tr>
<td>4</td>
<td>36%</td>
<td>41%</td>
<td>36%</td>
<td>39%</td>
<td>38%</td>
</tr>
<tr>
<td>5 - Very concerned</td>
<td>47%</td>
<td>33%</td>
<td>39%</td>
<td>42%</td>
<td>40%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q5: To what extent do you agree with the following: When making decisions today, decision-makers in my town should take into account scientific projections about what the climate might be like in 50 years.</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Totally disagree</td>
<td>0%</td>
<td>4%</td>
<td>0%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>2</td>
<td>3%</td>
<td>1%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>3 - Neither agree nor disagree</td>
<td>8%</td>
<td>3%</td>
<td>8%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>4</td>
<td>28%</td>
<td>39%</td>
<td>37%</td>
<td>29%</td>
<td>34%</td>
</tr>
<tr>
<td>5 - Strongly agree</td>
<td>61%</td>
<td>53%</td>
<td>53%</td>
<td>60%</td>
<td>56%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q6: Who do you feel should be responsible for preparing your town for the possible impacts of a changing climate? (Please select up to 3 options)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals</td>
<td>15%</td>
<td>15%</td>
<td>18%</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>Businesses</td>
<td>11%</td>
<td>9%</td>
<td>14%</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>6%</td>
<td>11%</td>
<td>9%</td>
<td>11%</td>
<td>9%</td>
</tr>
<tr>
<td>The City/Town government</td>
<td>31%</td>
<td>30%</td>
<td>29%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>The state government</td>
<td>19%</td>
<td>22%</td>
<td>19%</td>
<td>21%</td>
<td>20%</td>
</tr>
<tr>
<td>The national government</td>
<td>15%</td>
<td>12%</td>
<td>11%</td>
<td>13%</td>
<td>13%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
</tr>
</tbody>
</table>
### Post-Workshop Survey

<table>
<thead>
<tr>
<th>Q7: What do you think local decision-makers should do now to address climate change, if anything? (Please select only the single most urgent option)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>There is nothing local decision-makers can do</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Wait to see what the impacts are and then act accordingly</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Build major new infrastructure</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Change the way they make everyday planning and infrastructure decisions</td>
<td>86%</td>
<td>79%</td>
<td>84%</td>
<td>69%</td>
<td>79%</td>
</tr>
<tr>
<td>Raise the taxes to cover the costs of responding to a changing climate</td>
<td>0%</td>
<td>1%</td>
<td>3%</td>
<td>3%</td>
<td>1%</td>
</tr>
<tr>
<td>Restrict development on the waterfront</td>
<td>7%</td>
<td>10%</td>
<td>4%</td>
<td>18%</td>
<td>9%</td>
</tr>
<tr>
<td>Change the way they make everyday planning and infrastructure decisions</td>
<td>86%</td>
<td>79%</td>
<td>84%</td>
<td>69%</td>
<td>79%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q8: If the climate is changing, who do you think should be responsible for preparing for the possible impacts this might have on your community? (Please select up to 3 options)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local elected officials</td>
<td>16%</td>
<td>14%</td>
<td>17%</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>Local government departments</td>
<td>20%</td>
<td>22%</td>
<td>22%</td>
<td>17%</td>
<td>20%</td>
</tr>
<tr>
<td>Local emergency management personnel</td>
<td>12%</td>
<td>16%</td>
<td>16%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Local businesses</td>
<td>9%</td>
<td>7%</td>
<td>8%</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Homeowners and residents</td>
<td>19%</td>
<td>16%</td>
<td>18%</td>
<td>19%</td>
<td>18%</td>
</tr>
<tr>
<td>State government officials</td>
<td>12%</td>
<td>16%</td>
<td>12%</td>
<td>13%</td>
<td>13%</td>
</tr>
<tr>
<td>National officials</td>
<td>8%</td>
<td>6%</td>
<td>6%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Insurance companies</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Q9: How should your town deal with development in areas that are at high risk from flooding or damage from major storms? (Please select up to 3 options)</td>
<td>Barnstable</td>
<td>Cranston</td>
<td>Dover</td>
<td>Wells</td>
<td>Total</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Nothing</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Stop continued development in high risk areas</td>
<td>31%</td>
<td>28%</td>
<td>30%</td>
<td>27%</td>
<td>29%</td>
</tr>
<tr>
<td>Move homes and buildings out of the floodplain</td>
<td>8%</td>
<td>19%</td>
<td>6%</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>Invest in low impact, ecological solutions</td>
<td>30%</td>
<td>29%</td>
<td>32%</td>
<td>28%</td>
<td>30%</td>
</tr>
<tr>
<td>Build flood and storm protection</td>
<td>5%</td>
<td>8%</td>
<td>9%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Require that homes in high-risk areas be prepared for risks</td>
<td>22%</td>
<td>14%</td>
<td>18%</td>
<td>21%</td>
<td>19%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
<td>0%</td>
<td>3%</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q10: If the climate is changing, what is most likely to prevent your community from taking action? (Please select no more than 3)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Lack of scientific info</td>
<td>4%</td>
<td>6%</td>
<td>6%</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>Lack of agreement on what to do</td>
<td>27%</td>
<td>24%</td>
<td>27%</td>
<td>30%</td>
<td>27%</td>
</tr>
<tr>
<td>Lack of funding or financial resources</td>
<td>26%</td>
<td>29%</td>
<td>25%</td>
<td>28%</td>
<td>27%</td>
</tr>
<tr>
<td>Lack of technical know-how/capacity</td>
<td>5%</td>
<td>10%</td>
<td>5%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Lack of public support</td>
<td>19%</td>
<td>17%</td>
<td>23%</td>
<td>13%</td>
<td>18%</td>
</tr>
<tr>
<td>Lack of political will</td>
<td>17%</td>
<td>13%</td>
<td>13%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q11: How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?</th>
<th>1 - Not at all confident</th>
<th>2</th>
<th>3 - Somewhat confident</th>
<th>4</th>
<th>5 - Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all confident</td>
<td>9%</td>
<td>6%</td>
<td>8%</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>2</td>
<td>23%</td>
<td>24%</td>
<td>15%</td>
<td>24%</td>
<td>22%</td>
</tr>
<tr>
<td>3 - Somewhat confident</td>
<td>52%</td>
<td>52%</td>
<td>54%</td>
<td>51%</td>
<td>52%</td>
</tr>
<tr>
<td>4</td>
<td>13%</td>
<td>16%</td>
<td>20%</td>
<td>19%</td>
<td>17%</td>
</tr>
<tr>
<td>5 - Very confident</td>
<td>3%</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
</tr>
</tbody>
</table>
### Post-Workshop Survey

