

TIME FOR CHANGE:
HOW TEMPORAL FRAMES SHAPE JUDGMENTS AND DECISIONS ABOUT
HEALTH, WEALTH, AND THE ENVIRONMENT

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Sungjong Roh
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TIME FOR CHANGE:
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Sungjong Roh, Ph. D.

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My dissertation examines how temporal framing of social events can lead to meaningful changes in judgments holding downstream implications for social change. Chapter 1 lays out the phenomenological focus and theoretical motivations of the dissertation, setting the scope and plan of the investigation. Chapter 2 shows that highlighting a soft-drink company's future (planned) advertising campaign targeting youth—compared to one it had already implemented in the past—evoked more negative emotions toward the soda company and, in turn, drew more public support for soda taxes. Chapter 3 examines the uses and influences of temporal duration (short-term versus long-term) frames in communication about income inequality. Using either short-term or long-term framing, describing economic inequality in terms of its growth over a period of time in the past is associated with reduced support for policy action among the very group it needs to persuade to generate majority support (conservatives). Chapter 4 examines the uses and influences of temporal direction frames (past versus future) in communication about income inequality. A computerized linguistic analysis suggests the default temporal orientations manifested in communication about income inequality in daily news discourse, revealing a dominant past frame. Contrasting to this, two follow-up randomized experiments

suggest that forecasting the future of income inequality (e.g., the rich *will get* richer versus the rich *got* richer) could be more effective in raising political conservatives' moral intuitions that govern concern for individual welfare and justice and, in turn, lead to greater support for redistributive policy initiatives. Contrary to Chapters 2 and 4, Chapter 5 describes how prospective framing in communication, when expressed in terms of certainty, can also be counterproductive. A computerized linguistic analysis shows that conservative (versus liberal) media tends to be more future-oriented and less past-oriented in terms of its language uses in headlines of news stories dealing with global warming. Importantly, a follow-up survey experiment using a nationally representative sample shows that forecasting the future consequences of global warming—with certainty—further reduces skeptics' core climate beliefs (here, Republicans), increasing polarization. In Chapter 6, I conclude by discussing the broad implications of the findings covered in this dissertation.

BIOGRAPHICAL SKETCH

As it took 15 years for Odysseus to get back to Ithaca in Homer's *Odyssey*, Sungjong's journey to Ithaca took twice as much time. Sungjong Roh was born on February 21, 1982 in Seoul, South Korea, to Jae Seong Roh and to Kyoung Hee Kim. Two years later, he became the older brother of Kyoungjong Roh. After graduating with great honor in 2004 from Korea University, South Korea, he fulfilled his military duty as a soldier of the Korean Augmented Troops to the United States Army for 2 years. There, he worked in a medical clinic and made observations about how people could lead to suboptimal judgments and decisions even when they were motivated to pursue optimal outcomes, which catalyzed his research on heuristics and biases. He returned to Korea University, earning a Master's degree in 2008 with a perfect GPA (4.5 out of 4.5). Then, he worked for three years as a social science researcher for a variety of real-world issues. During this time, he observed how people are motivated to reason in favor of their self-identities and values even in the face of evident information at hand, which motivated his work on motivated reasoning. At last, to study the dynamics of heuristics and biases, motivated reasoning, and communication processes in shaping judgments and decisions relevant to real-world problems, Sungjong came to Cornell in 2011. He studied at Cornell under the guidance and mentorship of Professors Jeff Niederdeppe, Jonathon P. Schuldt, Katherine McComas, Michael A. Shapiro, and David Dunning. Between his master's and PhD studies, as of the 1st of May 2015, Sungjong has published 10 journal articles, 1 book review, and 1 encyclopedia entry (additional publications written in Korean include 11 journal articles and 3 book chapters). His dissertation was supported by the National Science Foundation's Doctoral Dissertation Grant (Decision, Risk, and Management Sciences Program). Sungjong will join the Lee Kong Chian School of Business at Singapore Management University as an Assistant Professor starting on July 1st, 2015.

To My Father, Mother, Brother, and You

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In addition to having such wonderful committee members (my intellectual uncles and aunts), I had the great fortune to have wonderful intellectual parents—my co-chairs. Dr. Jonathon P. Schuldt has always been supportive of my ideas and work. Jon arrived at Cornell in Fall 2012. But as we quickly found we had overlapping research interests during our first meeting, we began our collaboration even before he arrived at Cornell soon after he had accepted the offer by our department. In addition to many fond memories with Jon—presenting work at academic conferences and

publishing journal articles since then—I am very proud of founding the Social Cognition and Communication (SoComm) Lab with him. I believe that under his directorship our lab will keep flourishing. I will always be proud of being the first student in the lab. Lastly, it was my honor and privilege to have Dr. Jeff Niederdeppe as my advisor and a co-chair of my dissertation. Beyond being my doctoral advisor, Jeff is a model scholar and mentor. I have learned from our conversations wherever we had them—from his office to classrooms and Trillium in Kennedy Hall to softball fields to a seat next to him in academic conferences to Chapter House to Mandible Café in the Mann Library to Ithaca Coffee Company in Triphammer Mall. Jeff always provides sage guidance and constructive feedback. His mentorship has been irreplaceable in my development as a scholar. I hope to emulate him in my own career, and look forward to continuing to learn from him down the road.

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CHAPTER 1

INTRODUCTION: TIME FOR CHANGE

“Time makes more converts than reason.” – Thomas Paine

Time is a human condition; so is communication. Mental time travel is inherent across various forms of communication. Without having a clearly shared conception about time, social interaction cannot productively be coordinated (Teigen & Karevold, 2005; Zimbardo & Boyd, 1999). Conflict would not be resolved through negotiation: rather, it would be exacerbated (Adair & Brett, 2005). Making an apology, asking to be excused, and forgiving the faults of others are key elements in interpersonal relations, and their successes are critically dependent upon timing (Caruso, 2010; Frantz & Bennis, 2005).

The primacy of time in communication is also the case for impersonal (mediated) communication beyond interpersonal interaction. News is, by nature, oriented to time (Schudson, 1986; Tuchman, 1978). News stories construct connections among the past (Zelizer, 1992), present (Rushkoff, 2013), and future (Neiger, 2007) of individuals and societies and respond to the issue-attention cycle (Downs, 1972; Patterson, 1998). Though seemingly opposite in their goals, fictional narratives also often begin with locating the temporal setting of characters and events and often go back and forth in time (Currie, 2006; Deleuze, 1989; Tal-Or & Cohen, 2010). Strategic communication such as advertisements, public campaigns, and marketing often launches ahead of initiating the ideas, products, and behaviors that they aim to endorse, and continues once such objects are present (Jung Grant & Tybout, 2008; Roh & Schuldt, 2014).

This ubiquity of temporal cues in communication (here, temporal frames) raises a series of questions: (1) what forms of temporal frames exist in communication (explications of temporal frames); (2) how are such temporal frames processed (mechanisms of temporal frames) and (3) what influence do they have (effects of temporal framing); (4) when do temporal frames influence more and less (boundary conditions of temporal framing effects)? The current dissertation investigates these inquiries in diverse contexts of communication for social change.

Framing in Communication for Social Change

Framing is a popular rhetorical strategy in arguing for policy reform intended to bring about social change (Lakoff, 2010; Riker, 1986; Schattschneider, 1960; Sniderman & Theriault, 2004). Decades of behavioral science research suggest that even subtle changes in the way that information is described (framed), including arguments (Iyengar, 1991), evidence (Hart, 2010; Jacoby, 2000), definitions (Lowery, Chow, & Crosby, 2009; Maibach, Nisbet, Baldwin, Akerlof, & Diao, 2010), or labels (Roh & Niederdeppe, in press; Simon & Jerit, 2007) of a social issue, can influence how people assess and evaluate the information and take social actions based upon it.

Extant literature identifies two overarching types of frames: emphasis frames and equivalency frames (Druckman, 2001). Emphasis frames, which have been frequently examined in communication, sociology, and political science research (Benford & Snow, 2000; Entman, 1993; Iyengar, 1990; Sniderman & Theriault, 2004), selectively appeal to different knowledge structures stored in memory in order to invite particular ways of interpreting an issue (considerations) over others when constructing opinions. For example, information highlighting the economic

expenditures of welfare may lead people to focus on the cost-related considerations, thereby opposing welfare policy programs. The same recipients of information may have supported welfare, however, had the news media highlighted the humanitarian aspects. As a case in point, Price, Tewksbury, and Powers (1997) assigned participants (undergraduates) to read one of four fictitious news stories about state budget cuts to higher education. Stories of the three experimental conditions framed the issue in terms of human interest, conflict, or personal consequence considerations, respectively. First, the study found that the three experimental conditions, relative to a control condition (containing the core information only), appeared to activate the accessibility of frame-specific themes (e.g. tuition increases under the personal consequence frame) and inhibit those made accessible by the control (core story) version of the news story (e.g., reduction of the state budget). In addition, a follow-up experiment of the study showed effects that complemented the differences in cognitive accessibility (knowledge activation) observed in the earlier experiment (i.e., greater support for tuition caps in the personal consequences condition than in the control condition).

Emphasis frames, by definition, do not present *equivalent* information—they describe issues in different ways for strategic purposes. In contrast, equivalency frames, which have been more commonly examined in behavioral decision and economics research (McKenzie & Nelson, 2003; Teigen & Karevold, 2005; Tversky & Kahneman, 1981), utilize different cues in communication but convey information that is logically equivalent. For example, Quattrone and Tversky (1988, p. 727) presented alternative economic policies to participants such that, “if program J is adopted, 90% of the work force would be employed, while the rate of inflation would

be 12%. If program K is adopted, 95% of the work force would be employed, while the rate of inflation would be 17%.” The study found that 54% of participants opted for program J and 46% preferred program K. The preferences for the two policies were reversed, however, when the same question was presented in terms of *unemployment* (i.e., if program J is adopted, 10% of the work force would be unemployed, while the rate of inflation would be 12%; if program K is adopted, 5% of the work force would be unemployed, while the rate of inflation would be 17%) rather than *employment*—64% of participants opted for program K; and a mere 36% preferred program J.

The underlying assumption—or justification—of framing in communication for social change is that social/policy issues often are multifaceted as well as involve uncertainty and trade-offs (Edelman, 1993; Jerit, 2007; Petersen, Slothuus, Stubager, & Togeby, 2011). In general, a policy reform that benefits one sector of the population may work to the disadvantage of another sector (Quattrone & Tversky, 1988). For instance, economic policy initiatives designed to lead to higher rates of employment often have an adverse effect on inflation as illustrated above. Such policy discourses, as a result, are open to alternative ways of construal and descriptions (here, framing).

The current dissertation extends these lines of inquiry regarding framing effects to build support for social change by explicating and examining an underexplored, yet inherent contextual component in strategic communication: namely, temporal frames. As noted above, framing does not change the core piece of information about a given issue. Rather, what it does is provide an underlying context. I argue throughout this dissertation that the manner in which the *temporal* context is

presented (temporal framing) influences how people differentially construe the core piece of information about social issues, despite the frame leaving that core component intact.

Explicating Temporal Frames in Communication

Though a growing body of work has begun to tackle the influence of temporal frames in communication in the past decade (Chandran & Menon, 2004; Jung Grant & Tybout, 2008; Orbell & Hagger, 2006; Roh, McComas, Rickard, & Decker, in press; Roh & Schuldt, 2014), a unified, systemic definition for “temporal framing effect” has yet to emerge.

Herein I operationalize temporal framing effects as the influence of discrepant temporal information between messages that are otherwise alike. For example, information about growing income inequality in the U.S. such as, “The rich have gotten richer in the past 3 decades” can be reframed into messages without changing the core piece of information, for example: “The rich got richer last year” or “The rich will get richer next year.” These alternative messages exemplify discrete dimensions of the temporal framing of social events.

The distinction between the first and second messages can be conceptualized as temporal “duration” versus temporal “distance” frames. They are different in terms of temporal *distance* as they denote the extent (proximal vs. distal; 1 year from now vs. 3 decades from now) to which an event (growing income inequality) is temporally distant from the present. Also, they can be conceptualized as differing in temporal *duration* with distinct units of duration (short-term versus long-term; in one year versus in three decades).

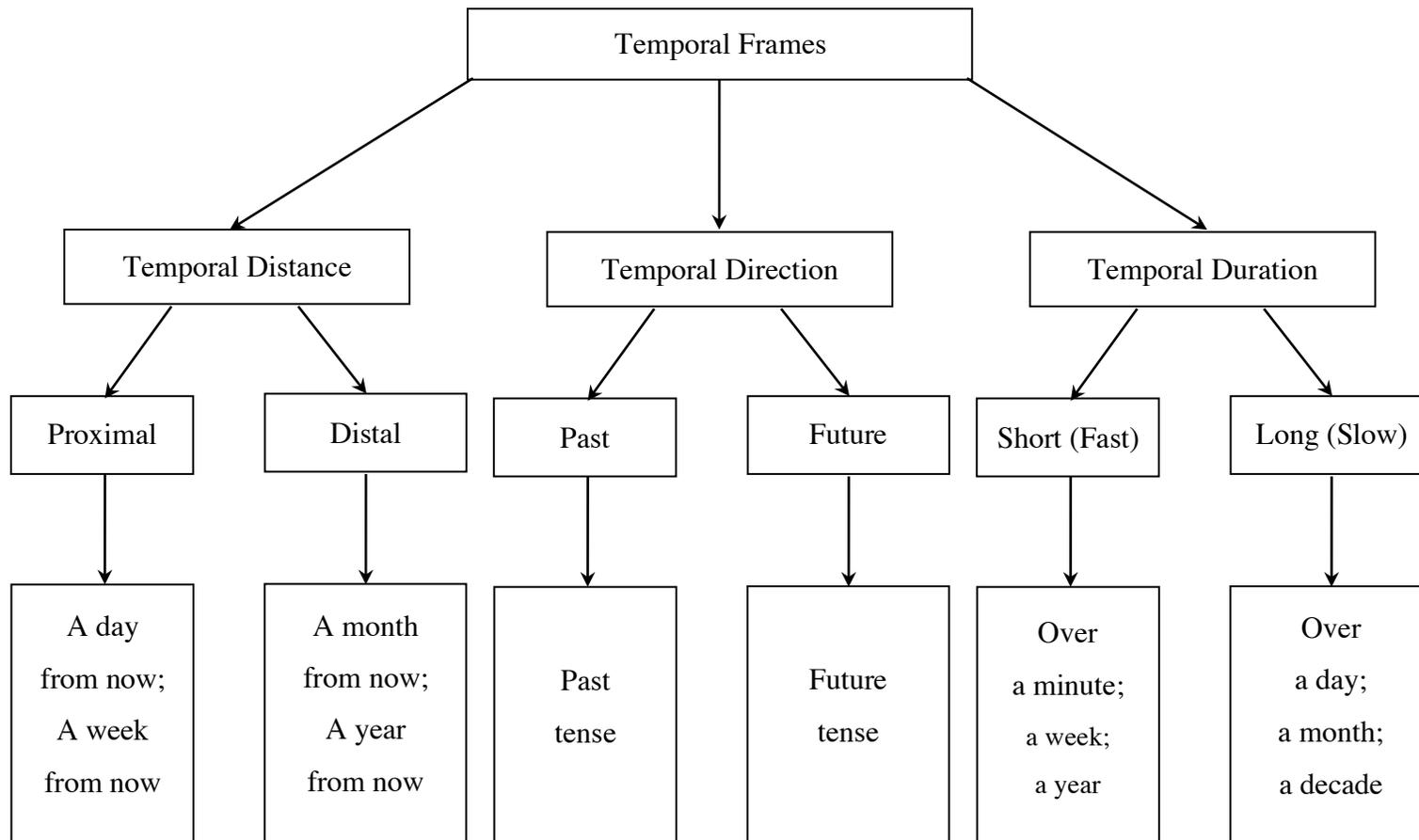
I conceptualize the differences between the second and third messages as temporal “direction” frames. They signify the attribute of temporal *direction*, indicating which temporal aspect (i.e., retrospective vs. prospective) is taken (e.g., The rich “got” richer “last” year versus The rich “will get” richer “next” year). Temporal direction frames essentially manipulate the tense of a social event (past or future). Figure 1.1 displays a conceptual map (three dimensions) of temporal frames.

Scope of the Dissertation

Before continuing, it is important to note the scope of the current investigation regarding the processes and influences of temporal frames. This dissertation focuses on the relative impact of temporal *direction* (past versus future) and temporal *duration* (short-term versus long-term) frames.

Though the role of temporal *distance* in communication has been well-investigated under the established theoretical frameworks of construal-level theory (Chandran & Menon, 2004; Lutchyn & Yzer, 2011), dual-processing models (McElroy & Mascari, 2007; Roh et al., in press), and personality traits regarding consideration of future consequences (Morison, Cozzolino, & Orbell, 2010; Orbell & Kyriakaki, 2008), the roles of direction and duration frames have been relatively less investigated, particularly in the context of communication for social change.

By “communication for social change” I mean any implicit or explicit persuasive attempt to change beliefs and preferences on social issues or policies that hold broader societal impact. Such communication phenomena include, but are not limited to, the following: issue advocacy, informational interventions, news stories, and social marketing campaigns. From a thematic standpoint, the current dissertation



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Figure 1.1. A conceptual map (three dimensions) of temporal frames.

hopes to help elucidate the process behind judgments and decisions that contribute to some of society's most pressing challenges in the domains of health (obesity), wealth (income inequality), and the environment (global climate change).

How Temporal Frames May Work in the Mind

The earlier section suggested an explication of temporal frames in communication with three dimensions of temporal frames: temporal *direction*, *duration*, and *distance*. Explicating discrete dimensions of temporal frames in communication is a necessary step toward teasing out their potential psychological consequences. Such explication, however, is not sufficient for understanding how differing frames are processed in the mind. The following sections briefly discuss the potential roles of temporal frames, laying out major predictions of the current dissertation. As I posit in the subsequent sections, even identical manifestations of temporal frames in communication could lead to divergent mental processes depending on the contexts of particular judgments and decisions.

When Future Framing Can Motivate Changes

When Future Means More than Past Framing. Communication about social injustice tends to be retrospective. When arguing for social change regarding timely issues, such as initiating soda taxes for better consumer health and enacting progressive income redistributive taxes to protect us from the danger of a New Gilded Age, communicators tend to highlight past social injustices. For example, public health experts point out industries' past unethical marketing practices (Schwartz & Ustjanauskas, 2012) and economists document previous years' Census data suggesting the rich *got* richer (Piketty & Saez, 2014).

Intuitively, it seems persuasive to talk about past instances of discontent when recruiting support for social change (e.g., policy reform). Since the unsatisfactory events *already happened*, such information seems to provide a firm ground to ask for change. Yet, a growing body of research on past and future asymmetries in human judgments (Burns, Caruso, & Bartels, 2012; Caruso, 2010; Roh & Schuldt, 2014; Van Boven & Ashworth, 2007; Van Boven, Kane, & McGraw, 2009) hints otherwise. Talking about the *future*—about that which *will occur* compared to that which *has already happened*—is likely to result in greater support for social change.

The prediction of the current dissertation is grounded in and is an extension of past-future asymmetry in human judgments. Retrospection tends to be more constrained than prospection in mental processes (Kane, Van Boven, & McGraw, 2012; Van Boven et al., 2009). Thus, the same event can be processed differently in terms of its perceived intentionality (Burns et al., 2012), elicitation of emotions (Van Boven & Ashworth, 2007), and fairness judgments (Caruso, 2010), depending on whether it is described as occurring in the past or in the future. Future framing of social events tends to be more emotionally evocative and to be perceived as unfair than past framing of the same event because people perceive less uncertainty and greater controllability in prospection than retrospection.

In the current dissertation, I further posit that such differences in cognitive and affective processes based on differential degrees of liberation in mental simulation hold downstream implications for a meaningful change in policy preferences (Roh & Schuldt, 2014). In addition to being less certain (which reduces imaginative constraints and allows for more extreme reactions), the future is also more controllable

than the past, which may promote stronger emotional responses and other action tendencies in line with functional theories of emotion (e.g., Frijda, 1987; Schwarz, 2012; Smith & Ellsworth, 1985). Consequently, the prospective framing of social injustice (e.g., the youth-targeted marketing practice of the soda industry) builds greater support for governmental regulations (e.g., initiating soda taxes) for counteracting such injustice.

Future Framing Shall Overcome Value-based Opposition to Change.

Communication for social change aiming at policy reforms does not arise in a social vacuum. Rather, such communication often faces opposition that has been deeply rooted in ideological divisions of a society. For example, there is a persistent political disagreement as to how economic inequality should be resolved in the U.S. Political conservatives typically show opposition toward policy proposals designed to reduce inequality (Kluegel & Smith, 1986). This opposition may be based on the psychology of conservatism in American politics (Jost & Amodio, 2012; Jost, Glaser, Kruglanski, & Sulloway, 2003). Extant literature on political ideology in American politics emphasizes the differing psychological and moral value orientations related to inequality and self-reliance between conservatives and liberals (individual responsibility regarding the inequality; see Jost, Federico, & Napier, 2009; Lakoff, 2002). On average, political conservatives tend to accept inequality and attribute it to individual effort founded on a social dominance orientation and system justification mindset (Bénabou & Tirole, 2006; Jost, Glaser, et al., 2003; Sidanius & Pratto, 2001). To the contrary, political liberals tend to refuse to accept inequality and desire

individual welfare and fairness based on greater reliance on the ethics of justice and care (Haidt & Graham, 2007).

A growing body of work in social cognition suggest that Americans often face such a psychological conflict between *abstract* national values of *justice for all* and relatively *concrete* everyday biases based on individual values and beliefs (Luguri, Napier, & Dovidio, 2012). Equality (at least about opportunities, if not always outcomes) is something of an American ideal (Napier & Jost, 2008) and people consider equality as desirable and just (Rawls, 1971/1999). However, individual values such as political ideology and group affiliation often make people betray such a cultural ideal. Thus, this line of research (e.g., Agerström, Björklund, & Allwood, 2010; Luguri et al., 2012; Yang, Preston, & Hernandez, 2012) posits that an abstract versus a concrete mindset could lead people to focus more on their core moral intuitions, which were found to be individualizing moral foundations (i.e., harm and fairness) (Napier & Luguri, 2013). Namely, a mechanism that is successful at inducing abstract thinking would potentially be effective in reducing the well-known ideological divide and disagreement on social justice initiatives.

The asymmetric nature of retrospection and prospection with respect to degrees of freedom in mental simulation makes future framing a potentially effective mechanism to promote such abstract (high-level) thinking about social injustice since future events, compared with past events, are more abstractly represented (Kane et al., 2012). Future framing may bring the moral intuitions (values) of fairness and welfare to the foreground of social judgments and has the potential to reduce the ideological divide on policy preferences. I predict that a relatively high-level (abstract) processing

of social injustice that could potentially be induced by prospective framing will lead people (especially conservatives, given their historical opposition to social justice initiatives and relatively insipid concern for individualizing moral foundations) to increasingly favor their individualizing moral values.

When Future Framing Can Backfire

One important argument of the current dissertation is that there is a need to untangle manifestations of temporal frames in communication and processing of temporal frames in the mind. In the previous section, I posited how future framing of social events (issues) in communication leads to desirable (intended) consequences where the default temporal frame seems to be retrospective. However, all prospective framing is not created equal—I qualify such a *future-motivates-change* argument by showing that future framing, when expressed in certain terms, can also be suboptimal.

While issues like economic inequality are widely recognized by the general public despite disagreement on how to resolve the issue, issues like global warming still remain in doubt in terms of its existence among skeptics. To dispel such skepticism, climate communication often emphasizes global warming's *future* consequences rather than those already observed in the past with assured confidence—presumably because communicators anticipate that warning the public about dire future consequences will mobilize climate-mitigating beliefs and actions. Yet, a closer look at evidence from psychological science offers mixed support for such intuition.

Communicating future consequences in certain terms can serve as a depolarizing mechanism on the one hand because unlikely events are perceived as more probable when they are temporally positioned in the future as compared to the

past (Van Boven et al., 2009). In the case of global warming beliefs, this perspective suggests that individuals who typically report perceiving global warming's consequences as unlikely (e.g., Republicans) may express heightened existence beliefs when information highlights future rather than past consequences.

On the other hand, since people experience more liberating mental simulation when thinking about the future than the past (Caruso, Gilbert, & Wilson, 2008; Newby-Clark & Ross, 2003; Strickland, Lewicke, & Katz, 1966; Van Boven et al., 2009), more skeptical individuals may express *even greater doubt* (lower existence beliefs) when the given information frames the phenomenon prospectively, given the lower constraints on mental simulation and increased possibility for self-serving judgments that thinking about the future affords (Weinstein, 1980). More recent work on optimism toward the favorable future suggests people believe that the future will unfold in ways that favor their social judgments. For instance, people who believed that global temperatures were increasing at the point when the study was performed expected that Americans would be more likely to believe the same thing in 20 years; in a similar vein, participants who believed that temperatures were decreasing projected that more Americans would come to agree with *their* views in 20 years (Rogers & Norton, 2014).

If this is the case, the well-documented tendency for Republicans to report lower belief in global warming (Dunlap & McCright, 2008) may be more prevalent when global warming's consequences are framed prospectively rather than retrospectively, since Republicans may find it easier to employ self-serving skepticism under the future framing (Newby-Clark & Ross, 2003). In particular, such self-serving

skepticism may be particularly pronounced when information fails to acknowledge the inherent uncertainty of scientific projections (Oreskes & Conway, 2010), perhaps giving rise to psychological reactance among climate skeptics whose freedom to imagine alternative outcomes (that favor their belief systems) occurring the future (an inherently uncertain time) is challenged (J. W. Brehm, 1966; S. S. Brehm & Brehm, 1981; Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012).

When Long-term Means More than Short-term Framing

Judgment and decision making literature also suggests that people may respond differentially to different *duration* cues of social events (Ariely, 2008; Hershfield, Bang, & Weber, 2014; Yeung & Soman, 2007). First, people appear to hold the lay theory that negative stimuli that are experienced over a short duration (like pain) is less severe of than negative stimuli experienced overs a longer period of time (Ariely, 2008)—though research on duration neglect (Fredrickson & Kahneman, 1993) and peak-end rules (Kahneman, Fredrickson, Schreiber, & Redelmeier, 1993) describe otherwise. As a case in point, more recent evidence suggests that people perceive the length of time something has been observable in the past as a rough measure of its robustness, not only against calamities of the past but also against whatever calamities may affect its observability in the future. Thus, people seemed to be more averse to the long-term description of calamities than to the short-term ones since people tend to estimate that the past duration of an event mirrors (diagnoses) the future duration of an event.

Such heuristic judgment about information about short-term and long-term duration can also found in literature on duration heuristics (Yeung & Soman, 2007).

People consider duration as a heuristic cue to infer service benefit. When people evaluate a consultation provided by a bank manager, for example, people appear to use the duration of the consultation as a heuristic cue to infer a quality of the consultation, although such duration information is not a benefit in itself but only serves as a vehicle for that benefit. People consider services with a shorter duration less favorably than those with a longer duration. Taken together, literature suggests that people are averse to a long duration of unfavorable events while they prefer a long duration of favorable events; people are less averse to a short duration of unfavorable events while they less prefer a long duration of favorable events.

I posit that such heuristic judgment toward duration cues may also be the case for the description of social injustice like income inequality and people's responses to such information. Though mere descriptions of social injustice (income inequality) over the past three *decades* or three *years* are not necessarily diagnostic in assessing the severity of the inequality phenomenon, people may perceive the problem as more unpleasant if it is framed as existing for a long-term versus a short-term duration; on the flip side, people may discount the problem if it is framed in the short-term versus the long-term duration. Hence, people may show greater support for policies aimed at reducing income inequality if it is framed in the long-term versus the short-term; and/or show less support for the policies in response to short-term versus long-term framing of income inequality. This may be particularly so among skeptics—political conservatives—compared with liberals who may hold crystallized support for such policy interventions.

When Short-term Means More than Long-term Framing

Given the arguments described above, it seems likely that advocates for redistributive economic policy would intuitively prefer long-term over short-term duration framing because they expect that people will perceive greater magnitude of inequality from the former and/or discount the severity of inequality from the latter. However, emerging work makes hints that there may be a condition under which the pattern of people's responses to such long-term framing of inequality can be reversed.

Picture that you meet an old friend for the first time in *three decades* and see that she has become rich. You might think that she has worked hard to earn her wealth over those years—your efforts will never betray you. But suppose that you learn that your friend became rich in just *three years*. You might suspect a lottery or inheritance windfall, that is, an *external* source of her newfound wealth.

As noted earlier, when describing income inequality and asking for social reforms to combat it, policy advocates tend to highlight perceived injustices that have already occurred in the past. Moreover, to stress the seriousness of the issue, “the rich got richer” phenomenon is often described as having happened for an extended period of time (e.g., “Income inequality gap widens among U.S. communities over 30 years”) (Chinni, 2011). Presumably, highlighting the extended duration of income inequality would intuitively feel more persuasive, in part because longer duration seems to imply the issue is more serious than a shorter duration and a shorter duration is perceived as less serious than a longer duration. However, the psychology of human judgment and decision-making hints otherwise—I suggest here that public responses to income

inequality construed over a longer period of time may create further system justification through internal rather than external attributions for accumulated wealth.

Studies on the effort heuristic (Kruger, Wirtz, Van Boven, & Altermatt, 2004) suggest that people construe levels of one's effort from the amount of time people spent on an event. For example, people perceive greater effort from an artist if a painting is drawn in three months rather than in three hours. Analogously, gaps in wealth emerging slowly rather than quickly may lead people to see greater effort from those who have accumulated the wealth. By the same token, income inequality that is framed as having occurred quickly may make people question whether the wealthy are responsible for their own successes (i.e., it may increase external attributions for wealth accumulation). As a result, construing *less* effort in the case of quickly formed wealth (a rising income gap within a shorter period of time) than for slowly formed wealth may, in turn, increase support for wealth redistribution policies. By the same token, again, perceiving more effort in the case of slowly formed wealth (a rising income gap within a longer period of time) may, in turn, decrease support for wealth redistribution policies. I further suggest that duration frames may be more prevalent among political conservatives given their belief system of just-world belief that the rich deserve their efforts—work hard and eventually you will do better than the previous generation.

Taken together, the previous discussion suggests that temporal frames could lead to divergent mental processes depending on the contexts of particular judgments and decisions. Altogether, the major argument I seek to make in the studies that follow is that the psychological processes of temporal frames in the mind matter and should

be carefully assessed in context. There is no inherent directional impact of temporal frames in communication, but the direction depends centrally on the decisional context and cognitive processes that this context engenders.

Plan of the Dissertation

The title of this dissertation—*time for change*—conveys the two goals of this project. First, the dissertation demonstrates how temporal framing of social events can lead to meaningful changes in judgments holding downstream implications for social change. Second, the current dissertation addresses how the *default* temporal frames in communication for social impact can be counterproductive under some conditions, suggesting that efforts to reframe time can more effectively accomplish the goals of such communication efforts. The plan of this dissertation is as follows.

In Chapter 2, I offer initial evidence that differences in affective processing of prospective versus retrospective frames hold downstream implications with meaningful impact on policy preferences. Specifically, I show that highlighting a soft-drink company's future (planned) advertising campaign targeting youth—compared to one it had already implemented in the past—evoked more negative emotions toward the soda company and, in turn, drew more public support for soda taxes.

Having established that temporal framing indeed matters in policy debates, Chapters 3 and 4 examine roles of temporal frames in shaping *redistributive* policy preferences. These chapters expand on Chapter 2 in four important ways. First, I further explicate and expand temporal *duration* framing, a novel temporal frame in addition to past and future framings (temporal *direction* framing). Second, by tackling a social issue that has been deeply rooted in ideological divisions of American society

(redistributive policy preferences), these chapters will show how both the context (situational cues: namely, temporal frames) and the character (persistent value and belief system: namely, political ideology) intersect. Third, moving on from the affective mechanism, I introduce a novel psychological mechanism of temporal framing effects—individualizing moral intuitions (i.e., concerns for harm and fairness). Finally, beyond mere assumptions about patterns of the current (default) use of temporal frames in communication about timely social issues, the following chapters investigate actual uses of temporal frames in media discourse by observing the ecological uses of such frames in stories published by major U.S. news outlets.

Chapter 3 examines the uses and influences of temporal duration (short-term versus long-term) frames in communication about income inequality. I find that the long-term duration is indeed employed more frequently than the short-term duration frame when U.S. news media address growing income inequality. Also, a short-term frame reduces conservatives' support for progressive tax policy reform. When the attribution judgment about the wealth is accessible *in situ*, however, the long-term framing of income inequality can engender political polarization by further reducing policy support from conservatives while also enhancing support from liberals. The results suggest a time paradox in framing income inequality. Using either short-term or long-term framing, describing economic inequality in terms of its growth over a period of time in the past is associated with reduced support for policy action among the very group it needs to persuade to generate majority support (conservatives).

Having found that *retrospective* framing of income inequality (in either short-term or long-term duration) can be suboptimal in policy debates, Chapter 4 examines

the uses and influences of temporal direction frames (past versus future) in communication about income inequality. Using a computerized linguistic analysis, the chapter first examines the default temporal orientations manifested in communication about income inequality in daily news discourse, revealing a dominant past frame. Contrary to this finding, two follow-up randomized experiments suggest that forecasting the future of income inequality (e.g., the rich *will get* richer versus the rich *got* richer) could be more effective in raising political conservatives' moral intuitions that govern concern for individual welfare and justice and, in turn, lead to greater support for redistributive policy initiatives. Though common daily discourse concerning income inequality tends to document its past, it is forecasting the future that changes historical skeptics' policy preferences.

Contrary to Chapters 2 and 4, Chapter 5 describes how prospective framing in communication, when expressed in terms of certainty, can also be counterproductive. Complementing past findings on future orientations of news reporting on global warming, a computerized linguistic analysis shows that conservative (versus liberal) media tends to be more future-oriented and less past-oriented in terms of its language uses in headlines of news stories dealing with global warming. Importantly, a follow-up survey experiment using a nationally representative sample shows that forecasting the future consequences of global warming—with certainty—further reduces skeptics' core climate belief (here, Republicans), increasing polarization.

In Chapter 6, I conclude by discussing the broad implications of the findings covered in this dissertation. I outline a variety of directions for future research that build upon the theoretical framework presented here.

