

# Politics in the Mind's Eye: Imagination as a Link between Social and Political Cognition

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## Abstract

*How do modern individuals form a sense of the vast societies they live in? Social cognition evolved to make sense of small, intimate social groups but in complex mass societies comparable vivid, social cues are scarcer. Extant research on political attitudes and behavior has emphasized media and interpersonal networks as key sources of cues. Extending a classical argument, we here provide evidence for the importance of an alternative and internal source: imagination. With a focus on social welfare, we collected survey data from two highly different democracies, the United States and Denmark, and conducted several studies utilizing explicit, implicit and behavioral measures. By analyzing the effects of individual differences in imagination, we demonstrate that political cognition relies on vivid, mental simulations that engage evolved social and emotional decision-making mechanisms. It is in the mind's eye that vividness and engagement is added to people's sense of mass politics.*

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Modern society is a society of strangers.<sup>2</sup> Living in large-scale societies of millions, we continuously interact with people we do not know and our welfare is affected by people we never meet. From the perspective of deep history, this is an unprecedented condition. As a species, we evolved in small groups (Dunbar 1998; Kelly 1995) and human social psychology most likely evolved to operate on the basis of the intimate social experiences within such groups (Fowler & Schreiber 2008; Kurzban 2001; Petersen 2012). Yet, despite our nature as small group social animals, mass society remains viable. How is this? The key, we suggest here, is that while we cannot directly view most fellow citizens, we see them in our mind's eye. On the basis of these mental simulations, our rich, sophisticated social psychology enables us to feel, reason and judge about the mass societies we live in. This argument is an extension of a classical view running through a century of social science research. Anderson (1983), for example, forcefully argued that the feeling of community underlying the modern nation state only emerged because the print press allowed for the dissemination of information that enabled people to vividly imagine those others living within the state's territory. Similarly, Hunt (2007) argues that the sense of a shared human dignity underlying the politics of indissoluble human rights was influenced by the invention of the novel. This allowed people to more vividly imagine the inner life of others and, hence, see the shared humanity through their mind's eye. Finally, regarding public opinion, Lippmann (1922) noted how "our opinions cover a bigger space, a longer reach of time, a greater number of things, than we can directly observe" (p. 42), and thus individuals are left to rely on the "pictures in their heads" of policy relevant events, places and target groups (Lippmann, 1922). Like Anderson (1983) and Hunt (2007), Lippmann (1922) proposed that the cognitive feat of mentally

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picturing the unseen emerges from the interplay of two distinct processes and is “pieced together out of what others have reported and what we can imagine” (p. 42).

Current research has made great progress in understanding how the reporting of others – social networks, political elites and news media – provides a basis for political cognition in mass society (e.g. Druckman & Nelson 2003; Iyengar and Kinder 1987; Mutz 1998; Nelson et al. 1997; Zaller 1992). In this article, we provide the first systematic test of the argument that a second and inner process, imagination, plays an equally crucial role in making mass political cognition possible.

On the basis of recent advances in the cognitive sciences, we argue that citizens use imagination—often referred to as *decoupled cognition*—to generate vivid mental simulations of relevant events and groups in mass politics (Boyer 2008; Buckner and Carroll 2007; Cosmides and Tooby 2000; Schacter and Addis 2007). With these vivid mental representations as input, psychological mechanisms of social cognition comes to process and facilitate citizens’ reasoning about mass political issues. By relying on their mind’s eye, the average citizen can reason as though mass political issues resemble the small-scale social problems we evolved to navigate and thus form coherent political attitudes despite their lack of substantive political knowledge.

In testing this argument empirically, we rely on the recent observation from personality research in both psychology and political science that genetic and environmental differences create stable individual level variation in traits such as imaginative capacity (Gerber et al. 2011; Mondak et al. 2010). If decoupled cognition is a key ingredient in the formation of political attitudes and behavior, individual differences in imagination should track important differences in how citizens think, feel and act in the domain of mass politics.

In the following section we develop the theoretical argument for decoupled cognition as the link between social and political cognition. Next, we develop and validate in four measurement studies a scale for measuring individual differences in imagination, the short imagination or S-IM scale, and convey our set of empirical predictions on how imagination is expected to facilitate the use of social cognition by helping individuals simulate vivid social cues. In our tests, we focus on the issue of

social welfare. To maximize cross-cultural leverage, we test our predictions using comparable, nationally representative web surveys collected in the United States and Denmark. A range of further tests are conducted with students in lab settings as well as in a survey experiment among the general Danish population. In total, we conduct seven main studies (in five separate samples) based on analysis of both opinion and behavioral measures. Our findings support that imagination facilitates the use of social cognition in public opinion formation by allowing people to feed vivid mental simulations of unseen events, groups, and individuals into basic mechanisms for social cognition. For a more detailed overview of the studies see Appendix 1.

### **Public Opinion and Social Cognition: Decoupled Cognition as the Link**

Current evidence suggests that substantial aspects of human social cognition evolved over the course of our biological evolution to help our ancestors solve repeated social problems relating to cooperation and conflict (Fowler and Schreiber 2008; Hatemi and McDermott 2011). For most of human evolutionary history, our ancestors lived in relatively small groups of perhaps between 30 and 250 individuals (Dunbar 1998; Kelly 1995). Evolved parts of human social cognition such as heuristics and emotions would, in other words, be adapted to life in small groups and designed to take advantage of the cues available in intimate face-to-face interactions (Haley and Fessler 2005; Kurzban 2001). In line with this, studies in social psychology have shown how social decisions and emotional reactions in everyday life are heavily influenced by the kinds of cues that are uniquely available in face-to-face interactions such as the presence of bystanders (Haley and Fessler 2005), eye contact (Kurzban 2001), facial expressions such as smiles (Scharlemann et al. 2001), facial features such as attractiveness and masculinity (Sell, Tooby, and Cosmides 2009; Wilson and Eckel 2006), and other kinds of non-verbal cues (Brown, Palameta, and Moore 2003).

In recent years, evidence has been provided that social cognition not only helps people navigate in small-scale everyday life but also helps citizens feel and reason about mass politics (Fowler and Schreiber 2008; Hatemi and McDermott 2011; Kuklinski and Quirk 2000; Petersen 2012; Schreiber

2007). Yet, to the extent mass political cognition emerges from more basic mechanisms for social decision-making, these mechanisms are deployed in a radically less intimate context than the context in which they evolved (small groups) and in which they normally operate (everyday life): Modern politics is played out in mass societies consisting of millions of inhabitants and citizens will most often lack intimate, vivid knowledge of groups and events being debated (Lippmann, 1922: 42; Kuklinski and Quirk 2000: 156-157; Zaller 1992: 6).

This informational deficit is far from trivial and current research suggests that a lack of vivid social cues normally inhibits social cognition. For example, studies using fMRI have shown how activity in brain regions related to emotional processing—a core element in social cognition (Haidt 2003)—are down-regulated when decision contexts resemble face-to-face interactions less (e.g., de Quervain et al. 2004; Sanfey et al. 2003). Outside the laboratory, this has been validated by research on group efficiency showing that social and emotional coordination in groups is inhibited when groups do not interact face-to-face (Baltes et al. 2002).