<table>
<thead>
<tr>
<th>Q12: How important is it that residents, local groups, and businesses be involved in deciding how to respond to climate change risks?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all important</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>2</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>3 - Somewhat important</td>
<td>9%</td>
<td>15%</td>
<td>10%</td>
<td>4%</td>
<td>10%</td>
</tr>
<tr>
<td>4</td>
<td>32%</td>
<td>29%</td>
<td>31%</td>
<td>34%</td>
<td>31%</td>
</tr>
<tr>
<td>5 - Very important</td>
<td>58%</td>
<td>55%</td>
<td>59%</td>
<td>58%</td>
<td>57%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q13: How significant do you think addressing climate change risk should be in your town’s planning and decision making over the next ten years?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all significant</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>2</td>
<td>2%</td>
<td>2%</td>
<td>4%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>Somewhat significant</td>
<td>3%</td>
<td>15%</td>
<td>13%</td>
<td>11%</td>
<td>3%</td>
</tr>
<tr>
<td>4</td>
<td>33%</td>
<td>33%</td>
<td>39%</td>
<td>31%</td>
<td>33%</td>
</tr>
<tr>
<td>5 - Very significant</td>
<td>60%</td>
<td>50%</td>
<td>45%</td>
<td>56%</td>
<td>61%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q14: How significant do you think climate change will actually be in your town’s planning and decision making over the next ten years?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all significant</td>
<td>6%</td>
<td>5%</td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>2</td>
<td>21%</td>
<td>22%</td>
<td>22%</td>
<td>28%</td>
<td>23%</td>
</tr>
<tr>
<td>Somewhat significant</td>
<td>53%</td>
<td>45%</td>
<td>52%</td>
<td>47%</td>
<td>49%</td>
</tr>
<tr>
<td>4</td>
<td>17%</td>
<td>22%</td>
<td>23%</td>
<td>16%</td>
<td>20%</td>
</tr>
<tr>
<td>5 - Very significant</td>
<td>2%</td>
<td>7%</td>
<td>3%</td>
<td>7%</td>
<td>5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q15: Has your confidence in the ability of your town to prepare for the risks of a changing climate changed as a result of your participation in this exercise?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Less confident</td>
<td>3%</td>
<td>3%</td>
<td>2%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>2</td>
<td>14%</td>
<td>12%</td>
<td>4%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>3 - No change</td>
<td>60%</td>
<td>51%</td>
<td>53%</td>
<td>46%</td>
<td>53%</td>
</tr>
<tr>
<td>4</td>
<td>20%</td>
<td>28%</td>
<td>35%</td>
<td>33%</td>
<td>29%</td>
</tr>
<tr>
<td>5 - More confident</td>
<td>2%</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>Q16: Do you think your town should use a decision-making process like that modeled in the exercise to reach agreement about how your town should respond to possible climate impacts?</td>
<td>Barnstable</td>
<td>Cranston</td>
<td>Dover</td>
<td>Wells</td>
<td>Total</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Yes, and it already is</td>
<td>3%</td>
<td>8%</td>
<td>8%</td>
<td>9%</td>
<td>7%</td>
</tr>
<tr>
<td>Yes, and I could see it happening soon</td>
<td>30%</td>
<td>38%</td>
<td>41%</td>
<td>31%</td>
<td>35%</td>
</tr>
<tr>
<td>Yes, but it isn’t realistically going to happen soon</td>
<td>41%</td>
<td>41%</td>
<td>30%</td>
<td>32%</td>
<td>37%</td>
</tr>
<tr>
<td>No, this wouldn’t be helpful</td>
<td>8%</td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Not sure</td>
<td>14%</td>
<td>8%</td>
<td>17%</td>
<td>19%</td>
<td>14%</td>
</tr>
<tr>
<td>Other</td>
<td>4%</td>
<td>5%</td>
<td>3%</td>
<td>6%</td>
<td>4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q17: Which type of industry most accurately describes your primary field? (please select one):</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry, fishing, hunting, mining</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>Construction</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1%</td>
<td>1%</td>
<td>4%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Retail trade</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Transportation, warehousing, and utilities</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Information</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Finance, insurance, and real estate rental and leasing</td>
<td>1%</td>
<td>5%</td>
<td>4%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Professional, scientific, and management, and administrative services</td>
<td>40%</td>
<td>30%</td>
<td>29%</td>
<td>28%</td>
<td>32%</td>
</tr>
<tr>
<td>Educational services, and healthcare and social assistance</td>
<td>22%</td>
<td>11%</td>
<td>25%</td>
<td>22%</td>
<td>20%</td>
</tr>
<tr>
<td>Arts, entertainment, and recreation, and accommodation and food services</td>
<td>2%</td>
<td>3%</td>
<td>3%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Public administration</td>
<td>11%</td>
<td>19%</td>
<td>10%</td>
<td>6%</td>
<td>12%</td>
</tr>
<tr>
<td>Other</td>
<td>16%</td>
<td>24%</td>
<td>18%</td>
<td>23%</td>
<td>20%</td>
</tr>
</tbody>
</table>
### Post-Workshop Survey

<table>
<thead>
<tr>
<th>Question</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q18: How would you describe your political viewpoint?</td>
<td>Conservative</td>
<td>10%</td>
<td>14%</td>
<td>11%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>Liberal</td>
<td>50%</td>
<td>40%</td>
<td>44%</td>
<td>47%</td>
</tr>
<tr>
<td></td>
<td>Independent</td>
<td>35%</td>
<td>39%</td>
<td>39%</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>6%</td>
<td>7%</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Q19: What is the highest level of education you have completed?</td>
<td>No formal schooling completed</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>High school graduate (or equivalent)</td>
<td>4%</td>
<td>20%</td>
<td>6%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree (BA, BS, AB, etc)</td>
<td>33%</td>
<td>32%</td>
<td>40%</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>Graduate degree (JD, MA, MSc, PhD)</td>
<td>58%</td>
<td>42%</td>
<td>52%</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>5%</td>
<td>5%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>Q20: Could you estimate your household's total income for the most recent calendar year?</td>
<td>Less than $14,999</td>
<td>7%</td>
<td>3%</td>
<td>3%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>$15,000 to $34,999</td>
<td>2%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>$25,000 to $34,999</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>$35,000 to $49,999</td>
<td>5%</td>
<td>4%</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>$50,000 to $74,999</td>
<td>22%</td>
<td>21%</td>
<td>23%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>$75,000 to $99,999</td>
<td>21%</td>
<td>16%</td>
<td>10%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>$100,000 to $149,999</td>
<td>20%</td>
<td>21%</td>
<td>19%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>$150,000 or more</td>
<td>6%</td>
<td>17%</td>
<td>21%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Refused</td>
<td>14%</td>
<td>11%</td>
<td>13%</td>
<td>19%</td>
</tr>
<tr>
<td>Q21: Did you learn something from the exercise that you might be able to apply to your own decisions?</td>
<td>Not really</td>
<td>74%</td>
<td>72%</td>
<td>74%</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>26%</td>
<td>28%</td>
<td>26%</td>
<td>27%</td>
</tr>
</tbody>
</table>
## 2013 Public Opinion Poll Results