CHAPTER 2

WHERE THERE'S A *WILL*: CAN HIGHLIGHTING FUTURE YOUTH-TARGETED MARKETING INCREASE SUPPORT FOR SODA TAXES?¹

“Where there’s a will, there’s a way” – English Proverb

The previous chapter argued that the same event can be processed differently in terms of its perceived intentionality, elicitation of emotions, and fairness judgments, depending on whether it is described as occurring in the past or in the future. I expect future framing of social events to be more emotionally evocative and to be perceived as unfair than past framing of the same events because people should perceive less uncertainty and greater controllability from prospection than retrospection.

This chapter provides initial evidence that differences in affective processes hold downstream implications with meaningful impact on policy preferences.

Chapter Abstract

Amid concern about high rates of obesity and related diseases, the marketing of nutritionally poor foods to young people by the food industry has come under heavy criticism by public health advocates who cite decades of youth-targeted marketing in arguing for reforms. In light of recent evidence that the same event evokes stronger emotional reactions when it occurs in the future versus the past, highlighting youth-targeted marketing that has yet to occur may evoke stronger reactions to such practices, and perhaps greater support for related health policy initiatives. In a

¹ A slightly modified version of the current chapter was published as follows: Roh, S., & Schuldt, J. P. (2014). Where there’s a *will*: Can highlighting future youth-targeted marketing increase support for soda taxes. *Health Psychology*, 33(12), 1610-1613. doi: 10.1037/hea0000021

between-subjects experiment, Web participants ($N = 285$) read that a major soda company had already launched (past condition) or was planning to launch (future condition) an advertising campaign targeting children. Measures included support for a soda tax and affective responses to the company's actions. Greater support for the soda tax was observed in the future condition than in the past condition. Moreover, participants in the future condition reported heightened negative emotions about the company's actions, which mediated (explained) the observed effect on soda tax support. The same action undertaken by the food industry (here, marketing soda to children) may evoke stronger negative emotions and greater support for a health policy initiative when it is framed prospectively rather than retrospectively.

Introduction

Public health experts widely acknowledge that the consumption of sugar-sweetened beverages (SSBs; e.g., nondiet sodas, fruit and energy drinks containing refined sugars such as high-fructose corn syrup, etc.) is linked to childhood obesity (Ludwig, Peterson, & Gortmaker, 2001), raising concerns about the food industry's practice of marketing these products to youth (Harris, Pomeranz, Lobstein, & Brownell, 2009; Nestle, 2006). Research suggests that such advertising is indeed linked to children's increased soda consumption and obesity rates in the United States,² prompting increased scrutiny of the industry's marketing practices (Brownell & Frieden, 2009). At the same time, public health advocates have proposed numerous policy initiatives aimed at reducing soda consumption among the public at large (e.g.,

² According to the Centers for Disease Control and Prevention (2013), nearly one fifth (i.e., 18%) of U.S. children between the ages of 6 and 11 were clinically obese in 2010, up from 7% in 1980.

Mayor Bloomberg's 16-ounce "portion cap" in New York City restaurants) and children specifically (e.g., banning soda from elementary schools). Among the most widely debated proposals are taxes on SSBs, which research suggests could lower consumption and help ameliorate obesity (Sturm, Powell, Chriqui, & Chaloupka, 2010; Wang, Coxson, Shen, Goldman, & Bibbins-Domingo, 2012).

Despite their popularity among health professionals, such taxes appear to be less popular among the American public (Harris Interactive, 2013; Marlow, 2013) and have failed to pass in over 30 jurisdictions (Dorfman, 2013), perhaps in part reflecting the wide disagreement over where responsibility for the obesity crisis ultimately rests (e.g., unhealthy situational factors vs. personal responsibility; Barry, Gollust, & Niederdeppe, 2012). In light of recent evidence that the same event evokes stronger emotional reactions when it occurs in the future versus the past (described earlier), this study tests whether highlighting youth-targeted marketing that has yet to occur evokes stronger reactions to such practices and, in turn, greater support for soda tax policy.

Given the significant consequences of childhood obesity for individuals and society, it is important to better understand the factors that affect public support for related health-policy initiatives. In monitoring food industry practices and arguing for reforms, public health advocates commonly inform the public about youth-targeted marketing that has already occurred (i.e., in the past; e.g., Schwartz & Ustjanauskas, 2012). Presumably, highlighting past instances of seemingly exploitative practices would intuitively feel more persuasive, in part because the past is more certain than the future (e.g., Lazarus, 1999). However, recent evidence suggests that highlighting future instances might be more persuasive. Studies find that future events evoke

stronger emotional reactions than equivalent past events (Caruso, 2010). As Caruso (2010) describes, these asymmetric emotional responses may be rooted in the different cognitive appraisals that accompany retrospective versus prospective simulation. For instance, in addition to being less certain (which reduces imaginative constraints and allows for more extreme reactions), the future is also more controllable than the past, which may promote stronger emotional responses and other action tendencies in line with functional theories of emotion (e.g., Frijda, 1987; Schwarz, 2012; Smith & Ellsworth, 1985).

Although informing the public about youth-targeted marketing practices may help build support for taxing SSBs, scant research has addressed this possibility directly. In light of evidence that people respond more strongly to events occurring in the future than in the past, the effect of this information on public attitudes may depend on its temporal location: whether the ad campaign has already occurred (in the past) or has yet to occur (in the future). Specifically, because people are generally expected to react negatively after learning that a company markets nutritionally poor food to children, this study investigated whether a soda company's youth-targeted advertising campaign would elicit stronger negative emotions and greater support for a soda tax when it was described as occurring in the future as compared with the past. In doing so, the work aims to help illuminate conditions that promote support for soda taxes and to explore implications of past/future message framing for policy preferences.

Method

Participants

This project recruited web participants ($N = 285$) via Amazon.com's crowd-sourcing worksite, Mechanical Turk, to complete an "opinion survey" in exchange for a nominal fee (\$0.25). Participants' mean age was 34.8 years ($SD = 12.9$), about 57% ($n = 163$) were female, and the majority (88%) reported at least some college education (49% had graduated college). Given the topic of study, the survey also collected details about self-reported height, weight, and political variables. We calculated body-mass index (BMI) based on self-reported height and weight, and participants were distributed among the four BMI categories used by the U.S. government as follows: underweight ($BMI > 18.5$; 3.2%), normal weight ($18.5 \leq BMI < 25.0$; 45.3%), overweight ($25.0 \leq BMI < 30.0$; 22.7%), and obese ($BMI \geq 30$; 22.8%). Politically, the sample leaned liberal ($M = 3.60$, $SD = 1.63$; 1 = *very liberal* to 7 = *very conservative*) and political party affiliation was distributed as follows: 18% Republican, 34% Democrat, 40% Independent, 8% something else.

Materials and Procedure

Past versus Future Framing. The survey asked participants to read a news article reporting on a youth-targeted marketing campaign by a major soda brand, adapted from a Web page monitoring food industry marketing practices hosted by the Yale Rudd Center for Food Policy and Obesity (<http://www.yaleruddcenter.org>). Specifically, the article reported on an ostensible TV advertising campaign by the Sprite brand targeting children, which was said to involve a partnership with a music star (the hip-hop artist Drake) and a tie-in with the National Basketball Association

(NBA). The article went on to describe the concerns of public health advocates about the ill effects of the industry’s “intensive and aggressive food marketing and advertising practices.” Depending on their randomly assigned condition, the article framed advertising campaign as having occurred in the past (e.g., the headline read, “Sprite launched a new ad campaign targeting kids” either “yesterday” or “last month”) or as occurring in the future (“Sprite will launch a new ad campaign targeting kids” either “tomorrow” or “next month”).^{3,4} Besides this temporal framing, the articles were identical. The full text of the news article appears below (alternative wordings in parentheses; temporally distal version depicted):

Sprite Launched (Will Launch) a New Ad Campaign Targeting Kids

Last Month (Next Month)

Sprite launched (will launch) a new campaign last month (next month) that is encountering opposition from those who are concerned that kids are already drinking too much soda. The new TV advertising campaign has been (will be) timed to coincide with a busy week in NBA basketball. Sprite has also launched (will also launch) a campaign to contribute funds to neighborhood parks and basketball courts. As a Sprite’s representative said, “Basketball . . . is a way to get teens around the world to express their passion and show off their moves.” Another

³ Suggesting that our randomization was successful, the experimental groups did not differ significantly across any of the demographic groups we collected ($ps > .05$).

⁴ Varying temporal distance (“yesterday” vs. “last month”; “tomorrow” vs. next month”) allowed us to explore whether psychological distance influenced the outcomes of interest (e.g., Eyal, Liberman, & Trope, 2008). No such differences emerged, and so we collapsed across this variable in the analysis.

representative said that Sprite's park campaign, and its collaboration with hip-hop artist Drake, has also helped to engage teens.

Experts, however, have expressed concern. A research group at Yale School of Public Health argues that U.S. children and adolescents have increasingly been targeted with intensive and aggressive food marketing and advertising practices. While multiple factors influence the eating behaviors and food choices of young people, many health experts believe that one potent force is food advertising that promotes increased soda consumption. Last month (Next month), it appears that Sprite contributed (will contribute) to this potent force with its new ad campaign.

Measures. After reading the article, participants completed the following policy support and emotion response measures. The survey measured the key dependent variable, support for a soda tax, with the following question adapted from previous national surveys (Rivard, Smith, McCann, & Hyland, 2012): "Do you support or oppose a tax on regular (i.e., non-diet) soda and soft drinks?" (1 = *oppose strongly*, 2 = *oppose somewhat*, 3 = *support somewhat*, 4 = *support strongly*). The survey counterbalanced the tax support question with a question assessing attributions of blame toward the company for its actions ("Sprite is to blame for its new campaign," from 1 = *totally disagree* to 7 = *totally agree*), which enabled us to test whether the article was perceived as implicating the company and whether the effect on tax support was bolstered when the blame judgment preceded it.⁵

⁵ Overall, participants attributed above-average levels of blame to the company relative to the scale midpoint ($M = 5.08$, $SD = 1.79$), $t(284) = 10.15$, $p < .001$.

Participants then completed the emotion measures, by rating how *angry*, *upset*, *bad*, and *disgusted* they felt about the company's actions on separate scales (0 = *not at all* to 5 = *very*), which we averaged to create a single negative emotion index (Cronbach's $\alpha = .94$, $M = 1.06$, $SD = 1.28$). Participants then reported on the individual difference items mentioned above and were debriefed. Importantly, participants were informed that the news story they read was fictional and was constructed for research purposes. The experimental procedure was approved by the Cornell University Institutional Review Board and lasted approximately 15 minutes on average.

Results

Recall that we expected to observe greater support for a soda tax when the soda company's youth-targeted marketing campaign was framed prospectively rather than retrospectively. Consistent with this prediction, participants in the future condition expressed significantly greater support for a soda tax ($M = 2.33$, $SD = 1.05$) than did participants in the past condition ($M = 2.03$, $SD = 1.07$), $t(283) = 2.44$, $p = .02$, $d = 0.29$. Likewise, participants in the future condition reported significantly greater negative emotion toward the company ($M = 1.22$, $SD = 1.38$) than did those in the past condition ($M = 0.90$, $SD = 1.16$), $t(283) = 2.10$, $p = .04$, $d = 0.25$.

To test whether heightened negative emotion mediated the effect of temporal condition on tax support, we employed a bootstrapping procedure with 5,000 resamples (Hayes, 2013). Results revealed that negative emotion was significantly associated with increased support for soda taxes, $b = .27$, $t(282) = 5.74$, $p < .001$, and that the original effect of temporal condition (i.e., future vs. past) fell to

nonsignificance when accounting for this mediation pathway, $t = 1.83, p = .07$ (95% bias-corrected bootstrap CI for the indirect effect: 95% CI [.01, .18]; see Figure 2.1).

Finally, although participants attributed more blame to the company in the future condition ($M = 5.24, SD = 1.73$) than in the past condition ($M = 4.92, SD = 1.84$), this difference was not significant, $t(283) = 1.53, p = .13$. In addition, we observed no effects of question order. Although we observed some main effects of individual difference variables on the tax and emotion measures—for example, conservatism negatively predicted support for soda tax ($r = -.30, p < .001$)—the effect

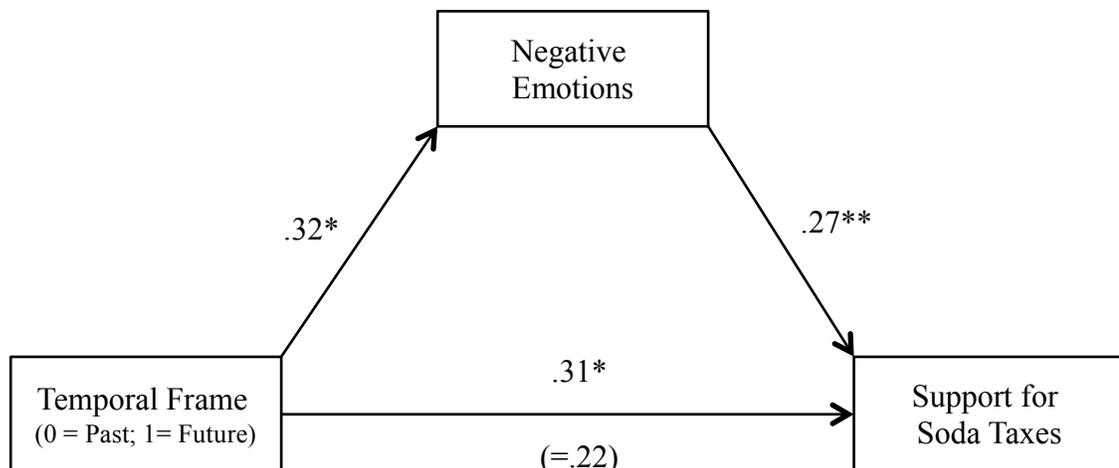


Figure 2.1. Model depicting the mediating role of negative emotions on the relationship between temporal framing (retrospective vs. prospective) and support for soda tax.

Note: Coefficients are unstandardized regression coefficients. The coefficient in parentheses is the direct relationship between the independent variable (temporal frames) and the dependent variable (support for soda tax), controlling for the proposed mediator (composite measure of negative emotions). * $p < .05$. *** $p < .001$.

of temporal framing did not vary by age, gender, education, political orientation, or BMI ($ps > .20$).⁶

Discussion

When informing the general public about youth-targeted marketing by soda companies and its implications for childhood obesity, public health advocates commonly point to advertising campaigns that have already occurred in attempting to build public support for reforms. However, recent psychological research suggests that, when possible, experts should highlight the industry's *future* (rather than past) planned advertising practices in their messages to achieve greater impact. Indeed, the present study found that reading about the same youth-targeted marketing campaign engendered greater support for a soda tax when the campaign was described as occurring in the future as opposed to the past. Moreover, participants' negative emotions toward the company's actions mediated this effect, suggesting that asymmetric emotional responses to future versus past events (Van Boven & Ashworth, 2007) may have implications for meaningful policy outcomes—here, support for taxing a sugar-sweetened beverage (specifically, soda).

This study is not without limitations. First, our convenience sample was not representative of the American public, which may limit the generalizability of these findings. Given the potential national-level policy implications of this work, future research may explore the effect of the temporal framing of youth-targeted advertising

⁶ The other significant correlations with outcome variables involved BMI and sex (coded 0 = male, 1 = female): BMI with negative emotions and tax support ($rs = -.17$, $ps < .01$); sex with negative emotions ($r = .24$, $p < .001$) and tax support ($r = .15$, $p = .02$).

with a representative sample of the voting public. It should be noted, however, that this concern is mitigated somewhat by the randomized experimental nature of the current research (as opposed to a descriptive survey), which offers strong internal validity and the ability to draw causal inferences (see Druckman & Lupia, 2012, for a relevant discussion).

Second, although the observed temporal framing effects were significant, effect sizes were modest (Cohen's d s < 0.30), and negative emotion ratings as well as soda tax support remained low in absolute terms across conditions (below the scale midpoint, on average). We note, however, that the effects were produced by a rather subtle experimental manipulation and that even modest effect sizes may be practically important in the broader context of public opinion on national policy issues.⁷

Third, although we observed elevated attributions of blame to the company in the future compared with the past condition, this difference was not significant. This may be due to the limited variance engendered by this question, which assessed blame for the marketing campaign as opposed to childhood obesity more generally, thus making it difficult for participants to blame anyone besides the company itself. More generally, the present work may have inadvertently overlooked some potentially relevant individual difference variables, such as personal soda consumption, parenting status, and concerns about healthy eating, to name a few, which future research may incorporate to help uncover important boundary conditions for these effects. In

⁷ We note another potential explanation of the low negative emotion and tax support ratings. In the mock news article, the soda company was depicted as engaging in an act of corporate social responsibility (i.e., donating money to help fund neighborhood parks and basketball courts), which may have evoked some positive feelings toward the brand (e.g., Klein & Dawar, 2004).

addition, given that public health advocates are unlikely to have (or rarely have) detailed advanced knowledge of a given company's marketing plans, future research may test whether similar framing effects emerge when a message focuses on the future actions of the soda industry in general rather than on the actions of a specific brand.

Limitations aside, the present results offer important insights for both theory and practice. Theoretically, they suggest that in addition to its influence on emotional responses to events themselves and to related moral judgments (Caruso, 2010; Van Boven & Ashworth, 2007), future versus past temporal framing can affect a timely and politically contentious policy preference—here, support for soda taxes. The correlation between negative emotions about the soda company's actions and support for a soda tax observed here may also be worth noting as it suggests that affective states play a role in mobilizing social actions (Peters & Slovic, 2000). From a practical standpoint, they suggest that attempts to recruit public opinion in favor of obesity-reducing initiatives by implicating youth-targeted marketing in the nation's health crises may enjoy greater success simply by highlighting practices that will occur.

Finally, although there is a growing recognition of the value of judgment and decision-making research in the development of behavior-change interventions and policy making (e.g., Shafir, 2012; Thaler & Sunstein, 2008), informed message design based on the psychology of human judgment has seen fairly limited application in public health messaging. The current work contributes to building a more systematic, research-grounded knowledge base for more effective public health message design.

CHAPTER 3

A TIME PARADOX IN FRAMING INCOME INEQUALITY: WHEN DURATION FRAMES MOBILIZE, DEMOBLIZE, AND POLARIZE REDISTRIBUTIVE TAX POLICY PREFERENCES

“Time is what we want most; but what we use worst.” – William Penn

The previous chapter shows where temporal framing (future versus past) of a social event (youth-targeted marketing practices of a brand) relevant to a policy initiative (soda tax) can lead to downstream implications on policy preferences that hold a broader societal impact (supporting taxing soda) via affective responses toward the event. In the previous case, we observed the effect of such temporal frames on support for regulatory action across the lines of ideological differences in politics.

Having established that temporal framing *can* matter in policy debates, the next two chapters examine roles of temporal frames in shaping *redistributive* policy preferences. These new chapters expand on the previous chapter in four important ways. First, I will explicate and examine effects of another temporal frame, temporal *duration* framing, which is distinct from past versus future framings (temporal *direction* framing). Second, these chapters will show the interplay of the context (situational cues: namely, temporal frames) and the character (persistent value and belief system: namely, political ideology) by tackling a social issue that has been deeply rooted in ideological divisions of American society, redistributive policy preferences. Third, moving on from the affective mechanism, I introduce a novel psychological mechanism of temporal framing effects—individualizing moral intuitions (i.e., concerns for harm and fairness). Finally, beyond mere assumption

about patterns of the current (default) use of temporal frames in communication about timely social issues, the following chapters investigate the prevalence of actual uses of temporal frames in media discourse by observing the frequency with which such frames appear in stories about income inequality from major U.S. news outlets.

Chapter Abstract

Rising inequality in the United States over the years can be described in two alternative ways in terms of its temporal duration: short-term (over the past “three years”) or long-term (“three decades”). Although both expressions similarly convey information about growing income inequality, the consequences of duration framing can be divergent. The current study uses data from news coverage of income inequality and two randomized survey experiments to analyze how temporal duration frames often used in news discourse about income inequality influence public support for redistributive policy initiatives. In Study 3.1, analyses of temporal markers in U.S. news media when communicating about income inequality or economic inequality revealed that “30 years” was most frequent duration appeared in newspapers. In Study 3.2, participants in a controlled web experiment ($N=556$) rated their support for redistributive tax policy initiatives in response to a mock news article framing the duration of income inequality. Participants overall showed less support in response to short-term framing (“the rich have gotten richer during the past 3 years”) compared to long-term framing (“the past 3 decades”). In addition, short-duration frames led to more political polarization by further reducing the levels of policy support from conservatives. In Study 3.3, participants ($N=1,000$) in a national telephone survey experiment rated their support for a progressive tax policy in response to a similar

duration manipulation, yet with an additional priming of an ideological cue with question order: Before answering questions about policy support, participants were primed with the attribution of wealth by answer a question tapping the attribution of wealth. Results show that long-term framing led to greater support for policies among overall participants. However, among conservatives such long-term framing further reduced support compared to their baseline preferences, when participants rated their levels of support for the policies without a duration manipulation. I conclude with a discussion of theoretical and practical implications for duration framing and dynamic public opinion of policy preferences.

Introduction

The rise of income inequality is an major and enduring social problem in the U.S (Oishi, Kesebir, & Diener, 2011; Stiglitz, 2012; Uslaner, 2005; Wilkinson & Pickett, 2009). In contrast to the fact that the U.S. is one of the wealthiest contries around the globe in recent history, it is also the case that the U.S. is one of the most divided ones among OECD countries in terms of annual amount of income (OECD, 2014). Piketty and Saez (2014) showed that almost a half of total pre-tax market income goes to the top 10% of income earners, which has been steadily increasing from 1997 when only 33% of total income share went to the top 10% of income earners. However, it is not only with respect to income share where we are witnessing a stark division in the U.S.; public opinion towards redistributive policy initiatives that aim to bridge the differeneecs has also been sharply divided across the lines of political difference (Jost, 2006; Skitka & Tetlock, 1993). Political conservatives show opposition to the redistributive policy reforms, which appear to be related to the core

political psychology of conservatism—system justification and just-world belief, for instance (Jost & Amodio, 2012; Jost, Glaser, et al., 2003). Among conservatives, social welfare programs can be seen as a failure to promote personal accountability and individual agency. Political conservatives are also more likely than liberals and moderates to accept and justify the existence of unequal outcomes and to see them as fair and legitimate (Jost, Glaser, et al., 2003).⁸

Policy advocates often seek to inform the public about growing income inequality by highlighting for how long the inequality has been growing in an effort to raise public support for redistributive policies that would reduce unequal distribution of wealth. Sometimes this takes the form of a relatively shorter time frame (e.g., over the past 3 *years*, the income inequality gap has widened; Vinik, 2014), whereas other times it takes the form of a relatively longer time frame (e.g., over the past 3 *decades*, the income inequality gap has widened; Chinni, 2011). Income inequality can be expressed as occurring in long-term (slow) or short-term (fast) duration frames.

Although both expressions convey information about growing income inequality, the consequences of duration framing can be divergent. I posit that a subtle change in such a duration frame can lead to a meaningful change in preferences

⁸ Americans in general (across political orientations) also tend to hold more conservative orientations than many other developed nations. International polling results about individual agency and success in life illustrate this view. In response to a question about whether one agrees or disagrees with the statement “success in life is pretty much determined by forces outside our control,” Americans, more than any other nationality, tended to disagree (Bénabou & Tirole, 2006). Thus, while there is variation in support for redistributive policies to reduce income inequality, overall levels of support for governmental intervention are constrained by an overall tendency to attribute success (financial or otherwise) to individual causes such as effort and determinism.

toward (or against) redistributive policies. Adding to previous work on the contextual influences on public support for redistributive policies (Chow & Galak, 2012; Lowery et al., 2009), this chapter investigates how the public responds to different duration framing of income inequality. Specifically, I examined conditions under which such information mobilizes, demobilizes, and/or polarizes support for redistributive policy.

Short-term versus Long-term Framing of Income Inequality

Research in judgment and decision making suggests that people may respond differentially to different *duration* cues of social events (Ariely, 2008; Hershfield et al., 2014; Yeung & Soman, 2007). Overall, the literature suggests that events unfolding over *short-term duration tend to be discounted* while events unfolding over the *long-term tend to be valued*.

As Ariely (2008) pointed out, people tend to hold a lay theory that negative stimuli that are experienced over a short duration (like pain) are less severe than negative stimuli experienced over a longer period of time—although research suggests that people *neglect duration* in their actual experiences of such events.⁹ More recent empirical findings further suggest that people seem to be more averse to long-term calamities than to the short-term ones—since people tend to estimate that the past duration of an event mirrors (diagnoses) the future duration of an event. For example, Hershfield et al. (2014, Study 2) found that when the United States was framed as an old country (versus a new one), participants donated more money to an environmental organization. The study appears to show that the length of time something has been

⁹ As duration neglect (Fredrickson & Kahneman, 1993) and peak-end rule (Kahneman et al., 1993) describe, people's judgments of the unpleasantness of painful experiences depend very little on the duration of those actual experiences.

observable in the past functions as a rough measure of its robustness not only against calamities of the past, but also against whatever calamities may affect its observability in the future.

In a similar vein, though opposite in valence, Yeung and Soman (2007) suggest a “duration heuristic,” in which people consider duration as a heuristic cue to infer service benefit. When people evaluated a consultation provided by a bank manager, for instance, they appeared to use the duration of the consultation as a heuristic cue to infer the quality of the consultation, although such duration information was not a benefit in itself but only a vehicle of benefit. People consider services with a shorter duration less favorably than those with a longer duration. Taken together, evidence suggests that people are more averse to a long duration of unfavorable events while they prefer a long duration of favorable events; people are less averse to a short duration of unfavorable events while they more prefer a long duration of favorable events.

I contend that this may be the case for the description of income inequality and people’s responses to such information. Though mere description of income inequality over the past three *decades* or three *years* does not necessarily speak to the severity of the inequality phenomenon, people may perceive the problem as more unpleasant if it is framed as existing for a long-term versus a short-term duration; on the flip side, people may discount the problem if it is framed in the short-term versus the long-term duration. Consequently, people may show greater support for policies aimed at reducing income inequality if it is framed in the long-term versus the short-term; and/or show less support for the policies in response to short-term versus long-term

framing of income inequality. This may be particularly so among skeptics—political conservatives—compared with liberals who hold crystallized support for such policy interventions.

When Attribution Judgments are Primed

In line with the arguments described above, it seems likely that policy advocates for redistributive policy would intuitively prefer long-term over short-term duration framing because they expect that people will perceive greater magnitude of inequality from the former and/or discount the severity of inequality from the latter. However, emerging work in judgment and decision making hints that there may be a condition in which the pattern of people's responses to such long-term framing of inequality can be reversed.

Imagine that you meet an old friend for the first time in three decades and see that she has become a billionaire. You might think that she has worked hard to earn her wealth over those years—namely, her own *internal* effort. Suppose that, however, you learn that your friend became rich in just three years. You might suspect a lottery or inheritance windfall, that is, an *external* source of her newfound wealth. As noted earlier, when describing income inequality and asking for social reforms to combat it, policy advocates tend to highlight perceived injustices that have already occurred in the past. Moreover, in order to emphasize the seriousness of the issue, “the rich got richer” phenomenon is described as having happened for an extended period of time (e.g., “Income inequality gap widens among U.S. communities over 30 years”) (Chinni, 2011). Presumably, highlighting the extended duration of income inequality would intuitively feel more persuasive, in part because longer duration seems to imply

the issue is more serious than a shorter duration. However, the psychology of human judgment and decision-making hints otherwise—such that public responses toward income inequality construed over a longer period of time may actually engender further system justification through internal rather than external attributions for accumulated wealth under some contexts.

Under the condition where people consider *how* the rich became rich (when causal attribution of wealth is made accessible *in situ*), framing the duration of changes in inequality within a relatively shorter or longer period of time may have the potential to shift judgments about whether the wealthy are rich because of internal attributes (e.g., they may be more hardworking than poor people) or because of external advantages (e.g., they may have more inherited wealth than poor people do).

Evidence suggests that people see more intention, agency (Tetlock, Kristel, Elson, Green, & Lerner, 2000; Study 2), and more importantly, greater effort (Kruger et al., 2004) from an event unfolding slowly rather than quickly. Specifically, the effort heuristic (Kruger et al., 2004) suggests that people construe levels of one's effort from the amount of time people spent on an event. For example, people perceive greater effort from an artist if a painting is drawn in three months than in three hours. Analogously, gaps in wealth emerging slowly rather than quickly may lead people to envision greater effort from those who have accumulated the wealth. On the flip side, income inequality that is framed as having occurred quickly may make people question whether the wealthy are responsible for their own success (i.e., it may increase external attributions for wealth accumulation): Perceiving *less* effort in the case of quickly-formed wealth (rising income gap within a shorter period of time) than

for slowly-formed wealth may, in turn, increase support for wealth redistribution policies. On the flip side, perceiving more effort in the case of slowly-formed wealth (rising income gap within a longer period of time) may, in turn, decrease support for wealth redistribution policies.

As noted before, I again posit that such temporal *duration* framing effects are likely to be particularly evident among people who, on average, tend to believe that the rich deserve their efforts: political conservatives and Republicans (as such information is consonant with the just-world belief—work hard and eventually you will do better than the previous generation) (Jost, Blount, Pfeffer, & Hunyady, 2003).

Overview of the Current Research

I begin this study of duration frames in communicating income inequality with an ecological examination of the temporal markers appearing in the U.S. media when it reports income inequality. To do so, I use LexisNexis[®] Academic to examine *how long* the duration of inequality has been portrayed in major newspapers that hold a national circulation over the period of the past 38 years. Subsequently, I continue with two randomized experiments—one with a convenience sample of Mechanical Turk (M-Turk) workers, and the other with a national probability sample of Marketing Systems Group’s national panel. Both experiments seek to examine conditions under which temporal *duration* frames mobilize, demobilize, and polarize the redistributive tax policy preferences of the American public.

Study 3.1: Duration Frames in News Media

Method

Economists document that income inequality has been rising since the 1970s in the U.S. (Piketty & Saez, 2014). Then, how far in the past does news media look back when they talk about income inequality? To address this question, I searched LexisNexis Academic for all the news article reported in major newspapers in the U.S. The search terms were “income inequality” or “economic inequality” with search areas set at headline or body. Given the politicized nature of the issue, newspapers across the lines of political difference were included. At the same time, I tried to include newspapers that hold broader readership. Based on Ho and Quinn (2008) that examined explicit political positions of representative news media in the U.S and data from the Alliance for Audited Media (2013) about newspapers’ circulation from October 2012 through March 2013, the following 6 newspapers were selected: The New York Times, The Washington Post, and USA Today were chosen as liberal media; whereas Wall Street Journal, The New York Post, and Investor’s Business Daily were selected as conservative media. The search yielded a total of 3,822 articles.

Using Python programming language,¹⁰ I only extracted sentences including both key terms signifying a temporal marker (i.e., day, week, month, year, and decade) and key terms (i.e., income inequality, economic inequality) within the searched data (the transcripts of the news media stories). Then, I further extracted the word preceding the temporal markers. This data extraction process permits the isolation of

¹⁰ Python is a computer programming language that allows extracting the target data (here, texts) from a text file. I have created syntax code to isolate information that was focal point of analysis: namely, temporal markers.

information regarding the length of time that news media look back when they talk about income inequality. Extraction processes leave out a total of 1,454 sentences. Then, two coders who were unaware of the goal of the study coded all 1,454 sentences and judged whether the time markers in sentences are used in describing income/economic inequality or whether they have nothing to do with description of income/economic inequality (0 = *non-relevant*; 1 = *relevant*). For example, sentences such as “ After years of debate, economists agree that income inequality[y]” are not relevant, thus are not included in the analysis; whereas sentences like “The result is the highest level of income inequality in more than three decades, according to the Paris-based OECD, whose members include 34 developed countries and whose mission is to promote policies for improving economic and social well-being” are relevant, thus included in the analysis. The coding scheme was reliable for each coding decision (Krippendorff’s $\alpha = .86$). The disagreement was resolved via discussion. Such elaborated extraction processes yielded an analytic n of 279 cases.

Results and Discussion

One sample chi-square test assuming an equal distribution across the entire categories (datapoints) revealed that there is a systemic skew, $\chi^2(18) = 431.44, p < .001$. The mode value of duration was at 30 years. About 24.7% of the analytic n pointed to 30 years, with 20 (16.9%), 10 (15.8%), and 8 (10.4%) years respectively. Figure 3.1 displays a histogram of duration information. This suggests that income inequality is more often described with relatively long-term over short-term frames.¹¹

¹¹ Though it was not a focal point of analysis, the distribution about duration frame also reiterates people’s preferences for round numbers in terms of reference points

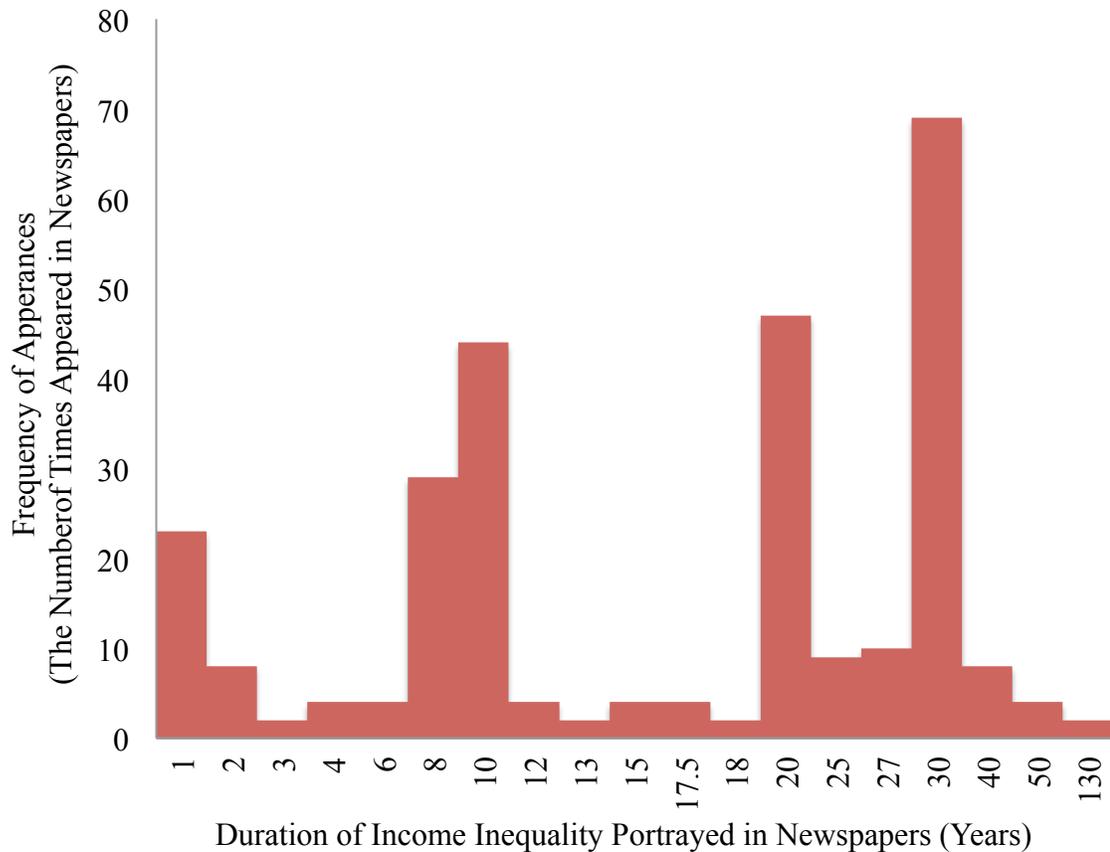


Figure 3.1. Histogram depicting the frequency of duration information appeared in U.S. newspapers in describing the growing income inequality over the year(s).