How, then, do modern individuals compensate for the lack of vivid cues ordinarily fuelling social cognitive processes in the course of political opinion formation? In cognitive psychology, researchers are increasingly coming to understand the compensatory strategies individuals utilize when making decisions in contexts with sparse information. These researchers point to the role played by internal psychological processes, often referred to as “decoupled cognition” (Buckner and Carroll 2007; Cosmides and Tooby 2000; Schacter and Addis 2007). This research suggests that when cues are absent yet required for decision-making, people rely heavily on intense mental simulations of the absent cues as they “extract, recombine and reassemble” stored memory content “into imaginary events that never occurred” (Schacter and Addis 2007, 27). In short, in sparse information contexts, people engage in decoupled cognition to imagine what they cannot see and feed these internally generated representations and beliefs into more basic cognitive and emotional mechanisms.

More formally, decoupled cognition involves representations that are (1) highly explicit in the sense of relying on thorough declarative memory searches, (2) imagined in the sense of operating

without direct sensory input, and (3) vivid in the sense of being emotionally engaging.<sup>3</sup> Importantly, these features mean that imaginative, decoupled processes could help bridge the gap between the informational needs of our social cognition and the sparse supply of cues in modern mass politics. Imaginative, decoupled processes could add vividness and flavor to the otherwise meager information often available during political opinion formation and, hence, help engage the more basic cognitive and emotional mechanisms composing social cognition.

By emphasizing the role of *internal* psychological sources of cues, we add to the traditional emphasis of political scientists on the role of the media and social networks as *external* sources of cues (e.g., Iyengar and Kinder 1987; Beck et al. 2002; de Vreese and Boomgarten 2006). Such extant lines of research have provided important evidence that external information, especially media stories containing vivid social cues (Iyengar 1991), increase the effects of basic psychological processes—such as emotions—on public opinion (Aarøe 2011; Gross 2008). Importantly, however, these external sources of cues often cannot influence opinion formation unaided by decoupled cognition. First, while the print media and social networks allow for disseminations of indirect verbal descriptions of political events and groups, research suggest that many verbal descriptions require mental simulation in order to engage us (Green & Brock 2000; see also validation Study A below). Second, while in particular television can offer a source of vivid social cues, political attitude formation often takes place unaided by such technology, e.g., at the polls, over the dinner table, at debate meetings, when answering an opinion survey, or when signing a petition or donating money to a cause. Thus in many contexts for political attitude formation, vivid social cues from the media are not immediately accessible but need to be pieced together and simulated from memory searches. In these contexts the need for decoupled cognition is not relieved.

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<sup>3</sup> These features are critical, as decoupled cognition presumably evolved to help us “re-experience the past and experience the future” (Boyer 2008, 219) in order for us to plan ahead, avoid past mistakes, and prepare ourselves. To plan beyond the present, we need imagined, decoupled representations that are vivid enough to help us simulate our reactions given the possible outcomes (Boyer 2008; Cosmides and Tooby 2000).

## Measuring Decoupled Cognition: An Individual Differences Perspective

Imaginative decoupled processes are argued to play a key role in public opinion formation across individuals. Yet prior research has produced ample evidence that the cognitive capabilities of individuals differ quite substantially, in no small part due to genetic factors (e.g., Wainwright et al. 2008). In the literature on individual differences, this has often been discussed with reference to imagination (or, at times, fantasy), which constitutes an everyday denotation of the same set of processes that we refer to as decoupled cognition. While a range of approaches to the assessment of such individual differences exists in the psychological literature, there is now widespread acceptance that the Big Five model is one of the strongest taxonomies of human personality variation (for applications in political science, see Gerber et al., 2011; Mondak et al. 2010). The Big Five model also includes imagination as a sub-component of the openness to experience factor (see, e.g., Goldberg 1999; McCrae and Costa 1996). As McCrae (1994, 258) argues, “open people are characterized by an active pursuit of novelty” as well as flexible cognitive processing such as “divergent thinking, in which remote associations are easily made, and ... synesthesia, in which the distinctions between different sensory modalities are blurred.” The latter components are closely related to decoupled cognition as defined here.

Individual differences in imagination are important because they provide a window into how decoupled cognition shapes mass political attitudes and behavior. If decoupled cognition is utilized during opinion formation in order for social cognition to operate, individual differences in the ability to imagine should track how and, in particular, how *easily* individuals form political attitudes. Indeed, the literature on how differences in openness to experience influence political behavior has provided important evidence that these differences predict a variety of measures of political engagement such that open people are more likely to be politically engaged (Gerber et al. 2011; Mondak and Halperin 2008; Mondak et al. 2010). While this is consistent with the argument advocated here, it nonetheless only provides indirect evidence. According to McCrae (1994), imagination constitutes one half of the general openness to experience trait, which also includes the novelty-seeking component:

adventurousness (Goldberg 1999). To validate our account, we need tests focusing directly on the relationship between individual differences in the imagination sub-trait and differences in dynamics during public opinion formation (for a similar approach, see Hirsch et al. 2010).

A first step is building a scale that allows us to measure differences in imagination. Our ambition was to create a short but reliable scale that can easily be included in future surveys and applied cross-nationally with satisfactory reliability (cf. Mondak et al. 2010). As our point of departure, we used the primary open-access inventory of personality scales, the International Personality Item Pool (IPIP), which includes measures for all traits included in the Five-Factor Model (Goldberg 1999). Consistent with our theoretical argument, we selected the three standard items from the IPIP imagination scale which most directly focused on the decoupled cognition aspect of imaginative processes (“I have a vivid imagination,” “I do not have a good imagination,” and “I have difficulty imagining things”). To these items we added a fourth self-formulated item (“I can easily imagine persons I hear or read about”). Thus, all four statements focus exclusively on the decoupled cognition aspect of imaginative processes. To obtain a scale, we ask participants how accurately each statement describe them on a 7-point scale ranging from “very inaccurate” to “very accurate” and summarize the answers as appropriate (see the Online Appendix A1 for further discussion).

Given that the short imagination scale, abbreviated as the S-IM scale, relies predominantly on well-tested items from the psychometric literature, its validity should be ensured. Still, to investigate the properties of the particular short-form scale, we ran four validation studies (Studies A–D), each providing detailed tests of the predictive, convergent, and divergent validity of S-IM scale.<sup>4</sup> Across all studies, the imagination scale had satisfactory reliability (Study A:  $\alpha = 0.74$ ; Study B:  $\alpha = 0.77$ ; Study C:  $\alpha = 0.78$ ; Study D:  $\alpha = 0.88$ ).

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<sup>4</sup> Studies A–B were collected as approximately nationally representative online surveys based on quota sampling on dimensions of gender, education, and age (age 40+ in the case of Study A). Study C was collected as a lab study with a student sample, and Study D was fielded as a pencil-and-paper survey to a sample of political science undergraduates (see the Online Appendix for detailed information on all validation studies). Together, these samples represent good variation along demographic dimensions such as social background, gender and age (Studies A–D), and education (Studies A–B).

The aim of Study A was to provide a face valid demonstration that the S-IM scale does in fact gauge individual differences in imagination. As we wanted to establish the predictive validity of our measure outside a political context, we focused on an everyday situation in which decoupled cognition is engaged: the reading of fiction. Participants read a short fairytale-like story. Afterwards, they first answered nine items from the well validated transportation scale (Green and Brock 2000), which measures the extent to which readers of a narrative become immersed into the story and “see the action of the story unfolding before them and respond emotionally to story events” (Mazzocco et al. 2010, 361; see also Green and Brock 2000). Second, they engaged in two free association tasks in which they were asked to list the words they would use to describe one of the main characters and the story as a whole to another person. Finally, they answered a range of questions about their personality and cognitive abilities, including the S-IM scale.