<table>
<thead>
<tr>
<th>Q1: Do you ever think about whether a change in the climate could affect your community?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, often</td>
<td>45%</td>
<td>36%</td>
<td>49%</td>
<td>54%</td>
<td>46%</td>
</tr>
<tr>
<td>Every once in a while</td>
<td>31%</td>
<td>30%</td>
<td>22%</td>
<td>19%</td>
<td>25%</td>
</tr>
<tr>
<td>I have once or twice</td>
<td>3%</td>
<td>3%</td>
<td>6%</td>
<td>7%</td>
<td>5%</td>
</tr>
<tr>
<td>No, not really</td>
<td>21%</td>
<td>31%</td>
<td>22%</td>
<td>20%</td>
<td>24%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q2: How concerned are you about the possible impacts a changing climate might have on your town?</th>
<th>1 - Not at all concerned</th>
<th>2</th>
<th>3 - Somewhat concerned</th>
<th>4</th>
<th>5 - Very concerned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>11%</td>
<td>9%</td>
<td>17%</td>
<td>15%</td>
<td>13%</td>
</tr>
<tr>
<td>Cranston</td>
<td>9%</td>
<td>13%</td>
<td>18%</td>
<td>11%</td>
<td>13%</td>
</tr>
<tr>
<td>Dover</td>
<td>36%</td>
<td>39%</td>
<td>29%</td>
<td>27%</td>
<td>33%</td>
</tr>
<tr>
<td>Wells</td>
<td>14%</td>
<td>15%</td>
<td>21%</td>
<td>21%</td>
<td>18%</td>
</tr>
<tr>
<td>Total</td>
<td>29%</td>
<td>24%</td>
<td>14%</td>
<td>26%</td>
<td>23%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q3: What do you think the most significant impacts of a possible change in the climate might be for your community? (Please select up to 3 options)</th>
<th>There will be no significant impact</th>
<th>Increased flooding risk</th>
<th>More severe storms</th>
<th>Increased need for air conditioning or home cooling</th>
<th>Increased poverty</th>
<th>Health impacts</th>
<th>Ecosystem Impacts</th>
<th>Higher taxes</th>
<th>Impacts on infrastructure</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>8%</td>
<td>14%</td>
<td>13%</td>
<td>33%</td>
<td>9%</td>
<td>11%</td>
<td>3%</td>
<td>3%</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Cranston</td>
<td>8%</td>
<td>14%</td>
<td>13%</td>
<td>33%</td>
<td>9%</td>
<td>11%</td>
<td>3%</td>
<td>3%</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Dover</td>
<td>36%</td>
<td>39%</td>
<td>29%</td>
<td>27%</td>
<td>33%</td>
<td>14%</td>
<td>25%</td>
<td>14%</td>
<td>17%</td>
<td>10%</td>
</tr>
<tr>
<td>Wells</td>
<td>14%</td>
<td>15%</td>
<td>21%</td>
<td>21%</td>
<td>18%</td>
<td>2%</td>
<td>4%</td>
<td>4%</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>Total</td>
<td>29%</td>
<td>24%</td>
<td>14%</td>
<td>26%</td>
<td>23%</td>
<td>6%</td>
<td>14%</td>
<td>17%</td>
<td>11%</td>
<td>8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q4: If the climate is changing, who do you think should be responsible for preparing for the possible impacts this might have on your community? (Please select up to 3 options)</th>
<th>Individuals</th>
<th>Neighborhoods</th>
<th>Businesses</th>
<th>The City/Town government</th>
<th>The state government</th>
<th>The national government</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>33%</td>
<td>3%</td>
<td>4%</td>
<td>18%</td>
<td>13%</td>
<td>19%</td>
<td>10%</td>
</tr>
<tr>
<td>Cranston</td>
<td>17%</td>
<td>0%</td>
<td>4%</td>
<td>12%</td>
<td>15%</td>
<td>34%</td>
<td>18%</td>
</tr>
<tr>
<td>Dover</td>
<td>33%</td>
<td>3%</td>
<td>2%</td>
<td>14%</td>
<td>18%</td>
<td>21%</td>
<td>9%</td>
</tr>
<tr>
<td>Wells</td>
<td>27%</td>
<td>0%</td>
<td>0%</td>
<td>14%</td>
<td>17%</td>
<td>22%</td>
<td>21%</td>
</tr>
<tr>
<td>Total</td>
<td>27%</td>
<td>2%</td>
<td>3%</td>
<td>14%</td>
<td>16%</td>
<td>25%</td>
<td>14%</td>
</tr>
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</table>
### 2013 Public Poll