Study 3.2: Influences of Duration Frames

Methods

Participants. To test influences of short-term versus long-term duration frames on redistributive policy preferences, I performed a randomized web-experiment in February 2015. Participants were American residents ($N=556$) recruited from Amazon.com’s Mechanical Turk (M-Turk). Participants were told that they would participate in an “Opinion Survey.” To ensure the validity of the study results, I

(Pope & Simonsohn, 2011). Duration frames were more frequently appeared with round numbers.

took multiple steps. First, I limited access to the current study to U.S. residents only based on Amazon's check system. Second, I only allowed workers with an impeccable track record such that their success rate was greater or equal to 97% and, at the same time, the number of projects they participated in (Human Intelligence Test (HIT) in M-Turk term) was greater or equal to 1,000.

Participants' mean age was 34.7 years ($SD = 11.6$), about 44.4% ($n = 247$) were female, and the majority (88.3%) reported at least some college education (39.2% had graduated college). Given the topical interest of the current research, I also measured reported annual income (19-pt scale running from 1= *less than \$5,000* to 19 = *\$175,000 or more* with an increment of \$2,500 range; $M = 10.17$ [\$ 35,000 to \$ 39,999], $SD = 4.26$). Self-identified political party affiliation was distributed as follows: 16% Republicans, 44% Democrats, 35% Independents, and 5% something else. Mean score of political ideology was 3.25 ($SD = 1.55$) on a scale running from 1 (=very liberal) to 7 (=very conservative). Table 3.1 describes the demographic characteristics of the study sample, including the number of participants assigned to each of the experimental conditions.

Power Calculation. I determined the sample size based on a power calculation using the G*Power 3 program (version 3.1.7; Faul et al., 2007). The N is expected to provide 90% power for detecting an effect size (d) of 0.30 (two-tailed t-test, assuming a Type 1 error rate of 0.05). I calculated that $n = 176$ per condition would be expected to provide 80% power for detecting an effect size (d) of 0.30 (two-tailed t-test, assuming a Type 1 error rate of 0.05) for any main effects of short-term compared to long-term framing or control conditions on redistributive policy preferences. Without

Table 3.1. Descriptive statistics of Study 3.2 participants.

	Total Sample $N = 1,000$; Proportion (n); M (SD)
Randomized Experimental Condition	
Past Frame	0.31 (179)
Future Frame	0.34 (192)
Control (No-information-treatment-exposure)	0.35 (203)
Political Ideology	3.25 (1.63)
Party Affiliations	
Republicans	0.15 (87)
Democrats	0.44 (253)
Independents	0.34 (194)
Something else	0.07 (40)
Female	0.50 (502)
Age (mean)	33.9 (11.7)
Highest Level of Education Completed	
High school diploma or less	0.10 (59)
Completed some college	0.42 (243)
College graduate	0.48 (434)
Income (19-pt variable, unit: \$2,500, rescaled 0-1)	9.45 (4.03)

Note: All sample characteristics are proportions with sample sizes in parentheses, except for political ideology, age and income, which are means (standard deviations in parenthesis)

both prior relevant studies with a direct linkage, I estimated a moderate effect size ($d = 0.30$).

I further attuned this calculated n so that I can draw 200 participants from each of the three conditions to detect proposed interactive effects between temporal frames and political ideology. This rules out potential concern about the variation in political ideology among an M-Turk sample. It is true that extant literature shows that the sample is more liberal than the general population. A bigger per-cell n , however, alleviates this concern to some extent. Past relevant work (Kuziemko, Norton, Saez, & Stantcheva, 2013; Roh & Schuldt, 2014) has suggested that approximately 20 percent of the sample can be classified as Conservatives/Republicans (about 40 percent as Liberals/Democrats; about 40 percent as Moderates/Independents). Thus, I could

expect up to 40 Republicans/Conservatives per cell, which is close to the guideline for appropriate n per cell proposed by recent discussion in the psychological sciences (n would be desirable when it is somewhere between 30 to 50 per cell and definitely needs to be over 20; Nelson, et al., 2011), by assigning 200 total participants for each of the three conditions. Such an experimental design would have adequate power—but not be overpowered—to detect the interactive effects between temporal frames and political ideology. Out of the initially-targeted 600 participants, a total of 556 participants successfully completed all of the questions, which comprises the total recruited N for the current study.

Short-term versus Long-term Frames. Participants assigned to experimental conditions were asked to read a short news article depending on their randomized group. The headline of the mock news article described growing income inequality either with a short-term (“The rich have gotten richer over the past 3 *years*, U.S. census data shows: INCOME inequality in the United States has grown over the past three *years*”) or a long-term (“over the past 3 *decades*”) duration frame. The main text was adapted from relevant prior work examining contextual influences on redistributive policy support (Chow & Galak, 2012) and was modified for the purposes of the current study. Participants read the article in the format of an online news article reported on data from the Income Division of the Internal Revenue Service (IRS), which indicates that income inequality has widened in the U.S.

Depending on their randomly assigned condition, the income gap was framed as having occurred in the short-term (e.g., in the past three years) or in the long-term

(e.g., in the past three decades). To strengthen the manipulation, this information was paraphrased once again with different duration frames, both in the second paragraph and on the side bar under the heading “Related stories.” To provide a sense that income inequality is a problematic social issue, the very top of the sidebar placed next to the main news story read, “The Inequality Conundrum” across conditions. Participants randomly assigned to a control condition continued directly to the questionnaire without reading an article. Figure 3.2 show the full texts of the news article.

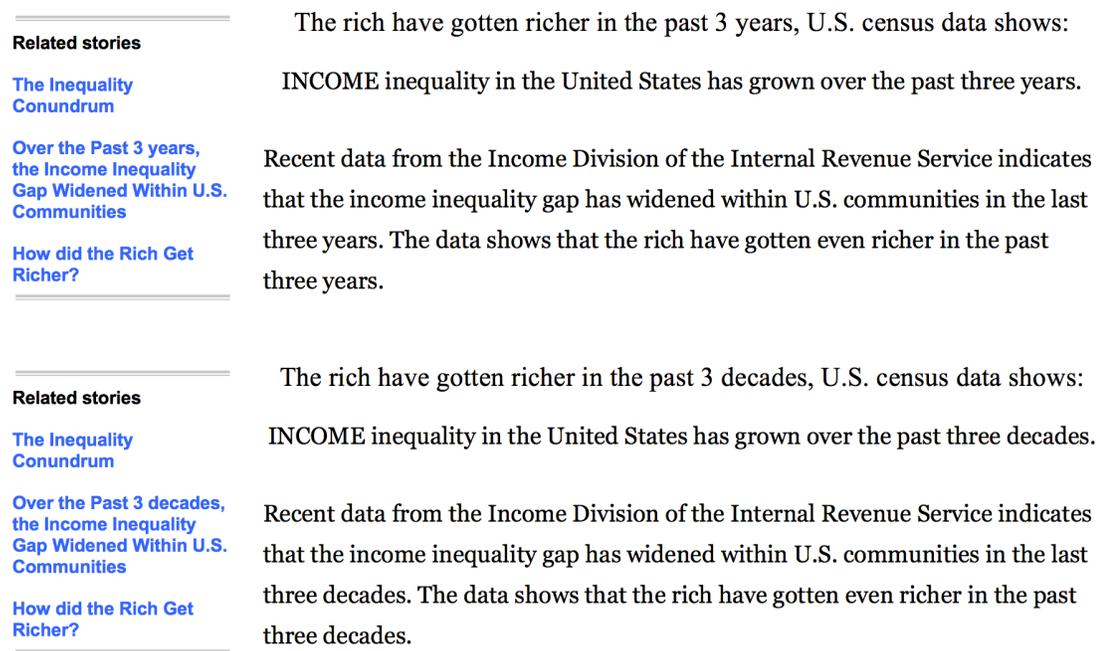


Figure 3.2. Experimental stimuli of temporal duration frames used in Study 3.2.

Note: The upper panel represents “short-term duration frame” condition; the lower panel shows “long-term duration frame” condition.

Measures. After reading the mock news article, participants completed the following policy support items. As for the key dependent measure of redistributive policy preferences, based on extant literature on preferences and support for redistributive policies (Chow & Galak, 2012; Kuziemko et al., 2013), I measured support for four policies, two for regulating wealth (taxation) and two for regulating poverty (food stamps and minimum wage).

Specifically, respondents were asked: “Many different ideas have been proposed to address income inequality in the U.S. Do you support or oppose the following policies? (1=*strongly oppose*; 7=*strongly support*)” Preferences for two redistributive policies were asked along with this question (the question order was random): (a) Creating a new tax bracket for incomes over \$5 million ($M = 5.59$, $SD = 1.68$); (b) Food Stamps program ($M = 5.32$, $SD = 1.57$). On the next page, participants were asked about a second set of redistribution policies: “Here are some other ideas that have been proposed to address income inequality in the U.S. Please indicate what you think about the following policies. (1=*should definitely be decreased*; 7=*should definitely be increased*)” Preferences for the following two policies were then asked: (a) income taxes on millionaires... ($M = 5.86$, $SD = 1.35$); (b) The minimum wage, which is currently \$8 per hour... ($M = 5.87$, $SD = 1.31$).

Three types of policy preference scores were created using the four policy items. First, I created an overall preference index with a mean score of all four items (Cronbach’s $\alpha = .79$, $M = 5.66$, $SD = 1.56$). I also created a preference score for two items with respect to regulating wealth via taxation based on their mean index ($r = .71$, $p < .001$, $M = 5.72$, $SD = 1.41$). Lastly, I created a preference score for two items

regarding regulating poverty (food stamps and the minimum wage) with their mean index ($r = .46, p < .001, M = 5.60, SD = 1.23$). I expected that since the information treatment was more about the rich (i.e., “the rich get richer”), not about the poor (i.e., “the poor get poorer”) (see Chow & Galak, 2012), the message effects would be more pronounced on the tax policies that are related to wealth regulation.

After soliciting policy preferences, I randomly assigned participants to experimental conditions (a mock news article about income inequality), and then completed manipulation checks and believability measures. Those who were in the no-message-exposure control condition directly proceeded to report the demographics and political orientation without completing the manipulation check and believability items. The instructional manipulation check item asked, “In the message you read, can you recall how long exactly income inequality has been widened?” Participants were asked to choose among four randomly ordered options: “Over the past three decades,” “Over the past three years,” “Over the past decade,” “Over the past year.” Such an IMC question is known to help to filter out participants who did not pay sufficient attention to stimuli, reducing noise in the data and improving the validity of a randomized experiment (D. M. Oppenheimer, Meyvis, & Davidenko, 2009).

The perceived believability of the mock news article was solicited in response to the question: “Please indicate how believable you found the news article you read. (1 = *NOT at all believable*; 7 = *Very believable*).” An independent-sample t test showed that there were no differences between the short-term ($M = 5.62, SD = 1.00$) and long-term ($M = 5.64, SD = 1.07$) framing conditions in terms of believability of the informational treatment, $|t| < 1$. Also, an one-sample t test suggested that

participants appeared to believe the news article they read, as they assigned above-average levels of believability to the news article relative to the scale mid-point (4) out of the 7-point scale ($M = 5.63$, $SD = .07$), $t(368) = 22.28$, $p < .001$.

Participants concluded the study by reporting on their demographics and political orientation items. The experimental groups did not differ significantly across any of the demographic measures we collected ($ps > .05$). At the end of the survey, participants were debriefed and informed that the news story they read was fictitious and was constructed for research purposes. Cornell University's Institutional Review Board (IRB) approved the procedure of the current experiment.

Results and Discussion

Forty-six participants in the experimental conditions (about 12.5 %) failed to provide the correct duration frames of the mock news article they read and hence were excluded from the main analysis. This left a total of 510 participants for our analytic n . The results did not vary substantially when these participants were included in the analysis. To test the main research questions, I conducted analysis of variance (ANOVA) and Ordinary Least Squares (OLS) regression analyses predicting preferences for redistributive policies.

First, to examine the main effects of duration frames on redistributive policy support, I ran an ANOVA that featured the independent variable for the three information conditions (short-term frame; long-term frame; no-message-exposure control). The results reveal only a marginally significant main effect of duration frames in predicting policy preferences (a two-item mean index item) regarding policies regulating wealth (tax policies), $F(2, 507) = 2.55$, $p = .08$, $n_p^2 = .01$). A post-

hoc analysis using Bonferroni correction further revealed that exposure to short-term framing of income inequality ($M = 5.55$, $SD = .10$) led to relatively lower policy support compared to the no-message-exposure (control) condition ($M = 5.87$, $SD = .10$), $p = .04$. Compared with long-term duration framing ($M = 5.78$, $SD = .12$), the short-term duration condition did not produce meaningful differences, $p = .27$. The ANOVA models predicting overall policy preferences and preferences for policy regulating the poor did not show such a main effect of duration frames.

Next, I turn to the interplay of temporal frames and political ideology, which is a focal analysis of the current study. I ran OLS regression in which the overall policy preferences were regressed onto duration conditions (using the control condition as the referent group), political ideology, and all second-order interaction terms.

Since participants' political orientation was not a randomized variable, I also tested the robustness of the demonstrated duration frames \times ideology interaction. To be specific, I ran another regression equations where income, gender, age, education, and race were included as covariates (the known factors correlated with political ideology)—I found the results hold constant, suggesting that the demonstrated duration frames and ideology interaction model appears robust. Since I did not find a substantial difference between the models with and without covariates, I focus results on the model without controls.

The regression equation predicting overall tax policy preferences yielded the predicted main effects of political ideology; participants who were more conservative showed less support toward the redistributive policies, $b = -.39$, $t(504) = -7.19$, $p < .001$. Such an expected influence of ideology was qualified by the predicted temporal

frames \times political ideology interactions. Specifically, the interaction term representing short-term (versus control) \times ideology, $b = -.22$, $t(504) = -2.99$, $p = .003$ was significant; the term representing long-term (versus control) \times ideology, $b = -.07$, $t(504) = -.81$, $p = .42$, was not.

Recall that I expected that exposure to short-term framing would reduce and/or long-term framing would increase support for redistributive policies among political conservatives. To examine such a prediction, I analyzed estimated values of tax policy preferences at each of the 7 points of the political ideology scale separately across the two conditions with a planned contrast analyses using the linear combination of coefficients (“*lincom*”) command in Stata. As expected and shown in Figure 3.3, the analysis revealed that conservatives (those scored 5, 6, or 7 on the political ideology scale) showed less support when income inequality was described as occurring in the past three years (short-term) compared with when they were not exposed to information about income inequality (suggesting baseline preferences), $|b|s > .62$, $|t|s > 3.55$, $ps < .001$. Likewise, those who self-identified as political moderates also showed less support when income inequality was expressed with a short-term versus not mentioned to them at all, $b = -.40$, $t = -3.03$, $p = .003$. To the contrary, those self-identified liberals were not altered by duration framing such that their overall preferences on tax policy preferences do not vary by condition, $|b|s < .18$, $|t|s < 1.45$, $ps > .14$.

The results of Study 3.2 provide initial evidence that duration frames may produce differing influences on redistributive policy preferences. Specifically, the

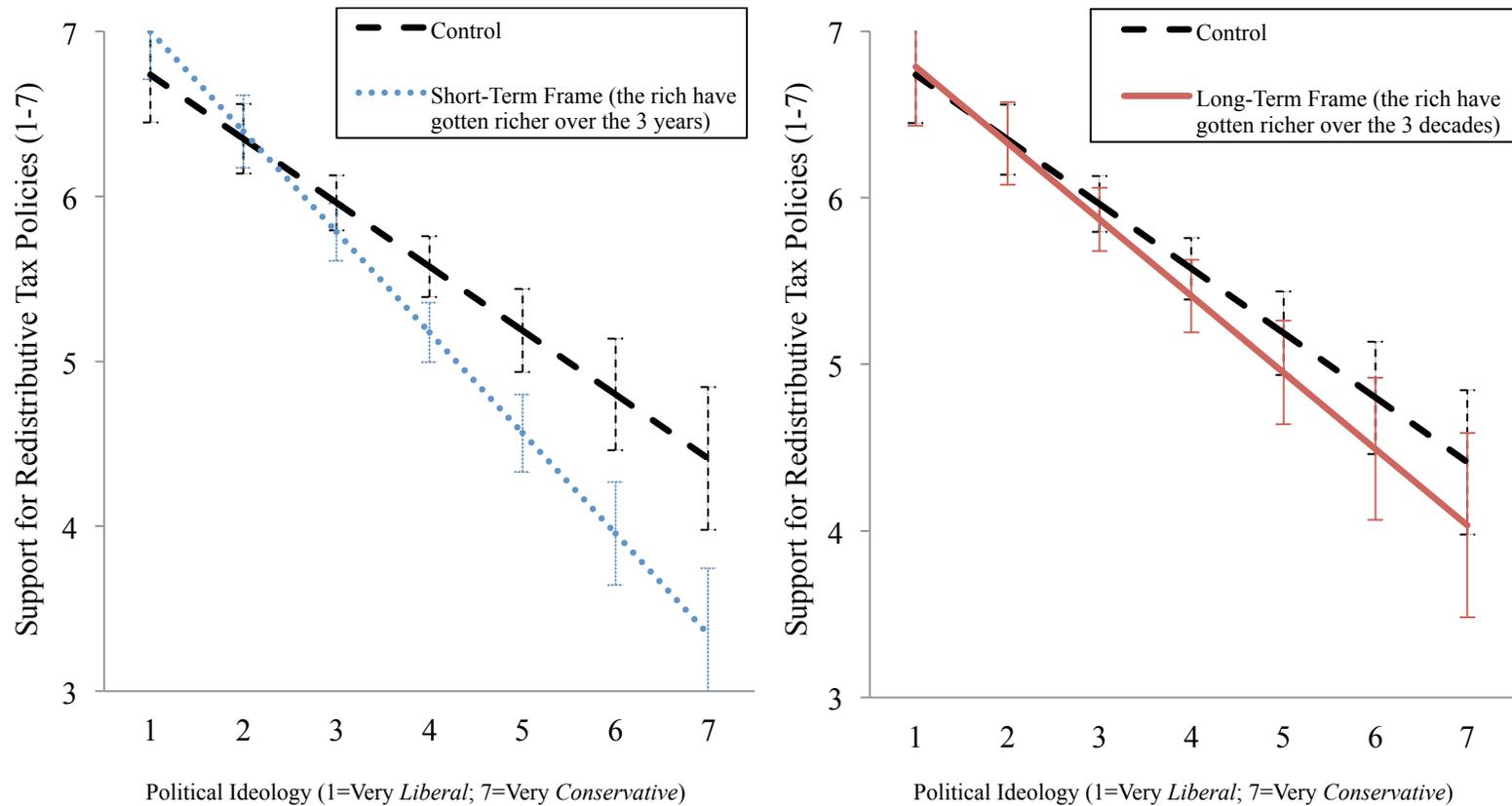


Figure 3.3. Graph depicting the interaction between framing condition and political ideology on redistributive tax policy support (Study 3.2).

Note: Support for policies were measured using a Likert-type scale ranging from 1 = strongly oppose to 7 = strongly support. Error bars represent 95% confidence intervals around the predicted mean of the item.

results revealed that the short-term framing of income inequality can be suboptimal in mobilizing support for redistributive policies—this was particularly so among those who are more inclined politically to be skeptical of these policies, conservatives. However, the study did not find either overall productive effects of the long-term frame or counterproductive effects of the frame among conservatives. To bolster the effects of duration frames, Study 3 added a prime to make judgments about attribution of wealth accessible *in situ* by including a question between the duration manipulation and tax policy preferences. In addition, while Study 3.2 featured a convenience sample from a panel on M-Turk, a group that is not representative of the U.S. public and may differ substantially in their distribution of income and political ideology, Study 3.3 attempts to extend the findings using a nationally representative sample of U.S. adults.

Study 3.3: Influences of Duration Frames When Attribution Judgment is Primed

Methods

A probability sample of $N = 1,000$ adult US residents ages 18 and over was recruited from Marketing Systems Group's national panel. The phone sample is a Random Digit Dial (RDD) list drawn from the continental United States and includes cell phones. The sample selection procedure ensures that every household with a phone has an equal chance to be contacted and, once contacted, every adult in the household has an equal chance of being included in the study. Data collection began on August 9, 2014, and was completed on October 26, 2014. All interviews were conducted in English using a Computer Assisted Telephone Interviewing (CATI) software system. The overall survey response rate was 19.7 percent (AAPOR Response Rate 3).

Procedure

Participants were randomly assigned to one of three survey versions varying temporal duration of income inequality (in the past three “years” versus “decades”) or to a no-exposure control group. Participants randomly assigned to an experimental condition were given one of the following two descriptions about income inequality before answering questions, whereas participants assigned to the control condition proceeded directly to the questions. The exact wording of the manipulation was as follows [long-term condition in brackets]:

“Recent data from the Income Division of the Internal Revenue Service indicates that the income inequality gap has widened among U.S. communities in the last three years [decades]. The data shows that the rich have gotten even richer in the past three years [decades].”

Although the manipulations were identical (except for the format differences due to the nature of phone vs. online surveys), Study 3.3 has an important difference to Study 3.2. Following extant studies on the priming effects of question order (e.g., Schwarz, 1999; Strack, Schwarz, & Wänke, 1991; for a discussion, see Schuman & Presser, 1981), before answering the target question concerning tax policy preferences, participants were asked to make an attribution judgment as to why the wealthy are rich as follows:

“How accurate is the following reason in explaining why the wealthy are rich? The American economic system allows them to take unfair advantage of the poor”

Participants were asked to answer a question with a 7-point likert-type scale running from 1 (=Not at all accurate) to 7 (=Extremely accurate).

I then solicited participants' preferences for a progressive tax policy.

Specifically participants were asked:

“As you may know, there have been proposals recently to raise income taxes on millionaires. Do you think income taxes on millionaires should be increased, stay the same, or be decreased?”

Political ideology, income, age, gender, education, and ethnicity were also collected. Table 3.2 describes the demographic characteristics of the analytic sample, including the number of participants assigned to each of the experimental conditions.

Results

I began with an analysis on levels of external attribution of the wealth across experimental conditions (short-term; long-term; control). ANOVA on levels of external attribution in which duration framing conditions were a random factor revealed a significant main effect of the frame conditions, $F(2, 994) = 5.28, p < .01, \eta_p^2 = .01$. A post hoc analysis using Bonferroni correction further revealed that long-term framing of income inequality ($M = 4.60, SD = .12$) tended to draw greater attributions that it is a structural problem than the control ($M = 4.22, SD = .12$), $p = .005$, and short-term frame conditions ($M = 4.22, SD = .12$), $p = .08$. The analysis revealed no differences between the control group and short-term frame conditions, $p = .93$.

Next, to test whether duration frames elicited different redistributive tax policy preferences (three-categorical nominal scale: income taxes on millionaires should *be increased, stay the same, or be decreased*), I ran a series of multinomial

Table 3.2. Descriptive statistics of Study 3.3 participants.

		Total Sample $N = 1,000$; Proportion (n); M (SD)
Randomized Experimental Condition		
	Short-Term Duration Frame	0.32 (317)
	Long-Term Duration Frame	0.35 (349)
	Control (No-information-treatment-exposure)	0.33 (334)
Political Ideology		
	Female	4.05 (1.63)
	Age (mean)	0.50 (502)
		49.26 (18.18)
Highest Level of Education Completed		
	High school diploma or less	0.23 (229)
	Completed some college	0.31 (308)
	College graduate	0.45 (460)
Race/Ethnicity		
	White, Non-Hispanic	0.77 (764)
	Other	0.23 (234)
Birthplace		
	Born in US	0.10 (100)
	Not Born in US	0.90 (900)
Income (9-pt variable, unit: \$10,000, rescaled 0-1)		
		0.62 (.28)
	Northeastern region	0.21 (215)
	Midwestern region	0.25 (247)
	Western region	0.19 (191)
	Southern region	0.35 (347)

Note: All sample characteristics are proportions with sample sizes in parentheses, except for age and income, which are means (standard deviations in parenthesis).

logistic regression models to estimate the relative likelihood (relative risk ratio, *RRR*) that participants would endorse a given nominal response category over another. The first model examined the main effect of duration frames; the second model tested the interplay of the duration frames and political ideology.

The first model revealed a significant main effect of duration frames on tax policy preferences. As shown in Figure 3.4, the relative likelihood of participants

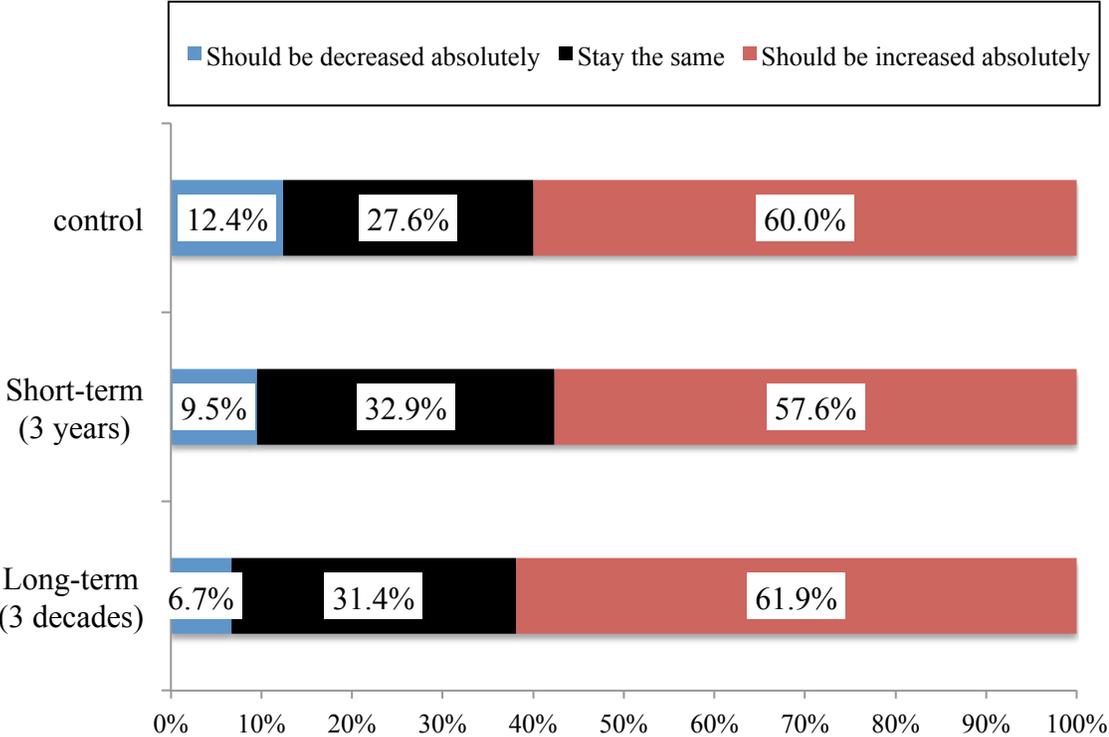


Figure 3.4. Graph depicting the effect of duration frames on redistributive tax policy preferences (Study 3.2).

Note: Point estimates were calculated based on a multinomial logistic regression equation in which redistributive tax policy preferences (three-categorical nominal scale: income taxes on millionaires should be increased, stay the same, or be decreased) was criterion variable, and the duration framing of income inequality (short-term, long-term, and control; control as a referent group) was a predictor.

endorsing the “should be *increasing*” option over “should be *decreasing*” option was greater in the long-term duration (61.9 percent versus 6.7 percent, respectively) than in the control condition (60.0 percent versus 12.4 percent, respectively), $RRR = 1.92$, $z = 2.28$, $p = .02$. Also, the relative likelihood of participants endorsing “stay the same” option over the “should be decreasing” was greater in the long-term duration (31.4 percent versus 6.7 percent, respectively) than control condition (27.6 percent versus 12.4 percent, respectively), $RRR = 2.12$, $z = 2.47$, $p = .01$. There was no significant difference between short-term frame and control conditions, $z < 1$.

To test the interplay of duration frames and political ideology on redistributive tax policy preferences, I ran an additional multinomial logistic regression model with interaction terms (short-term frame (versus control) \times ideology and long-term frame (versus control) \times ideology). The second model revealed that the observed main effect of duration frames was further qualified by political ideology. Specifically, the relative likelihood of participants endorsing the “should be *increasing*” option over “should be *decreasing*” option in the long-term duration differed depending on participants’ political ideology, $RRR = .63$, $z = -2.03$, $p = .04$.

To probe this interaction, as shown in Figure 3.5, I plotted estimated values of endorsing each category of responses (should be increasing, stay the same, and should be decreasing) at each of the seven points of the political ideology scale separately across the three conditions. Then, I compared the differences of the differences between participants assigned to long-term framing and control conditions in terms of their likelihoods of choosing between “should be increasing” and “should be

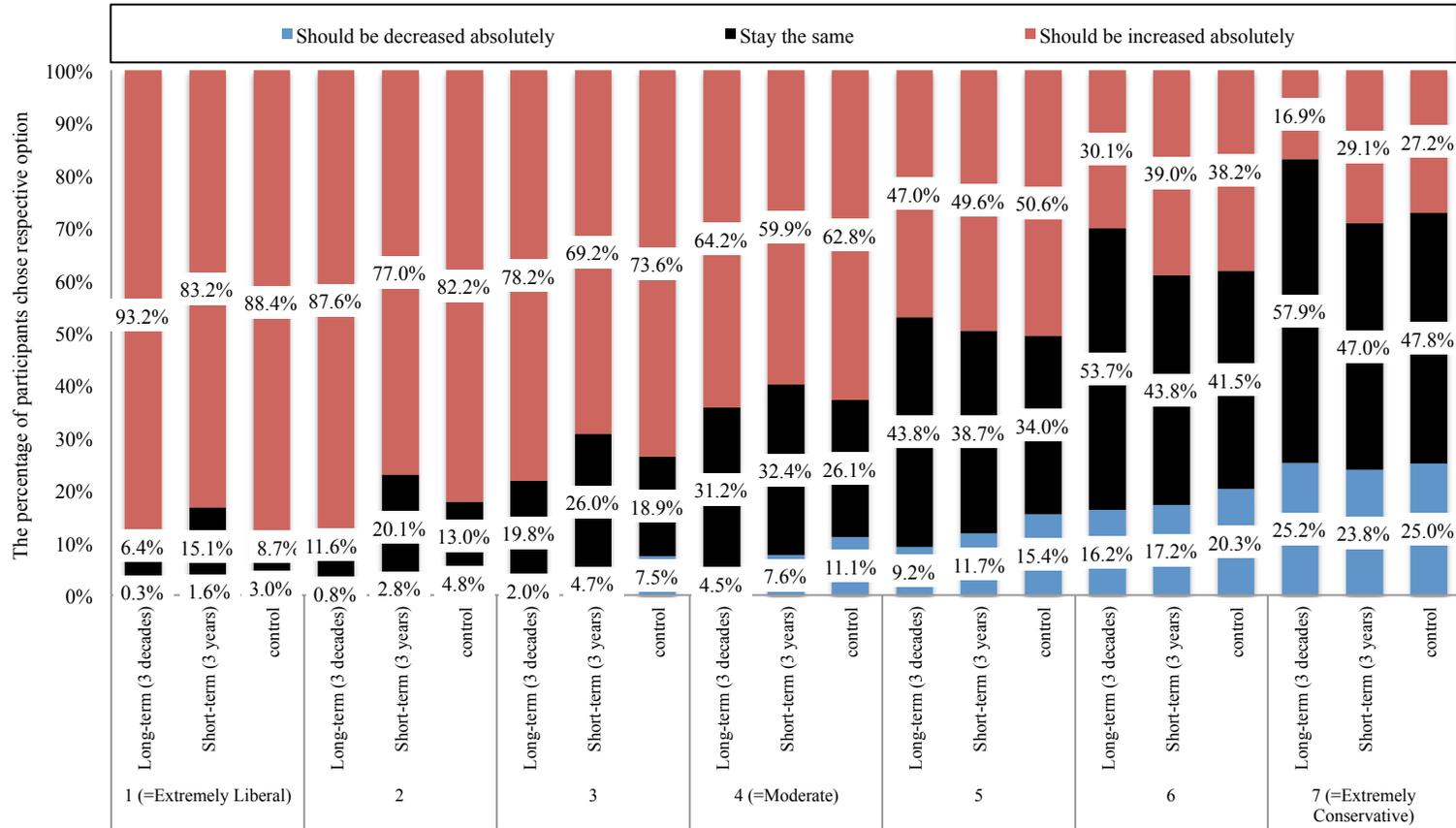


Figure 3.5. Graph depicting the interaction between framing condition and political ideology on preferences for redistributive tax policy support (Study 3.3).

Note: Predicted probabilities of preferences for redistributive tax policy are about three-categorical nominal response: income taxes on millionaires should *be increased, stay the same, or be decreased*.

decreasing” at the $M - 1SD$ and $M + 1SD$ levels of the political ideology scale (Aiken & West, 1991). As predicted, this analysis revealed that conservatives (here, operationalized as $M + 1SD$) were more likely to endorse the “should be *decreasing*” than “should be *increasing*” option when income inequality was described in the long-term compared to control, $|z| = 2.42, p = .016$. To the contrary, the analysis showed that liberals ($M - 1SD$) were more likely to endorse “should be *increasing*” than “should be *decreasing*” when income inequality was described in the long-term relative to control, $|z| = 2.28, p = .023$.