Analyses showed that subjects’ values on the S-IM scale significantly and strongly correlated with differences in the degree to which individuals felt mentally transported into the story ( $r = 0.43$ ,  $p < 0.001$ ) and the number of associations they freely recollected to describe the human main character ( $r = 0.33$ ,  $p < 0.001$ ) and the overall story ( $r = 0.25$ ,  $p = 0.001$ ). As detailed analyses in the Online Appendix A5 reveal, all three effects were highly robust to the inclusion of a large range of control variables related to both closely related personality constructs (general openness to experience, adventurousness, need for closure, and political ideology) and variables tracking cognitive abilities (need for cognition and need to evaluate). Testifying to the criteria validity of the scale, these findings document that the S-IM scale uniquely tracks how vividly individuals experience descriptions of unseen people and events as well as how vividly they recollect these descriptions.

As Study A relied on self-reports and quasi-behavioral measures of returned associations, the goal of Study B was to provide evidence that the S-IM scale tracked individual differences in the abilities to engage in decoupled cognition using a genuinely behavioral task. The best validated behavioral tasks of visual imagery (a key component of decoupled cognition) in psychology are “mental rotation tasks” (see Shepard and Metzler 1971). Mental rotation ability, as measured by these

tasks, is the ability of people to “rotate figures in their minds’ eye” (Peters and Battista 2008, 261); that is, to mentally visualize rotating complex figures of blocks in three-dimensional space. Specifically, we rely on the redrawn Vandenberg & Kuse Mental Rotation Task (Peters et al. 1995).<sup>5</sup> To investigate whether our imagination scale predicts success on the mental rotation task, participants completed the task and our scale online (see Online Appendix A2 for study details). Testifying to the validity of the S-IM scale, subjects’ values on the scale have a non-trivial and highly significant effect on the success rate on the mental rotation task ( $r = 0.35$ ,  $p = 0.001$ ).

Third, our argument hinges on the capacity of imaginative processes to engage more basic psychological and emotional processes. To verify that the S-IM scale tracks relevant individual differences in this regard, Study C provided a test of the effect of imagination on the responses of subjects to positive and negative still images. To obtain an unobtrusive and direct measure of the engagement of basic emotional mechanisms, we relied on a physiological reaction measure in the form of skin conductance response (SCR) during image presentation (see Oxley et al. 2008). SCR provides a valid measurement of the activation of the sympathetic nervous system, which is a key circuit in the generation of emotional arousal (Figner and Murphy 2011). All of the images of interest were strictly non-political: a bright flower, a happy baby, a foot with an infected wound, and a large spider.

In the study, subjects were placed in front of a computer screen and asked simply to sit and look at the images. The analysis found that subjects’ score on the imagination scale is positively and significantly related to their SCR during the presentation of images ( $r = 0.27$ ,  $p = 0.03$ ).<sup>6</sup> Hence, people high in imagination, as measured by the S-IM scale, exhibit stronger physiological reactions to

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<sup>5</sup>In this task, subjects are provided with 24 sets of five figures: a three-dimensional target figure and four other figures. Two of these other figures are rotated versions of the target, while the two others are mirrored versions (i.e., the target figure cannot be rotated to match them). The subjects are then asked (under significant time pressure) to indicate the figures that match the target. A high success rate provides a clear behavioral indication of high visual imagination. We here measure success rates as the number of correctly indicated figures (see Online Appendix A2 for further discussion).

<sup>6</sup> SCR was measured as the mean area bound by the response curve during the presentation of all four images from one second after the onset of the stimuli to the stimuli disappeared from the screen.

emotional images. These findings support that the scale reliably tracks individual differences in the ability to engage basic psychological mechanisms in the face of limited information.

Finally, we checked the extent to which the imagination scale overlapped with answers to other well-used cognitive ability measures in the political science literature as well as closely related personality constructs. To this end, we measured a range of prominent measures across the studies: general openness to experience (cf. Mondak et al. 2010), adventurousness (Goldberg 1999), political ideology (related to openness cf. Gerber et al. 2010), need for closure (cf. Webster and Kruglanski 1994), political awareness (Zaller 1992), need for cognition (Cacioppo and Petty 1982), need to evaluate (Jarvis and Petty 1996), and grade point average as a measure of general cognitive abilities (cf. Frey and Detterman 2004, 376). Across the studies in this article, imagination as measured by the S-IM scale naturally correlates with adventurousness (average  $r = 0.30$ ) and general openness (average  $r = 0.21$ ). Also, we find correlations with need for cognition (average  $r = 0.18$ ) and need for closure (average  $r = -0.21$ ); however, the size of all these correlations is relatively modest. For the rest of the constructs, there does not seem to be any overlap between them and values on the S-IM scale. Together with the results from Study A, which showed that the S-IM scale uniquely tracked abilities to mentally simulate fictional descriptions, this suggests that the scale tracks individual differences left untapped by other available measures. We return to this in Studies 6 and 7 below.

### **Studies 1 and 2: Imagination and Vivid Representations of Politics**

Having established our key independent variable, the S-IM scale, and our individual differences approach to studying how decoupled cognition shapes public opinion, we now turn to outlining and testing precise predictions for how these differences influence the use of social cognition. Our first two studies are oriented towards establishing a key premise of our argument: that imaginative people generate vivid mental representations of relevant target groups or events when forming opinions about mass politics.

## *Predictions*

In the domain of mass politics, imagination is expected to facilitate opinion formation by helping individuals to simulate vivid, social input to the social decision-making mechanisms. Social psychologists consistently emphasize that the key attribute of well-structured opinions is attitude strength (e.g., Eagly and Chaiken 1993; Krosnick et al. 1993). Given this, our first prediction is that individuals high in imagination should form stronger opinions on issues concerning mass politics (H1). To develop precise predictions for how this effect emerges, we must consider the outlined cognitive components in decoupled cognition. Decoupled cognition emerges from (a) a thorough memory search and (b) the piecing together of vivid and engaging mental representations from the results of these search processes. In the domain of politics, this implies that differences in imagination should be related to both how individuals process policy statements and the quality, vividness, and detailed nature of politically relevant mental representations.

In terms of processing, past research on public opinion has focused on two different modes through which individuals form political attitudes: memory-based processing and online processing (Lodge, McGraw, and Stroh 1989; Zaller 1992). Memory-based processing involves searching the memory for relevant considerations, whereas online processing involves the mere retrieval of an affective tag that applies to the relevant attitude object. Given the mental operations involved in decoupled cognition, we predict that people high in imagination should be more likely to engage in memory-based processing when forming social welfare opinions (H2).

Some past studies have suggested that individuals who process information in an online manner often have stronger attitudes (Druckman and Nelson 2003). Nonetheless, among imaginative individuals, a memory-based processing mode is predicted to co-exist with coherent attitudes. We suggest that this relates to the high quality mental representations that imaginative people form on the basis of the memory search. Despite being vivid, such representations could principally be quite ambiguous and, hence, form a less useful basis for executing social cognition. Yet increasing evidence indicates that memory searches are often biased in a specific direction aligned with the pre-

dispositions of the individual (Kunda 1990; Taber and Lodge 2006). This suggests that more thorough memory searches by imaginative people ought to lead them to generate more vivid as well as more consistent mental representations of objects (e.g., target groups, events) relevant to the political issue in question. Our third prediction is therefore that when individuals high in imagination form opinions, they have more vivid elaborated and coherent mental representations available (H3).

### *Materials and Methods*

To investigate the first three predictions, we conduct two studies embedded in an online survey collected in the United States and Denmark. Both in the United States and Denmark, the data were collected by the YouGov survey agency. Based on quota sampling, nationally representative samples of citizens on the dimensions of gender, age (> 18, < 70), and geography (state in the US case, region in the Danish case) were drawn from the agency's standing web panels ( $n_{US} = 1009$ ,  $n_{DK} = 1006$ ).