<table>
<thead>
<tr>
<th>Question</th>
<th>Option</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5: To what extent do you agree with the following: When making decisions today, decision-makers in my town should take into account scientific projections about what the climate might be like in 50 years.</td>
<td>1 - Totally disagree</td>
<td>12%</td>
<td>14%</td>
<td>17%</td>
<td>10%</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4%</td>
<td>6%</td>
<td>1%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>3 - Neither agree nor disagree</td>
<td>16%</td>
<td>25%</td>
<td>24%</td>
<td>21%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>19%</td>
<td>24%</td>
<td>22%</td>
<td>19%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>5 - Strongly agree</td>
<td>49%</td>
<td>31%</td>
<td>35%</td>
<td>46%</td>
<td>40%</td>
</tr>
<tr>
<td>Q6: How “risky” do you think climate change is?</td>
<td>Very High</td>
<td>24%</td>
<td>23%</td>
<td>23%</td>
<td>30%</td>
<td>25%</td>
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<tr>
<td></td>
<td>High</td>
<td>26%</td>
<td>22%</td>
<td>31%</td>
<td>28%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>33%</td>
<td>40%</td>
<td>27%</td>
<td>25%</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>9%</td>
<td>13%</td>
<td>4%</td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>Very Low</td>
<td>8%</td>
<td>3%</td>
<td>14%</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Q7: How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?</td>
<td>1 - Not at all confident</td>
<td>26%</td>
<td>20%</td>
<td>20%</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>18%</td>
<td>28%</td>
<td>21%</td>
<td>21%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>3 - Somewhat confident</td>
<td>30%</td>
<td>35%</td>
<td>42%</td>
<td>34%</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>13%</td>
<td>12%</td>
<td>7%</td>
<td>15%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>5 - Very confident</td>
<td>13%</td>
<td>5%</td>
<td>10%</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>Q8: How important is it that residents, local groups, and businesses be involved in deciding how to respond to climate change risks?</td>
<td>1 - Not at all important</td>
<td>2%</td>
<td>3%</td>
<td>8%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1%</td>
<td>4%</td>
<td>7%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>3 - Somewhat important</td>
<td>15%</td>
<td>23%</td>
<td>22%</td>
<td>16%</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>17%</td>
<td>26%</td>
<td>19%</td>
<td>23%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>5 - Very important</td>
<td>64%</td>
<td>45%</td>
<td>44%</td>
<td>52%</td>
<td>51%</td>
</tr>
<tr>
<td>Q9: How significant do you think addressing climate change risk should be in your town’s planning and decision making over the next ten years?</td>
<td>1 - Not at all significant</td>
<td>8%</td>
<td>8%</td>
<td>10%</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>Somewhat significant</td>
<td>13%</td>
<td>37%</td>
<td>25%</td>
<td>24%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>25%</td>
<td>14%</td>
<td>29%</td>
<td>27%</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>5 - Very significant</td>
<td>48%</td>
<td>32%</td>
<td>27%</td>
<td>29%</td>
<td>33%</td>
</tr>
<tr>
<td>Q10: How significant do you think climate change will actually be in your town’s planning and decision making over the next ten years?</td>
<td>Barnstable</td>
<td>Cranston</td>
<td>Dover</td>
<td>Wells</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>1 - Not at all significant</td>
<td>23%</td>
<td>18%</td>
<td>33%</td>
<td>27%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>23%</td>
<td>36%</td>
<td>34%</td>
<td>30%</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>3 - Somewhat significant</td>
<td>37%</td>
<td>32%</td>
<td>23%</td>
<td>33%</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>9%</td>
<td>7%</td>
<td>7%</td>
<td>8%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>5 - Very significant</td>
<td>7%</td>
<td>7%</td>
<td>4%</td>
<td>4%</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q11: What is your gender?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>38%</td>
<td>56%</td>
<td>52%</td>
<td>48%</td>
<td>49%</td>
</tr>
<tr>
<td>Female</td>
<td>62%</td>
<td>44%</td>
<td>48%</td>
<td>52%</td>
<td>51%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q12: What is your age group?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 &amp; Under</td>
<td>7%</td>
<td>7%</td>
<td>14%</td>
<td>14%</td>
<td>11%</td>
</tr>
<tr>
<td>30-39</td>
<td>9%</td>
<td>21%</td>
<td>11%</td>
<td>6%</td>
<td>12%</td>
</tr>
<tr>
<td>40-49</td>
<td>23%</td>
<td>24%</td>
<td>24%</td>
<td>18%</td>
<td>23%</td>
</tr>
<tr>
<td>50-59</td>
<td>26%</td>
<td>21%</td>
<td>24%</td>
<td>24%</td>
<td>24%</td>
</tr>
<tr>
<td>60+</td>
<td>35%</td>
<td>27%</td>
<td>26%</td>
<td>38%</td>
<td>31%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q13: How long have you been a member of this community?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>0%</td>
<td>0%</td>
<td>6%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>1-3 years</td>
<td>1%</td>
<td>3%</td>
<td>3%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>3-10 years</td>
<td>18%</td>
<td>18%</td>
<td>21%</td>
<td>17%</td>
<td>19%</td>
</tr>
<tr>
<td>10-20 years</td>
<td>42%</td>
<td>29%</td>
<td>24%</td>
<td>24%</td>
<td>30%</td>
</tr>
<tr>
<td>20+ years</td>
<td>39%</td>
<td>49%</td>
<td>46%</td>
<td>58%</td>
<td>48%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q14: What seasons are you usually in residence in this town? (Please check all that apply)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year-round</td>
<td>92%</td>
<td>99%</td>
<td>97%</td>
<td>94%</td>
<td>96%</td>
</tr>
<tr>
<td>Summer</td>
<td>2%</td>
<td>0%</td>
<td>1%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Autumn</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Winter</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
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<tr>
<td>Spring</td>
<td>0%</td>
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<td>0%</td>
<td>0%</td>
<td>0%</td>
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<tr>
<td>Holidays only</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>I am here sporadically</td>
<td>3%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q15: How would you describe your political viewpoint?</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservative</td>
<td>22%</td>
<td>19%</td>
<td>25%</td>
<td>20%</td>
<td>22%</td>
</tr>
<tr>
<td>Liberal</td>
<td>26%</td>
<td>23%</td>
<td>19%</td>
<td>18%</td>
<td>21%</td>
</tr>
<tr>
<td>Independent</td>
<td>44%</td>
<td>48%</td>
<td>55%</td>
<td>52%</td>
<td>50%</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
<td>11%</td>
<td>2%</td>
<td>10%</td>
<td>7%</td>
</tr>
<tr>
<td>Q16: Do you belong to any non-profit groups that regularly advocate on behalf of environmental conservation and/or protection?</td>
<td>No</td>
<td>Yes, a national group (like The Nature Conservancy or National Audubon Society, etc.)</td>
<td>Yes, a local group (like a watershed alliance or local conservation committee, etc.)</td>
<td>Yes, other</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Barnstable</td>
<td>79%</td>
<td>8%</td>
<td>12%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Cranston</td>
<td>67%</td>
<td>20%</td>
<td>7%</td>
<td>6%</td>
<td></td>
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<tr>
<td>Dover</td>
<td>73%</td>
<td>3%</td>
<td>16%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Wells</td>
<td>77%</td>
<td>6%</td>
<td>13%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>74%</td>
<td>9%</td>
<td>12%</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q17: What is the highest level of education you have completed</th>
<th>No formal schooling completed</th>
<th>High school graduate (or equivalent)</th>
<th>Bachelor’s degree (BA, BS, AB, etc)</th>
<th>Graduate degree (JD, MA, MSc, PhD)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>0%</td>
<td>43%</td>
<td>32%</td>
<td>21%</td>
<td>4%</td>
</tr>
<tr>
<td>Cranston</td>
<td>0%</td>
<td>43%</td>
<td>23%</td>
<td>31%</td>
<td>2%</td>
</tr>
<tr>
<td>Dover</td>
<td>2%</td>
<td>30%</td>
<td>41%</td>
<td>24%</td>
<td>1%</td>
</tr>
<tr>
<td>Wells</td>
<td>0%</td>
<td>54%</td>
<td>14%</td>
<td>23%</td>
<td>3%</td>
</tr>
<tr>
<td>Total</td>
<td>0%</td>
<td>42%</td>
<td>28%</td>
<td>25%</td>
<td>4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q18: Could you estimate your household's total income for the most recent calendar year?</th>
<th>Less than $14,999</th>
<th>$15,000 to $34,999</th>
<th>$25,000 to $34,999</th>
<th>$35,000 to $49,999</th>
<th>$50,000 to $74,999</th>
<th>$75,000 to $99,999</th>
<th>$100,000 to $149,999</th>
<th>$150,000 or more</th>
<th>Refused</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>1%</td>
<td>7%</td>
<td>6%</td>
<td>8%</td>
<td>20%</td>
<td>7%</td>
<td>5%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>Cranston</td>
<td>7%</td>
<td>3%</td>
<td>5%</td>
<td>1%</td>
<td>20%</td>
<td>5%</td>
<td>12%</td>
<td>12%</td>
<td>8%</td>
</tr>
<tr>
<td>Dover</td>
<td>3%</td>
<td>1%</td>
<td>3%</td>
<td>1%</td>
<td>7%</td>
<td>5%</td>
<td>12%</td>
<td>12%</td>
<td>15%</td>
</tr>
<tr>
<td>Wells</td>
<td>9%</td>
<td>12%</td>
<td>4%</td>
<td>8%</td>
<td>5%</td>
<td>6%</td>
<td>14%</td>
<td>13%</td>
<td>15%</td>
</tr>
<tr>
<td>Total</td>
<td>6%</td>
<td>9%</td>
<td>4%</td>
<td>4%</td>
<td>7%</td>
<td>5%</td>
<td>8%</td>
<td>10%</td>
<td>5%</td>
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</tbody>
</table>
### 2014 Public Opinion Poll Results