To further illustrate such polarizing effects of duration frames across the lines of political differences, Figure 3.6 displays the difference between the probability of the seven points of the political ideology scale across the three duration framing endorsing the “should be increasing” option and the “should be decreasing” option at each of conditions. It suggests that long-term duration frames created further polarization between liberals and conservatives in terms of redistributive tax policy preferences; liberals showed greater endorsement (up to 10 percentage-point) for the *increase* of taxes on millinnoaires, whereas conservatives showed greater endorsement (again, up to 10 percentage-point) for the *decrease* of taxes on millionaires in response to long-term framing of income inequality (versus control).

The results of Study 3.3 revealed the multifaceted roles of duration frames in shaping redistributive tax policy preferences. Contrary to Study 3.2, Study 3.3 showed that when attribution judgment was primed, long-term frames enhanced the likelihood of supporting an increase in tax rate for millionaires in general. However, among political conservatives, the long-term frame further reduced their support for policy

—while it increased levels of support among liberals—thereby further polarizing public preferences on tax policy.

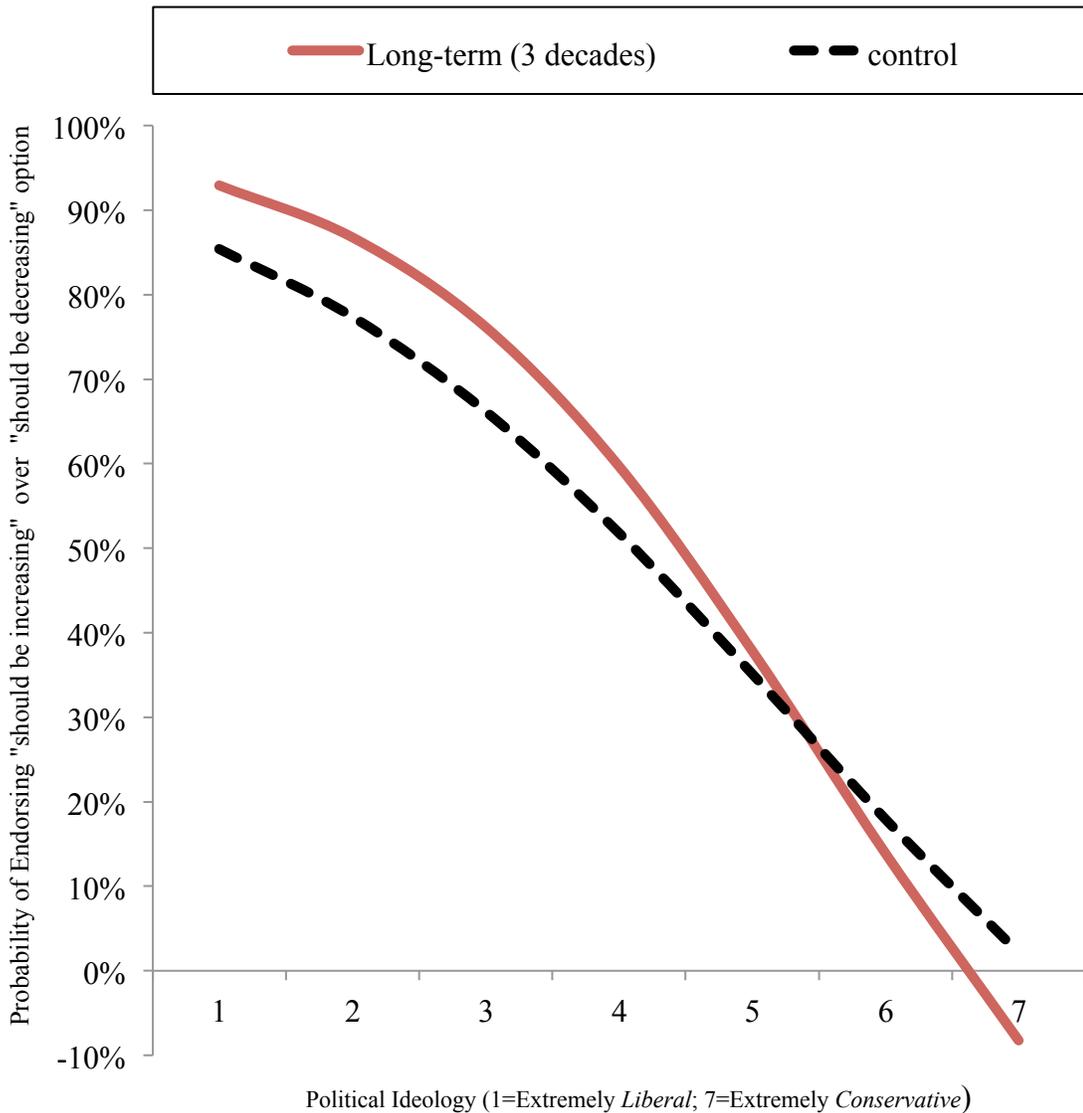


Figure 3.6. Graph depicting the effect of duration frames (long-term versus control) on redistributive tax policy preferences by political ideology (Study 3.3).

Note: The y-axis represents the difference between the probabilities of endorsing “should be *increasing*” over “should be *decreasing*” option. Negative value denotes conditions under which participants were more likely to choose “should be *decreasing*” over “should be *increasing*” options.

General Discussion

As income inequality persists, the past duration of this inequality accumulates because a longer period of time passes. To emphasize the severity of financial inequality, social scientists and policy advocates often highlight how income inequality has occurred over an extended period of time (i.e., in the long-term: “the rich have gotten richer for the past three decades”). Take, for instance, a quote from a recent scholarly publication noted “The distribution of income in America has shifted toward the very wealthy over the past *thirty years*, making it the most unequal of advanced democracies” (Luttig, 2013, p. 811; emphasis added). On its face, highlighting past instances of seemingly exploitative occurrences that have unfolded over a long period of time intuitively appears to be more persuasive. The current research suggests different conditions under which such intuition can be the case.

Specifically, this study offers three forms of data—analyses of temporal markers found from archival news stories, a web-based M-Turk survey experiment, and a telephone-based national survey experiment—to assess the uses and impact of duration frames. I found evidence that long-term duration is more often employed than short-term duration frame. In addition, I found that duration frames lead to differential tax policy preferences, particularly among political conservatives. Results revealed that messages emphasizing income inequality backfired among conservatives when they employed a short-term framing of income inequality. Moreover, conservatives also experienced backlash in response to a long-term frame—a frame which increased levels of support among liberals—when attribution of wealth was made accessible *in situ*.

Taken together, the results suggest a time paradox in framing income inequality. Framing increases in income inequality in the short-term without an explicit attribution cue was suboptimal both for the entire sample and for conservatives. Framing increases in income inequality in the long-term with an external attribution cue appeared to draw greater policy support from the liberal sub-sample but reduced conservatives' support. Either way, however, framing income inequality in terms of its growth over a period of time in the past was associated with reduced support for policy action among the very group it needs to persuade to generate widespread majority support—political conservatives.

Study Implications

Theoretically speaking, this study describes conditions under which duration frames can mobilize, demobilize, and/or polarize citizen redistributive policy preferences. While previous literature suggests a unitary influence of duration information, this study suggests that the influence of such information may be divergent depending on judgments *in situ*. In contrast to intuition, which has largely emphasized how duration cues influences on judgments and decisions, I focused on the motivational uses of such informational cues: how political conservatives form relevant policy preferences in response to different duration framing of income inequality. This focus was inspired by evidence that people see more effort and agency in the *slowly* formed than in the *quickly* formed event. Thus, I expected that duration framing of income inequality on redistributive policy preferences might depend on its accessible judgment criterion (in this case, the causal attribution of that wealth). This

focus also highlights the likely role of political ideology in such effects, given its longstanding association with oppositions to redistributive policy initiatives.

Practically speaking, this study offers some insights, but no categorical solutions, to those looking to shape policy preferences toward progressive tax policy. First, study results remind us that public opinion on enduring political issues like redistributive tax policy is sensitive to the context in which the inequality is described (Chow & Galak, 2012; Lowery et al., 2009), since seemingly mundane duration frames can influence policy support among historical skeptics toward the redistributive policy. Specifically, given the findings of the current study that the effect of duration information about income inequality on support for redistributive tax policy reforms is not context-free but instead constrained by how that information is likely to be applied under currently activated cognitive schemas (Higgins, 1996). Thus, these results carry practical implications for those seeking to shape public opinion in the progressive tax policy debate: whereas opponents may deliberate on deciding whether or not to integrate attribution of the wealth in response to differential duration frames of income inequality, proponents may wish to avoid using either long-term or short-term duration frames to describe the observed (past) rise of income inequality, as both duration frames can lead to conundrum from a strategic standpoint.¹²

¹² On the other hand, it is plausible for proponents to intentionally use long-term duration frame with attribution information. Since—when attribution judgment is primed—the long-term framing of income inequality appears to resonate more than short-term frame among liberals, the ideological group with the highest support for progressive tax policy reforms in general (Chow & Galak, 2012; Kuziemko et al., 2013). There might be circumstances where the use of such ideologically divisive but differentially persuasive duration frame can be useful in mobilizing support among

Study Limitations and Future Research Directions

This work is not without limitations. First, though Study 3.3 found a contingent effect of duration frames with the attribution prime, participants in both Study 3.2 and 3.3 were not fully crossed with the duration frame and attribution prime factors. In Study 3.3, all participants were asked to make the attribution judgments before reporting their policy preferences; because our design did not include a non-priming condition within the same study, it is unclear whether the attribution prime indeed caused the polarized policy preferences in response to long-term duration frames that we observed among political liberals and conservatives. The future work should replicate the current findings, addressing such limitations in design.

Second, investigating the influences of temporal *duration* frames (short-term versus long-term framing), the current study did not fully integrate yet another meaningful dimension of temporal frames: namely, temporal *direction* (past versus future framing). All messages framed the growth of income inequality in retrospective terms. Given earlier findings that the past and future framing of events have implications for policy preferences (found in the *previous* chapter of this dissertation, with some indication that prospective frames are more impactful, future work (and in fact the *next* chapter of this dissertation) should and will further investigate the influence of past versus future frames on policy support.

Finally, in Study 3.3, I used a question order to prime participants to think about causal attribution. However, it is worth noting that the question might do more

liberals who are already inclined toward support for such progressive tax policy reforms.

than simply prime causal attribution. It might have been also priming beliefs about the poor (whether they are victims or not) and the rich themselves (whether they take advantage of others or not). It also indicts the system and people (people are taking advantage, but the political system lets it occur), especially among liberals. This might explain why long-term duration appeared to resonate more than short-term frame among liberals. Future work should test the robustness of the current findings by employing alternative ways to prime the causal attribution.

Conclusion

When describing income inequality and seeking support for social reforms to combat it, policy advocates tend to highlight injustices that have already occurred in the past. Moreover, in order to emphasize the seriousness of the issue, “the rich got richer” phenomenon is often described as having happened for an extended period of time (e.g., “Income inequality gap widens among U.S. communities over 30 years”). Presumably, highlighting the extended duration of income inequality would intuitively feel more persuasive, in part because longer duration seems to imply the issue is more serious than a shorter duration. Reflecting such observation and intuition, the current research found that the long-term duration is indeed employed more frequently than the short-term duration frame when U.S. news media address growing income inequality (Study 3.1). Also, a short-term frame reduces conservatives’ support for progressive tax policy reform (Study 3.2). When the attribution judgment about wealth is accessible *in situ*, however, the long-term framing of income inequality can engender political polarization by further reducing policy support from conservatives while also enhancing support from liberals (Study 3.3).

CHAPTER 4

TIME TO CHANGE: CAN FORECASTING THE FUTURE OF INCOME INEQUALITY INCREASE SUPPORT FOR REDISTRIBUTIVE POLICIES?

“Change is the law of life. And those who look only to the past or present are certain to miss the future.” – John F. Kennedy

The previous chapter suggested conditions under which framing income inequality in terms of long-term versus short-term (temporal *duration* framing) can be less effective in shaping policy preferences among enduring skeptics (here, political conservatives). Having found that *retrospective* framing (in either short-term or long-term duration) of income inequality can be suboptimal in policy debates, this chapter returns to examine the influence of temporal *direction* framing: namely, *prospective* versus *retrospective* framing.

Chapter Abstract

Income inequality can be construed in two ways in terms of its temporal orientations: “the rich *got* richer” (*retrospective* frame) or “the rich *will get* richer” (*prospective* frame). Intuitively, it seems persuasive to talk about past instances of discontent when people make a case for social change. Since the unsatisfactory events already happened, such information seems to provide firm grounds to justify future change. The present work challenges such an intuition. I investigated how alternative temporal cues in communication (temporal frames) used to inform income inequality are conveyed in everyday discourse, potentially influencing judgments and decisions about whether or not to support efforts to reduce it. In Study 4.1, computerized analyses of news stories about income inequality in major U.S. news media ($N=3,822$

articles) using Linguistic Inquiry and Word Count (LIWC) found that income inequality was mostly described through linguistic cues pertaining to the past rather than the future perspective. In Study 4.2, a between-subjects experiment ($N=581$ Americans aged over 18) found that the future framing condition, compared to the past and no message conditions, led to greater support for redistributive policies among conservatives, who have historically shown opposition to such policy initiatives. The contingent effect of the future frame (relative to the control) on conservatives' policy support was further explained (mediated) by an increased valuation of individualizing moral foundations (concerns for harm and fairness). In Study 4.3, a between-subjects experiment ($N=1,357$) conceptually replicated the findings of Study 4.2 by varying the duration information (over the *last* versus *next* 3 years/decades). Though mundane news discourse about income inequality tends to document its past, it is forecasting the future that changes enduring skeptics' policy preferences—it's *time* to change.

Introduction

Disparity between the haves and the have-nots is a source of social problems. A long list of social ills, including bankruptcy (Frank, Levine, & Dijk, 2014), distrust (Uslaner, 2005), racism (Kennedy, Kawachi, Lochner, Jones, & Prothrow-Stith, 1997), obesity (Pickett, Kelly, Brunner, Lobstein, & Wilkinson, 2005), unhappiness (Oishi et al., 2011), and violence (Hsieh & Pugh, 1993), are associated with income inequality. Identifying strategies to reduce the gap between the rich and the poor has thus been an enduring topic for behavioral and social scientists (Piketty, 2014; Stiglitz, 2012; Wilkinson & Pickett, 2009). Though it is uncommon for individuals to exert direct influences on the gap between the haves and have-nots, democracy lets people express

preferences (e.g., by casting votes in free elections, deliberating in public forums, or by responding to publicized opinion polls) regarding redistributive policies, which in turn can—indirectly—shape the disparity between the rich and the poor (Lowery, Unzueta, Knowles, & Goff, 2006).

A group of economists (Piketty, 2014; Saez, 2013) argues that reducing income inequality will be unlikely without a transfer of wealth from the rich to the poor through redistributive policies such as progressive taxation. However, with one or two notable exceptions (e.g., the Earned Income Tax Credit), few of these redistributive policies have been implemented, perhaps reflecting low public support for governmental intervention to address the problem (see Hochschild, 1986 for a consistent resistance in supporting governmental intervention on income redistribution appeared in national polls for years). Tax rates on the top 1 percent of taxpayers in fact fell between 2008-2012, a period characterized by rising inequality (Piketty, 2014).

There seems to be a disconnect between awareness of the problem and preference for action: Americans are increasingly aware of the income gap between the rich and the poor, but continue to show only modest support for governmental efforts to address it (Kuziemko et al., 2013). For example, one national survey showed that about three-quarters of Americans realized that income inequality has increased since the 1970s (Bartels, 2005). Given the significant disconnect between public awareness of rising income inequality and a lack of support for redistributive policies, it is important to better understand factors that influence public support for social policy intending to reduce economic inequality. Specifically, the awareness-preference gap points to the notion that it is not *what* to communicate, but *how* to communicate

about income inequality that obliges reconsideration of the status quo, leading to social actions for change.

Indeed, a growing body of work (Chow & Galak, 2012; Lowery et al., 2009; Lowery, Chow, Knowles, & Unzueta, 2012) suggests different ways to describe inequality (via framing) have the potential to alter public support for redistributive policies, especially for those social groups like political conservatives who have historically rejected redistributive policy initiatives (Chow & Galak, 2012).

Complementing previous work on framing effects on redistributive policies, the current study asks whether temporal frames of income inequality make a difference in shaping policy preferences and bridging differences in support by political ideology.

In the current research, I investigated how alternative temporal cues in communication (temporal frames) that are used to inform income inequality are conveyed in everyday discourse, potentially influencing judgments and decisions about whether or not to support efforts to reduce it. To be specific, I suggest that the mere awareness of inequality is insufficient to counteract political conservatives' opposition to policies. Rather, to shift preferences, inequality must be framed in prospective (not retrospective) terms. I posit that forecasting the future of income inequality puts conservatives into a relatively high-level of justice and ethics construal/consideration where moral intuitions of concern for individual welfare and justice tend to be more valued. This, in turn, motivates them to have greater support for redistributive policies that resolve harm and fairness moral concerns.

Past versus Future Framing of Income Inequality

Income inequality can be portrayed in two ways in terms of its temporal perspectives: “the rich have gotten more than the poor” (retrospective frame) or “the rich will be getting more than the poor” (prospective frame). Although these expressions deliver seemingly similar information about increasing income inequality, I posit that the temporal direction in which inequalities are framed will differentially shape individuals’ judgments and decisions on redistributive policy initiatives.

Conventional communication about income inequality would seem to point in the direction of retrospection. Describing income inequality as something that has been out there (i.e., in the past: “the rich got richer”)—compared to keeping silent or describing such inequality as something that will be out there—would appear to have an evidentiary advantage in efforts to increase support for redistributive policies. Since the unsatisfactory events already have existed, such information seems to provide firm grounds to justify future change. Yet, an emerging body of research suggests that future framing of injustice that may lead to greater change.

My prediction is grounded in and an extension of past-future asymmetry in human judgments. Psychologically, retrospection is more constrained than prospection in mental simulation (Kane et al., 2012; Van Boven et al., 2009). That the same event can be processed differently in terms of its perceived intentionality (Burns et al., 2012), elicitation of emotions (Van Boven & Ashworth, 2007), and fairness judgments (Caruso, 2010), depending on whether it is described as occurring in the past or in the future. Future framing of social events tends to be more emotionally evocative and to

be perceived as unfair than past framing of the same event because people perceive less uncertainty and greater controllability in prospection than retrospection.

Indeed, such differences in cognitive and affective processes based on differential degrees of liberation in mental simulation hold downstream implications for a meaningful change in policy preferences (Roh & Schuldt, 2014). For example, (Roh & Shapiro, 2015) found that when consumers learned of a privacy-settings change by a social networking site beforehand (future framing) rather than afterward (past framing), the same engendered more negative consumer responses (in this case perceiving greater ill-intent and negative emotions). Moreover, participants' perceived intentionality toward the corporate behavior and evoked negative emotions were not merely restricted to such proximate affective and cognitive judgment, but went beyond these to motivate harsher legal punishment—demanding a greater amount of compensation as a mock juror for a potential lawsuit.

In the current work, I address how these asymmetries in how people think about the past and future can make a difference in leading to greater public support for income redistribution policies when the issue is framed prospectively rather than retrospectively via a novel mechanism: increased concern for individualizing moral foundations.

Future (versus Past) Frame of Mind and Moral Intuitions

There is widespread agreement in the research community about the harmful consequences of income inequality (Oishi et al., 2011; Stiglitz, 2012). There is, at the same time, a persistent political disagreement as to how income inequality should be resolved (Chow & Galak, 2012). Political conservatives historically show opposition

toward policy proposals designed to reduce income inequality (Kluegel & Smith, 1986) . This opposition may be based on the psychology of conservatism in American politics (Jost & Amodio, 2012; Jost, Glaser, et al., 2003). Extant literature on political ideology in American politics emphasizes their differing psychological and moral value orientations related to inequality and self-reliance (individual responsibility regarding the inequality; see Jost et al., 2009; Lakoff, 2002). On average, political conservatives tend to accept inequality and attribute it to individual effort founded on a social dominance orientation and system justification mindset (Bénabou & Tirole, 2006; Jost, Glaser, et al., 2003). To the contrary, political liberals refuse inequality and desire individual welfare and fairness based on greater reliance on the ethics of justice and care (Haidt & Graham, 2007).

The ethics of justice and care can be understood as individualizing moral foundations within a framework of Moral Foundations Theory. The theory suggests people consider two general dimensions in assessing social justice: (a) violations that infringe on the rights of others or otherwise cause harm and (b) loyalty to the in-group, deference to authority, and purity (Graham et al., 2013; Haidt & Joseph, 2007). While foundations of harm and fairness are primarily concerned with protecting the welfare and justice of individuals, in-group loyalty, authority, and purity are focused on preserving the group as a whole. Here, the first two sets of foundations (i.e., harm and fairness) are referred to as the individualizing foundations, while the other three sets of foundations (i.e., in-group loyalty, authority, and purity) are referred to as the binding foundations (Haidt & Graham, 2007; Napier & Luguri, 2013).

Moral Foundations Theory suggests that the reason why political liberals and conservatives differ in their support or opposition to policies aiming at reducing social injustice comes from differing weights on moral intuitions. Whereas political liberals consider moral motivations primarily based upon the first two foundations (individualizing moral foundations), political conservatives put more emphasis on the binding moral foundations. Such differential emphasis on morality makes conservatives seem to oppose justice.

Recall that past research suggests that future framing of social events may induce meaningful decisions holding a broader societal impact since thinking about the future, compared to the past, is perceived as less certain and fixed, affective (emotional evocation) and cognitive (sense of agency) psychological processes governing moral judgments are pronounced (Burns et al., 2012; Caruso, 2010; Van Boven & Ashworth, 2007). Past work shows that just momentary shifts in affective and cognitive responses indeed exert downstream implications on differences in policy preferences (Roh & Schuldt, 2014; as presented in Chapter 2). Yet, as found in the case of redistributive policy preferences, oppositions to policy reforms are so firmly established based on value systems that such past-future asymmetries on fleeting affective and cognitive responses to social events may not be enough to lift baseline preferences on policy initiatives. Can temporal frames still hold implications for policy preferences under the circumstances where such momentary shifts in affective and cognitive mechanisms are hardly expected due to deeply rooted values?

I suggest that temporal framing of income inequality holds the potential to raise political conservatives' consideration of individualizing moral foundations

(moral intuitions that govern care about the welfare and justice of individuals). In doing so, this framing strategy has potential to reduce the ideological divide over preferences for redistributive policy initiatives. That is, information about widening income inequality will elicit greater consideration toward harm and fairness of moral intuitions—thus strengthening support for redistributive policies—when it is described as occurring in the future as compared to without description (where there are baseline relationships between political ideology and preferences for redistributive policy initiatives) or described as occurring in the past.

The future framing of income inequality has greater potential to increase preferences for individualizing moral foundations (harm and fairness) because people tend to engage more in abstract (versus concrete) mental processing when they think about the future compared to about equivalent past events. Since prospection is less constrained by realities, it tends to be more liberating and less concrete in terms of interpreting social events. Two separate lines of research in social cognition with respect to political psychology and mental time travel lend credence to this prediction.

First, recent work in political psychology shows that an abstract mindset versus a concrete mindset could lead people to focus more on their core moral intuitions, which were found to be individualizing moral foundations (i.e., harm and fairness) (Napier & Luguri, 2013). In a similar vein, a growing body of research indeed hints that a mechanism inducing abstract thinking would potentially be effective in reducing well-known ideological divides (e.g., Agerström et al., 2010; Luguri et al., 2012; Yang et al., 2012).

For example, Luguri et al. (2012) found that political conservatives came to feel less negative toward non-normative groups when they had abstraction-oriented personalities (Study 1) or when they were primed with an abstract mindset through a construal-level priming mechanism¹³ (Studies 2 and 3). The study further found that increased tolerance toward the non-normative group from conservatives was mediated by heightened concerns about fairness tapped with the Moral Foundations Questionnaire (Study 3). In a similar vein, Yang et al. (2012) found that liberals' and conservatives' opposing attitudes toward building a mosque near Ground Zero were reduced by putting participants into an abstract mindset both with a construal-level priming mechanism (Study 2) and fluency manipulation¹⁴ (Study 3).

For message designers aiming at social change, these findings further imply that framing messages in ways that promote abstract thinking and bring the moral intuitions (values) of fairness and welfare to the foreground of social judgments has the potential to reduce the ideological divide on policy preferences. Extant mechanisms frequently discussed in the extant literature as solutions to counteracting value-based resistance (Lewandowsky et al., 2012; Luguri et al., 2012; Yang et al., 2012)—such as self-affirmation, construal-level, or fluency manipulations—are often difficult to implement as real-world interventions. Thus, they are relatively less

¹³ Participants were induced abstract or concrete mind-sets through a why/how paradigm. Specifically, in Study 2, participants were asked to think about the issue of sustaining good physical health and to explain either *why* they would do so (abstract construal) or *how* they would do so (concrete construal).

¹⁴ Participants in the fluent condition read an easy-to-read version of the article, with a high-contrast font against the background. In the disfluent condition, the text font was adjusted to a lighter color so that the contrast was less defined.

actionable. The remaining question is, then, how can we construct a simple (actionable) but significant (effective) framing mechanism?

Second, in direct response to this question, research suggests that the asymmetric nature of retrospection and prospection with respect to degrees of freedom in mental simulation makes events be more abstractly represented during prospection than retrospection (Kane et al., 2012). Kane and colleagues (2012) found that college undergraduates tended to choose an abstract description of a given action (e.g., ordering pizza, attending a party) when the action was going to occur in the future versus in the past (Study 3). To be specific, participants tended to choose the more abstract description “getting organized” over the more concrete description “writing things down” when they were asked to describe a future versus a past action.

Based on these lines of research, I predict that a relatively high-level (abstract) processing of income inequality that could potentially be induced by prospective framing will lead people (especially conservatives, given their historical opposition to redistributive policy initiatives and relatively anemic concern for individualizing moral foundations) to increasingly favor their individualizing moral values. More importantly, this should also lead to greater support for redistributive policy initiatives. To the contrary, past framing of income inequality, which I conjecture is more often used in daily discourse about income inequality as its default temporal frame, does not share such potential since it is construed more in a low-level (concrete) sense. Thus, the past frame would not hold leveraging power to shift preferences for moral intuitions related to individual welfare and justice.

Overview of the Current Research

I began my investigation with a test for differences in temporal orientations in public communication about income inequality. To do so, I used LexisNexis[®] Academic searches on major U.S. news outlets with national coverage to identify the degree to which past versus future temporal orientations have been used in daily public discourse about income inequality over the past 4 decades. I continued with two randomized experiments that examined the relative impact of the past versus future frames of income inequality in shaping redistributive policy preferences. The randomized experiment also sought to test the proposed novel psychological mechanism (namely, heightening individualizing moral intuitions) underlying the potential temporal framing effects.

Study 4.1: Temporal Orientations of Income Inequality in News Media

Methods

Does everyday news discourse about income inequality feature more frequent temporal orientations toward the past compared to the future? To find out, I conducted an analysis of news media representations of income inequality. News is an ecologically valid platform to look at the temporal orientation of income inequality in public discourse since it is inherently oriented to and conscious of time—news articles tend to be precise in usage of tenses. I predicted that when income inequality is dealt with, it would be manifested more using past rather than future temporal orientation.

I searched the LexisNexis[®] Academic (<http://www.lexisnexis.com/hottopics/lnacademic/>) database over the past 38-year period from January 1977 through December 2014. To search for stories of income inequality, I used the terms “income

inequality” and “economic inequality.” These terms were searched throughout entire texts—search areas were set at, for example, “Headline (income inequality OR economic inequality)” or “Body (income inequality OR economic inequality)” in the LexisNexis[®] Academic search engine. I selected the target news outlets based on two criteria. First, I tried to collect news outlets with national reach and coverage. Second, given the topical interest of the current investigation, I tried to gather news outlets with varying politically ideological leanings of their readership. To achieve these goals, I used data from the Alliance for Audited Media (2013) about newspapers’ circulation from October 2012 through March 2013 (the most updated circulation data at the time) and Ho and Quinn (2008) work that examined explicit political positions of representative news media in the U.S. As a result, three major liberal newspapers—The New York Times, The Washington Post, and USA Today—and three major conservative newspapers—The Wall Street Journal, The New York Post, and Investor’s Business Daily—were selected. The search yielded a total of 3,822 articles.

I first sought to extract specific places in news articles where the authors discussed income inequality in temporal terms. To do this, I extracted target sentences for analyses from each article by creating Python programming language¹⁵ to extract (1) sentences only including the key terms and (2) sentences only included in headlines. This method afforded me the ability to sensitively capture more content-specific temporal orientations since it only captured such temporal manifestations found from sentences including the key terms. The results did not substantially differ

¹⁵ Python is a computer programming language that allows extracting the target data (here, texts) from a text file.

across the two different methods of analysis—I report the results based on sentences only including the key terms.

I then analyzed the textual description of income inequality using LIWC 2007 (Pennebaker, Booth, & Francis, 2007).¹⁶ LIWC compares every word in the transcript with its internal dictionary of 4,500 words and assigns it to one or more of its 76 word categories, such as function words (e.g., articles; prepositions), mental processes (e.g., negative emotions; cognitive processes), and, importantly, temporal orientations (i.e., past; present; future). LIWC identifies temporal orientations of the past and future based on the tense of the verbs and auxiliary verbs (see Appendix for entire vocabulary of Past and Future categories used in LIWC). To capture the prevalence of past and future orientations, the percentage shares of words belonging to past and future categories were used in the analysis. The word count of the given articles (the denominator in percentage shares) was based on the number of words in sentences only including the key terms.

Results

A mean comparison based on a paired-sample *t* test reveals that news articles including key terms of income inequality and economic inequality tend to use more past-oriented language ($M = 1.85$, $SD = 2.92$) than future-oriented ($M = .64$, $SD = 1.65$) linguistic traces, $t(3,686) = 21.14$, $p < .001$. Suggesting the robustness of this tendency, the follow-up sensitivity analysis with the dataset including only headlines from news texts suggests similar patterns respectively. Figure 4.1 represents year-by-

¹⁶ LIWC (Linguistic Inquiry and Word Count) is a computerized textual analysis program that measures the linguistic traces of mental processes behind the produced texts.

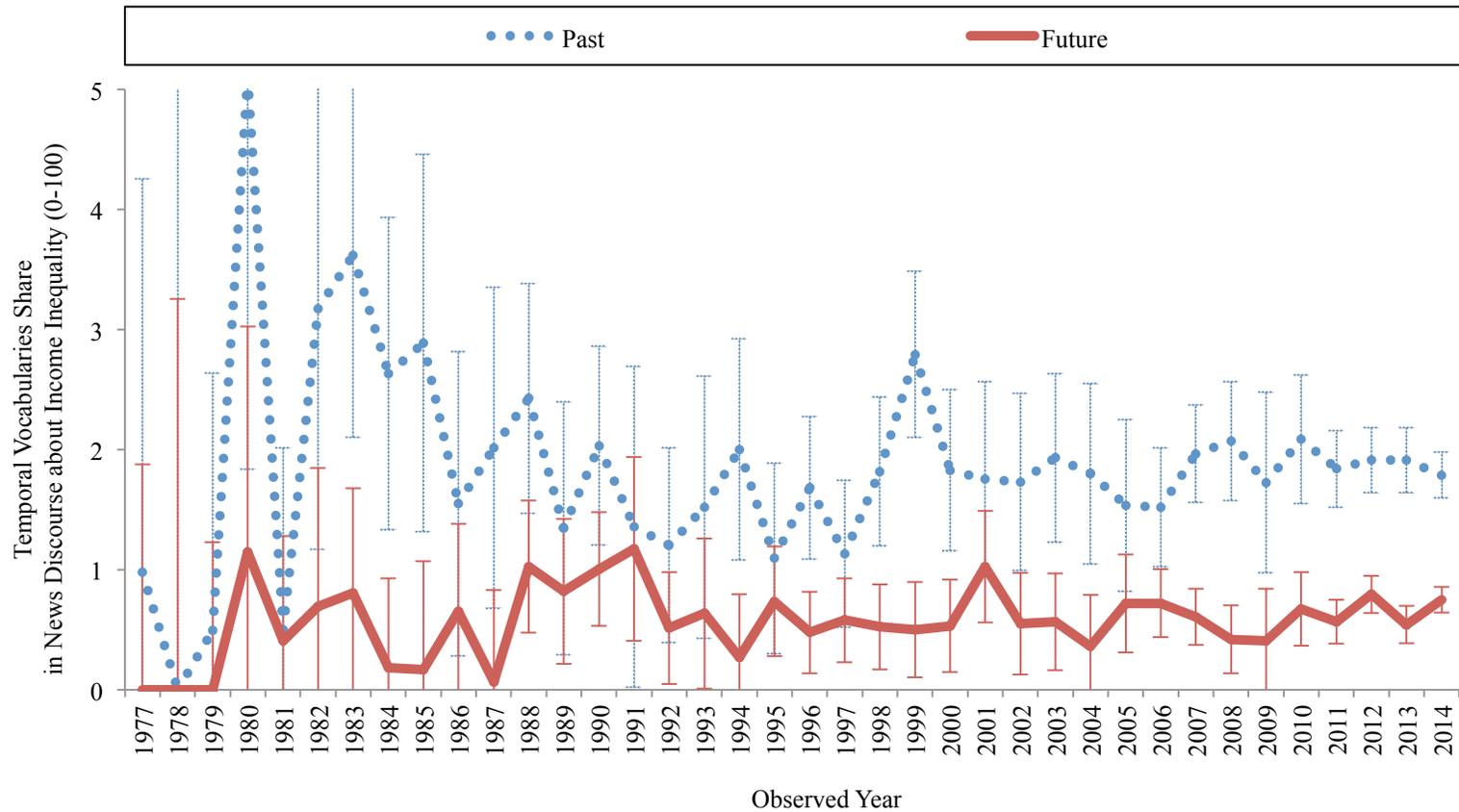


Figure 4.1. Graph depicting the year-by-year comparison between the percentages of past and future vocabularies found in news discourse about income inequality in major U.S. newspapers (1977-2014).

Note: Error bars represent 95% confidence intervals around the predicted means.

year comparison between past and future orientations in news discourse about income inequality plotted based on the analysis of the sentences including key terms. Despite the fluctuation over the past 38 years of time period, the results show a fairly consistent pattern: a dominant past orientation.