Social welfare was chosen as the specific test case for the investigation of our predictions. Social welfare offers a prime example of a domain heavily influenced by social cognition. In particular, as demonstrated by a rich body of research, a powerful heuristic—the deservingness heuristic—compels citizens to seek information about the deservingness of the recipients of welfare programs, and these perceptions account for a substantial part of the variation in welfare opinions (Gilens 1999; Petersen 2012; Petersen et al. 2011; Skitka and Tetlock, 1993; Sniderman, Brody, and Tetlock 1991; Van Oorschot 2000). Citizens tend to support welfare provisioning if bad luck is perceived as the cause of economic need, whereas they oppose welfare provisioning when laziness is perceived as the root of the recipients' situation (Petersen 2012). Importantly for our purpose, numerous studies have explicitly grounded the deservingness heuristic in core aspects of human social cognition. Thus, social psychologists have shown how the deservingness heuristic drives help-giving judgments in everyday situations far beyond the context of social welfare (Weiner 1995) in populations as different as North American citizens and Amazonian Indian tribe members (Sugiyama, Tooby, and Cosmides 2002) and on the basis of the range of cues available in face-to-face interaction

(Brown, Palameta, and Moore 2003). If differences in imagination are involved in helping individuals in connecting social cognition and mass political issues, these differences should be substantially related to how individuals use the deservingness heuristic when forming opinions on welfare.

The data for the two studies were collected in both the United States and Denmark, and all of the items in the two studies were fully parallel. In testing general psychological arguments about public opinion, replicating predicted effects across different macro contexts is key (Mondak et al. 2010). With respect to our focal issue, social welfare, the United States and Denmark constitute a “most different systems design,” which maximizes the variation on central national-level variables, including electoral and government systems, media systems, public engagement in politics, and type of welfare state (Esping-Andersen 1990).

Testing our predictions requires four key measures: first, our measure of individual differences in imagination, the S-IM scale; second, a measure to gauge differences in attitude strength on the issue of social welfare; third, a measure of the degree to which an individual engages in memory-based processing when forming opinions on social welfare; and fourth, a measure of the vividness of the individuals’ mental image of welfare recipients. As described, we predict that imagination differences affect the variation in these three latter measures. All of the measures are described in detail in the Online Appendix A6.

*Imagination scale.* To measure individual differences in imagination, all subjects provided answers on the S-IM scale. The scale was found to be satisfactorily reliable both overall ( $\alpha = 0.69$ ) and in the individual countries ( $\alpha_{US} = 0.67$ ;  $\alpha_{DK} = 0.72$ ).

*Social welfare attitudes and strength.* To measure political attitudes in the issue domain of social welfare, we relied on a general question battery ( $\alpha_{US} = 0.64$ ;  $\alpha_{DK} = 0.87$ ). The scale asks subjects to indicate agreement or disagreement with three pro-statements and three con-statements about social welfare. According to Bassili (1996), one of the best measures of attitude strength is attitude extremity. Following standard procedures for measuring strength in this way, we fold the attitude

scale in the middle so that higher values on the attitude strength scale indicate stronger attitudes in either direction (Krosnick et al. 1993).

*Memory-based versus online-based processing.* To assess the processing mode of the respondents during opinion formation, we use response latencies. This is a classic measure of individual differences in memory-based versus online-based processing (e.g., Mackie and Asuncion 1990; Tormala and Petty 2001) with memory-based processors producing longer response latencies than online-based processors (Tormala and Petty 2001, 1601). For each respondent, we obtained the time in seconds used to answer the opinion battery about social welfare. Following past studies using response times obtained over the Internet, we ranked the response times from lowest through highest (Petersen et al. 2011, 2012). Higher values on the resulting measure indicate longer response latency.

*Vividness of mental images.* To measure the vividness of the relevant mental representations that respondents utilize during opinion formation, they were immediately asked after finishing the opinion battery to engage in a free association task equivalent to those used in Study A. Specifically, they were asked to write the words they would use to describe people who receive social welfare in up to 20 boxes with one word in each box. The content of the respondents' associations was subsequently coded by two student coders (see Online Appendix A6 for details on coding scheme and intercoder reliability tests). Based on the coded associations, we created two measures, each tapping a distinctive aspect of the respondents' mental images of welfare recipients.

First, to get a measure of the elaborateness of the mental representation, we made an overall count of the number of deservingness-relevant associations returned by the individual respondent. High scores on this measure can be obtained in two ways: by having a large number of associations that are mutually contradictory with respect to deservingness (e.g., that those who first associate welfare recipients with laziness subsequently reason that some of them are actually unfortunate) or by having a large number of highly consistent associations (e.g., that those who associate welfare recipients with laziness also think of them as ungrateful outgroup members that have never had a job but could get one if they genuinely wanted to do so). To discern between these possibilities, we,

secondly, generated a measure of association consistency by subtracting the number of deserving associations from the number of undeserving associations and obtained the numerical value of this calculation such that higher values indicate more consistent associations in either direction.

In all analyses, we include control for demographics which have proven important in prior work on the effects of personality factors (e.g., Mondak et al. 2010) and in prior work on the effects of political sophistication (e.g., Sniderman, Brody, and Tetlock 1991). Thus, we control for gender (1 = female), age (in years), and length of education. As Sniderman, Brody, and Tetlock (1991, 21) emphasize, education constitutes “the handiest proxy” to measure political sophistication, as education is both well measured and covaries with political awareness and information. In addition, as evidenced by analyses in the Online Appendix A4, the inclusion of education also serves as a partial control for individual differences in general openness and need for cognition as education tracks both to a significant and non-trivial extent. Testifying to the discriminant validity of the S-IM scale, individuals’ scores on this scale are not related to educational achievement.

All variables range between 0 and 1 except for age (reported in years) and association measures (reported in numbers of associations). All analyses are performed using OLS regression and all reported coefficients are unstandardized.

### *Results*

The first prediction to be investigated in the US and Danish studies is whether individuals high in imagination have more coherent opinions (H1). Table 1 shows the effect of imagination on the strength of the respondents’ opinions on the social welfare issue (M1 and M5).

*Table 1 around here*

Consistent with H1, we find a substantial and statistically significant effect of imagination on attitude strength in both the United States and Denmark ( $b_{US} = 0.20, p < 0.001$ ;  $b_{DK} = 0.13, p = 0.017$ ). In both

countries, the findings support that imaginative respondents tend to hold stronger attitudes on social welfare issues as compared to unimaginative respondents.<sup>7</sup>

The second prediction entails that people high in imagination engage more in memory-based processing when forming opinions. To test this, we rely on response latencies and, as revealed in models M2 and M6 in Table 1, imaginative people do have longer response latencies than unimaginative individuals in both the United States and Denmark ( $b_{US} = 0.22, p < 0.001$ ;  $b_{DK} = 0.14, p = 0.005$ ). These observations support H2 and indicate that imagination tracks how people process information and that highly imaginative individuals conduct a more thorough memory search than unimaginative individuals.