<table>
<thead>
<tr>
<th>Question</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1: Do you ever think about whether a change in the climate could affect your community?</td>
<td>Yes, often</td>
<td>47%</td>
<td>33%</td>
<td>20%</td>
<td>42%</td>
</tr>
<tr>
<td></td>
<td>Every once in a while</td>
<td>31%</td>
<td>32%</td>
<td>41%</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>Once or twice</td>
<td>3%</td>
<td>15%</td>
<td>11%</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>No, not really</td>
<td>19%</td>
<td>20%</td>
<td>28%</td>
<td>20%</td>
</tr>
<tr>
<td>Q2: How concerned are you about the possible impacts a changing climate might have on your town?</td>
<td>1 - Not at all concerned</td>
<td>14%</td>
<td>15%</td>
<td>15%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8%</td>
<td>7%</td>
<td>9%</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>3 - Somewhat concerned</td>
<td>30%</td>
<td>35%</td>
<td>44%</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>22%</td>
<td>19%</td>
<td>10%</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>5 - Very concerned</td>
<td>26%</td>
<td>24%</td>
<td>22%</td>
<td>20%</td>
</tr>
<tr>
<td>Q3: Has your level of concern about the impacts climate change could have on your town shifted during the last year?</td>
<td>Significantly decreased</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Decreased</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>No change</td>
<td>55%</td>
<td>52%</td>
<td>55%</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>Increased</td>
<td>28%</td>
<td>36%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Significantly increased</td>
<td>17%</td>
<td>10%</td>
<td>18%</td>
<td>5%</td>
</tr>
<tr>
<td>Q4: What was the primary cause of this shift in your concern about the possible impacts climate change could have on your town?</td>
<td>Natural weather event</td>
<td>46%</td>
<td>65%</td>
<td>64%</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>News story</td>
<td>25%</td>
<td>11%</td>
<td>25%</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Local government action</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>State or national government action</td>
<td>0%</td>
<td>8%</td>
<td>0%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>The National Climate Assessment or another scientific report</td>
<td>4%</td>
<td>0%</td>
<td>4%</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>A personal or professional interaction</td>
<td>7%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Educational workshop or presentation</td>
<td>11%</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>School</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>6%</td>
<td>11%</td>
<td>7%</td>
<td>29%</td>
</tr>
</tbody>
</table>
### 2014 Public Poll

<table>
<thead>
<tr>
<th>Q5: What do you think the most significant impacts of a change in the climate might be for your community? (First response shown)</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>There will be no significant impact</td>
<td>12%</td>
<td>14%</td>
<td>12%</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>Increased flooding</td>
<td>20%</td>
<td>30%</td>
<td>19%</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>Sea level rise</td>
<td>32%</td>
<td>21%</td>
<td>25%</td>
<td>33%</td>
<td>27%</td>
</tr>
<tr>
<td>More heat waves</td>
<td>8%</td>
<td>4%</td>
<td>10%</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>More severe storms</td>
<td>14%</td>
<td>14%</td>
<td>18%</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>Ecosystem impacts</td>
<td>13%</td>
<td>15%</td>
<td>7%</td>
<td>11%</td>
<td>12%</td>
</tr>
<tr>
<td>Infrastructure impacts</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Drought</td>
<td>0%</td>
<td>2%</td>
<td>9%</td>
<td>2%</td>
<td>3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q6: If the climate is changing, who do you think should be responsible for preparing for the possible impacts this might have on your community? (First response shown)</th>
<th>Individuals</th>
<th>Neighborhoods</th>
<th>Businesses</th>
<th>The City/Town government</th>
<th>The state government</th>
<th>The national government</th>
<th>Other</th>
<th>All the above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>16%</td>
<td>8%</td>
<td>1%</td>
<td>19%</td>
<td>6%</td>
<td>19%</td>
<td>27%</td>
<td>4%</td>
</tr>
<tr>
<td>Cranston</td>
<td>31%</td>
<td>1%</td>
<td>4%</td>
<td>12%</td>
<td>4%</td>
<td>47%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Dover</td>
<td>40%</td>
<td>2%</td>
<td>6%</td>
<td>16%</td>
<td>11%</td>
<td>19%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Wells</td>
<td>37%</td>
<td>0%</td>
<td>6%</td>
<td>9%</td>
<td>10%</td>
<td>19%</td>
<td>17%</td>
<td>3%</td>
</tr>
<tr>
<td>Total</td>
<td>32%</td>
<td>3%</td>
<td>4%</td>
<td>14%</td>
<td>8%</td>
<td>26%</td>
<td>11%</td>
<td>3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q7: To what extent do you agree with the following: Preparing for climate change risks should be a priority for my town over the next decade.</th>
<th>1 - Totally disagree</th>
<th>2</th>
<th>3 - Neither agree nor disagree</th>
<th>4</th>
<th>5 - Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnstable</td>
<td>9%</td>
<td>12%</td>
<td>5%</td>
<td>31%</td>
<td>43%</td>
</tr>
<tr>
<td>Cranston</td>
<td>8%</td>
<td>10%</td>
<td>2%</td>
<td>41%</td>
<td>38%</td>
</tr>
<tr>
<td>Dover</td>
<td>9%</td>
<td>12%</td>
<td>6%</td>
<td>30%</td>
<td>44%</td>
</tr>
<tr>
<td>Wells</td>
<td>15%</td>
<td>10%</td>
<td>11%</td>
<td>27%</td>
<td>36%</td>
</tr>
<tr>
<td>Total</td>
<td>10%</td>
<td>11%</td>
<td>6%</td>
<td>32%</td>
<td>40%</td>
</tr>
</tbody>
</table>
**Q8:** To what extent do you agree with the following: When making decisions today, decision-makers in my town should take into account scientific projections about what the climate might be like in 50 years.

<table>
<thead>
<tr>
<th></th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Totally disagree</td>
<td>8%</td>
<td>11%</td>
<td>3%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>2</td>
<td>2%</td>
<td>7%</td>
<td>9%</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>3 - Neither agree nor disagree</td>
<td>8%</td>
<td>4%</td>
<td>6%</td>
<td>17%</td>
<td>9%</td>
</tr>
<tr>
<td>4</td>
<td>28%</td>
<td>24%</td>
<td>28%</td>
<td>33%</td>
<td>28%</td>
</tr>
<tr>
<td>5 - Strongly agree</td>
<td>54%</td>
<td>55%</td>
<td>53%</td>
<td>39%</td>
<td>50%</td>
</tr>
</tbody>
</table>

**Q9:** How confident are you that your town will be able to effectively respond to climate-related risks despite uncertainty about what the future climate will be like?