Next, I examined if such dominant past temporal orientation of news discourse about income inequality spanned across ideological lines of differences in news media. I conducted a fixed effects multilevel regression model with a random intercept, predicting temporal orientations (*past* = 0; *future* = 1) and political ideology of news media (*liberal* = 0; *conservative* = 1), as well as two-way interactions between the two variables. As shown in Figure 4.2, results from this multilevel regression model revealed a significant two-way interaction with political orientations of news media: conservative (versus liberal) \times temporal orientation, $b = .48$, $z = 2.86$, $p = .004$.

To probe this interaction, I compared the past and future temporal orientation scores between liberal and conservative news media using the linear combination of coefficient (“*lincom*”) algorithm. Results indicated that while liberal and conservative news media showed no differences in linguistic manifestations of the future, $|z|s < 1$, the volume of linguistic manifestations of the past appeared to be greater in liberal news media ($M = 1.90$, $SD = .04$) than those of conservative news media ($M = 1.50$, $SD = .11$), $b = .39$, $z = 3.33$, $p < .001$. Thus, the observed leaning toward the past temporal orientation was more pronounced in liberal than conservative news media.

These findings are informative for two reasons at this point. First, the economics literature has shown that income inequality has been both consistently widening and growing since the 1970s in the U.S. It appears, however, that temporal

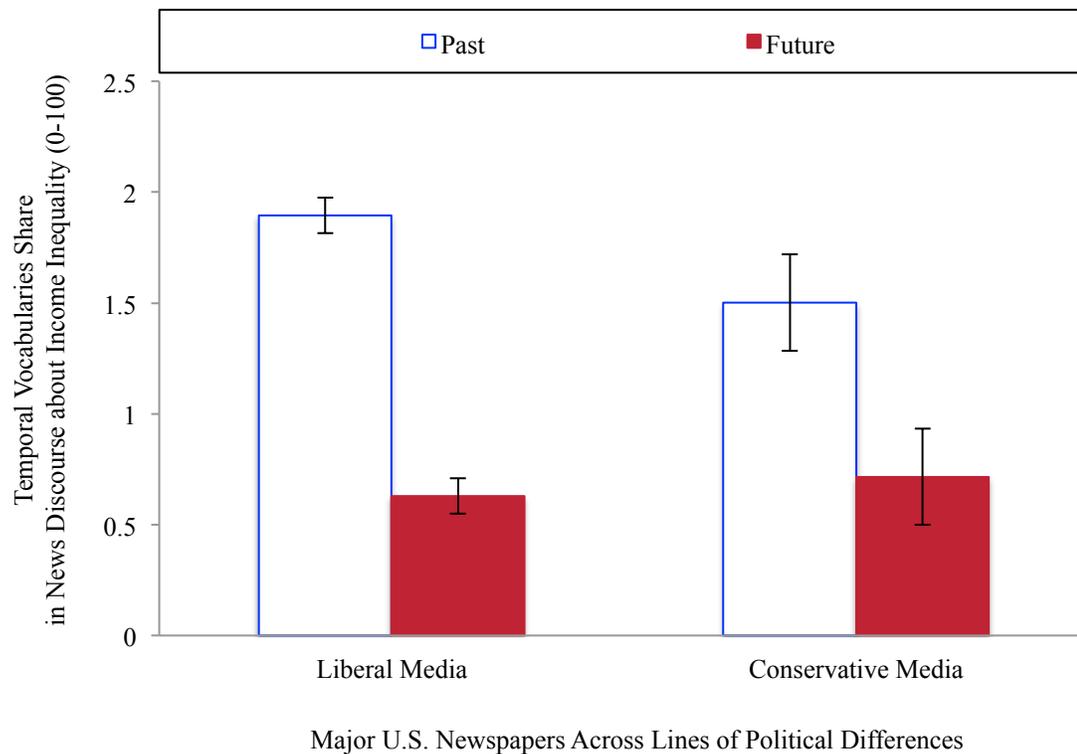


Figure 4.2. Graph depicting the differences between newspapers on the percentages of past versus future temporal vocabularies found in news discourse about income inequality.

Note: Error bar represents 95% confidence intervals around the predicted means.

orientation found in news discourse about income inequality has been more often documenting than anticipating history. Second, income and economic inequality are fundamentally economic news, which is often concerned with what is going to happen next (stock predictions, the strength of various currencies, future earnings projections, etc.). However, the linguistic traces of time in stories about income inequality in major US news outlets were less forecast-oriented than is typical for other economic issues.

Building on these findings about an ecological pattern of temporal orientations in communication about income inequality, I further sought to test the impact of differential temporal frames on redistributive policies. Counter to the default temporal

orientation found in daily news discourse, I expected that prospective framing of income inequality would be linked to increased support for policy interventions from a subset of the public that historically opposed the notion of redistributive policies.

Study 4.2: Effects of Temporal Frames on Redistributive Policies and Their Psychological Mechanisms

Methods

Participants. To test influences of past versus future temporal frames on redistributive policy preferences, I conducted a randomized web-experiment between December 2014 and February 2015. Participants ($N=574$) were recruited from Amazon.com's Mechanical Turk (M-Turk) and were told that they would participate in an "Opinion Survey." A couple of cautious steps were taken to ensure the validity of the study results. First, I limited access to our study to U.S. residents only based on Amazon's check system. Second, only workers with a formidable track record such that their success rate was greater than or equal to 97% and, at the same time, the number of studies they participated in (Human Intelligence Test (HIT) in M-Turk terms) was greater than or equal to 1,000.

Participants' mean age was 33.9 years ($SD = 11.7$), about 44% ($n=255$) were female, and the majority (90%) reported at least some college education (48% had graduated college). Given the thematic interest of the current study, I collected reports of annual income (19pt scale running from "*Less than \$5,000*" to "*\$175,000 or more*" with an increment of \$2,500 range; $M = 9.45$, $SD = 4.03$). Self-identified political party affiliation was distributed such that 15% were Republicans, 44% were Democrats, 34% were Independents, and 7% were something else. Mean score of

political ideology was 3.25 ($SD = 1.63$) on a scale running from 1 (=very liberal) to 7 (=very conservative). Table 4.1 describes the demographic characteristics of the study sample, including the number of participants assigned to each of the experimental conditions.

Power Calculation. I determined the sample size based on a power calculation using the G*Power 3 program (version 3.1.7; Faul, Erdfelder, Lang, & Buchner, 2007). The target N was expected to provide 80% power for detecting an effect size (d) of 0.30 (two-tailed t-test, assuming a Type 1 error rate of 0.05). I calculated that $n = 176$ per condition would be expected to provide 80% power for detecting an effect size (d) of 0.30 (two-tailed t-test, assuming a Type 1 error rate of 0.05) for the

Table 4.1. Descriptive statistics of Study 4.2 participants

	Total Sample $N = 1,000$; Proportion (n); M (SD)
Randomized Experimental Condition	
Past Frame	0.31 (179)
Future Frame	0.34 (192)
Control (No-information-treatment-exposure)	0.35 (203)
Political Ideology	3.25 (1.63)
Party Affiliations	
Republicans	0.15 (87)
Democrats	0.44 (253)
Independents	0.34 (194)
Something else	0.07 (40)
Female	0.50 (502)
Age (mean)	33.9 (11.7)
Highest Level of Education Completed	
High school diploma or less	0.10 (59)
Completed some college	0.42 (243)
College graduate	0.48 (434)
Income (19-pt variable, unit: \$2,500, rescaled 0-1)	9.45 (4.03)

Note: All sample characteristics are proportions with sample sizes in parentheses, except for political ideology, age and income, which are means (standard deviations in parentheses).

potential main effects of future framing compared to past framing or control conditions on redistributive policy preferences. The effect size was drawn from relevant work showing temporal asymmetries of past versus future judgments (Burns et al., 2012; Caruso, 2010; Roh & Schuldt, 2014).

To further examine a novel prediction about the interplay of the temporal frames and political ideology, I adjusted this calculated n so that I can draw 200 participants from each of the three conditions to detect proposed interactive effects between temporal frames and political ideology. This rules out a potential concern about the variation in political ideology among an M-Turk sample. It is true that extant literature shows that the sample is more liberal than the general population. A bigger per-cell n , however, alleviates this concern to some extent. Past relevant work (Kuziemko et al., 2013; Roh & Schuldt, 2014) has found that about 20 percent of the sample can be classified as Conservatives/Republicans (about 40 percent as Liberals/Democrats; about 40 percent as Moderates/Independents). Thus, I expected up to 40 Republicans/Conservatives per cell, which is close to the guideline for appropriate n per cell proposed by recent discussion in the psychological sciences (n would be desirable when it is somewhere between 20 to 50 per cell and definitely needs to be over 20; Simmons, Nelson, & Simonsohn, 2011), by assigning 200 total participants for each of the three conditions. For the experimental design used here the study had adequate power—but was not overpowered—to detect the interactive effects between temporal frames and political ideology. A total of 574 participants successfully completed all the questions.

Past versus Future Framing. Depending on the randomized conditions, participants assigned to experimental conditions were asked to read a short news article. Specifically, the headline of the mock news article described widening income inequality either retrospectively (“The rich *got richer* last year, U.S. census data shows”) or prospectively (“The rich *will get richer* next year, U.S. census data shows”) (emphasis added). The main text was mainly adapted from previous research (Chow & Galak, 2012) and modified for the purposes of the current study. As Chow and Galak (2012) suggest, income inequality could refer to “the rich getting richer,” “the poor getting poorer,” or both. Here, I chose to go with the former (rich getting richer) for two reasons. First, it holds greater ecological validity. U.S. income data suggest that net income of the top 1% has climbed 86.1% during the last two decades; the income of the remaining 99% of the population has improved only 6.6% (Piketty & Saez, 2014). Second, more importantly, previous work suggests that the rich getting richer is the condition where the ideological divide is less-strongly observed (e.g., there is less variance explained by political ideology)—thus, it makes the demonstration of the effects of the temporal frames a more conservative test.

The mock article used the simple format of an online news story and reported on data from the Income Division of the Internal Revenue Service (IRS) that indicates income inequality between the top 5 percent earner and the median wage earner. Depending on their randomly assigned condition, I framed the income gap as having occurred in the past (e.g., “Last year, the IRS estimates that the top 5 percent (the 95th percentile) of wage earners made, on average, \$132,905 more than the median wage earner (the 50th percentile)), or as occurring in the future (“Next year, the IRS

estimates that the top 5 percent (the 95th percentile) of wage earners will make, on average, \$132,905 more than the median wage earner (the 50th percentile)). I derived the specific income inequality estimate from the 2012 IRS report, the most contemporary updated income data at the time.

Aside from verbs related to temporal framing, the articles were identical. To provide a sense that income inequality is a social problem, the very top of the sidebar placed next to the main news story read, “The Inequality Conundrum” across conditions. Participants randomly assigned to the control condition advanced directly to the questionnaire without reading an article. Figure 4.3 shows the full article texts.

Measures. After reading the article, participants completed the following policy support and moral foundation measures. As for the key dependent measure of redistributive policy preferences, based on extant literature on preferences and support for redistributive policies (Chow & Galak, 2012; Kuziemko et al., 2013), I measured support for four specific policies: two for regulating wealth (taxation) and two for regulating poverty (food stamps and minimum wage).

To be specific, respondents were asked: “Many different ideas have been proposed to address income inequality in the U.S. Do you support or oppose the following policies? (1 = *strongly oppose*; 7 = *strongly support*)” I solicited preferences for two redistributive policies along with this question (the order of questions was randomly selected): (a) Creating a new tax bracket for incomes over \$5 million ($M = 5.62$, $SD = 1.65$); (b) Food Stamps program ($M = 5.31$, $SD = 1.63$). On the next page,

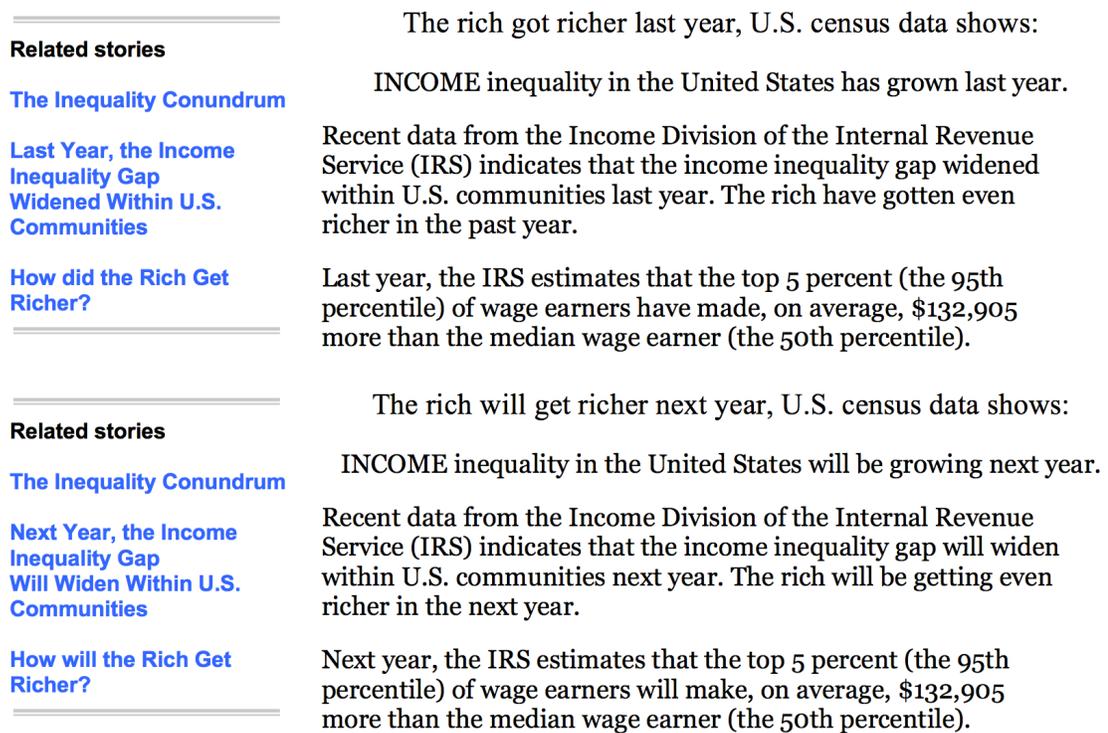


Figure 4.3. Experimental stimuli of temporal direction frames used in Study 4.2.

Note: The upper panel represents “past frame” condition; the lower panel shows “future frame” condition.

participants were asked about a second set of redistributions policies: “Here are some other ideas that have been proposed to address income inequality in the U.S. Please indicate what you think about the following policies (1=*should definitely be decreased*; 7=*should definitely be increased*).” The preferences for the following two policies were solicited: (a) income taxes on millionaires... ($M = 5.88, SD = 1.39$); (b) the minimum wage, which is currently \$8 per hour... ($M = 5.92, SD = 1.34$). I computed a preference index by averaging the four items (Cronbach’s $\alpha = .81, M = 5.68, SD = 1.21$).

Following these measures, adapted from prior work (Roh & Schuldt, 2014), participants were asked to rate how angry, upset, bad, and outraged they feel about income inequality (i.e., Right now, income inequality in the United States makes you feel...) on a 7-point scale ranging from 1 (=Not at all) to 7 (=Very much). I averaged the four items to create a single negative emotion index ($\alpha = .94$, $M = 2.83$, $SD = 1.24$). Then, participants filled out a version of the Moral Foundations Questionnaire (Graham, Haidt, & Nosek, 2009; Study 2), which is designed to assess the five moral foundations: harm, fairness, in-group loyalty, authority, and purity (for detailed questionnaires see Graham et al., 2009, p. 1044). Following extant literature (Napier & Luguri, 2013; van Leeuwen & Park, 2009), I averaged the four harm and four fairness questions into a single mean index representing individualizing moral values ($\alpha = .70$, $M = 5.20$, $SD = .91$), and combined the four questions pertaining to purity, in-group loyalty, and authority respectively into a mean composite index of binding moral values ($\alpha = .83$, $M = 4.05$, $SD = 1.07$).

Those participants in experimental conditions—who read either a future- or past-framed mock news article about income inequality—then completed an instructional manipulation check (D. M. Oppenheimer et al., 2009). To be specific, I asked participants: “In the message you read, can you recall when exactly income inequality was or will be widened?” Participants were asked to choose among the following randomly ordered options: “Last Month,” “Next Month,” “Last Year,” “Next Year.” This task helps to heighten the validity and reduce noise in the data by excluding participants who did not pay attention to the study materials in a sufficient manner. Following the manipulation check, participants (those who were in the no-

message-exposure control condition directly proceeded here without the manipulation check) reported on the demographics and political orientation items mentioned in the previous section and were debriefed. Specifically, at the end of the survey, I informed participants that the news story they read was fictitious and constructed for research purposes. Cornell's Institutional Review Board (IRB) approved the procedure of the experiment. On average, the experiment lasted approximately 7 minutes.

Results

Forty-three participants in experimental conditions (about 10.9%) failed to provide the correct temporal frames of the mock news article they read and were thus excluded from the analysis. This left a total of 531 participants for the analytic n . The results did not change substantially when these participants were included in the analysis. To test main predictions, I conducted an analysis of variance (ANOVA) and a series of Ordinary Least Squares (OLS) regression analyses predicting preferences for redistributive policies and individualizing moral foundations.

Main Effects of Messages

First, I ran an ANOVA analysis in order to examine main effects of messages. A comparison of mean values for support for redistributive policy preferences did not reach statistically significant differences across the three conditions, $F(2, 528) = .30$, $p = .74$. Overall, mean values for overall redistributive policy preferences (4-items mean index) were above the scale's midpoint (4) across conditions ($M_{\text{Past}} = 5.76$, $M_{\text{Future}} = 5.72$, $M_{\text{No Message}} = 5.66$). Such a pattern of results was also analogous when it came down to policy preferences for wealth regulation, $F(2, 528) = .97$, $p = .74$, and

poverty regulation, $F(2, 528) = .16, p = .85$ —neither found differences across conditions.

The Interplay of Temporal Frames and Political Ideology on Policy Preferences

Next, I turn to the interplay of temporal frames and political ideology. I ran an OLS regression in which I regressed the overall policy preferences onto message conditions (using the no-message-exposure control as the referent group), political ideology, and all second-order interaction terms. In demonstrating temporal frames \times political ideology interaction, since participants' political orientation was not a randomized factor, I also ran regression equations where gender, age, education, and income are included as covariates (the known factors correlated with political ideology). Since I did not find a substantial difference between the two sets of models, I focus results on the set of models without controls.

The equation predicting overall redistributive policy preferences yielded the predicted main effects of political ideology; participants who were more conservative showed less support toward the redistributive policies, $b = -.39, t(527) = -14.49, p < .001$ (in a regression model without including interaction terms). Such effect of ideology was qualified by the predicted temporal frames \times political ideology interactions. While the term denoting past (versus control) \times ideology was nonsignificant, $b = -.002, t(525) = -0.04, p = .97$, as predicted, the term representing future (versus control) \times ideology revealed a significant interaction, $b = .17, t(525) = 2.67, p = .008$ (See Model 1 of Table 4.2). Complementing the analysis, a post-hoc regression analysis including the term representing future (versus past) \times ideology

revealed a significant interaction, $b = .17$, $t(525) = 2.61$, $p = .009$. Figure 4.4 displays the patterns of such interactions.

Recall that I expected to observe exposure to forecasting the future of income inequality would induce greater support for redistributive policies among political conservatives. To examine this prediction, I calculated estimated values of redistributive policy preferences at each of the seven points of the political ideology scale separately across the three conditions with contrast analyses using the linear combination of coefficients (“*lincom*”) algorithm in Stata. This analysis revealed, as expected, that conservatives (those who responded 5, 6, or 7 on the political ideology scale) showed greater support when income inequality was described prospectively compared to retrospectively, $|b|s > .44$, $|t|s > 3.00$, $ps < .003$, or without being exposed to information about income inequality (suggesting baseline preferences), $|b|s > .37$, $|t|s > 2.55$, $ps < .011$. Likewise, those who self-identified as middle of the road (political moderates) also showed greater support when income inequality was expressed prospectively versus retrospectively, $b = .21$, $t = 1.91$, $p = .057$, or not mentioned to them at all, $b = .26$, $t = 2.36$, $p = .019$. To the contrary, those self-identified liberals were not swayed by temporal framing such that their overall preferences on redistributive policies do not vary by conditions, $|b|s < .28$, $|t|s = 1.66$, $ps > .10$.

The Interplay of Temporal Frames and Political Ideology on Moral Values

Note that I expected that such an influence of temporal frames might be driven by heightened moral intuitions of harm and fairness as future framing has the potential

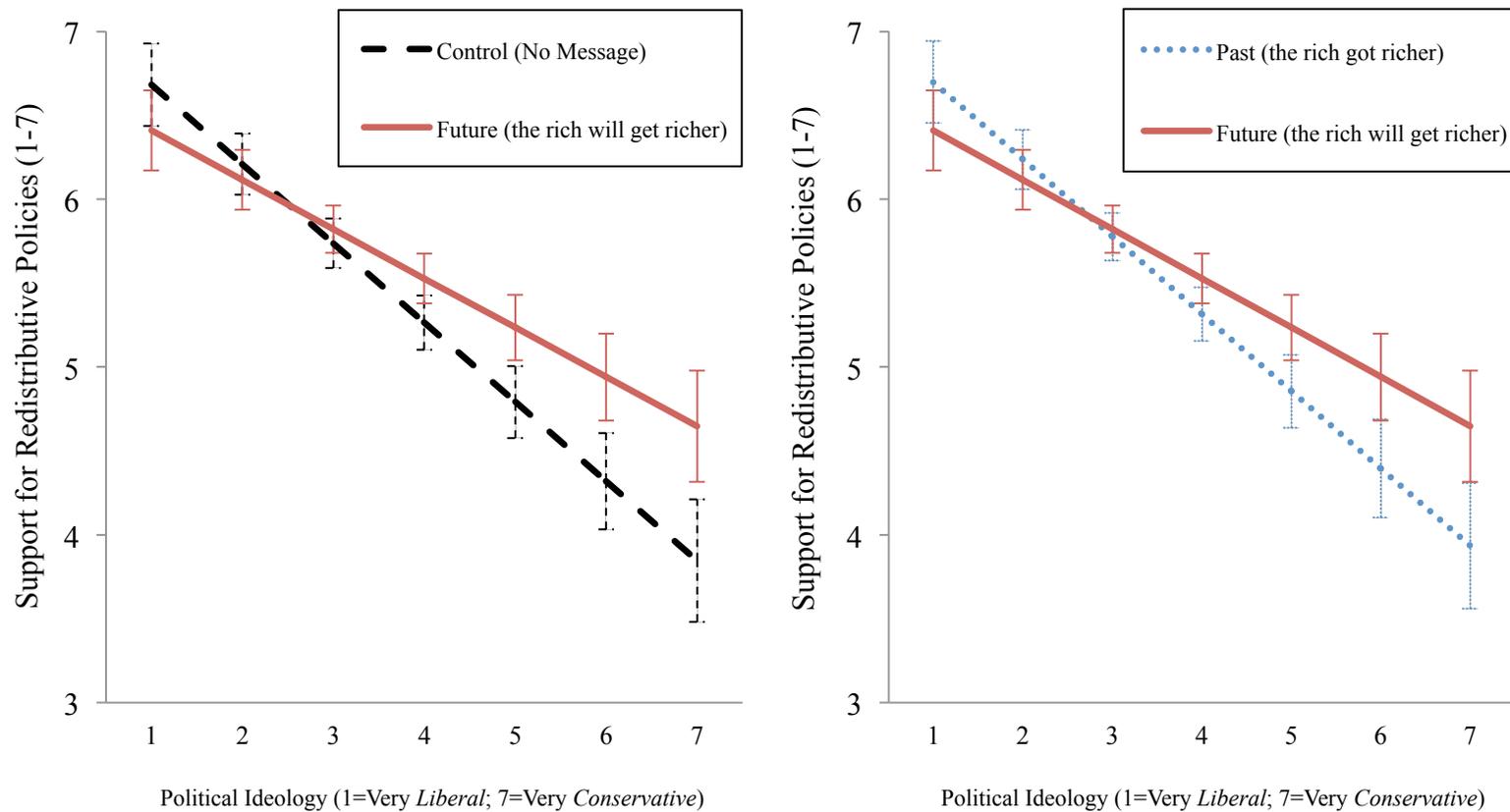


Figure 4.4. Graph depicting the interaction between framing condition and political ideology on redistributive policy support (Study 4.2).

Note: Support for policies were measured using Likert-type scales ranging from 1 = less support & should be decreased to 7 = greater support & should be increased. Error bars represent 95% confidence intervals around the predicted mean of the item.

to raise conservatives' preferences for individualizing moral foundations—moral intuitions related to care about individual welfare and justice. To test this, I ran OLS regression in which the individualizing moral foundations were regressed onto message conditions (using the future frame as the referent group), political ideology, and all second-order interaction terms. The results showed an analogous significant interaction, such that while the term representing past (versus control) \times ideology was nonsignificant, $b = .05$, $t = -.90$, $p = .37$, the term representing control (versus future) \times ideology, $b = .12$, $t(525) = -2.17$, $p = .03$ (See Model 2 of Table 4.2). Complementing this, the additional post-hoc regression analysis revealed that the terms representing past (versus future) \times ideology, $t = -1.47$, $p = .14$, were non-significant. Figure 4.5 displays the patterns of such interactions.

To further probe the control (versus future) \times ideology interaction, I again plotted the estimated values of policy support at each value of political ideology. A planned contrast analysis by using the “lincom” command in Stata revealed the same pattern that I had found from the model predicting overall policy preferences. Political conservatives (representing 5, 6, 7 of political ideology scale) showed greater endorsement of individualizing moral foundations when exposed to an information treatment regarding income inequality with a prospective framing than their baseline endorsement of the moral intuitions when they had not read any messages, $|b|s > .31$, $|t|s > 2.44$, $ps < .015$. Further, moderates also showed the same pattern, with the model predicting overall policy preferences such that, compared with in the control condition, those exposed to future framing of income inequality now showed greater endorsement for moral values concerning individual welfare and justice, $b = .20$, $t =$

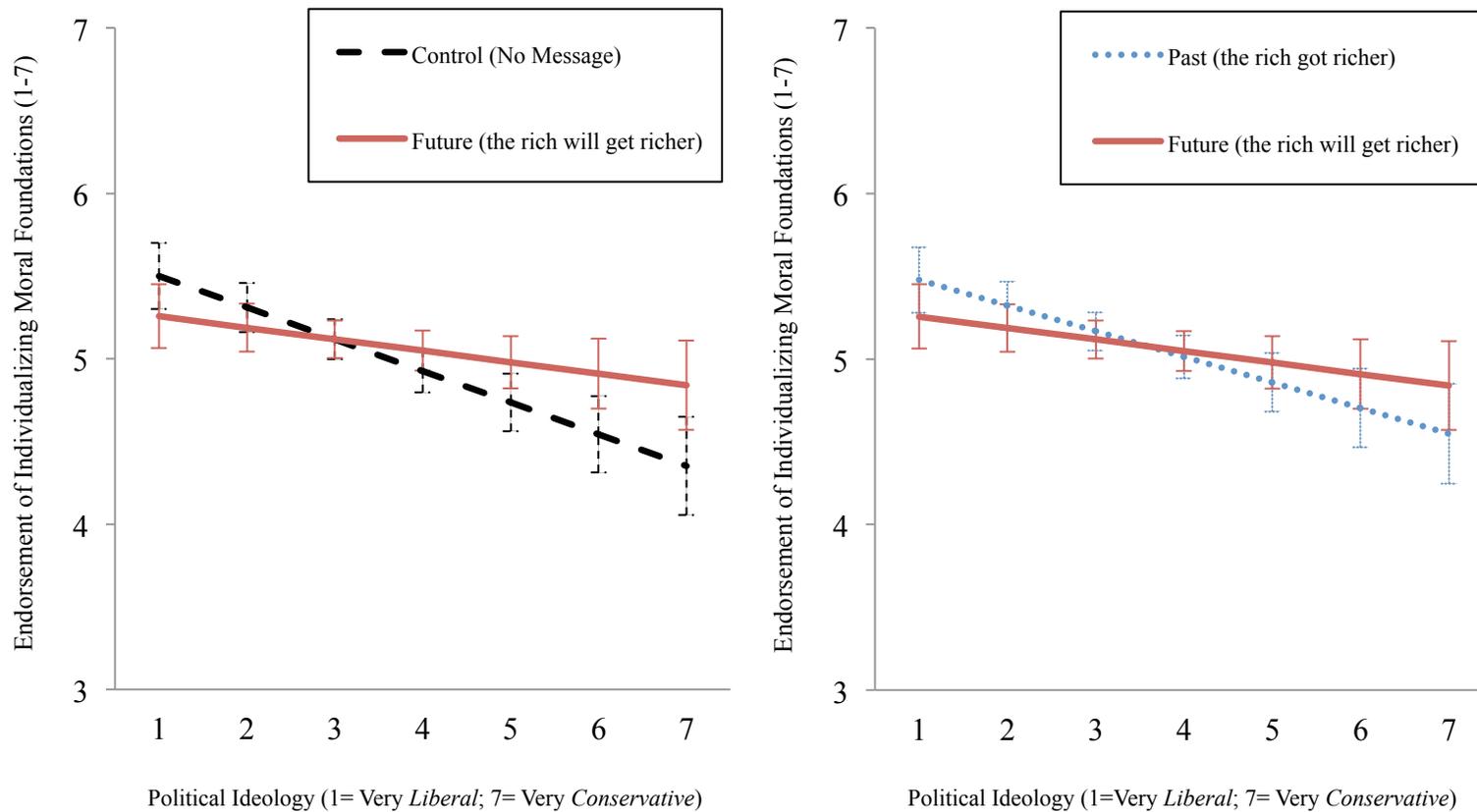


Figure 4.5. Graph depicting the interaction between framing condition and political ideology on endorsement of individualizing moral foundations (Study 4.2).

Note: Endorsement of Individualizing Moral Foundations were measured using a Likert-type scale ranging from 1 = strongly disagree to 7 = strongly agree. Error bars represent 95% confidence intervals around the predicted mean of the item.

2.02, $p = .044$. Again, liberals did not change their endorsement for individualizing moral foundations depending on conditions, $|b|s < 16$, $|t|s = 1.00$, $ps > .32$.

ANOVA and regression equations predicting binding moral foundations did not show either main effects of message conditions, $F(2, 528) = .56$, $p = .57$, or significant interaction-terms, $|b|s < .12$, $|t|s < 1.92$, $ps > .056$. I further ran ANOVA and regression analysis in which negative emotions were regressed onto message conditions, political ideology, and all second-order interaction terms. This analysis also did not produce either main effects of message conditions, $F(2, 528) = .13$, $p = .88$, or significant interaction-terms, $|b|s < .05$, $|t|s < .72$, $ps > .47$.

Testing the Mediated Moderation Model

I next tested whether differences in the salience of the moral intuitions of harm and fairness (individualizing moral foundations) mediated the relationships between the interplay of ideology \times temporal framing treatment and policy preferences. First, as expected, overall policy preferences for redistribution and individualizing moral foundations are correlated ($r = .46$, $p < .001$). To examine this mediated moderation I employed statistical procedures described by Muller, Judd, and Yzerbyt (2005).

As with the OLS regression, temporal framing treatment (i.e., future framing versus no-message control conditions) moderated the influence of ideology on policy preferences (Model 1 of Table 4.2). In addition, there were analogous findings on the salience of individualizing moral intuitions (Model 2 of Table 4.2). Further, I found a partial effect of the individualizing moral intuitions (the proposed mediator of the

Table 4.2. OLS regression models testing predictions of Study 4.2.

	Model 1: Redistributive Policy Preferences (Moderation)		Model 2: Individualizing Moral Foundations (Moderation)		Model 3: Redistributive Policy Preferences (Mediated Moderation)	
	<i>b</i> (SE)	<i>t</i>	<i>b</i> (SE)	<i>t</i>	<i>b</i> (SE)	<i>t</i>
Variables in the equations						
Political Ideology (conservatism; centered)	-0.45 (.05)	-9.80***	-0.25 (.04)	-6.39***	-0.35 (.04)	-7.25***
Past Framing (ref = No message control)	0.07 (.11)	0.64	0.11 (.04)	1.25	0.02 (.04)	0.23
Future Framing (ref = No message control)	0.12 (.11)	1.11	0.11 (.04)	1.23	0.07 (.04)	0.75
Ideology × Past Framing	0.002 (.07)	-0.04	0.05 (.04)	0.90	-0.02 (.04)	-0.23
Ideology × Future Framing	0.17 (.06)	2.67**	0.12 (.04)	2.17*	0.12 (.04)	1.90
Individualizing Moral Foundations (centered)					0.42 (.04)	4.94***
Individualizing Moral Foundations × Future Framing					-0.04 (.04)	-0.36
Individualizing Moral Foundations × Past Framing					-0.03 (.04)	-0.28
Constant	5.64 (.08)	74.88***	5.14 (.06)	80.42***	5.67 (.07)	79.34***
% explained R^2		29.9		13.0		37.8
Number of Observations		531		531		531

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

current study) on overall redistributive policy preferences, $b = .38$, $t(525) = 4.87$, $p < .001$ (Model 3 of Table 4.2). Finally, when I accounted for individualizing moral intuitions and their interaction with temporal framing treatments, the residual direct effects of the ideology were no longer moderated by temporal framing treatments (again, Model 3 of Table 4.2). The coefficient of the political ideology and exposure to future framing relative to no-message exposure interaction-term was reduced and fell down to nonsignificance from $|t| = 2.67$, $p = .008$, 95% CIs $[-.29, -.04]$ to $|t| = 1.90$, $p = .06$, 95% CIs $[-.25, .004]$.

Thus, upon accounting for the individualizing moral foundations and letting the indirect effect be moderated via the proposed mediator, the residual direct effect of exposure to future framing of income inequality relative to no-message exposure on overall redistributive policy preferences no longer depended on political ideology, thereby establishing the conditions for a mediated moderation as shown in Figure 4.6.

Discussion

Study 4.2 found that the way income inequality was described in terms of its temporal direction affected political conservatives' concerns for the welfare and justice of individuals, which in turn affected their policy preferences aimed at reducing such inequality. As expected, juxtaposed to the default temporal orientation of news media ecology found in Study 4.1, it is the future framing of income inequality that reduced the historic trend of substantial political polarization in support of redistributive policies.