Finally, according to H3, one consequence of these thorough memory searches is that individuals high in imagination are able to piece together more vivid and elaborate mental representations during opinion formation. To investigate this, the total number of the respondents' associations about welfare recipients (M3 and M7) and the internal consistency of these associations (M4 and M8) is regressed on imagination in Table 1. The number of associations ranges from 0 to 20, and association consistency ranges from 0 to 20, higher values indicating stronger consistency. Consistent with H3, we find that both imaginative Americans and Danes generate a higher number of associations about welfare recipients than their unimaginative countrymen ( $b_{US} = 1.84, p < 0.001$ ;  $b_{DK} = 1.42, p < 0.001$ ). Furthermore, as can be seen from the findings in M4 and M8, high levels of imagination not only increase the number of associations but also their internal consistency. This response pattern is robust across the US and Danish studies ( $b_{US} = 0.82, p = 0.009$ ;  $b_{DK} = 1.17, p < 0.001$ ). These observations support that, during opinion formation, highly imaginative individuals have more vivid—in the sense of more information-dense and unambiguous—mental representations available regarding the target group of primary relevance to the issue.

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<sup>7</sup> The coding of the attitude strength measure implies that we cannot detect whether there is a specific ideological direction in the results (e.g., whether imaginative people's attitudes mainly are stronger in a liberal direction). As revealed by analyses in Online Appendix A10, the effects of imagination do not seem to have a general, inherent ideological direction.

### **Studies 3 and 4: Imagination and Social Cognition**

Studies 1 and 2 show that individual differences in imagination are related to people's tendency to piece together vivid mental representations of welfare recipients' deservingness when forming opinions about social welfare. In this way, Studies 1 and 2 focused on the input side of the deservingness heuristic. While demonstrating that imaginative people had stronger opinions regarding welfare, the studies did not provide direct evidence that this effect occurred because the imagined, vivid representations were subsequently fed through social cognition in the form of the deservingness heuristic. Studies 3 and 4 were therefore designed to provide direct evidence that imaginative individuals specifically engage the deservingness heuristic to a greater extent than non-imaginative individuals.

#### *Predictions*

As any other tool in the social cognition toolbox (Gigerenzer, Todd, and the ABC Research Group 1999), the deservingness heuristic is a sophisticated information-processing system that takes a highly defined set of information as input and produces a narrow set of emotions as output (Petersen et al. 2012). Regarding the input side, a range of different studies have shown how the deservingness heuristic does not pick up all types of positive or negative information about needy individuals but, in particular, information about recipient effort (see Gilens 1999; Petersen et al. 2012; Weiner 1995). In relation to deservingness-based welfare opinions, Gilens (1999), for example, shows that of three racial stereotypes (that blacks are lazy, unintelligent, and violent), Americans' deservingness judgments in the domain of welfare are driven by laziness alone. Similarly, when examining Danes and Americans, Petersen et al. (2012) show how, of two stereotypes about welfare recipients in general (that they are lazy and unintelligent), stereotypes about laziness predominantly regulate reactions to welfare recipients. On the basis of such perceptions of effort, the deservingness heuristic subsequently produces a particular set of emotions, anger, and compassion, which then regulate helping decisions towards needy individuals (Petersen et al. 2012; Skitka and Tetlock 1993; Weiner

1995). Requests for help from lazy individuals are met with anger, whereas requests from those who are making an effort are met with compassion. Testifying to the precise operations of social cognitive mechanisms, such perceptions do not directly regulate emotions that are otherwise closely related to anger, such as anxiety (Petersen et al. 2012).

Imaginative processes help us build vivid representations by extracting, recombining, and reassembling stored memory content (Schacter and Addis 2007, 27). In political attitude formation, stereotypes represent a particularly important form of memory content (e.g., Gilens 1999; Lippmann 1922). While both imaginative and non-imaginative people should be able to hold stereotypes, e.g., believe that welfare recipients are lazy, the activation of stereotypes should result in a much richer and vivid set of representations among the imaginative; these richer representations should allow for a deeper engagement of the deservingness heuristic. Given the above insights on the input and output of the deservingness heuristic, it becomes possible to test this claim empirically. If valid, more imaginative individuals should exhibit stronger links between the exact stereotypes that the heuristic takes as input and the exact emotions it delivers as output. Essentially, the stereotype that welfare recipients are lazy should lead to *more* anger and *less* compassion among those high in imagination as compared to those low in imagination. Conversely, the stereotype that welfare recipients are hard-working should lead to *less* anger and *more* compassion among the imaginative (H4). Furthermore, if the deservingness heuristic is indeed engaged, imagination should not moderate the effects of other stereotypes on anger and compassion (H5) nor should imagination moderate the effects of stereotypes about laziness on other types of emotions (H6).

### *Design and Measures*

As parts of the surveys on which Studies 1 and 2 were based, we inquired as to the respondents' stereotypes about welfare recipients and emotional reactions to them. See the Online Appendix A7 for the specific question wording for the measures in Studies 3–4.

*Stereotypes.* To measure stereotypes, we adapted standard measures from ANES about welfare recipients' efforts (measured as perceived laziness) and competences (measured as perceived intelligence).

*Emotions.* To measure emotions, we rely on the standard self-report format for measuring distinct but closely related emotions (Marcus et al. 2006). Anger and compassion constitute our two focal emotional measures, and concern was chosen as the anxiety-related emotion most applicable to social welfare issues.

All measures are recoded to vary between 0 and 1. Higher values indicate stronger laziness, unintelligence, anger, compassion, and concern, respectively.

### *Results*

The deservingness heuristic takes stereotypes about effort as input and, as output, produce and regulate feelings of anger and compassion. As demonstrated in Studies 1 and 2, perceptions are embedded in richer sets of associations among the imaginative. Table 2 tests whether, as predicted, this magnifies the relationship between holding the stereotype that welfare recipients are lazy and feelings of anger and compassion towards them. In statistical terms, the prediction entails the existence of a two-way interaction effect between imagination and the laziness stereotype on feelings of anger and compassion. Importantly, such interaction effects should not be observed in relation to stereotypes that are not processed by the deservingness heuristic (stereotypes about unintelligence) nor emotions that are not regulated by the heuristic (feelings of concern).

*Table 2 around here*

As can be observed from the findings in Table 2, the predictions are generally supported in both the United States and Denmark. In the United States, feelings of anger towards welfare recipients are driven by a highly significant two-way interaction between individual differences in imagination and the stereotype that welfare recipients are lazy ( $b = 0.56$ ,  $p = 0.001$ ). As imagination increases, perceiving welfare recipients as lazy (equaling a high score on the stereotype measure) generates

higher levels of anger. The same interaction can be observed in Denmark, although here the interaction term is only marginally significant ( $b = 0.36$ ,  $p = 0.074$ ). In the case of compassion, the prediction is supported at conventional levels of significance in both the United States ( $b = -0.34$ ,  $p = 0.021$ ) and Denmark ( $b = -0.47$ ,  $p = 0.023$ ). Thus, among people high in imagination, the stereotype that welfare recipients are making an effort (equaling a low score on the stereotype measure) leads to greater levels of compassion in both the United States and Denmark. Across all models, there are no significant interaction effects with the alternative unintelligence stereotype nor are there any interaction effects on the alternative emotion: concern. These observations are consistent with H5–6.

### **Study 5: Imagination, Social Cognition, and Implicit Memory Content**

Studies 3 and 4 rely on self-reported measures of memory content, which raise concerns about endogeneity. Study 5 therefore seeks to replicate the basic finding that imaginative people form political opinions more easily by utilizing stored memory content, using a highly validated psychological measure of *implicit* rather than explicit, more endogenous stereotypes: the implicit association test.