<table>
<thead>
<tr>
<th></th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all confident</td>
<td>22%</td>
<td>35%</td>
<td>17%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>2</td>
<td>17%</td>
<td>14%</td>
<td>12%</td>
<td>16%</td>
<td>15%</td>
</tr>
<tr>
<td>3 - Somewhat confident</td>
<td>38%</td>
<td>43%</td>
<td>56%</td>
<td>37%</td>
<td>44%</td>
</tr>
<tr>
<td>4</td>
<td>13%</td>
<td>1%</td>
<td>3%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>5 - Very confident</td>
<td>9%</td>
<td>8%</td>
<td>11%</td>
<td>14%</td>
<td>10%</td>
</tr>
</tbody>
</table>

**Q10:** If the climate is changing, what is most likely to prevent your community from taking appropriate action? (First response shown)

<table>
<thead>
<tr>
<th></th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing; my community is prepared</td>
<td>2%</td>
<td>5%</td>
<td>2%</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>Lack of scientific information</td>
<td>8%</td>
<td>5%</td>
<td>7%</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>Uncertainty about what the future climate will be like</td>
<td>12%</td>
<td>8%</td>
<td>26%</td>
<td>29%</td>
<td>19%</td>
</tr>
<tr>
<td>Lack of agreement about what to do about it</td>
<td>27%</td>
<td>8%</td>
<td>12%</td>
<td>10%</td>
<td>14%</td>
</tr>
<tr>
<td>Lack of funding or financial resources</td>
<td>32%</td>
<td>40%</td>
<td>38%</td>
<td>20%</td>
<td>33%</td>
</tr>
<tr>
<td>Lack of technical know-how/capacity</td>
<td>5%</td>
<td>10%</td>
<td>2%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Lack of public support</td>
<td>4%</td>
<td>5%</td>
<td>3%</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>Lack of political will</td>
<td>9%</td>
<td>18%</td>
<td>10%</td>
<td>13%</td>
<td>13%</td>
</tr>
</tbody>
</table>
**Q11: How important is it that residents, local groups, and businesses be involved in deciding how to respond to climate change risks?**

<table>
<thead>
<tr>
<th>Importance Level</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all important</td>
<td>8%</td>
<td>13%</td>
<td>5%</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>2</td>
<td>12%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>3 - Somewhat important</td>
<td>17%</td>
<td>33%</td>
<td>34%</td>
<td>30%</td>
<td>29%</td>
</tr>
<tr>
<td>4</td>
<td>15%</td>
<td>4%</td>
<td>13%</td>
<td>19%</td>
<td>13%</td>
</tr>
<tr>
<td>5 - Very important</td>
<td>48%</td>
<td>50%</td>
<td>48%</td>
<td>42%</td>
<td>47%</td>
</tr>
</tbody>
</table>

**Q12: How significant do you think addressing climate change risk should be in your town’s planning and decision making over the next ten years?**

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all significant</td>
<td>8%</td>
<td>10%</td>
<td>10%</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>2</td>
<td>9%</td>
<td>8%</td>
<td>3%</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>Somewhat significant</td>
<td>19%</td>
<td>32%</td>
<td>41%</td>
<td>32%</td>
<td>31%</td>
</tr>
<tr>
<td>4</td>
<td>17%</td>
<td>11%</td>
<td>9%</td>
<td>20%</td>
<td>14%</td>
</tr>
<tr>
<td>5 - Very significant</td>
<td>48%</td>
<td>39%</td>
<td>38%</td>
<td>37%</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Q13: How significant do you think climate change will actually be in your town’s planning and decision making over the next ten years?**

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all significant</td>
<td>24%</td>
<td>32%</td>
<td>16%</td>
<td>22%</td>
<td>24%</td>
</tr>
<tr>
<td>2</td>
<td>25%</td>
<td>21%</td>
<td>18%</td>
<td>23%</td>
<td>22%</td>
</tr>
<tr>
<td>3 - Somewhat significant</td>
<td>43%</td>
<td>39%</td>
<td>60%</td>
<td>43%</td>
<td>47%</td>
</tr>
<tr>
<td>4</td>
<td>4%</td>
<td>2%</td>
<td>3%</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>5 - Very significant</td>
<td>3%</td>
<td>6%</td>
<td>2%</td>
<td>5%</td>
<td>4%</td>
</tr>
</tbody>
</table>

**Q14: How willing would you be to pay slightly higher taxes so that your town can prepare for climate change risks?**

<table>
<thead>
<tr>
<th>Willingness Level</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Not at all willing</td>
<td>24%</td>
<td>34%</td>
<td>29%</td>
<td>17%</td>
<td>26%</td>
</tr>
<tr>
<td>2</td>
<td>8%</td>
<td>10%</td>
<td>7%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>3 - Somewhat willing</td>
<td>29%</td>
<td>36%</td>
<td>34%</td>
<td>41%</td>
<td>35%</td>
</tr>
<tr>
<td>4</td>
<td>13%</td>
<td>4%</td>
<td>17%</td>
<td>9%</td>
<td>11%</td>
</tr>
<tr>
<td>5 - Very willing</td>
<td>26%</td>
<td>16%</td>
<td>14%</td>
<td>17%</td>
<td>18%</td>
</tr>
</tbody>
</table>
Q15: What would make you more willing to pay slightly more in taxes so that your town can prepare for climate change risks...  

<table>
<thead>
<tr>
<th>Reason</th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am already very willing to pay slightly more in taxes for this purpose</td>
<td>2%</td>
<td>8%</td>
<td>1%</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>If my town got hit by a major storm or other climate disaster</td>
<td>10%</td>
<td>5%</td>
<td>4%</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>If I started seeing the impacts of climate change</td>
<td>21%</td>
<td>3%</td>
<td>20%</td>
<td>21%</td>
<td>15%</td>
</tr>
<tr>
<td>If I had more confidence in my town's ability to effectively manage climate change risks</td>
<td>33%</td>
<td>31%</td>
<td>16%</td>
<td>24%</td>
<td>26%</td>
</tr>
<tr>
<td>If my voice was represented in my town’s decision-making about how to prepare</td>
<td>2%</td>
<td>5%</td>
<td>8%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>If my town decision-makers included climate change preparations in everyday planning decisions</td>
<td>7%</td>
<td>12%</td>
<td>11%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>I do not want to pay more taxes for this purpose</td>
<td>17%</td>
<td>35%</td>
<td>24%</td>
<td>23%</td>
<td>25%</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
<td>1%</td>
<td>15%</td>
<td>3%</td>
<td>7%</td>
</tr>
<tr>
<td>Q16: Over the last year, a handful of role-play simulation workshops about possible local climate change risks were run in your town. Which of the following is true (select all that are true)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>I did not know about this</td>
<td>79%</td>
<td>73%</td>
<td>49%</td>
<td>73%</td>
<td>68%</td>
</tr>
<tr>
<td>I read or saw something about this</td>
<td>6%</td>
<td>1%</td>
<td>10%</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>I heard something about this from a friend or acquaintance</td>
<td>1%</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>I attended a role-play simulation workshop</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>I would have liked to attend a workshop, but did not</td>
<td>4%</td>
<td>0%</td>
<td>8%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>I did not hear about these workshop, but would have been interested</td>
<td>9%</td>
<td>24%</td>
<td>31%</td>
<td>11%</td>
<td>19%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q17: What is your gender?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q18: What is your age group?</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 &amp; under</td>
</tr>
<tr>
<td>30-39</td>
</tr>
<tr>
<td>40-49</td>
</tr>
<tr>
<td>50-59</td>
</tr>
<tr>
<td>60+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q19: How long have you been a member of this community?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
</tr>
<tr>
<td>1-3 years</td>
</tr>
<tr>
<td>3-10 years</td>
</tr>
<tr>
<td>10-20 years</td>
</tr>
<tr>
<td>20+ years</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q20: What seasons are you usually in residence in this town? (First response shown)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year-round</td>
</tr>
<tr>
<td>Summer</td>
</tr>
<tr>
<td>Autumn</td>
</tr>
<tr>
<td>Winter</td>
</tr>
<tr>
<td>Spring</td>
</tr>
<tr>
<td>Holidays only</td>
</tr>
<tr>
<td>I am here sporadically</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>
### Q21: How would you describe your political viewpoint?