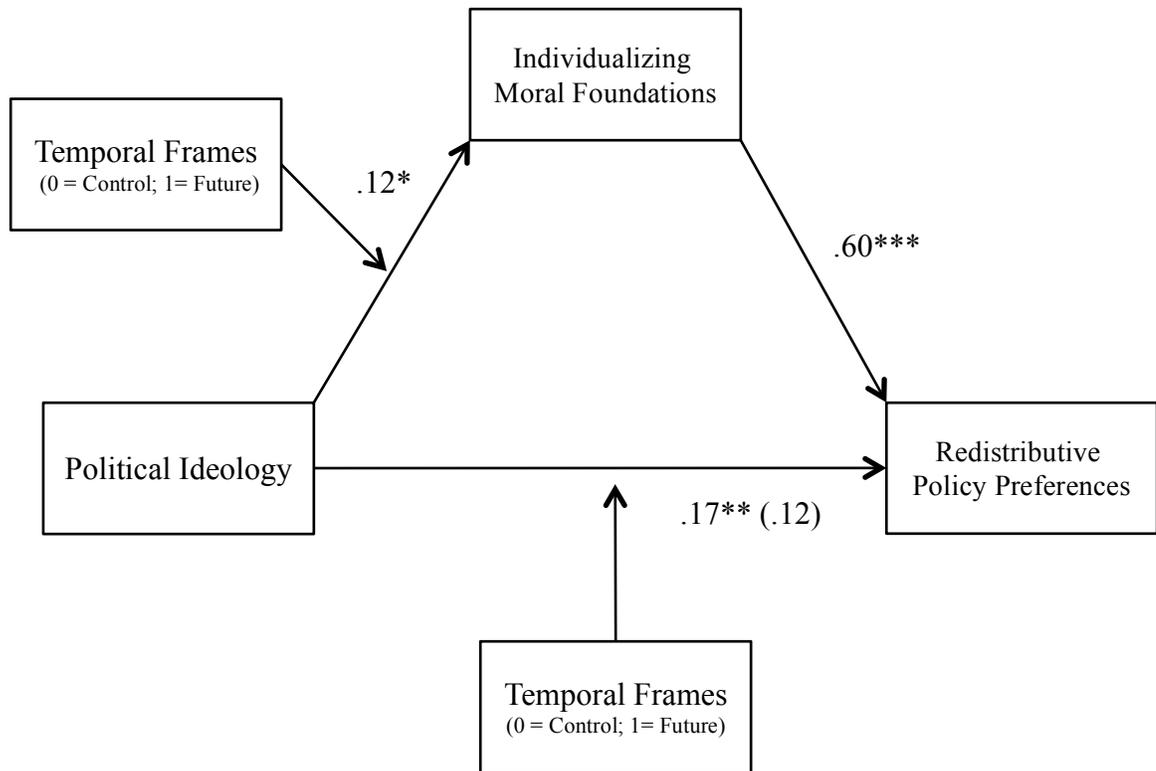


Figure 4.6. Model depicting the effect of the ideology \times temporal frames on redistributive policy preferences, controlling for the effect of the ideology \times temporal frames on endorsement of individualizing moral foundations (Study 4.2).

Note: Coefficients are unstandardized regression coefficients. The coefficient in parentheses is the direct relationship between the ideology \times temporal frames and redistributive policy preferences, controlling for the proposed mediator (individualizing moral foundation).

* $p < .05$, ** $p < .01$, *** $p < .001$.

Political conservatives, who are conventionally opposed to redistributive policy initiatives, showed greater support for redistributive policies in response to income inequality described using prospective framing than they showed without being exposed to any description of income inequality (baseline level of support) or when inequality is retrospectively framed. In addition, conservatives showed greater

concern for individualizing moral foundations under the future framing than the control conditions. Notably, the past framing made no difference compared with the control condition in both cases.

The future framed informational treatment—like the past framed one—did not provide explicit information with respect to what should be done to resolve income inequality. Nevertheless, it seems that conservatives showed greater support for policy initiatives via the heightened concern for welfare and justice of individuals when being exposed to an informational treatment forecasting the future of income inequality.

Building on the findings of Study 4.2, I further examined if such influences of future framing are also observed with varied *duration* information about income inequality. The common lament about growing income inequality in the U.S. often includes a temporal marker indicating how long the inequality has been growing in an effort to raise public support for redistributive policies that would reduce unequal distribution of wealth (e.g., “Income inequality gap widens among U.S. communities over 30 years”) (Chinni, 2011). Moving on from the independent tests of the two dimensions of temporal frames (temporal *duration* and *direction* frames as suggested in the previous and current chapter, respectively), Study 4.3 investigates the potential interplay of direction and duration frames. Importantly, such design affords a conceptual replication of temporal *direction* framing with varied *duration* information.

Study 4.3: Effects and Processes of Past and Future Framing Varying Duration Information

Methods

Participants. To test potential interactive influences of past versus future temporal frames on redistributive policy preferences, I conducted a randomized web-experiment between March 2015 and April 2015. Participants ($N=1,154$) were recruited from Amazon.com's Mechanical Turk (M-Turk). Participants were told that they would participate in an "Opinion Survey." To ensure the validity of the study results, the same participants criteria used in Study 4.2 were employed (i.e., participants region, HIT success rates, and the number of participation). In addition, to rule out participants who have already participated in Study 4.2 (and Study 3.2 in Chapter 3), a pre-emptive measure to screen out such participants were used. Specifically, using the worker qualification management tool on M-Turk, I granted scores (identifiers) to participants in previous studies, and participants who hold scores were automatically prevented from participating in the current study.

Participants' mean age was 35.6 years ($SD = 12.1$), about 49% ($n=568$) were female, and the majority (89%) reported at least some college education (45% had graduated college). Given the thematic interest of the current study, I collected reports of annual income (19pt scale running from "Less than \$5,000" to "\$175,000 or more" with an increment of \$2,500 range; $M = 10.05$, $SD = 4.38$). Self-identified political party affiliation was distributed such that 15% were Republicans, 43% were Democrats, 35% were Independents, and 7% were something else. Mean score of political ideology was 3.37 ($SD = 1.64$) on a scale running from 1 (=very liberal) to 7

(=*very conservative*). Table 4.3 describes the demographic characteristics of the study sample, including the number of participants assigned to each of the experimental conditions.

Power Calculation. I determined the sample size based on a power calculation using the G*Power 3 program (version 3.1.7; Faul et al., 2007) used in Study 4.2. The power calculation suggested that target $n = 176$ per condition would be expected to provide 80% power for detecting an effect size (d) of 0.30 (two-tailed t -test, assuming a Type 1 error rate of 0.05) for the potential main effects of future framing compared to past framing or control conditions on redistributive policy preferences based on

Table 4.3. Descriptive statistics of Study 4.3 participants.

	Total Sample $N = 1,000$; Proportion (n); M (SD)
Randomized Experimental Condition	
Past Frame with Short-term Duration	0.17 (196)
Past Frame with Long-term Duration	0.16 (189)
Future Frame with Short-term Duration	0.16 (189)
Future Frame with Long-term Duration	0.17 (192)
Control (No-information-treatment-exposure)	0.34 (388)
Political Ideology	3.37 (1.64)
Party Affiliations	
Republicans	0.15 (177)
Democrats	0.43 (499)
Independents	0.35 (398)
Something else	0.07 (80)
Female	0.49 (568)
Age (mean)	35.6 (12.1)
Highest Level of Education Completed	
High school diploma or less	0.12 (139)
Completed some college	0.43 (497)
College graduate	0.45 (518)
Income (19-pt variable, unit: \$2,500, rescaled 0-1)	9.45 (4.03)

Note: All sample characteristics are proportions with sample sizes in parentheses, except for political ideology, age and income, which are means (standard deviations in parenthesis)

past research (Roh & Schuldt, 2014). As did in Study 4.2, I adjusted this calculated n and aim to draw 200 participants from each of the four temporal framing conditions (i.e., past-fast, future-fast, past-slow, & future-slow).

Further, in Study 4.3, I doubled the size of the control group to allow the study reasonable statistical power to detect both explore the interactive effects of temporal direction and duration framing potential interaction effects between temporal direction framing and political ideology—as hypothesized and examined in Study 4.2. Specifically, $n = 400$ (200×2) for a set-aside control condition because my key hypotheses are about testing the contingent interactive effects of past and future framing on political conservatives (which were about 15% of the sample in Study 4.2). As a result, we planned to recruit $N = 1,200$. This makes the size of conservatives close to the guideline for appropriate n per cell proposed by the most recent discussion in psychological sciences at the time (n would be desirable when it is somewhere between to to 50 per cell and definitely needs to be over 20; Simmons et al., 2011), ruling out such concern. A total of 1,154 participants successfully completed all the questions.

Temporal Direction and Duration Framing. Depending on the randomized conditions, participants were randomly assigned to one of five conditions featuring a 2 (temporal direction: past vs. future) \times 2 (temporal direction: fast vs. slow) + 1 (an offset control group) between-subject design. Similar to the mock articles used in Study 4.2, the headline of the mock news article described widening income inequality varying its temporal direction (“The rich *have gotten richer* over the last 3 years, U.S. census data shows” versus “The rich *will get richer* over the next 3 years”, U.S. census

data shows”) and duration or prospectively (“The rich *will get richer* over the next 3 *decades*”) (emphasis added).

The main text was similar to the one used in Study 4.2. Participants read the article in the format of an online news article reported on data from the Income Division of the Internal Revenue Service (IRS), which indicates that income inequality has widened in the U.S. Aside from verbs related to temporal framing, the articles were identical. To provide a sense that income inequality is a social problem, the very top of the sidebar placed next to the main news story read, “The Inequality Conundrum” across conditions. Participants randomly assigned to the control condition advanced directly to the questionnaire without reading an article. Figure 4.7 shows the full article texts.

Measures. The same set of measures used in Study 4.2 was employed. After reading the article, participants completed the following policy support, negative emotions, and moral foundation measures. Specifically, participants were asked: “Many different ideas have been proposed to address income inequality in the U.S. Do you support or oppose the following policies? (1 = *strongly oppose*; 7 = *strongly support*)” Preferences for two redistributive policies were solicited along with this question (the order of questions was randomly selected): (a) Creating a new tax bracket for incomes over \$5 million ($M = 5.55$, $SD = 1.71$); (b) Food Stamps program ($M = 5.26$, $SD = 1.64$). On the next page, participants were asked about a second set of redistributions policies: “Here are some other ideas that have been proposed to address income inequality in the U.S. Please indicate what you think about the following policies (1=*should definitely be decreased*; 7=*should definitely be increased*).” The

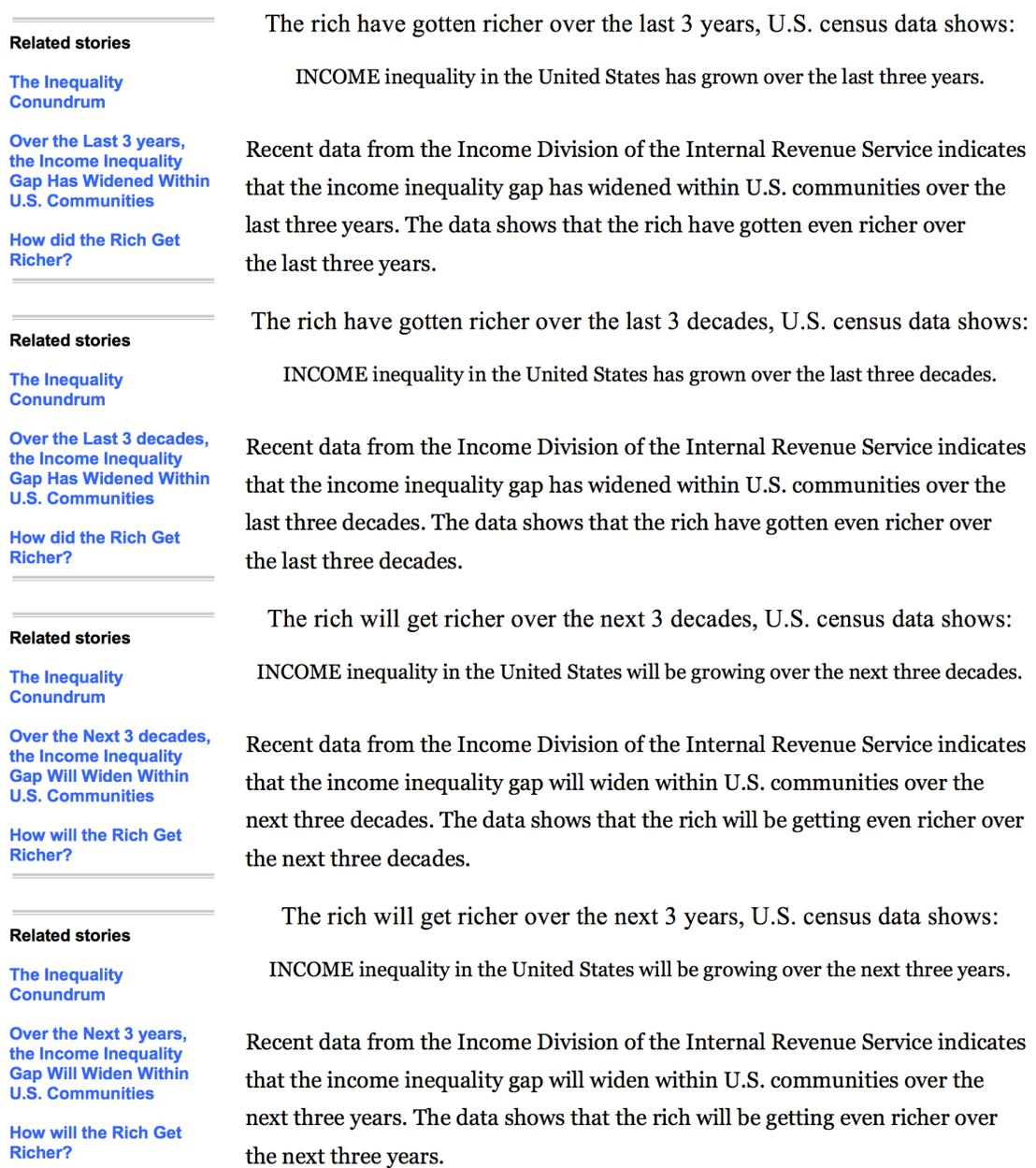


Figure 4.7. Experimental stimuli of temporal direction frames used in Study 4.3.

Note: The top panel represents “past frame with short-term duration” condition; the second panel from the top shows “past frame with long-term duration” condition; the third panel from the top show “future frame with short-term duration”; the bottom panel represents “future frame with long-term duration” condition

preferences for the following two policies were solicited: (a) income taxes on millionaires... ($M = 5.85$, $SD = 1.42$); (b) the minimum wage, which is currently \$8 per hour... ($M = 5.87$, $SD = 1.29$). By averaging four items, I created policy preference index ($\alpha = .81$, $M = 5.63$, $SD = 1.22$).

Following these measures, again like Study 4.2, participants were asked to rate how angry, upset, bad, and outraged they feel about income inequality (i.e., Right now, income inequality in the United States makes you feel...) on a 7-point scale ranging from 1 (=Not at all) to 7 (=Very much). I averaged the four items to create a single negative emotion index ($\alpha = .94$, $M = 2.70$, $SD = 1.23$). Then, participants filled out a version of the Moral Foundations Questionnaire used in Study 4.2 (Graham et al., 2009; Study 2), which is designed to assess the five moral foundations: harm, fairness, in-group loyalty, authority, and purity. Following extant literature (Napier & Luguri, 2013; van Leeuwen & Park, 2009), I averaged the four harm and four fairness questions into a single mean index representing individualizing moral values ($\alpha = .71$, $M = 5.04$, $SD = .90$), and combined the four questions pertaining to purity, in-group loyalty, and authority respectively into a mean composite index of binding moral values ($\alpha = .82$, $M = 3.94$, $SD = 1.06$).

Then, participants reported on the demographics and political orientation items mentioned in the previous section and were debriefed. Like in Study 4.2, at the end of the survey, I informed participants that the news article they read was fictitious and

constructed for research purposes. Cornell's Institutional Review Board (IRB) approved the procedure of the experiment.¹⁷

Results

To explore the interactive effects of temporal direction and duration frames and replicate the predictions prescribed and tested in Study 4.2, I conducted an analysis of variance (ANOVA) and a series of Ordinary Least Squares (OLS) regression analyses predicting preferences for redistributive policies and individualizing moral foundations.

The Interplay of Temporal Direction and Duration Frames

First, I ran a series of ANOVAs predicting policy preferences, negative emotions, and individualizing moral foundations that featured independent variable for temporal direction (*past*=0; *future*=1), duration (*short-term*=0; *long-term*=1), and an interaction term between them.¹⁸ I considered a statistically significant interaction ($p < .05$) between the two message design characteristics, as well as a significant overall F -test for the model ($p < .05$). The results revealed that none of these analyses were significant, F 's (1, 762) < 1.13, $ps > .28$, suggesting a non-significant interaction between direction and duration frames.

The Main Effects of Temporal Frames

Then, I analyzed the independent effects of temporal direction and duration frames. As with temporal direction framing, a comparison of mean values for support

¹⁷ Since the results were not different with and without participants who could recall the exact temporal cues in Study 4.2, Study 4.3 did not include instructional manipulation check item.

¹⁸ These models excluded the control group, since the group did not receive any information about growing income inequality.

for redistributive policy preferences did not reach statistically significant differences across the three conditions, $F(2, 1,151) = .21, p = .81$. Overall, mean values for redistributive policy preferences were above the scale's midpoint (4) across conditions ($M_{\text{Past}} = 5.62, M_{\text{Future}} = 5.67, M_{\text{No Message}} = 5.61$). Turning to temporal duration framing, a comparison of mean values for support for redistributive policy preferences did not reach statistically significant differences across the three conditions either, $F(2, 1,151) = 1.28, p = .28$.

The Interplay of Temporal Frames and Political Ideology on Policy Preferences

Next, as planned, I turn to the conceptual replication of Study 4.2, the interplay of temporal *direction* frames and political ideology. I ran an OLS regression in which I regressed the overall policy preferences onto message conditions (using the no-message-exposure control as the referent group), political ideology, and all second-order interaction terms. Again, in analyzing temporal frames \times political ideology interaction, as participants' political orientation was not a randomized factor, I also ran regression equations where the known factors correlated with political ideology (i.e., gender, age, education, and income) are included as covariates. As I did not find a substantial difference between the two sets of models, I focus results on the set of models without controls.

The regression model predicting overall redistributive policy preferences yielded the predicted temporal frames \times political ideology interactions. While the term denoting past (versus control) \times ideology was nonsignificant, $b = .07, t(1,148) = 1.65, p = .10$, as predicted, the term representing future (versus control) \times ideology revealed a significant interaction, $b = .10, t(1,148) = 2.23, p = .026$ (See Model 1 of Table 4.4).

Contrary to findings in Study 4.2, a post-hoc regression analysis including the term representing future (versus past) \times ideology was not significant, $b = .02$, $t(1,148) = .55$, $p = .58$. Figure 4.8 displays the patterns of such interactions.

Recall that I expected to observe that exposure to forecasting the future of income inequality would induce greater support for redistributive policies among political conservatives. To examine this prediction, again, I calculated estimated values of redistributive policy preferences at each of the seven points of the political ideology scale separately across the three conditions with a planned contrast analyses using the linear combination of coefficients algorithm. As expected and replicating Study 4.2, this analysis revealed that conservatives (those who responded 5, 6, or 7 on the political ideology scale) showed greater support when income inequality was described prospectively compared to retrospectively than without being exposed to information about income inequality (suggesting baseline preferences), $|b|s > .21$, $|t|s > 2.00$, $ps < .046$. To the contrary, those self-identified moderate and liberals were not swayed by temporal framing such that their overall preferences on redistributive policies do not vary by conditions, $|b|s < .19$, $|t|s = 1.49$, $ps > .13$.

The Interplay of Temporal Frames and Political Ideology on Moral Values

I ran a further, analogous analysis performed in Study 4.2 to further test the prediction that such an influence of temporal frames might be driven by heightened moral intuitions of harm and fairness as future framing has the potential to raise conservatives' preferences for individualizing moral foundations—moral intuitions related to care about individual welfare and justice. Specifically, I ran OLS regression in which the individualizing moral foundations were regressed onto message

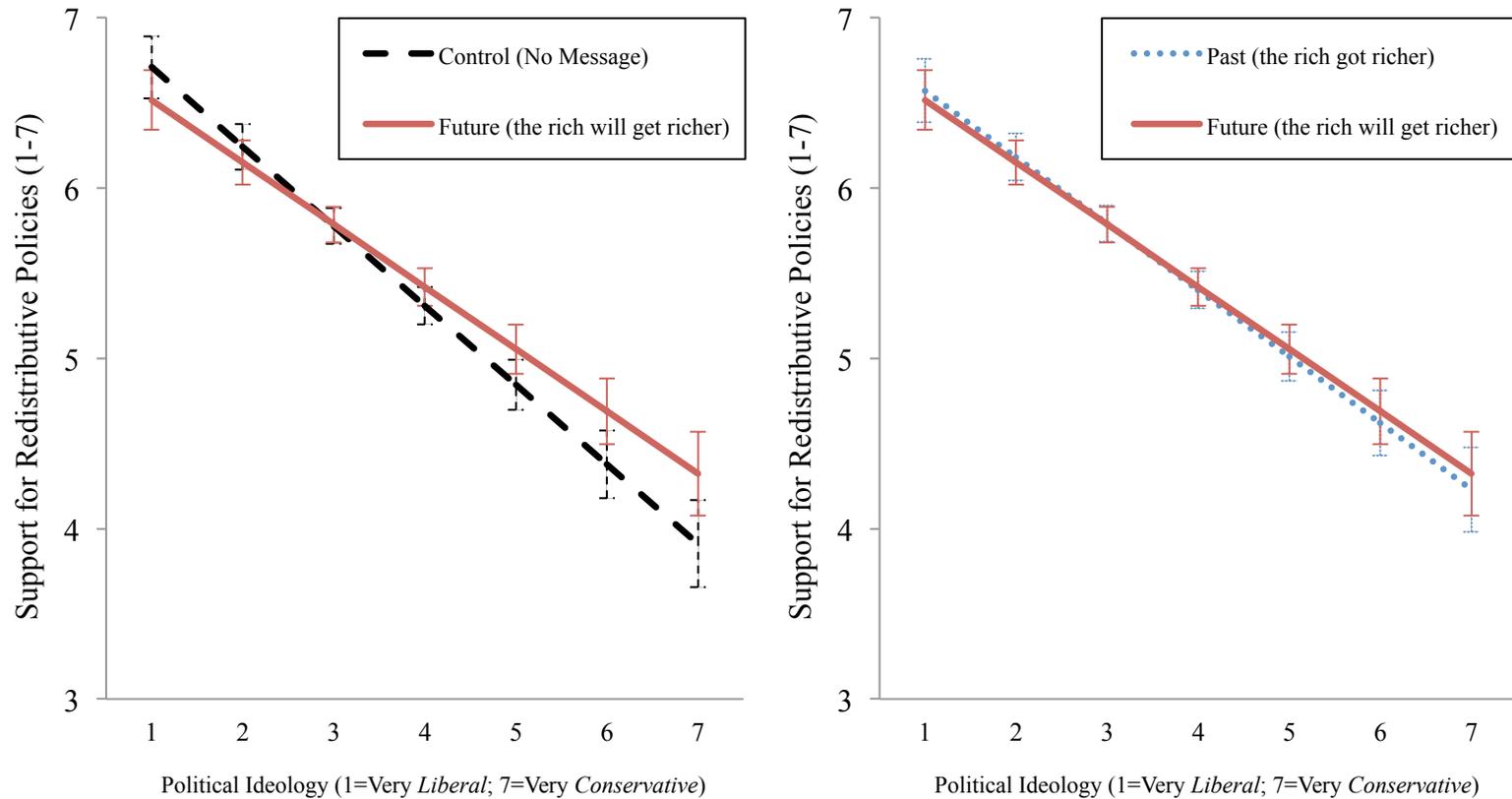


Figure 4.8. Graph depicting the interaction between framing condition and political ideology on redistributive policy support (Study 4.3).

Note: Support for policies were measured using Likert-type scales ranging from 1 = less support & should be decreased to 7 = greater support & should be increased. Error bars represent 95% confidence intervals around the predicted mean of the item.

conditions (using the future frame as the referent group), political ideology, and all second-order interaction terms. The results revealed a consonant significant interaction, such that while the term representing past (versus control) \times ideology was nonsignificant, $b = .04$, $t(1,148) = 1.25$, $p = .21$, the term representing control (versus future) \times ideology was significant, $b = .11$, $t(1,148) = 2.71$, $p = .007$ (See Model 2 of Table 4.4). Complementing this, the additional post-hoc regression analysis revealed that the terms representing past (versus future) \times ideology, $t = 1.44$, $p = .15$, were nonsignificant. Figure 4.9 displays the patterns of such interactions.

To further probe the control (versus future) \times ideology interaction, I again plotted the estimated values of policy support at each value of political ideology. A planned contrast analysis by using the “lincom” command in Stata revealed the same pattern that I had found from the model predicting policy preferences. Political conservatives (representing 5, 6, 7 of political ideology scale) showed greater endorsement of individualizing moral foundations when being exposed to information treatment regarding income inequality with a prospective framing than their baseline endorsement of the moral intuitions when they had not read any messages, $|b|s > .21$, $|t|s > 2.32$, $ps < .021$. Again, moderates and liberals did not change their endorsement for individualizing moral foundations depending on conditions, $|b|s < .20$, $|t|s = 1.90$, $ps > .057$.

As found in Study 4.2, ruling out the role of negative emotions and binding moral foundations, ANOVA and regression equations predicting binding moral foundations did not show either main effects of message conditions, $F(2, 1,151) = 1.14$, $p = .32$, or significant interaction-terms, $|b|s < .01$, $|t|s < .25$, $ps > .80$. I further

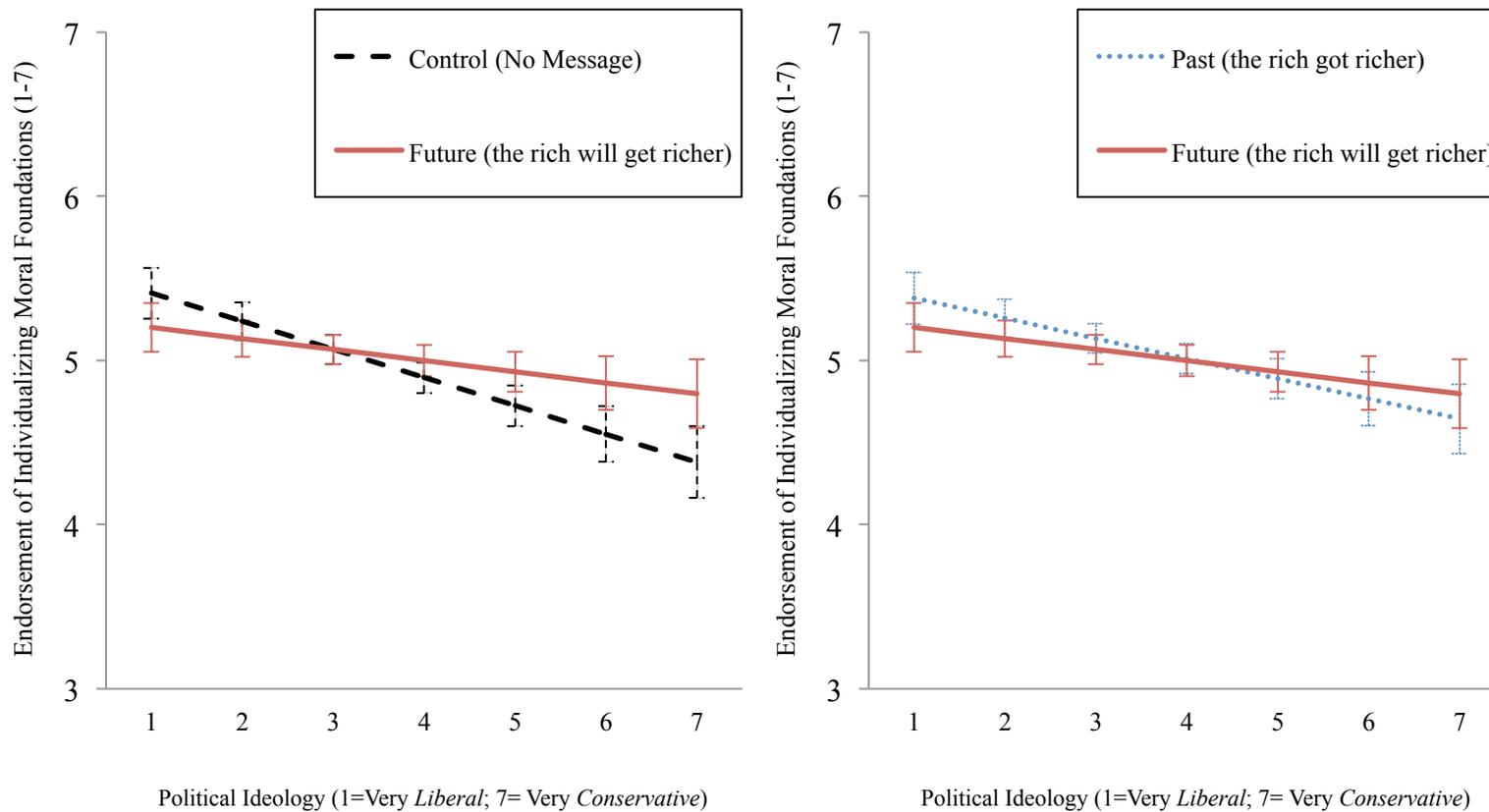


Figure 4.9. Graph depicting the interaction between framing condition and political ideology on endorsement of individualizing moral foundations (Study 4.3).

Note: Endorsement of Individualizing Moral Foundations were measured using a Likert-type scale ranging from 1 = strongly disagree to 7 = strongly agree. Error bars represent 95% confidence intervals around the predicted mean of the item.

ran ANOVA and regression analysis in which negative emotions were regressed onto message conditions, political ideology, and all second-order interaction terms. This analysis also did not produce either main effects of message conditions, $F_s(2, 1,151) < 1.54, p_s > .21$, or significant interaction-terms, $|b|s < .05, |t|s < 0.95, p_s > .34$.

Testing the Mediated Moderation Model

I next tested whether differences in the salience of the moral intuitions of harm and fairness (individualizing moral foundations) mediated the relationships between the interplay of ideology \times temporal framing treatment and policy preferences as found in Study 4.2. First, as expected, overall policy preferences for redistribution and individualizing moral foundations are correlated ($r = .43, p < .001$). Again, I employed statistical procedures described by Muller et al. (2005), examining this mediated moderation model.

First, as with the OLS regression, temporal framing treatment (i.e., future framing versus no-message control conditions) moderated the influence of ideology on policy preferences (Model 1 of Table 4.4). Then, there were analogous findings on the salience of individualizing moral intuitions (Model 2 of Table 4.4). Further, I found a partial effect of the individualizing moral intuitions (the proposed mediator of the current study) on overall redistributive policy preferences, $b = .40, t(1,145) = 7.06, p < .001$ (Model 3 of Table 4.4). Finally, when I accounted for individualizing moral intuitions and their interaction with temporal framing treatments, the residual direct effects of the ideology were no longer moderated by temporal framing treatments (again, Model 3 of Table 4.2). The coefficient of the political ideology and exposure to future framing relative to no-message exposure interaction-term was reduced and fell

Table 4.4. OLS regression models testing predictions of Study 4.3.

	Model 1: Redistributive Policy Preferences (Moderation)		Model 2: Individualizing Moral Foundations (Moderation)		Model 3: Redistributive Policy Preferences (Mediated Moderation)	
	<i>b</i> (SE)	<i>t</i>	<i>b</i> (SE)	<i>t</i>	<i>b</i> (SE)	<i>t</i>
Variables in the equations						
Political Ideology (conservatism; centered)	-0.47 (.03)	-14.26***	-0.17 (.03)	-6.16***	-0.39 (.03)	-12.49***
Past Framing (ref = No message control)	0.04 (.07)	0.59	0.09 (.06)	1.37	0.01 (.07)	0.11
Future Framing (ref = No message control)	0.05 (.07)	0.63	0.04 (.06)	0.61	0.03 (.07)	0.47
Ideology × Past Framing	0.08 (.05)	1.65	0.06 (.04)	1.25	0.06 (.04)	1.39
Ideology × Future Framing	0.10 (.05)	2.23*	0.11 (.04)	2.71**	0.06 (.04)	1.51
Individualizing Moral Foundations (centered)					0.40 (.06)	7.06***
Individualizing Moral Foundations × Future Framing					0.04 (.08)	0.55
Individualizing Moral Foundations × Past Framing					0.09 (.08)	1.22
Constant	5.60 (.05)	107.60***	5.00 (.04)	112.85***	5.62 (.04)	125.90***
% explained R^2		29.8		5.4		40.0
Number of Observations		1,154		1,154		1,154

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

down to nonsignificance from $|t| = 2.34, p = .019, 95\% \text{ CIs } [.02, .18]$ to $|t| = 1.51, p = .06, 95\% \text{ CIs } [-.02, .15]$.

Thus, upon accounting for the individualizing moral foundations and putting the indirect effect be moderated via the proposed mediator, the residual direct effect of exposure to future framing of income inequality relative to no-message exposure on overall redistributive policy preferences no longer depended on political ideology—namely, the models establishes the conditions for a mediated moderation as shown in Figure 4.10.

Discussion

Though, the exploration about the interplay of direction and duration were not observed in shaping redistributive policy preferences, the findings of Study 4.3 are informative, providing further evidence to the role of prospective framing of income inequality in shaping redistributive policy preferences. Namely, Study 4.3 conceptually replicated the effects of past and future framing of income inequality on redistributive policy preferences by varying duration information about income inequality. As found in Study 4.2, again, it is the future framing of income inequality that reduced the historic trend of substantial political polarization in support of redistributive policies via enhanced concern for moral intuitions governing individual welfare and justice—the mediated moderation was replicated.