#### *Predictions*

A key feature of implicit memory content is that it influences attitudes and opinions faster, with less possibility for control, and can be unavailable to self-reports (Greenwald and Banaji 1995). Importantly, however, previous research has repeatedly and convincingly demonstrated that the explicit process of imagination has the power to enhance opinion effects of content in implicit memory (Blair 2002). This implies that the basic findings from Studies 3 and 4 should, if valid, be replicable using implicit measures of stereotypes. As with explicit stereotypes, the opinion effects of implicit stereotypes should be stronger among the imaginative (H7).

#### *Design and Measures*

Study 5 is based on a smaller laboratory study conducted in Denmark. The participants were 61 university students. In a computer lab, the participants were seated in front of individual computer terminals and introduced to the implicit association test (IAT). They completed a short questionnaire about their social welfare attitudes and their imagination and then completed the IAT on the computers.

*Implicit stereotypes.* We measured implicit stereotypes about welfare recipients using the IAT. The IAT is based on comparisons of the response speed with which the subject pairs positive and negative words to social categories. The underlying logic of the IAT is that responses will be facilitated—and thus faster—when the pairing task matches how the categories and words are paired in subjects’ memories; that is, their stereotypes (Lane et al. 2007, 62) (see Online Appendix A11 for further discussion). To measure specifically implicit stereotypes about welfare recipients, the IAT was set up to measure subjects’ associations of the category “unemployed” with attributes of being lazy, and the category “employed” with attributes of being hard-working. A higher IAT score reflects the stronger implicit pairing of unemployment with laziness and employment with hard-work.

*Imagination.* Imagination was measured using the four items from the S-IM scale, which were combined to form a satisfactorily reliable scale ( $\alpha = 0.78$ ).

*Social welfare attitudes.* In Studies 3 and 4, we used emotional reactions as dependent measures. In Study 5, we obtained a measure of social welfare attitudes rather than emotional reactions in order to increase the causal distance between the dependent and independent measures. To measure social welfare attitudes, we used the same scale as in Studies 1 and 2, which showed satisfactory reliability ( $\alpha = 0.74$ ). The scale is coded such that a high value reflects opposition against social welfare. All measures except the IAT score are recoded to vary between 0 and 1.

## *Results*

We tested prediction H7 using an OLS regression model. In statistical terms, the prediction entails the existence of a two-way interaction effect between imagination and implicit stereotypes about welfare

recipients on social welfare attitudes (measured using IAT scores). Essentially, as imagination increases, the relationship between holding the implicit stereotype that unemployed individuals are lazy and opposition against social welfare should magnify. As expected, we find the existence of a two-way interaction effect between imagination and implicit stereotypes ( $F = 3.5$ ,  $p = 0.06$ , two-tailed test).<sup>8</sup> Calculations of the marginal effects of implicit stereotypes for the less and the more imaginative (as specified by the bottom and top of the interquartile range on the S-IM scale) show that the marginal effect is insignificant among the less imaginative ( $b = -0.03$ ,  $p = 0.77$ ) but significant, positive, and large among the more imaginative ( $b = 0.21$ ,  $p = 0.04$ , two-tailed). Thus, as imagination increases, holding implicit stereotypes that the unemployed are lazy (equaling a high score on the IAT measure) generates higher levels of opposition against social welfare (the full interactive regression model is shown in Online Appendix A11, Table A10). Hence, using an implicit measure of stereotypes obtained in the laboratory, we are able to replicate the basic finding from Studies 3 and 4.

### **Study 6: Imagination in the Face of Vivid Social Cues**

Studies 1–5 suggest that imagination serves as a bridge between public opinion formation and social cognition across highly different political systems. Specifically, the studies suggest that imagination facilitates opinion formation on social welfare because imaginative processes help individuals activate implicit and explicit memory content to build vivid perceptions of welfare recipients and feed them through the deservingness heuristic, resulting in intense emotional reactions. In Study 6, we investigate the boundary conditions of the role of imagination. Imagination, we have argued, is of particular importance in linking social and political cognition, because political views are often formed in the absence of vivid social cues. If valid, this implies that imagination should play less of a role when vivid social information is externally provided during opinion formation. Using an experimental design to manipulate the vividness of the available information, Study 6 provides

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<sup>8</sup> Given that we replicate effects from Studies 3 and 4 in Study 5 and, hence, have strong directional expectations, it would be appropriate to use one-tailed t-tests and consider the result significant by conventional standards of  $p = 0.05$ . To make the reporting of Study 5 comparable with the other studies, we report the two-tailed effect.

compelling evidence for this key assertion. Furthermore, in Study 6, we increase statistical control and directly control for the other component of openness, adventurousness, to demonstrate that the predicted effects are specific to the imagination trait.

### *Predictions*

When trying to form opinions about abstract mass politics, imaginative individuals are argued to fill in the information gaps using their stored memory content to a much greater extent than unimaginative people. Consistent with this argument, Studies 3–5 demonstrated how imagination increased the effects of stereotypes -. These studies focused on the effect of stereotypes on reactions to the stereotyped group. Yet another well-studied effect of stereotypes is their effect on people’s responses to individual members of the stereotyped group (Krueger and Rothbart 1988; Kunda and Sherman-Williams 1993). In politics, such effects become relevant when citizens encounter episodic media stories (Iyengar 1991) depicting individual members of groups targeted by policies (Aarøe 2011; Gross 2008). Importantly, as argued by media researchers, elites can use such episodic stories to increase the vividness of their communications by emphasizing human interest details which personalize and emotionalize political issues by highlighting “a particular individual’s story as illustrative of a broader issue” (Gross 2008, 171). In this manner, episodic descriptions provide an excellent test case for the investigation of the role of imagination when vivid social information is externally provided during opinion formation.

Parallel to the results in Studies 3–5, we expect imaginative people’s opinions toward specific members of stereotyped categories to be more heavily influenced by stereotypes than unimaginative people’s opinions (H8). Hence, when reading an episodic story, imaginative people should be better at filling in the gaps in this story using stored memory content in the form of stereotypes and, hence, will be more likely to interpret it along the lines of their prior beliefs about the group.

If, however, imagination is a cognitive tool deployed in mass politics to compensate for a lack of vivid social cues, the political role of imagination should change as a function of the direct

availability of such cues. Thus, in the face of very vivid and detailed episodic information, all people should be able to build a sufficiently vibrant representation for social cognition to execute. Consistent with this argument, prior research has demonstrated that stereotypes drive impressions of specific individuals less in the face of highly detailed information (Krueger and Rothbart 1988; Kunda and Sherman-Williams 1993). Likewise, studies in political science have shown that individuals rely less on prior beliefs and more on the available cues when forming opinions in the face of vivid and detailed cues (Peffley et al. 1997; Petersen et al. 2011), and vivid episodic information facilitates the general reliance on emotional systems in the course of opinion formation (Aarøe 2011). Given these observations, we predict that the availability of vivid information limits the cognitive advantages of imaginative people. Neither imaginative nor unimaginative individuals should feel a need to filter in their prior stereotypes in the face of very vivid information (H9).

#### *Experimental design and measures*

To investigate how imagination shapes opinion formation in the presence of vivid social cues, an experiment was designed and embedded in a nationally representative online survey conducted in Denmark in June 2011. Data were collected by the Epinion polling company. A total of 146 respondents participated in the experiment. See the Online Appendix A8 for all of the study and measurement details.

*Experimental stimuli and the dependent variable.* The respondents were randomly assigned to one of three experimental conditions, each depicting a social welfare recipient named Lars Jørgensen (a common Danish male name), and then asked whether the eligibility requirements for social welfare should be made stricter for people like him. Answers were recoded to vary between 0 and 1 with higher values indicating stronger support for stricter eligibility requirements.