<table>
<thead>
<tr>
<th></th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservative</td>
<td>16%</td>
<td>23%</td>
<td>28%</td>
<td>15%</td>
<td>21%</td>
</tr>
<tr>
<td>Liberal</td>
<td>29%</td>
<td>16%</td>
<td>20%</td>
<td>28%</td>
<td>23%</td>
</tr>
<tr>
<td>Independent</td>
<td>44%</td>
<td>57%</td>
<td>50%</td>
<td>50%</td>
<td>51%</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
<td>3%</td>
<td>2%</td>
<td>7%</td>
<td>6%</td>
</tr>
</tbody>
</table>

### Q22: Do you belong to any non-profit groups that regularly advocate on behalf of environmental conservation and/or protection?

<table>
<thead>
<tr>
<th></th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>79%</td>
<td>90%</td>
<td>82%</td>
<td>83%</td>
<td>84%</td>
</tr>
<tr>
<td>Yes, a national group (like The Nature Conservancy or National Audubon Society, etc.)</td>
<td>7%</td>
<td>6%</td>
<td>9%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Yes, a local group (like a watershed alliance or local conservation committee, etc.)</td>
<td>10%</td>
<td>4%</td>
<td>1%</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>Yes, other</td>
<td>4%</td>
<td>0%</td>
<td>8%</td>
<td>1%</td>
<td>3%</td>
</tr>
</tbody>
</table>

### Q23: What is the highest level of education you have completed?

<table>
<thead>
<tr>
<th></th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No formal schooling completed</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>High school graduate (or equivalent)</td>
<td>13%</td>
<td>32%</td>
<td>23%</td>
<td>31%</td>
<td>25%</td>
</tr>
<tr>
<td>Bachelor’s degree (BA, BS, AB, etc)</td>
<td>48%</td>
<td>36%</td>
<td>55%</td>
<td>46%</td>
<td>46%</td>
</tr>
<tr>
<td>Graduate degree (JD, MA, MSc, PhD)</td>
<td>30%</td>
<td>23%</td>
<td>19%</td>
<td>20%</td>
<td>23%</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
<td>8%</td>
<td>3%</td>
<td>3%</td>
<td>6%</td>
</tr>
</tbody>
</table>

### Q24: Could you estimate your household’s total income for the most recent calendar year?

<table>
<thead>
<tr>
<th></th>
<th>Barnstable</th>
<th>Cranston</th>
<th>Dover</th>
<th>Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $14,999</td>
<td>8%</td>
<td>3%</td>
<td>4%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>$15,000 to $24,999</td>
<td>11%</td>
<td>10%</td>
<td>10%</td>
<td>8%</td>
<td>10%</td>
</tr>
<tr>
<td>$25,000 to $34,999</td>
<td>10%</td>
<td>11%</td>
<td>7%</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>$35,000 to $49,999</td>
<td>15%</td>
<td>13%</td>
<td>15%</td>
<td>21%</td>
<td>16%</td>
</tr>
<tr>
<td>$50,000 to $74,999</td>
<td>21%</td>
<td>12%</td>
<td>14%</td>
<td>22%</td>
<td>17%</td>
</tr>
<tr>
<td>$75,000 to $99,999</td>
<td>13%</td>
<td>20%</td>
<td>18%</td>
<td>11%</td>
<td>16%</td>
</tr>
<tr>
<td>$100,000 to $149,999</td>
<td>12%</td>
<td>9%</td>
<td>14%</td>
<td>8%</td>
<td>11%</td>
</tr>
<tr>
<td>$150,000 or more</td>
<td>10%</td>
<td>21%</td>
<td>18%</td>
<td>15%</td>
<td>16%</td>
</tr>
</tbody>
</table>
APPENDIX H: Explanation of Interview Coding

Follow-up interviews were completed with approximately 25 percent of workshop participants four to six weeks following each workshop. A total of 140 follow-up interviews were conducted: 38 in Barnstable, 38 in Cranston, 35 in Dover, and 29 in Wells.

MIT graduate students conducted follow-up interviews using a semi-structured interview protocol. Interviews were recorded and transcribed in a comprehensive memo format. Interview memos captured all key ideas, themes, and quotes from each interviewee. Interview memos were uploaded into NVivo, a qualitative data analysis software program, and were analyzed and coded to identify indications of learning or lack of learning around the perspective shifts of interest: concern, should act, confidence, support, empathy, and enriched understanding (see Chapter 3 and Chapter 4).

The coding process included multiple steps. I first analyzed each interview memo to identify whether the participant showed clear signs of experiencing transformative learning around each of the variables of interest (e.g., TL concern, TL empathy, TL should act, etc.). Whether a participant was identified as experiencing transformative learning around each of the learning objectives of interest was based on the overall interview; some participants said that the workshop increased their concern about climate change risks, but did not otherwise show signs of increased concern and therefore were not marked as experiencing transformative learning around concern. Similarly, some
participants said that the workshop did not change their perspectives in any way, but showed important signs of major perspectives shifts during the course of their interviews, and were therefore marked as experiencing certain kinds of transformative learning. Examples of interview data that were indicative of transformative learning around each variable of interest are shown below in Table H.1.