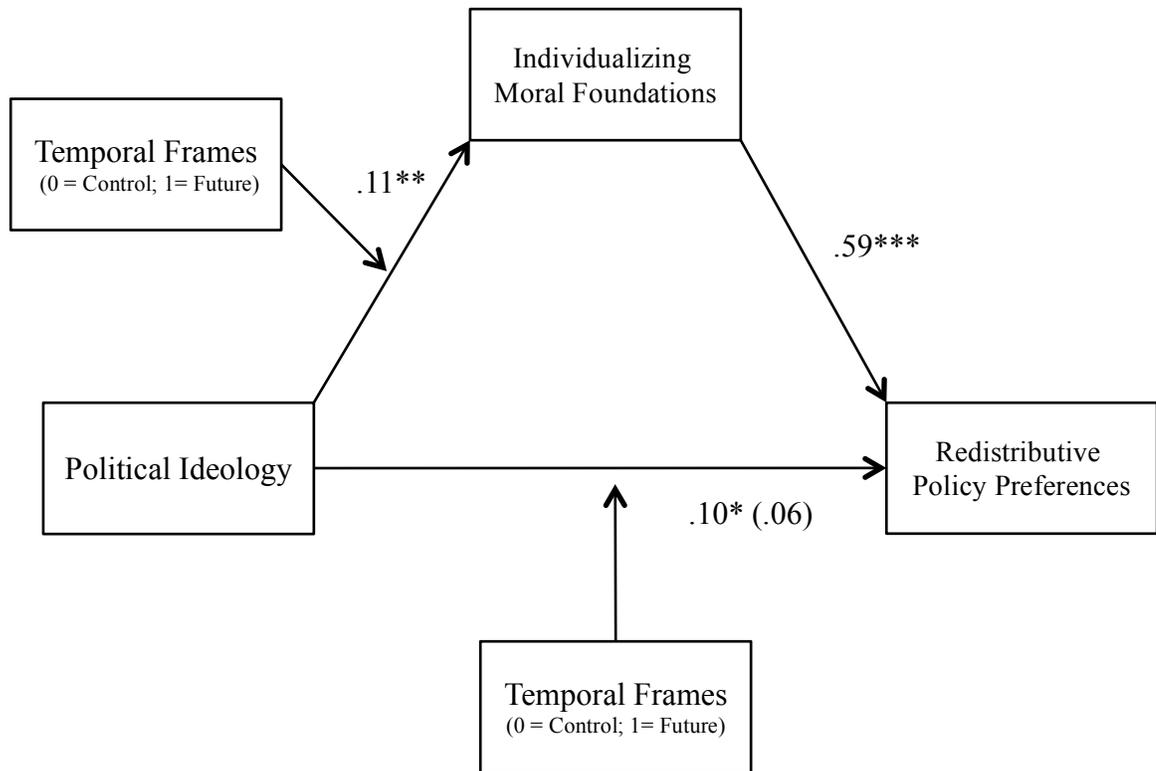


Figure 4.10. Model depicting the effect of the ideology \times temporal frames on redistributive policy preferences, controlling for the effect of the ideology \times temporal frames on endorsement of individualizing moral foundations (Study 4.3).

Note: Coefficients are unstandardized regression coefficients. The coefficient in parentheses is the direct relationship between the ideology \times temporal frames and redistributive policy preferences, controlling for the proposed mediator (individualizing moral foundation).

* $p < .05$, ** $p < .01$, *** $p < .001$.

General Discussion

It is timely to investigate the factors contributing to preference formation of redistribution policies. Amid concern about the detrimental consequences of income inequality for individuals and society, daunting information about growing income inequality is everywhere. U.S. income data suggests that in 2012 the top 10 percent of earners took home more than half of the country's total income, reaching the highest

level ever recorded (Saez, 2013). However, increasing information about growing income inequality seems insufficient to mobilize public support for redistributive policy support given tax rates on the top 1 percent of taxpayers fell even further between 2008-2012, a period characterized by increasing inequality (OECD, 2014). In two studies, the first incorporating computerized textual analyses of major U.S. newspapers and the second using randomized experiment testing the effects of temporal frames on redistributive policy preferences, this chapter reveals that perhaps the time has come for *time* to change in order to promote social *change*.

Results from Study 4.1 demonstrated that media discourse on income inequality in major U.S. news media tends to employ retrospective language more often than prospective language in dealing with this inequality. The past-dominance of this language use was more pronounced in politically liberal than in conservative media, but the pattern was present across media outlets. Intuition may seem to suggest that communicating about certain and concrete data about past income inequality should be more effective in mobilizing public support for redistributive policy initiatives because of the evidentiary benefit of this information. Challenging this intuition, however, Studies 4.2 and 4.3 show that the uncertain, less concrete/more abstract nature of a future frame/construal can be leveraged to motivate people to support redistributive policies. When political conservatives were exposed to information about income inequality with prospective framing—compared with without exposure and retrospective framing—they became more likely to support redistributive policies. These future-framed influences were driven, at least in part, by

heightened concerns of conservatives for moral intuitions governing individual welfare and justice.

Study Implications

From a theoretical standpoint, this chapter adds to a body of evidence suggesting that there are important differences between the past and future frames of mind when it comes to social judgments about ethics, morality, and justice. Prior work has shown that the past-future asymmetry has implications for such social cognition due to the inherent differences in degrees of freedom with respect to mental simulation. Past research suggests that future framing of social events may induce meaningful decisions holding a broader societal impact since thinking about the future, compared to the past, is perceived as less certain and fixed, affective (emotional evocation) and cognitive (sense of agency) psychological processes governing moral judgments are pronounced. Under the circumstance where such momentary shifts in affective and cognitive mechanisms are hardly expected due to the overriding of deeply rooted values, the current study suggests an alternative motivational psychological mechanism that future framing of communication can bring to mind: the core (or some semblance thereof) moral intuitions governing the values of harm and fairness.

In addition, the current research contributes to an integration of three lines of work. First, this work expands on previous studies showing that temporal frames not only influence more proximate social judgments, but also more distal preferences for relevant social policy and interventions. The current work expands on this previous work by revealing the interplay of context and character, demonstrating that temporal

framing mechanism can reduce well-established ideological differences in preferences for social policy. Second, the work suggests a way to shift people's concern for individualizing moral foundations that a growing body of political psychology literature noted as a promising mechanism to bridge the ideological disagreement or ossification.

It is worth noting, however, that there was still a gap between the two groups on redistributive policy support when future framing was used in both Studies 4.2 and 4.3. This may imply, on the one hand, that prospective framing is helpful toward bridging the ideological gap, but it does not completely solve the disparity. On the other hand, I would note that the effects were produced by a quite subtle experimental manipulation and that even modest effect sizes may be practically important in the broader context of public preference formation on national policy initiatives. In a similar vein, I note another potential explanation of the remaining ideological differences on policy preferences. The information treatment did not explicitly highlight causes of economic inequality and/or the need for policy solutions. Though I intentionally omitted explicit attributions or policy solutions to see if temporal framing itself can induce changes in preferences, the effects could have been bigger. I leave this to future empirical test.

Third, for communication researchers who have been searching for message framing theory to go against the motivational influence of individuals, temporal framing suggests a promising mechanism beyond the non-message-related—thus, relatively less actionable—self-affirmation, construal-level, or fluency manipulations

that are often discussed in extant literature as solutions to counteract motivated reasoning (Lewandowsky et al., 2012; Luguri et al., 2012; Yang et al., 2012).

Methodologically, the current work suggests a *holistic* approach by capturing both the mundane pattern of communication and its potential influences. In the era when large-scale real-world data are more accessible than ever, collecting archival data and performing computerized linguistic analysis of target framing strategy used *in the wild* (beyond the lab) would provide more benefit than cost to researchers.

As revealed earlier, since its first appearance in 1977 in the LexisNexis archive of the news media examined here, linguistic manifestations of the past consistently prevail over those of the future. As shown in Figure 4.11, such investigation further allows us to compare between a secular trend of temporal orientations in news discourse about income inequality and real-world data showing the trend of top 10% income share: namely, a proxy of income inequality.

Given the findings of the influences of temporal frames (forecasting the future *motivates* changes; documenting the past *inhibits* changes), this comparison also depicts a case of social construction of reality and public opinion (Burger & Luckman, 1966; Edelman, 1993; Gitlin, 1980; Lippmann, 1922; Riker, 1986; Schattschneider, 1960)—how the reality depicted in media often betrays (constructs) what is (will be) happening in reality. In integrating the social uses and influences of temporal frames, analyzing such data is particularly advantageous to understand the role of communication for social change. Taken together, the methodological approaches of the current investigation lend a more comprehensive understanding of the observed

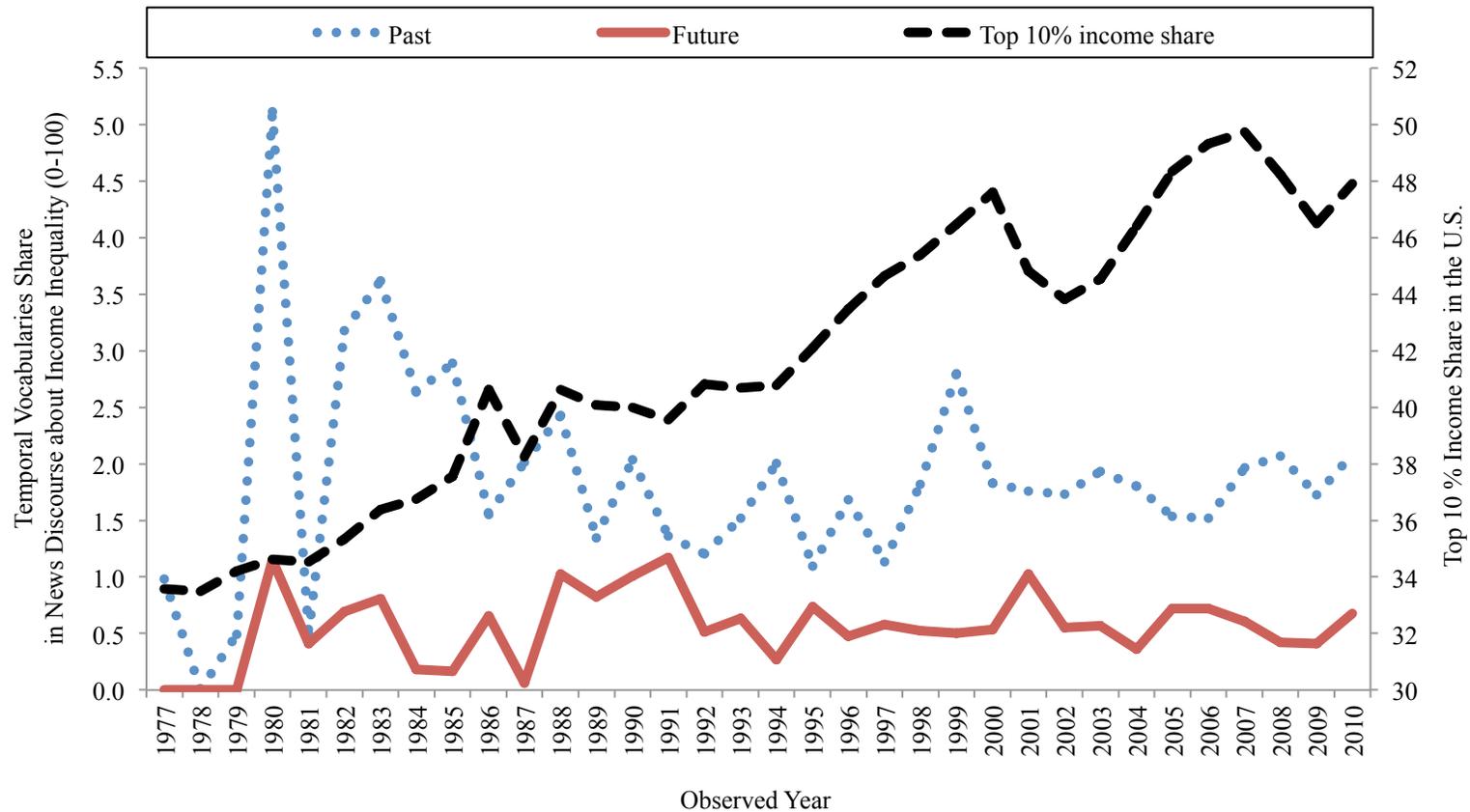


Figure 4.11. Graph depicting the year-by-year comparison among past and future vocabularies in news discourse about income inequality in major U.S. newspapers (1977-2010) and top 10% income share in the U.S.

Note: The U.S. income share data were retrieved from Quandl, a search engine for financial, economic, and social datasets (<https://www.quandl.com/data/PIKETTY>).

phenomena: temporal frames, construing income inequality, and dynamic policy preferences on redistributive policy initiatives.

Practically speaking, the current findings suggest that future versus past temporal framing can affect timely and politically contentious policy preferences that include support for redistributive policy initiatives. Attempts to recruit public opinion in favor of redistributive policy initiatives may enjoy greater success by forecasting the future of income inequality rather than documenting its past. Temporal framing appears to promote the values of fairness and welfare to the foreground of social judgments of ethics, justice, and morality—this can be meaningful in reducing ideological divide on preferences with respect to various policy issues relevant to gender, health, and racial disparity.

Combined with the message effects study, the investigation regarding the ecology of temporal orientations in communicating income inequality in major newspapers asks us to revisit the nature and functions of news in society. Given the social harm perpetuated by growing economic inequality, it would have been more beneficial for the welfare of individuals and society if news discourse should have had an opposite orientation in temporal direction when it delivers a story about inequality: namely, a prospective language (see Figure 4.11).

Study Limitations and Future Research Directions

To fully appreciate the contributions of the current work a few limitations are worth noting. First, as to the ecological test of temporal orientation in news stories about income inequality, critics might argue that there are temporal constraints or affordances involved in news media forecasting the future of income inequality

(Schudson, 1986; Tenenboim-Weinblatt & Neiger, in press). However, given that what the economy holds in the future—a forecast—is at the heart of the economic sciences and given the news media’s reliance on expert sources and attributions (Doyle, 2006; Parsons, 1989), the default temporal orientation of news reporting about temporal framing cannot simply be attributed to the news media’s naturalistic orientation toward a recent past event. Also, note that to rule out the influence of such general temporal orientation of news stories, I extracted and mainly analyzed sentences including “income inequality” or “economic inequality” within an article. Furthermore, more importantly, apparently the past-recent temporal constraints or affordances of news stories are not applied in other domains of news stories such as climate change communication. A recent study (Hart & Feldman, 2014) suggests that major network news of the U.S. has a future rather than a past orientation, which rules out the inherent temporal constraints of news articles account.

Second, as to the randomized experiment, though the informational treatment used in the current research does not explicitly make a persuasive claim to support redistributive policy, participants could have felt some normative pressure toward supporting this outcome. However, this concern seems unlikely as information from only one form of the message influenced perceptions (future framing), but there were no differences in policy support between past framing and the no-message exposure control group. In addition, the current findings are about interactive effects, not main effects, which rules out a demand account (that participants guessed the study hypotheses and responded accordingly).

The sample from Amazon Mechanical Turk was not representative of the American voters, which may limit the generalizability of these findings. Randomized experiments afford causal inference and strong internal validity but do impose controls on the user experience (e.g., forced exposure to the message). Future work might examine the influence of temporal framing of income inequality with a nationally representative sample of the U.S. electorate, both to replicate these findings and apply them to a broader cross-section of the public.

Finally, although the measured mediator of individualizing moral foundations appears to satisfy the statistical procedures establishing a mediated moderation, the magnitude of the original interactive effect on redistributive policy preferences produced by future (versus control) \times political ideology was only reduced by 29.4% in Study 4.2 (*bs* from .17 to .12) and 40% in Study 4.3 (*bs* from .10 to .06), respectively. This suggests that other psychological mechanisms that potentially account for the influence of prospective framing wait for further investigation.

Conclusion

Time is fundamentally connected to communication for social change (since change is by definition a dynamic process that unfolds over time). Communication about income inequality tends to be retrospective rather than prospective, but forecasting future income inequality could be more effective in raising political conservatives' support for redistributive policy initiatives. Though common daily discourse concerning income inequality tends to document its past, it is forecasting the future that changes historical skeptics' policy preferences—it's *time* to change.

CHAPTER 5

FUTURE SHOCK: FORECASTING THE FUTURE OF GLOBAL WARMING WITH CERTAINTY WIDENS THE PARTISAN DIVIDE ON BELIEF

“Time does not have the same appeal for every one.” – William Shakespeare

In Chapters 2 and 4 of this dissertation, I showed how prospective framing in communication leads to desirable (intended) consequences among message recipients where the default temporal frame was retrospective. In the following chapter, I qualify these findings by showing that prospective framing, when expressed in certain terms, can also be counterproductive. The study shows that typical practice of forecasting the future consequences of global warming—with certainty—further reduces skeptics’ (here Republicans’) climate beliefs, increasing political polarization.

Chapter Abstract

Previous work indicates that information about global warming tends to be prospective and to be conveyed with a strong sense of certainty. The psychology of belief toward a favorable future and motivated reasoning predicts, however, that this may result in suboptimal consequences, especially in trying to convince skeptics. A computerized linguistic analysis of archival data of major U.S. newspapers ($N = 40,927$) suggests that conservative (versus liberal) media tend to be more future-oriented and less past-oriented in terms of language use. A randomized survey experiment with a nationally representative sample of U.S. adults ($N = 1,000$) further revealed that highlighting the certainty of global warming's future consequences exacerbated the well-known partisan divide on a core climate belief—whether or not

global warming is really happening—by further reducing historically low levels of existence beliefs among skeptics.

Introduction

When the Intergovernmental Panel on Climate Change (IPCC) issued a draft of the United Nations climate report in 2013 (IPCC, 2013a), the accompanying press release highlighted the panel’s near certainty that global warming and its anthropogenic causes are real (IPCC, 2013c). Citing the panel’s report, news media often focused more on the certainty of future consequences than on consequences already observed. For example, an article in the *New York Times* reported that “A United Nations panel of scientists says...rising temperatures *will make it* harder for crops to thrive” (Gillis, 2013) (emphasis added). Indeed, recent science communication literature indicates that major broadcasting news in the U.S. focus on future, as opposed to past, impacts of global warming (Hart & Feldman, 2014).

Taken together, these observations point to the idea that climate communication often emphasizes global warming’s *future* consequences rather than those already observed in the past with assured confidence—presumably because communicators anticipate that warning the public about dire future consequences will mobilize climate-mitigating beliefs and actions. Yet, such an intuition has not been subject to empirical scrutiny until the present investigation.

The current investigation is two-fold. First, using Linguistic Inquiry and Word Count (LIWC), I analyzed archival data from major U.S. newspapers across the lines of political difference to assess how news media story headlines dealt with global warming in terms of their temporal orientation and certainty. Next, capitalizing on an

oft-cited polling question soliciting Americans' core existence belief in global warming where its wording includes both temporal cues and certainty language, I ran a randomized survey experiment with a nationally representative sample of U.S. adults, assessing the interplay of temporal and certainty frames on climate beliefs.

Partisan Divide and Situated Climate Belief

Despite consistent warnings from scientists, a significant number of Americans still remain in doubt that global warming is indeed happening (Zaval, Keenan, Johnson, & Weber, 2014), a belief that is highly politicized (Kahan, Jenkins-Smith, & Braman, 2011; Krosnick, Holbrook, & Visser, 2000; McCright & Dunlap, 2011). Public opinion polling results between 2006 and 2013 suggest a persistent partisan divide, such that Democrats' beliefs that there is solid evidence the earth is warming ranged from 75 to 91 percent, whereas Republicans' beliefs ranged from 35 to 59 percent (Pew Research Center for the People and the Press (Pew), 2013).

Amid the continuous efforts of climate scientists and policymakers to inform the skeptical public about the existence of global warming, extant literature suggests that the core climate belief often tends to be sensitive to and conditioned by contextual information. For example, research suggests that informational cues like labels (Schuldt, Roh, & Schwarz, 2015), temperature (Schuldt & Roh, 2014), and severity of consequences (Feinberg & Willer, 2011) have meaningful implications for the partisan divide. For example, Feinberg and Willer (2011) found that, though seemingly well-intentioned, the receipt of information about the potentially dire consequences of global warming raises skepticism toward the existence of global warming among those who hold stronger just-world beliefs.

Likewise, in the current study, I posit that information highlighting experts' high degree of certainty regarding the future consequences of global warming has potential implications for the partisan divide. At first, such information may intuitively feel persuasive to strategic climate communicators seeking to mitigate the partisan gap, given that people may worry about a doomed future more than an unalterable past that has left them relatively unscathed. However, a closer look at the accumulated evidence from psychological science offers mixed support for this intuition.

Psychology toward the Future and Motivated Climate Beliefs

On the one hand, communicating future consequences in certain terms can serve as a depolarizing mechanism because unlikely events are perceived as more probable when they are temporally positioned in the future as compared to the past (Van Boven et al., 2009). In the case of global warming beliefs, this perspective suggests that individuals who typically report perceiving global warming's consequences as unlikely (e.g., Republicans) may express heightened existence beliefs when information highlights future rather than past consequences.

On the other hand, since people experience more liberating mental simulation when thinking about the future than the past (Caruso et al., 2008; Newby-Clark & Ross, 2003; Strickland et al., 1966; Van Boven et al., 2009), more skeptical individuals may express even greater doubt (lower existence beliefs) when the given information frames the phenomenon prospectively, given the lower constraints on mental simulation and increased possibility for self-serving judgments that thinking about the future affords (Weinstein, 1980).

Indeed, recent work shows that as people tend to be overconfident regarding their own future performance (Helzer & Dunning, 2012) and in support of their sports teams (Simmons & Massey, 2012), people expect that the future will unfold in ways to favor their social judgments (Rogers & Norton, 2014). For example, Rogers and Norton (2014, Study 1) found that participants who believed that global temperatures were increasing at the point when the study was performed expected that Americans would be more likely to believe the same thing in 20 years; in a similar vein, participants who believed that temperatures were decreasing projected that more Americans would come to agree with their views in 20 years, such that temperatures would be decreasing.

Taken together, the well-documented tendency for Republicans to report lower belief in global warming (Dunlap & McCright, 2008) may be more prevalent when global warming's consequences are framed prospectively rather than retrospectively, since Republicans may find it easier to employ self-serving skepticism under future framing (Newby-Clark & Ross, 2003). Notably, such self-serving skepticism may be particularly pronounced when information fails to acknowledge the inherent uncertainty of scientific projections (Oreskes & Conway, 2010), perhaps giving rise to psychological reactance among climate skeptics whose freedom to imagine alternative outcomes occurring the future—an inherently uncertain time—is challenged (J. W. Brehm, 1966; S. S. Brehm & Brehm, 1981; Lewandowsky et al., 2012).

Overview of the Current Study

My investigation begins with analyses of linguistic certainty and temporal markers manifested in news stories about global warming. In Study 5.1,

complementing past research (Hart & Feldman, 2014) suggesting the future orientation of news reporting on global warming, the headlines of news articles from seven major U.S. newspapers across the lines of political difference over the past 38 years were collected via LexisNexis Academic and analyzed using LIWC, a computerized textual analysis program. Next, I turn to test the potential influence of the combination of future and certainty frames in climate. Specifically, in Study 5.2, I report the results of a nationally representative survey experiment ($N=1,000$ U.S. adults) showing how highlighting the certainty of global warming's future consequences can exacerbate the well-known partisan divide concerning a core climate belief: whether or not global warming is really happening.

Study 5.1: Linguistic Manifestations of Time and Certainty in News Media

Methods

I searched the LexisNexis Academic database for a 38-year period from January 1977 through December 2014. To search for stories about global warming, I used the terms “global warming OR climate change OR global climate change” with search areas including both headline and body.

Given the politicized nature of the topic of the current research, I tried to draw from ideologically diverse newspapers so that I could compare the temporal and certainty language between liberal and conservative newspapers. I selected the target news outlets based on two criteria. First, I tried to collect news outlets with national reach and coverage. Second, given the topical interest of the current investigation, I tried to gather news outlets with varying politically ideological leanings of their readership. To achieve these goals, I used data from Alliance for Audited Media

(2013) about newspapers' circulation from October 2012 through March 2013 and the work by Ho and Quinn (2008) that examined explicit political positions of representative news media in the U.S. As a result, three major liberal newspapers—The New York Times, The Washington Post, and USA Today—and three major conservative newspapers—Wall Street Journal, The New York Post, and Investor's Business Daily—were selected. The search yielded a total of 40,927 articles.

To capture the tone of news stories in terms of their temporal orientations and levels of certainty when they deal with global warming, I analyzed the headlines of the searched articles. Previous research shows that headlines are the strongest text and influence readers the most—it is headlines that are catchy and contagious for readers. In addition, given that the main text of news stories is often constrained to using recent, past temporal markers more than future ones, analyzing headlines was expected to sensitively capture the notion of temporal orientation, compared with analyzing the entire text of the news stories.

I used LIWC 2007 (Pennebaker et al., 2007) to analyze the textual manifestations of global warming in terms of temporal orientation and certainty. LIWC (Linguistic Inquiry and Word Count) is a computerized textual analysis program that processes the linguistic mechanism of mental processes underlying a given text. LIWC compares each word within a given text with its prepared dictionary of 4,500 words and assigns it to one or more of its 76 word categories: words that have grammatical functions like articles and prepositions, that manifest certain psychological processes such as emotions, and, more importantly, that indicate tense

(past and future; See Appendix for entire vocabulary of Past and Future categories used in LIWC) and degree of certainty.

Results

I analyzed the temporal orientations of news stories about global warming with a paired-samples t test. The results suggest that global warming headlines are more future-oriented ($M = 0.56$, $SD = 2.81$) than past-oriented ($M = 0.52$, $SD = 3.12$) linguistic manifestations, $t(40,926) = 2.57$, $p = .01$. Given the sample size and the magnitude of the difference (Cohen, 1988), however, it appears more valid to describe that there were similar volumes of past and future tenses used in global warming headlines.

I further examined if temporal orientation about global warming differs across ideological lines of differences in news media. To address this question, I performed a fixed effects multilevel regression model with a random intercept, predicting temporal orientation ($past=0$; $future=1$) and political ideology of news media ($liberal=0$; $conservative=1$) as well as their interaction term. Results from this multilevel regression model revealed a significant two-way interaction between temporal orientation and political ideology (with liberal newspapers as the reference group), $b = .34$, $z = 5.46$, $p < .001$.

Probing patterns of this interaction, I compared the past and future temporal orientation scores between liberal and conservative news media using the linear combination of coefficient (“lincom”) algorithm. Results indicated that while liberal news media show no differences in linguistic manifestations of past and future, $b = .01$, $z = .40$, $p = .69$, significant differences did emerge in conservative newspapers, $b =$

-.32, $z = -5.72$, $p < .001$. As shown in Figure 5.1, compared with liberal newspapers ($M_{past} = .56$; $M_{future} = .55$), conservative newspapers used more language related to the future temporal orientation than the past one ($M_{past} = .35$; $M_{future} = .68$). At the same time, conservative papers employed fewer past tenses compared with liberal papers.

Next, I turn to analyses on levels of linguistic certainty found in headlines of major U.S. newspapers across political orientation of the media outlets. A mean-comparison on levels of linguistic certainty between political orientations of media

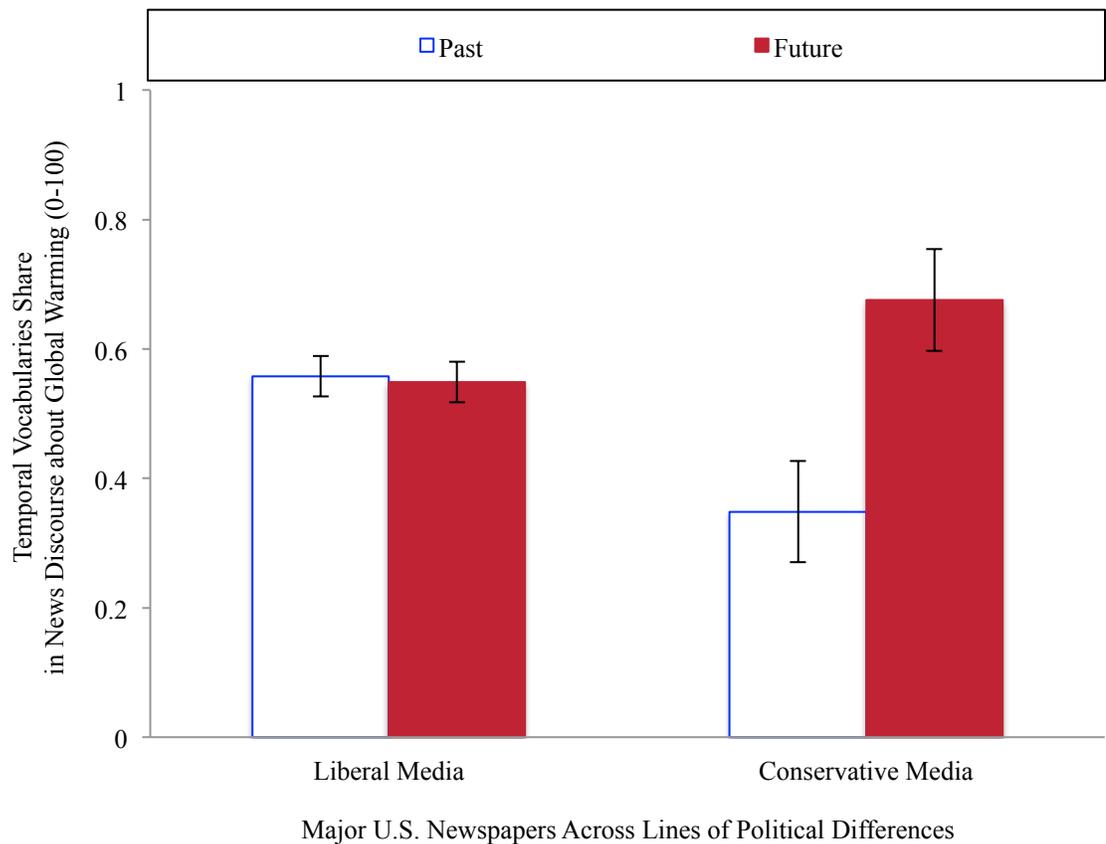


Figure 5.1. Graph depicting the differences among newspapers on the percentages of past versus future temporal vocabularies.

Note: Error bar represents 95% confidence intervals.

revealed that liberal media ($M = 1.35$, $SD = 7.94$) tended to use more language manifesting certainty than conservative media ($M = 1.04$, $SD = 5.34$), $t(39,397)$, $p = .004$, $d = .04$. Again, however, in the case of large sample sizes, the effect size is often a better indicator of the model than the significance value (which is often inflated). According to Cohen (1988), a d of .04 would be considered to be too small to claim a meaningful difference. Thus, it appears that headlines of liberal and conservative newspapers dealing with global warming reported alike in terms of linguistic certainty.

Discussion

Complementing previous content analysis (Hart & Feldman, 2014) suggesting future orientation of news reporting on global warming in the U.S., Study 5.1 showed ideological differences in the tendency to use linguistic certainty and future tenses when communicating about global warming. Conservative newspapers referred to global warming as an issue in terms of the future more often than the past. This did not differ for liberal newspapers. On the other hand, language used in headlines about global warming did not differ between media across the lines of political differences in terms of certainty.

The findings are consistent with the notion that the issue of climate change has been highly politicized in the U.S. The climate skepticism of conservatives appeared to be reflected in the relatively lesser use of past orientation (neglecting its past existence) and heavy use of future orientation in conservative media. In light of these findings, it is interesting to ask how such temporal and certainty frames of climate communication influence people's existence belief of the phenomenon. With this background knowledge of the temporal and certainty dimensions of climate change

news across the lines of political differences, Study 5.2 tests the potential influence of this contextual information.

Study 5.2: The Interplay of Temporal and Certainty Frames on Climate Belief

Methods

Participants. To examine the influence of highlighting the future of global warming with assured confidence on climate belief, data were collected from a phone-based survey experiment between August 7 and November 2, 2013. The phone-based survey experiment recruited a national panel of U.S. adults ($N=1,000$) maintained by Marketing Systems Group. The phone sample was provided by Marketing Systems Group and a Random Digit Dial (RDD) list drawn from the continental United States, including cell phones. During the sample selection procedure, every household with a phone had an equal chance to be contacted and every adult in the household had an equal chance of being included in the study once contacted. All interviews were conducted in English using a Computer Assisted Telephone Interviewing (CATI) software system. The overall survey response rate was 25.3 percent (AAPOR Response Rate 3). Table 5.1 describes the demographic characteristics of the analytic sample, including the number of participants assigned to each of the experimental conditions.

Wording Manipulations of Temporal and Certainty Frames. National surveys about global warming commonly employ questions that frame the phenomenon in both retrospective and uncertain terms. For example, an oft-cited question used in previous national surveys asks:

Table 5.1. Descriptive statistics of Study 5.2 participants.

	Total Sample $N = 1,000$; Proportion (n); M (SD)
Randomized Experimental Condition	
Past with Uncertainty Frames	0.27 (271)
Future with Uncertainty Frames	0.25 (251)
Past with Certainty Frames	0.21 (213)
Future with Uncertainty Frames	0.27 (265)
Political Party Leanings	
Republican	0.34 (329)
Democrat	0.42 (415)
Independents	0.24 (234)
Female	0.50 (502)
Age (mean)	47.18 (17.47)
Highest Level of Education Completed	
High school diploma or less	0.25 (248)
Completed some college	0.32 (318)
College graduate	0.43 (434)
Race/Ethnicity	
White, Non-Hispanic	0.16 (156)
Other	0.84 (844)
Birthplace	
Born in US	0.08 (84)
Not Born in US	0.92 (916)
Income (9-pt variable, unit: \$10,000, rescaled 0-1)	0.60 (.27)
Northeastern region	0.21 (209)
Midwestern region	0.23 (227)
Western region	0.20 (208)
Southern region	0.36 (356)

Note: All sample characteristics are proportions with sample sizes in parentheses, except for age and income, which are means (standard deviations in parentheses).

“You may have heard about the idea that the world’s temperature may have been going up over the past 100 years, a phenomenon sometimes called ‘global warming.’ What is your personal opinion regarding whether or not this has been happening?”

This survey question provides an ecologically plausible platform for comparing combinations of future and certainty frames to other types of temporal and certainty framing because both temporal (i.e., “over the past 100 years”) and certainty (i.e., “may have been going up”) frames are embedded within the question stem itself.