To maximize the experimental control, the descriptions of the welfare recipient varied only in terms of the vividness of the available cues but were constant in terms of the strength of these cues. In keeping with the existing research, we manipulated the vividness of the episodic information by

increasing the level of detail in the provided information (Kunda and Sherman-Williams 1993). Hence, in the condition with lowest vividness, subjects are merely informed that Lars Jørgensen “has never had a regular job but he is in good health” and that “he is not motivated to get a job.” In the two others conditions, more vivid descriptions that illustrated and deepened this basic information were added (e.g., “in his neighborhood, there have often been relevant job ads, for example, as a janitor and cleaning assistant. But he has never gotten around to applying”). We hold the strength of the cues constant by providing information that is equally suggestive about the deservingness of the recipient independently of its vividness. The precise wordings are provided in the Online Appendix A8. There, we also provide successful manipulation checks demonstrating that the conditions vary in vividness but are equal in terms of the strength of the cues. However, while we had expected a gradual increase in the vividness of the three conditions, the manipulation checks show that the conditions fall in two blocks: one low vividness condition and two high vividness conditions.

*Stereotypes.* Respondents’ prior stereotypes about welfare recipients were measured using agreement with two statements about laziness as an explanation for why people are in need. These were combined into a single scale of prior stereotypes ranging from 0 to 1, the higher values indicating that welfare recipients are stereotyped as lazy (correlation between the individual items was  $r = 0.72$ ).

*Personality.* Again, in Study 6, the S-IM scale showed satisfactory reliability ( $\alpha = 0.67$ ). In addition, a scale of adventurousness based on the IPIP inventory showed similar satisfactory reliability ( $\alpha = 0.83$ ).

## *Results*

According to H8, the opinions of imaginative people toward specific members of stereotyped categories should be more heavily influenced by stereotypes than unimaginative people’s opinions. In order to support H8, we should thus observe that opinions toward the specific welfare recipient are driven by a two-way interaction between imagination and the prior stereotypes such that the effect of

stereotypes increases as imagination increases. According to H9, however, this cognitive advantage of imaginative people should be conditioned by the vividness of the descriptions of the specific welfare recipient. In the face of very vivid social cues, neither imaginative nor unimaginative individuals should then feel a need to filter in their prior stereotypes.

Thus, as a first test of these expectations, we ran separate two-way interaction models for the low vividness condition and for the two high vividness conditions and plotted the predicted marginal effect of the stereotypes on opinion across the levels of imagination for each condition (see Figure 1). As can be observed in the low vividness condition (panel A), when vivid social cues are lacking, we find a strong tendency for imaginative people to filter in their own stereotypes to a greater extent than unimaginative people. That is, as imagination increases, the predicted marginal effect of prior stereotypes on support for tougher means testing increases as well (as indicated by the positively sloped line) and, as the associated confidence intervals cease to include zero, becomes significant. These observations are consistent with H8. Importantly, as can be observed in the two high vividness conditions (panels B and C), when very vivid social cues are provided, there are no discernible effects of stereotypes on opinions among the imaginative and the unimaginative alike. The flat lines indicate that the effects of prior stereotypes do not change as a function of imagination and, as revealed by the associated confidence intervals, the effect is insignificant across the entire span of differences in imagination. This pattern of findings is consistent with H9.

*Figure 1 around here*

To further test the robustness of these conclusions, we estimated full three-way interactions between imagination, stereotypes, and the experimental manipulations of vividness in the externally provided descriptions (see Online Appendix A12, Table A11, M1–2). The findings corroborate the substantial nature of the difference in the effect of imagination that can be observed in Figure 1. Hence, when comparing the low vividness condition to both high vividness conditions, we find significant three-way interaction terms between imagination, stereotypes, and experimental condition (comparison with High I:  $F = 7.07$ ,  $p = 0.009$ ; comparison with High II:  $F = 5.70$ ,  $p = 0.019$ ), which lends support to the

notion that imagination facilitates the use of stereotypes significantly less when vivid social cues are provided.<sup>9</sup> In sum, these analyses show that when judging loosely described welfare recipients, imaginative people are better able than unimaginative people at filtering in their prior stereotypes. Hence, when facing unvivid descriptions of specific welfare recipients, imaginative people who believe that most welfare recipients are lazy are highly supportive of tougher means-testing, whereas imaginative people who believe that most welfare recipients are unlucky are strictly against tougher means-testing. This stands in contrast to judgments in the face of vivid descriptions of specific welfare recipients. In such situations, *all* individuals—independently of stereotypes and imaginative capacity—follow the information given. In the present case, where the recipient is described as being low in effort, everybody supports tougher means-testing.

As argued in the theory section, imagination constitutes one of the components of the more general personality trait: openness to experience. Study 6 included a measure of the other component of openness: adventurousness. As analyzed in detail in Online Appendix A12, the effects of imagination stay robust to control for adventurousness and are not replicable using adventurousness. These results support that the effects we predict and observe are specific for the sub-trait imagination. This is something we address further in the next study.

### **Study 7: Imagination, Social Welfare Attitudes and Charity Donations**

In Studies A–D and 1–6, we have relied on a combination of physiological, behavioral, implicit, and self-report measures to show how individual differences in imagination help people link social and political cognition. In this final study, we extend our account to show how imagination is engaged during actual incentivized behavioral decisions. Furthermore, as the demonstrated effects of imagination are argued to be specific for imagination rather than related psychological constructs (as

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<sup>9</sup> To further ensure the robustness of these results, two additional sets of analyses have been performed: First, we have controlled the three-way interaction models for age, sex and education. The interactions are robust to the inclusion of these controls (Low compared with High I:  $F = 6.42$ ,  $p = 0.013$ ; Low compared with High II:  $F = 4.32$ ,  $p = 0.04$ ; all  $p$ -values two-tailed). Second, we have examined the models for the influence of outliers and do not find any (see Online Appendix A12).

also shown in Study A and, to some extent, Study 6), Study 7 includes a large battery of cognitive and personality measures which can be included as control variables. The study shows that not only are more imaginative people more likely to follow the behavioral implications of their political attitudes, this effect is also robust to control for a very large range of closely related personality constructs (need for closure, ideology, general openness to experience, and adventurousness) and cognitive ability measures (need for cognition, need to evaluate, and political knowledge).

### *Predictions*

As argued in the theory section, a key adaptive function of decoupled cognition is to help individuals plan. By facilitating vivid simulations of future scenarios and potential outcomes, imagination allows individuals to experience their reactions to these outcomes before they happen and adjust their behavior accordingly (Boyer 2008; Cosmides and Tooby 2000; see also Schacter, Addis, and Buckner 2007, 660). This is particularly relevant in social and political situations in which individuals experience a constellation of cross-cutting incentives. In particular, in both social and political dilemmas, individuals often face choices about whether to sacrifice long-term principles and values for the short-term satisfaction of self-interest. Previous research on behavior in social dilemmas has shown that giving in to short-term temptations can elicit feelings of guilt and regret, which subsequently motivates behavior adjustment (Ketelaar and Au 2003). By facilitating vivid and emotional-engaging simulations of different outcomes, high levels of imaginative capacity allow individuals to anticipate such feelings and stick to their principles in the first place.

In this way, individual differences in imaginative capacity should not only track the ease with which individuals form political attitudes but also how strongly these attitudes subsequently guide actual political behavior. In short, we predict higher levels of attitude–behavior consistency (cf. Fazio and Roskos-Ewoldsen 2005) among the imaginative relative to the unimaginative (H9). In the study, we continue our focus on social welfare attitudes and specifically ask whether imagination magnifies

the effect of political support for helping the disadvantaged on actual behavior with real money in the form of money transfers to charity organizations and fellow individuals.