### Table H.1: Examples of interview data coded for transformative learning for each variable of interest

<table>
<thead>
<tr>
<th>Learning objective/variable of interest</th>
<th>Explanation of desired transformative learning</th>
<th>Example interview data coded for transformative learning for the variable of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concern about local climate change risks (“concern”)</td>
<td>Perspective change related to increased concern about local climate change risks, understanding of local risks, and/or sense of urgency in responding to risks</td>
<td>“I think, it struck me, as I said before, that this is not just a federal issue. Climate change may be a federal issue but rising sea levels is very much a local issue. And it’s going to hit the people who are vulnerable soon, and very directly. And it’s going to be selective … your neighbor might be at risk and you might be ok.”</td>
</tr>
<tr>
<td>Sense that municipality should take action on climate change adaptation in the near future (“should act”)</td>
<td>Perspective shift related to increased sense of local responsibility for preparing for climate change risks, appreciation of the need for local government action, and/or sense of importance of engaging diverse local actors</td>
<td>“Before, I thought it [preparing for climate change risks] was more of a federal thing. That it should have been the big government doing it and then the state. But now thinking about it, it makes way more sense to have local government really helping and then state and I still think the Federal needs to have something in place for it. Seeing the local government and planners and homeowner association, it makes me see that it is important to have the local community involved.”</td>
</tr>
<tr>
<td>Confidence that municipality can effectively respond to climate change risks despite uncertainty about climate change risks (“confidence”)</td>
<td>Perspective shift related to increased optimism about the prospects of local adaptation action and/or confidence in the ability of the community to effectively respond to climate change risks</td>
<td>“…one thing I came away with was thinking, ‘Well maybe we will do something [to prepare for climate change risks] within the next 5, 7 years and not push this off 15 or 20 years.’ So in that sense, my move up my kind of optimism or rather down the skepticism scale, that was something that came, I think, directly as a result of the scenario.”</td>
</tr>
<tr>
<td>Support for a consensus building approach to adaptation decision-making (“support for CBA”)</td>
<td>Perspective shifts related to increased understanding of the importance of engaging diverse stakeholders in decision-making, support for collaborative decision-making processes, and/or familiarity with collaborative decision-making processes, particularly as they pertain to adaptation decision-making</td>
<td>“When you take the emotions out of it and you actually look at the data and stuff like that it definitely kind of opens up your mind to how to go about debating certain issues like that and it gets you thinking - should representatives of people be the ones that are having these discussions or should it be the people themselves that have their preconceived notions? It differently changed the way you think about how the decisions are made.”</td>
</tr>
<tr>
<td>Understanding of and empathy for different perspectives and interests (“empathy”)</td>
<td>Perspective shifts related to increased appreciation for, willingness to accept and work with, and/or appreciation for the need to address diverse interests and perspectives</td>
<td>“I had to play a different role and saw different roles – I became a little bit more aware than I was before of the necessity for bringing people together of different, not different viewpoints on climate change, they all think climate change is important, but different viewpoints on how climate change needs to be dealt with… I think that we need to, we need to start engaging more in dialogue with people who belong to the chamber of commerce, and business people, and all the people concerned with it to try to locate what the issues are, what is going, what of climate change is going to hit them hardest and where you can talk about them to get them to see there are some things they need to be concerned about even if they don’t initially think so.”</td>
</tr>
<tr>
<td>Enriched understanding</td>
<td>Generally improved or expanded understanding of climate change risks, what climate change adaptation will entail, and challenges and opportunities for adaptation</td>
<td>“I learned at the workshop that there are a lot issues. I also learned a bit more about what’s actually been done recently with the buy-back program… I see how there can be obstacles so everyone’s fighting for their own interest, and I see how it really takes everyone to put their heads together and compromise to make it a success and to really make these improvements… I think the public needs to be involved. It’s more successful when everyone is aware and supportive.”</td>
</tr>
</tbody>
</table>

During this first round of coding, I also coded interviews for signs of participants experiencing the “transformative elements” of RPS exercises – suspending disbelief, perspective taking, engaging in problem solving, and learning together (see Chapter 3 and
Chapter 5). Examples of interview data that were coded for each of the transformative elements are shown in Table H2.

**Table H.2: Examples of interview data coded for each transformative element of RPS exercises**

<table>
<thead>
<tr>
<th>Transformative element / variable of interest</th>
<th>Explanation of transformative element</th>
<th>Example interview data coded for transformative learning for the variable of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspending disbelief</td>
<td>Engagement in suspending disbelief and/or skepticism and really playing the simulation</td>
<td>“I think it was kind of difficult to talk and fill someone else’s shoes on short notice like that. It was definitely fun and I think it was pretty insightful as well...I played the role of the neighborhood committee guy and I am a homeowner so I can understand where that person’s coming from...It was kind of difficult to just kind of hop in just really quickly and become like emotionally involved with it, which, you know, the process of debating the thing is probably a good thing. It’s harder for someone to compromise but you know once you kind of get a grip of what you’re advocating for it’s easy enough and it’s fun.”</td>
</tr>
<tr>
<td>Perspective taking</td>
<td>Engagement in taking on the assigned role and playing the simulation from that perspective</td>
<td>“I was asked to be the head of the Chamber of Commerce [laughs]. So they’re usually on the polar opposite of environmental regulators. Not always, but certainly their interests are – different from my own, and they also have a different viewpoint on climate change than the scientists like myself, typically. So it was kind of fun [laughs] to act out that type of role.”</td>
</tr>
<tr>
<td>Engaging in problem solving</td>
<td>Engagement in working with others to collaboratively problem solve within the role-play simulation exercise</td>
<td>“I think people would have been surprised and enjoyed watching our group, I found the dialogue to be enlightening. I felt ours was very good. We role-played very well, we moved our perspectives and positions around and tried to accommodate others' viewpoints. It was a very healthy process.”</td>
</tr>
<tr>
<td>Learning together</td>
<td>Engagement in learning with and from each other in the context of the role-play simulation and broader workshop</td>
<td>“For me, I think listening to my teammates was more helpful in my planning my role out, which was helpful to me because it was not a role I had ever played before. So listening to the town selectman make his comment and other people make their comments about the real estate and different things like that sort of gave me a broader view, I think, of how difficult it is, on the money side, to plan for climate change...I had a good time, I enjoyed my teammates...I learned a lot from my teammates.”</td>
</tr>
</tbody>
</table>
After this first layer of coding had been completed for all interviews, I then re-read and re-coded each interview transcript with my initial codes hidden. I compared my codes from the two rounds of coding to ensure consistent and accurate assessment of the interview data. My two rounds of coding were generally very consistent. Where there were inconsistencies or questions about the meaning of interview data, I erred on the side of caution (i.e., not identifying the participant as experiencing transformative learning or experiencing the transformative element of interest).

After comparing and reconciling my two round of interview coding, I identified each participant as experiencing, maybe experiencing, or not experiencing transformative learning. Individuals who were identified as clearly experiencing a major positive perspective shift around one or more of the learning indicators of interest were marked as “Yes TL.” Interviewees who showed no strong signs of positive perspective shifts around the learning objectives of interest were marked as “No TL.” The strong majority of participants clearly had or had not experienced a significant shift in perspective or thinking about the indicators of interest. However, there were a number of interviews that suggested people had experienced notable signs of positive perspective shifts but where data were not sufficient to clearly indicate that transformative learning had occurred. I marked these participants as Maybe TL. Where it was not clear that participants had experienced positive perspective shifts, I erred on the side of caution, marking them as Maybe TL if there was a notable indication of transformative learning and No TL if there were no significant signs of positive perspective shifts. The Yes TL, No TL, and Maybe TL codes classifications were mutually exclusive.
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