In addition to this default question wording that frames global warming’s *past* with *uncertainty*, the present survey experiment included three additional conditions—namely, *future-uncertainty* (i.e., “*may go up* over the *next* 100 years”), *past-certainty* (i.e., “*has gone up* over the *past* 100 years”), and most importantly, *future-certainty* (i.e., “*will go up* over the *next* 100 years”) (emphasis added). Respondents were randomly assigned to report their existence belief on one of these four question wording conditions varying temporal and certainty frames.

Measures

The response options for existence belief ranged from 1 (*Definitely has not been happening*) to 4 (*Not sure either way*) to 7 (*Definitely has been happening*), a scale which was adapted from the previously-noted national survey question (ABC News, Stanford University, & Time, 2006). I created a dummy variable for this outcome by recoding responses endorsed 5 (i.e., unsure but leaning toward it has been happening) or above in the 7-point scale item as believing in the existence of global

warming, while recoding responses 4 (i.e. unsure) or below (i.e., unsure but leaning toward it has *not* been happening; emphasis added) on the scale as not believing.

I measured political party identification with a 7-point scale ranging from 1 (=Strong Democrat) to 4=(Independent (close to neither party) to 7=(Strong Republican), and collapsed into three party affiliations: Democrats (1-3), Independents (4), and Republicans (5-7); leaners were included as partisans. In addition to these key variables, I collected data on a variety of other items that have been suggested to be linked to climate beliefs and party identification in previous literature—gender, age, education, ethnicity, income, and regional location (Northwest, Midwest, South, and West) (e.g., Hamilton, 2010; Krosnick, Holbrook, Lowe, & Visser, 2006; McCright, 2010).

Results

To test the prediction, I ran multiple logistic regression models, where existence belief (binary outcome: *belief* vs. *non-belief* in global warming) was regressed onto the question wording conditions (dummy-coded with future-certainty as the reference category) and the party identification (dummy-coded with Democrats as the reference category). Importantly, to test for the predicted interactive influence of the combinations of temporal and certainty frames and political identity on the existence belief of global warming, I included all six second-order interaction terms in the logistic regression model.

As shown in Model 1 of Table 5.2, logistic regression models predicting existence beliefs revealed a number of significant interaction terms ($ORs > 3.02$, $|z|s > 2.09$, $ps < .03$) between question wording and Republican party-identification

Table 5.2.

Logistic regression models testing interactions between combinations of temporal and certainty frames and party identification.

	Model 1: With Controls		Model 2: Without Controls	
	OR (95% CI)	<i>z</i>	OR (95% CI)	<i>z</i>
Key Variables				
Past with Uncertainty (ref=Future with Certainty) Frames	.58 (.28-1.22)	-1.43	.66 (.32-1.33)	-1.16
Future with Uncertainty (ref=Future with Certainty) Frames	.52 (.25-1.05)	-1.82	.49 (.25-.97)	-2.04
Past with Certainty (ref=Future with Certainty) Frames	.78 (.36-1.70)	-.62	.82 (.38-1.74)	-.52
Republicans (ref=Democrats)	.12 (.06-.26)	-5.65***	.13 (.07-.26)	-5.81***
Independents (ref=Democrats)	.49 (.22-1.07)	-1.79	.45 (.21-.96)	-2.07
Past with Uncertainty Frames × Republicans	3.25 (1.25-8.48)	2.41*	2.57 (1.02-6.47)	2.00*
Future with Uncertainty Frames × Republicans	3.82 (1.49-9.81)	2.79**	3.40 (1.37-8.46)	2.63**
Past with Certainty Frames × Republicans	3.02 (1.07-8.50)	2.09*	2.90 (1.06-7.94)	2.07*
Past with Uncertainty Frames × Independents	1.84 (.63-5.37)	1.11	1.78 (.63-5.08)	1.08
Future with Uncertainty Frames × Independents	1.67 (.56-4.98)	0.92	1.92 (.67-5.42)	1.21
Past with Certainty Frames × Independents	1.87 (.56-6.27)	1.02	1.98 (.61-6.45)	1.13
Controls				
Female (ref=male)	1.10 (.82-1.48)	0.62		
Age	.99 (.98-1.00)	-2.09*		
High school diploma or less (ref=college graduate)	.60 (.52-1.08)	-2.52*		
Completed some college (ref=college graduate)	.75 (.60-1.51)	-1.53		
Nonwhite (ref=White)	.95 (.60-1.51)	-.22		
Born in US (ref=Not Born in US)	.60 (.33-1.10)	-1.65		
Income (9-pt variable, unit: \$10,000, rescaled 0-1)	1.22 (.67-2.22)	0.64		
Northeastern region (ref=South)	1.40 (.92-2.12)	1.58		
Midwestern region (ref=South)	1.09 (.74-1.60)	0.45		
Western region (ref=South)	1.46 (.96-2.22)	1.75		
Constant	13.37 (4.62-38.67)	4.78***	5.81 (3.42-9.88)	6.50***
% explained R^2				
Number of Observations		968		977

Note: * denotes $p < .05$, ** $p < .01$, *** $p < .001$

(Democratic party-identification was the reference group). In contrast, this pattern did not emerge for Independents, $ORs < 1.87$, $|z|s < 1.11$, $ps > .26$. As shown in Model 2 of Table 5.2, I also tested the proposed logistic regression models without the list of controls. I did not find a substantive difference between the two models. As the point estimate of existence belief among the national sample is a focal interest in the current study, I focus results on the model with controls.

Note that I expected that any effect of condition on the partisan belief gap would be driven by the altered beliefs of Republicans in particular. To test this, we examined the pattern of interaction by comparing Republicans' likelihood of endorsing beliefs between the future-certainty and the other three question wording conditions with planned contrasts using the "lincom" algorithm. Results indicated that Republicans were significantly less likely to endorse the existence of global warming (43.0%) under in the future-certainty condition than in the past-uncertainty condition (58.9%), $b = -.16$, 95 % CI = $-.31$ to $-.01$, $z = -2.08$, $p = .03$, the future-uncertainty condition (60.0%), $b = -.17$, 95% CI = $-.32$ to $-.02$, $z = -2.18$, $p = .02$, or the past-certainty condition (64.0%), $b = -.21$, 95% CI = $-.37$ to $-.05$, $z = -2.55$, $p = .01$. In contrast, this pattern did not emerge among Democrats, who were equally likely to endorse belief in the existence of global warming in the future-certainty condition (85.9%) as they were in all other wording conditions (i.e., past-uncertainty: 78.0%, future-uncertainty: 75.9%, and past-certainty: 82.6%), $bs < .10$, $|z|s < 1.85$, *ns*.

Figure 5.2 displays predicted probabilities of believing in the existence of global warming among Republicans and Democrats across experimental conditions.

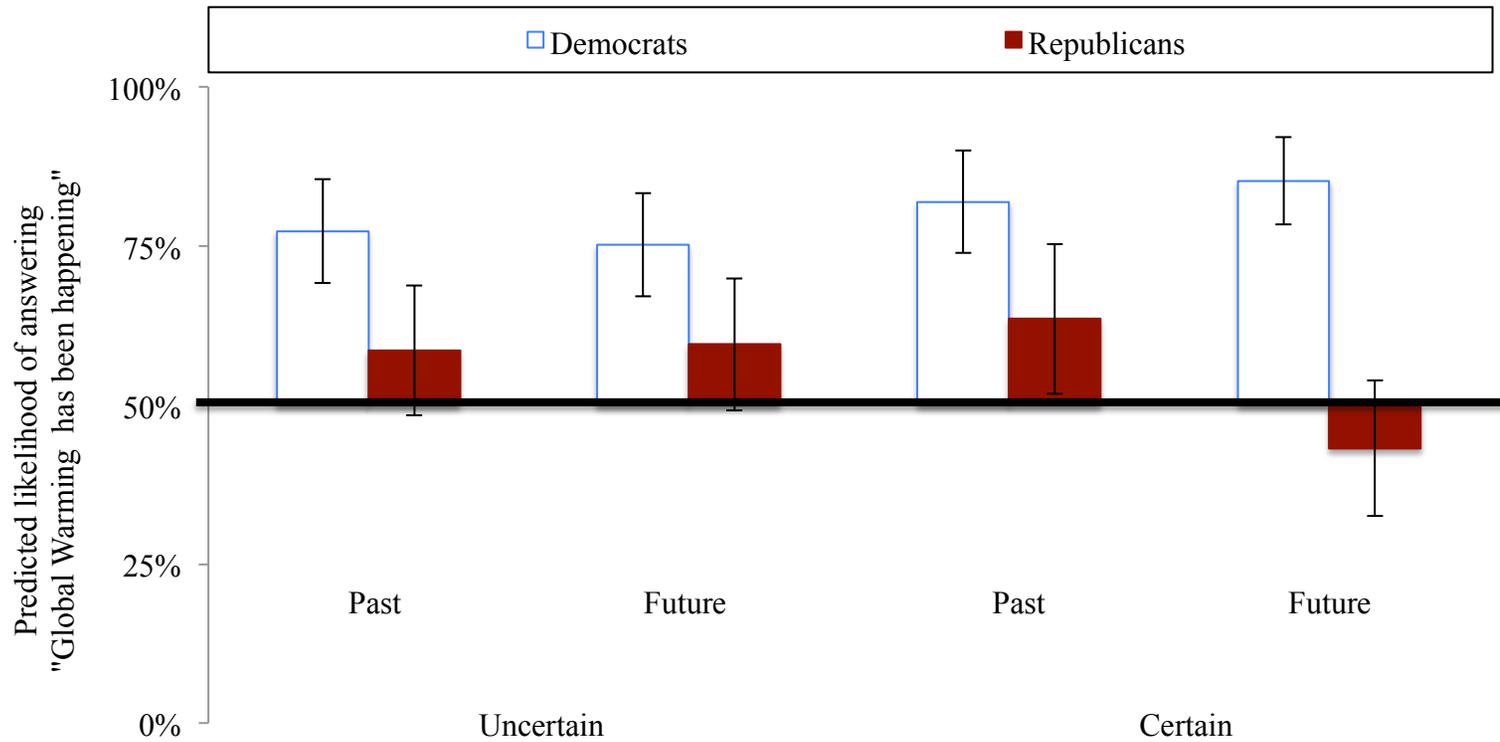


Figure 5.2. Graph depicting the interaction between framing condition and political party affiliation on existence beliefs in global warming.

Note: Predicted probabilities of support for existence belief of global warming was recoded responses endorsed 5 or above in the 7-point scale item as "believing"; while recording responses 1 through 4 of the scale as "not believing". Error bars represent 95% confidence intervals around the predicted means.

I further probed this interaction by comparing the *differences* of the differences between Democrats' and Republicans' likelihood of endorsing the existence of global warming between the reference condition (namely, future-certainty frame) and each of other three conditions. This analysis revealed that, although all four question wording conditions revealed the familiar belief gap between Democrats and Republicans, this difference was significantly greater when global warming's future consequences were described with certainty (42.9 percentage points) as compared to uncertainty (16.0 percentage-point), $b = .27$, 95% CI = .08 to .45, $z = 2.86$, $p = .004$. The partisan gap in the future-certainty condition was larger than those observed in either of the past conditions as well: past-uncertainty (19.1 percentage-point), $b = .24$, 95% CI = .05 to .42, $z = 2.54$, $p = .01$, and past-certainty (18.6 percentage-point), $b = .24$, 95% CI = .05 to .43, $z = 2.48$, $p = .01$.

Discussion

Study 5.2 assessed whether highlighting the future consequences of global warming with certainty would widen or reduce the familiar gap among U.S. partisans regarding the existence of global warming. Results suggest that the co-occurrence of the future (vs. past) and certain (vs. uncertain) frames greatly increases the partisan divide by heightening doubt among the group that is traditionally more skeptical about the phenomenon's existence, namely, Republicans. Presumably, messages that counter one's pre-existing beliefs by emphasizing what *will* happen in the *future* infringe upon one's psychological freedom to challenge that which has not yet occurred and is thus inherently uncertain, giving rise to a form of psychological reactance that manifests as lower self-reported existence beliefs.

General Discussion

Extensive literature documents the partisan divide in existence beliefs regarding global warming, with Republicans reporting lower levels of belief than Democrats (McCright & Dunlap, 2011; Schuldt et al., 2015). I extend this research by examining conditions under which temporal and certainty frames can further exacerbate the partisan divide concerning climate beliefs, suggesting a peril of partisan backlash when informing the public about the near certainty of global warming's future consequences. In addition, I observed how the combination of future and certainty information is manifested in major U.S. newspapers across lines of political difference. Results revealed that the future orientation seems more salient in conservative than in liberal newspapers.

In addition to their theoretical implications for the psychology of time, motivated reasoning, and framing literature, our findings are also practical and actionable. While climate scientists and news media routinely attempt to dispel climate skepticism by communicating that global warming and its future consequences are almost certainly real, our results suggest that this well-intentioned practice may produce an opposite-than-intended effect among the very group it seeks to persuade.

A couple of limitations and future directions are worth noting. First, despite an advantage that a large-scale textual analysis of newspapers affords, LIWC analysis about temporal orientations and certainty has limitations in making inferences about where the observed patterns come from. For example, using more future tenses than past tenses in conservative media could be related to (or driven by) specific content characteristics that may be more easily found in conservative than liberal media,

regardless of story content. Moreover, if conjunctive analysis of past-future orientation and certainty were available in the future, beyond the current discrete analysis, it would provide more valuable information about the language of mediascape about climate change communication. Limitations aside, complementing previous work about future orientation, the current findings further suggest asymmetries in the past-future orientation of partisan media.

Second, the framing of the question (the experimental manipulation) was either about the “past or future” existence of global warming, while the main question always refers to the existence of global warming in the past or present (i.e., “What is your personal opinion regarding whether or not this has been happening?”). This may raise concerns regarding possible demand effects (that participants guessed the study hypotheses and responded accordingly). I see a demand account as unlikely, however, given that I observed a moderation effect (not a main effect). Third, given the potential national-level policy implications of this work, future research should also test whether the influence of temporal and certainty frames extend beyond personal existence belief to affect policy preferences. Lastly, the present research tested the effects of only a single temporal framing strategy by embedding it with the survey question itself. A potential direction for future research lies in examining the influence of temporal framing within a longer message (e.g., news article).

Conclusion

Behavioral and social science research have recently turned their attention to subtle contextual information and how the public responds to it in constructing its judgments about global warming (e.g., Joireman, Truelove, & Duell, 2010; Li,

Johnson, & Zaval, 2011; Schuldt & Roh, 2014). Despite accumulating evidence that climate judgments are often influenced by such information, the role of temporal and certainty frames in self-reported existence belief has received little attention. A better understanding of the psychology of human judgments can help explain and predict the public's reaction to global warming (M. Oppenheimer & Todorov, 2006; Weber & Stern, 2011) and inform effective strategies used to communicate the phenomenon.

CHAPTER 6

CONCLUSION: IT'S ABOUT TIME

“Time is the wisest of all things that are; for it brings everything to light.” – Thales

This dissertation argues that temporal frames could lead to multifaceted processes and influences on human judgments and decisions that hold broader societal impact. Temporal frames can be an agent of social change (Chapters 2 and 4) as well as a *biasing* (Chapter 3 and 5) and *debiasing* mechanism (Chapter 4). Taken together, these studies point to an interesting lesson—communication practices (strategies for framing time) that intuitively would seem to be an effective means for the attainment of an end are in reality communication practices that can function ineffectively, the evidence for which is drawn from 9 studies across 4 empirical papers. Each chapter began with an argument with respect to the default use of temporal frames in communication (and Chapters 3, 4, and 5 looked at the default uses in public discourse) and further suggested results counter to such common practices. The findings countering real-world, perhaps intuition-based uses of temporal frames call for additional investigations about the roles of temporal frames in belief and preference formation.

Temporal Framing as Psychological Processes *and* Social Processes

This dissertation is mainly devoted to investigating how temporal frames in communication are processed in the mind—the psychological processes of temporal frames. As I noted across each empirical chapter, this knowledge seems to provide an actionable guideline for communication practitioners. It is worth noting, however, that the dissertation also hints that there may be overarching social processes behind how

temporal frames in communication are used in daily—and/or media—discourse to begin with.

For example, although message designers seeking social change may intend to employ prospective frames in communicating unethical marketing practices or corporate behavior (using knowledge gained from Chapter 2) or predicting growing income inequality down the road (based on what we learned from Chapter 4), such temporal framing may require some pre-conditions in society. In the case of letting people know about what is going to occur regarding corporate behaviors, the regulatory systems in society might ask for greater transparency from corporations about their practices. For instance, consumer interest groups emphasizing consumer welfare might want to advocate for making prior notification about marketing practices mandatory for corporations in order to draw more public concern about relevant social change enhancing consumer welfare.

While the previous case needs motivation from social actors, sometimes it might require certain capabilities from them as well. In the case of forecasting economic inequality, for instance, advancements in forecasting science and techniques are likely to be further developed and coupled with the motivation to inform the public about what is going to occur in our economic systems. Just as the global economic crisis came without knowing beforehand, this dissertation suggests failed prediction may result in costly social change.

At the same time, the findings of this dissertation can be interpreted from an alternative perspective. Framing research often focuses on the persuasive power of information over belief and preference formation and how framing enjoys the ability

to construct social reality. Thus, it is likely that researchers only have been valuing “changes” as sites where we can observe an effect. As a result, the manipulative power of framing over belief and preference formation by bringing about *non-change* or maintaining the status quo might have been largely overlooked (Gans, 1979; Gitlin, 1980; Hall, 1973; Horkheimer & Adorno, 1973; Jensen, 1987; Tuchman, 1978).

Focusing on how differing temporal frames can create desirable changes matters. But what might also matter is looking at and/or realizing how conventional communication (e.g., forecasting the future of income inequality for greater support for redistributive policy initiatives)—consciously or not—does *not* present a certain temporal frame to the public (e.g., to document or *not* to forecast the future of income inequality to prevent building greater support for redistributive policy reforms; (Roh & Hancock, 2014). This type of research question is challenging for behavioral researchers in the hypothetico-deductive tradition as it requests testing the null-hypothesis. Yet, this might be a blind spot of framing research in general. Reframing the questions of temporal frames would drive further theoretical development in understanding temporal framing as social processes—beyond psychological processes.

Relevance to Communication Phenomena

The downstream implications for social judgments involving ethical, moral, and justice considerations may help to better illuminate communication phenomena. The current findings may be applied to broader areas in communication and its sub-disciplines. In particular, I believe that the current findings generate interesting potential research topics in the fields of media psychology, interpersonal

communication, public relations/crisis management, political communication, and health communication.

Media Psychology

Recent work in media psychology (Krakowiak & Oliver, 2012; Shafer & Raney, 2012; Tamborini et al., 2011) has been trying to understand how people understand morally complex (questionable) characters such as antiheroes, and how the processing of characters' morality connects to audiences' enjoyment and/or appreciation of media narratives. As the findings of the present study suggest that audiences may form different moral judgments about characters' past wrongdoings and future infractions, it would be worthwhile to examine if temporal factors (both direction and duration) related to moral transgressions in movies or soap operas influence other processes associated with media narratives including perspective taking, empathy, and identification (e.g., Tal-Or & Cohen, 2010).

Interpersonal Communication

The current findings may also have implications for interpersonal communication. The temporal framing effects on moral evaluations suggest that it is more difficult to get permission for an unethical action than it is to get forgiveness for the same transgression (Caruso, 2010), but notably this pattern is altered when the transgression is temporally distant. Given that making an apology, asking to be excused, and forgiving the faults of others are key elements in building and maintaining interpersonal relationships (Knapp, Stafford, & Daly, 1986) as well as in bargaining and negotiations (Goei, Roberto, Meyer, & Carlyle, 2007; Roloff &

Janiszewski, 1989). Findings from these studies suggest promising avenues for future studies.

Public Relations and Crisis Management

There may also be implications for strategic public communication (public relations in general, crisis management in particular). The temporal framing effects reiterate the “tell it all, tell it fast, tell it truthfully” principle, as the findings of the current research show that once you have done something wrong you should tell it fast, but if you will do something you should tell it after the thing has done. The “timing” of release of information about ethical mistakes (Lee, 2004) and apologetic messages (Hargie, Stapleton, & Tourish, 2010) might produce a substantial difference in public acceptance. In a similar vein, negative political attack ads (see Pinkleton, 1997; Shah, Watts, Domke, & Fan, 2002 for effects of negative ads or message framing on the candidate appraisal) and framing effects of scandals involving public figures (Kepplinger, Geiss, & Siebert, 2012) may also be studied through the lens of temporal frames. The current set of studies suggest that the timing of a candidate’s mistakes and the timing of a response may play a role in how voters think about a politician’s moral infraction.

Health Campaign and Sin Taxes

As suggested in Chapter 2, health campaigns such as the TRUTH campaign are designed to depict the tobacco industry as unethical (Farrelly, Davis, Haviland, Messeri, & Heaton, 2005). In a similar vein, public health experts and research centers often try to inform the public about unethically targeted marketing (Hawkes, 2007). The findings of one of the current studies found that temporal frames might

have distinct impacts on mobilizing public actions. Importantly, given that a variety of health problems in the U.S. are caused by financial inequality (Kawachi, Daniels, & Robinson, 2005; Kawachi & Kennedy, 1999), the findings of the current study have implications as to how to communicate in order to mobilize public support for social policy reforms aiming at reducing health disparity.

Relevance to Psychological Principles

Prospect Theory

Past versus future framing shares important characteristics with prospect theory (Kahneman & Tversky, 1979), though they are not completely corresponding. They are similar in that I posit that there is a reference point (present time), and people are sensitive to the way information is presented relative to that reference point. Also the current dissertation appears to imply that future framing tends to loom larger for individuals regardless of context (regarding moral, justice, ethical considerations or beliefs in existence of a phenomenon) than does past framing, thus people are more sensitive to such frames and their corresponding construals. Yet, in prospect theory, equivalent frames describe an outcome in terms of a gain or loss, while in the case of past and future framing, although the current dissertation mainly deals with circumstances closer to a loss, each frame can afford to describe both gain and loss (both advantageous and disadvantageous aspect of events). It is plausible that people were sensitive to the future framing presented in the current dissertation in that the core piece of information surrounded by temporal frames was perceived as disadvantageous (a loss). Thus, the uncertain nature of future frame might have

motivated people to be more responsive to information treatments. Future work should further investigate ties between past versus future framing and prospect theory.

Construal-Level Theory

The findings of Studies 4.2 and 4.3 of Chapter 4 also share an important feature with construal-level theory (Trope & Liberman, 2003, 2010). I integrated literature using psychological abstraction as a way to reduce tolerance and raise concern for core moral values. Indeed, the future and past dichotomy seems to share a tenet of construal-level theory such that the future can be construed as inherently more hypothetical than the past. However, note that three other facets of construal-level theory—temporal, spatial, and social distance manipulation—can additionally be manipulated with future and past framing. Also, in the current study, to rule out a sense of hypotheticality from the informational treatment between the past and future condition, I provided specific information about the amount of the income gap attributed to a specific federal organization. Hence it appears, in the current stage of investigation, that the findings suggest that past and future framing and construal-level theory are neither entirely orthogonal nor overlapping—they share some similarities in their mechanisms, but it is not entirely certain that construal-level explains the explained variance that temporal frames produced or vice versa. I leave it to future research to scrutinize whether, beyond construal-level, there is a residual effect of temporal frames (tense) on policy preferences and individualizing moral foundations.

Representativeness Heuristics

A theoretical basis concerning how and why people think about the same event (object) in the past and future differently may have implications for understanding

representativeness heuristics (Tversky & Kahneman, 1974). Since the future is more open than the past and the past is more fixed than the future, people may judge unlikely events as more likely in the future than in the past and likely events as more likely in the past than in the future.

A relatively simple experiment could be designed to test this notion. For example, imagine a simple thought experiment of a coin toss. When imagining flipping a coin twenty times, people tend to think it is more likely that heads and tails will alternate rather than getting a series of heads or tails in a row. The reason why people think alternate heads and tails are more likely than the alternative is based on our knowledge about base-rates (representativeness heuristics). Imagine that participants will be asked to imagine that his or her friend flipped a coin twenty times *last week* or that a friend will flip a coin twenty times *next week*. After having participants ponder one of these two scenarios, a researcher could show them two outcomes and ask which one *was* or *will be* the more likely outcome: (a) alternate heads and tails (HTHTHTHTTHTHTHTHTHTH) or (b) a series of heads and tails in a row (TTTTTHHHHHHTHHHTHHHHH). I suspect that, although in both cases people will tend to be more likely to choose *option (a)* overall, people who are asked about the future will tend to choose *option (b)* significantly more often because the less likely outcome is judged more likely in the future than the past.

Future Directions for Studying Time

Framing Time of Positive Social Events

The studies presented in the current dissertation all have focused on temporal framing of social events that have negative implications to individuals and society

(youth-targeted soda marketing, growing income inequality, and global warming). In future work, I suggest studying temporal framing of social events that have positive implications. For instance, the past-future asymmetric judgments reported here about marketing practices of the soda industry can also be applied to communication about positive corporate behaviors as well. Researchers could see whether consumers' learning about a corporate behavior with positive implications influences their evaluations in a positive way. I predict that when corporations communicate about their actions with good will, this will draw more positive responses from consumers, thereby more effectively building their corporate reputations. If this is the case, on the one hand, corporate communication experts may want to let consumers know before the corporation initiates a positive act. On the other hand, unintentional, undesirable downstream implications can also be drawn—namely, less support for soda taxes after exposure to prospective framing of the soda industry's corporate social responsibility acts. Future work should test such symmetric influences of past-future framing (that may lead to asymmetric consequences).

From Conceptual Influences of Temporal Frames to Perceptual Influences

These dissertation studies seem to suggest that future frames loom larger than past frames to individuals. Future research may go beyond the conceptual-level judgments of temporal influences into sensory perception about past-future events. One prediction is that future imagination about a gain or loss of resources as opposed to past reconstruction about a gain or loss of resources may actually be *seen* differentially in terms of volumes or sizes. The perceptual estimates of a gain or loss of resources (amount of crackers, money, or water/glaciers) may be perceived as

greater in the case of prefactual thoughts than in the case of counterfactual thoughts. This could be a fruitful venue for communicating about issues dealt with in the current dissertation regarding obesity (crackers), income inequality (money), and climate change (water/glaciers).

Framing Time of Visual Information

Another promising venue to examine the effects of temporal framing lies in a visual mode of communication beyond its typical verbal framing. Testing for temporal framing effects in the context of visual messages beyond verbal messages reflects the ecological change in the information environment and theoretical development in strategic policy messaging. In recent years, coupled with a trend toward data visualization (Friedman, 2008), news media more often have come to employ *infographics* to convey their messages in a more compelling manner (Stovall, 1997). In this age of data visualization, people have an increasing number of opportunities to view the forecast map of risk events (e.g., Fukushima fallout; hurricane movement maps).

In addition to this ecological change in the information environment, there has been a theoretical push to include visual information in the study of strategic message framing effects. In their recent comprehensive review on framing effects, Scheufele and Iyengar (in press) ask for studies to investigate effects of message framing with non-verbal cues. Indeed, the metaphorical concepts of emphasis framing and framing effects stem from visual perception (Kahneman, 2011) and display (Goffman, 1974).

Specifically, the temporal *duration* (slow versus fast) frames are often essential cues in a visual format of communication. As a case in point, using hurricane forecast

maps displaying the same forecast information, but using different temporal units (12-hour vs. 24-hour units), Roh and Cho (2014) demonstrated that participants who view a forecast map in a short-duration unit (12-hour forecast) versus a long-duration unit (24-hour) judge that a hurricane moves relatively slowly and farther away from the target area (Figure 6.1 displays experimental stimuli employed in Roh & Cho, 2014). Moreover, such asymmetric speed and distance judgments led to downstream consequences for relevant decisions—people who view the forecast map with the short-term (versus long-term) duration unit were more likely to recommend an insurance plan for those people in the community on the map. Hurricane maps with the same forecast information but with different temporal units led to divergent judgments and decisions. Such a study may be an exemplar of the potentially fruitful domain of studies using temporal frames in visual communication.

Conclusion

Time is inherent in both social life and human communication. Kurt Lewin (1943)(Lewin, 1943), a pioneer in the both field of cognitive social psychology and communication research, recognized the primacy of time in our understanding of the social world when he suggested the concept of “time as a life space” in his Field Theory.

However, the temporal element has been an often-overlooked piece of the puzzle in grasping the role of time in human judgments as well as appreciating communication processes and influences. Cognitive social psychology has tended to put more emphasis on the impacts of social environments on time perception

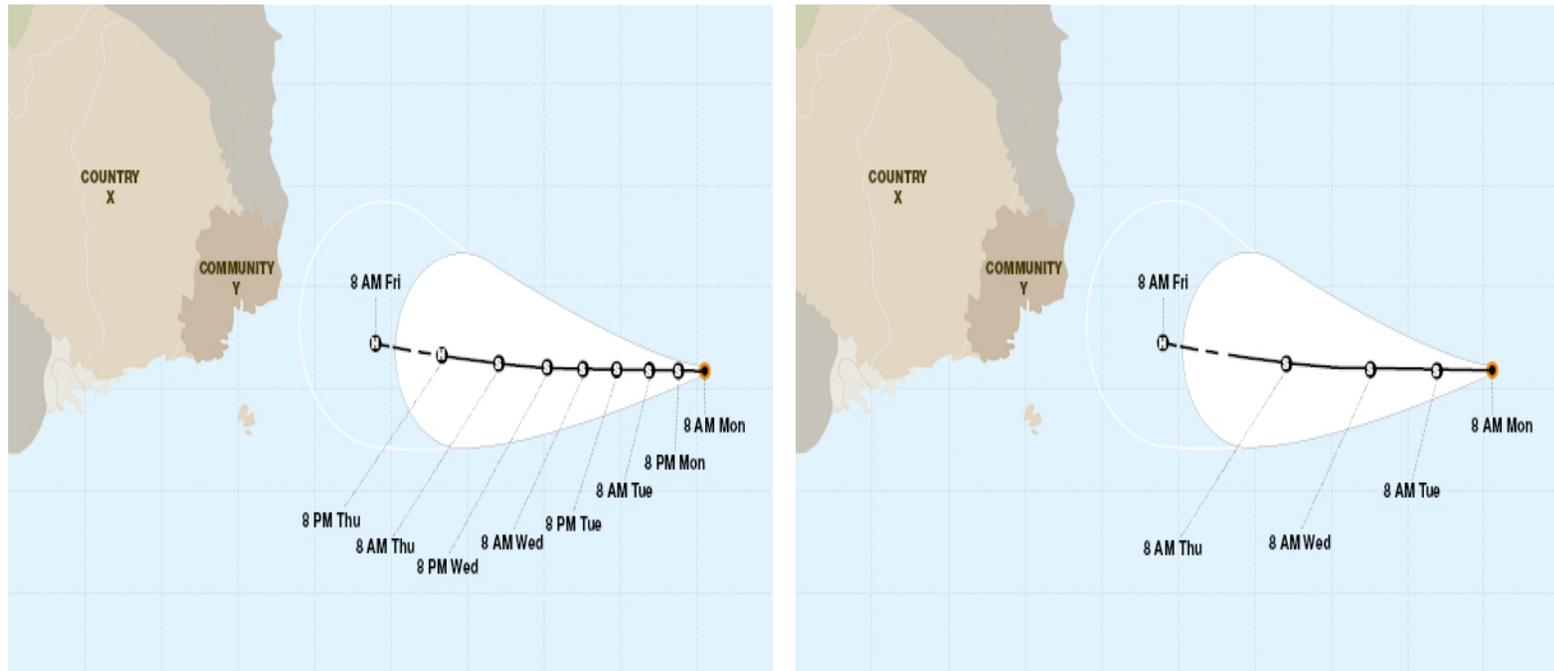


Figure 6.1. Exemplars of temporal duration framing in visual communication.

Note: The hurricane forecast maps are experimental stimuli created and used by Roh & Cho (2014). The left-hand panel denotes a short-term framing, whereas the right-hand panel denotes a long-term framing.

(Grondin, 2010; Ross & Wilson, 2002) or orientations toward time as individual differences (Zimbardo & Boyd, 1999) than the influence of time on human judgments, although such trend has been changing in recent years (Van Boven et al., 2009).

In communication research, Harold Lasswell's (1948) canonical SMCRE model lays out "*Who says what in which channel to whom with what effect.*" Yet, it leaves out "*when.*" Communication research has enjoyed success in examining the role of source (who), content (what), medium (which channel), and audience (whom) in predicting an impact (effect) under the heuristic value of the SMCRE model. Despite such frequent use of temporal cues in communication about pressing social issues, there has been a lack of investigation about its potential influences.

This dissertation on temporal framing suggests that the "when" aspect of communication *can* shape judgments and decisions at a new level by making a difference in processing source and content, thus bringing about differential impact. I hope that this dissertation sheds light on a "*temporal*" *turn* in investigating the role of time in behavioral and social sciences beyond its specific findings—it's about *time*.

APPENDIX

LIWC vocabulary of Past and Future categories

	Past		Future
accepted			couldve
admitted	gone	spoke*	could've
affected	got	started	gonna
appeared	gotten	stayed	gotta
arrived	guessed	stood	he'll
asked	had	stopped	I'll
ate	hadnt	stuck	itll
became	hadn't	studied	it'll
been	happened	sucked	may
began	hated	suffered	might
believed	heard	supported	must
bought	held	supposed	mustnt
brought	helped	taken	must'nt
called	hoped	talked	mustn't
came	kept	taught	mustve
cared	knew	tended	must've
carried	lied	thanked	ought
caught	liked	thought	oughta
changed	listened	threw	oughtnt
couldve	lived	told	ought'nt
could've	looked	took	oughtn't
cried	lost	tried	oughtve
depended	loved	turned	ought've
described	made	understood	shall
did	meant	used	she'll
didnt	met	viewed	should
didn't	missed	waited	shouldnt
died	moved	walked	should'nt
disliked	mustve	wanted	shouldn't
done	must've	was	shouldve
drank	needed	wasnt	should've
driven	owed	wasn't	thatll
drove	paid	went	that'll
eaten	played	were	theyll
emailed	ran	weren't	they'll
ended	said	weve	we'll
entered	sat	we've	wholl
explained	saw	wished	who'll
fed	seemed	woke	will
felt	seen	woken	wont
fled	sensed	won	won't
flew	sent	wondered	would
followed	shared	wore	wouldnt
forgot*	shouldve	worked	wouldn't
fought	should've	worn	wouldve
found	showed	wouldve	would've
fucked*	slept	would've	youll
gave	sold	written	you'll
given	spent	wrote	

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