### *Design and Measures*

As part of a larger study, 58 university students (33 males and 25 females, mean age = 23.5 years) participated in two incentivized behavioral social and political dilemmas and answered questions about their political attitudes and personality and cognitive abilities. For their participation, subjects entered a lottery among all participants with a number of gift certificates of approximately \$40 each. Further details and all measurement details are available in the Online Appendix A13. All measures vary between 0–1.

*Social welfare attitudes.* We wanted to obtain a morally binding measure of social welfare attitudes that could be expected to guide subjects' subsequent behavioral decisions. To this end, we devised a new scale based on Turiel's (1983) conceptualization of morally charged attitudes and asked subjects about the extent to which they viewed helping the poor and disadvantaged as a moral responsibility that is (1) serious to violate, (2) independent of cultural traditions, and (3) independent of the discretion of political authorities. The scale consisted of 9 Likert-scale items which were added together to form a reliable scale ( $\alpha = 0.81$ ).

*Behavioral dilemmas.* To investigate how these attitudes influence behavior, we placed subjects in two incentivized dilemmas: one interpersonal and one political. First, we used one of the most well studied interpersonal dilemmas in experimental economics: the Dictator Game (cf. Camerer 2003). In the Dictator Game, subjects are asked to divide a real sum of money (here, approximately \$400) between themselves and another anonymous participant in the study. They can divide the sum in any way they see fit. Such decisions have been demonstrated to activate cross-cutting incentives. On the one hand, there is the self-oriented motive to keep the money for oneself. On the other hand, research has demonstrated that such decisions activate egalitarian motives in subjects, which create an urge to

hand over some of the money to the other participant (Tricomi et al. 2010). Such egalitarian motives, we suggest, should be stronger among those who view social welfare and redistribution as a moral imperative. Second, at the end of the study, subjects were put in a similar but more directly politically relevant dilemma. Specifically, they were asked what they wanted to do with their winnings if they won in the lottery they participated in for showing up. Should they be paid to the subject—or should they, on behalf of the subject, be paid to a charity organization, the Danish Red Cross, which is heavily involved in social work among disadvantaged groups in Danish society? Whereas the Dictator Game allowed for continuous responses, this second dilemma was posed as a forced choice between keeping all of the money for oneself or giving it all to charity.

*Personality.* Again, the S-IM scale showed high levels of reliability ( $\alpha = 0.88$ ). In addition, as described below and in the Online Appendix A9, we measured a range of other constructs related to personality and cognitive ability.

## *Results*

We expect that individuals who support social welfare are more likely to provide money to charity organizations and directly to fellow individuals. Furthermore, we expect this attitude–behavior link to be facilitated by mental simulation processes such that imaginative people’s political behavior is more strongly guided by their political attitudes. In tandem, these expectations entail the existence of a two-way interaction between social welfare attitudes and imagination on the monetary donation tasks used in the study. For donations both in the Dictator Game and to the charity organization, F-tests reveal that the interaction between attitudes and imagination effect is significant (Dictator Game:  $F = 7.08$ ,  $p = 0.01$ ; Charity Donation:  $\chi^2 = 6.49$ ;  $p = 0.01$ ). In Figure 2, we graphically display these interaction effects (with the full models available in the Online Appendix A13, Table A12). Panel A shows the marginal effects of social welfare attitudes on donation behavior in the Dictator Game, while Panel B shows the same in relation to the charity organization. As can be seen, imagination significantly increases the effect of people’s political principles on incentivized behavior such that the imaginative

are more likely to stick to their principles (i.e., donate if supportive of welfare) in the face of short-term temptations to sacrifice their principles for money. This supports H9.

Individual differences in imagination are, of course, just one part of a larger set of the psychological differences existing between individuals. This leaves open the question of whether the effects we are reporting are specifically driven by differences in imagination or whether they are confounded by some of the other psychological variables that imagination is related to (cf. Studies A–D). First, because imagination forms part of the larger Big Five trait, openness to experience, other subparts of openness or indeed the general openness trait itself could be responsible for the effect. Second, because high imagination allows for a deeper cognitive processing of information, the effects of imagination could be confounded by other measures of cognitive ability. In Study A, we showed that imagination has a unique effect on the ability to vividly experience and recollect fiction. Here, we follow the same strategy and control for the effects of imagination for potential confounds. All of the details for these analyses are to be found in the Online Appendix A13.

First, we tried replicating the reported interaction effect on donation behavior using a general measure of openness to experience (cf. Mondak et al. 2010). Yet for both donation tasks, the interaction effect between social welfare attitudes and openness was insignificant ( $p = 0.27$  and  $p = 0.85$  for the dictator and charity decisions, respectively). As the more refined measurement at the subtrait level of imagination is required to obtain the effect, this suggests that the demonstrated effects are specifically tied to this component of openness. Second, we examined a set of key personality measures that previous research in psychology and political science have found to be related to openness to experience and, therefore, potentially to imagination: adventurousness (Goldberg 1999), political ideology (cf. Gerber et al. 2010) and need for closure (Webster and Kruglanski 1994). For each of these variables, we constructed two-way interaction terms with social welfare attitude and regressed donation behavior on them. Importantly, the interactive effect of imagination was robust to the inclusion of these other personality measures in both donation tasks (after control:  $p = 0.08$  and  $p = 0.03$  with two-tailed tests for dictator and charity decisions, respectively). None of the alternative

personality constructs had any consistent significant effects on behavior across the two decisions. Third, we controlled for measures of cognitive ability. In political science, three measures of cognitive ability are widely used: need for cognition (Cacioppo and Petty 1982), need to evaluate (Jarvis and Petty 1996) and political knowledge (cf. Zaller 1992). Again, however, the effect of imagination remained robust to the inclusion of interaction terms with these cognitive variables (after control:  $p = 0.07$  and  $p = 0.03$  with two-tailed tests for dictator and charity decisions, respectively). Furthermore, neither the alternative personality constructs nor the measures of cognitive ability had any consistently significant effects on behavior across the two decisions. In sum, these analyses suggest that the effects we report are specifically tied to individual differences in imagination and, consistent with theoretical arguments, that decoupled cognition plays a unique role in facilitating attitude-behavior consistency in the face of short-term economic incentives to forgo one's political principles.

## **Conclusion**

Despite the widespread lack of extensive political knowledge, citizens readily form opinions on what constitutes the best and most efficient policies. This has correctly been identified as a classic puzzle in the literature on public opinion: How do citizens form opinions on something they do not understand (e.g., Sniderman, Brody, and Tetlock 1991)? Since the initial phrasing of this puzzle, a long line of significant research on information processing has consistently produced evidence that citizens achieve this by relying on simplifying cues and heuristics (e.g., Sniderman, Brody, and Tetlock 1991; Lau and Redlawsk 2006; Zaller 1992). Our suggestion is that these important insights lead to a new, fundamental puzzle: The research into the processes that citizens use to organize political choice increasingly suggests that they were not first and foremost designed for decision-making in mass politics. Rather, they are generic social cognitive devices used in a whole range of everyday social and moral judgments (Fowler and Schreiber 2008; Hatemi and McDermott 2011; Kuklinski and Quirk 2000; Petersen 2012; Schreiber 2007). As evidenced by research in psychology, everyday social cognition operates on the basis of a massive number of intimate social cues (e.g., Kurzban 2001;

Scharlemann et al. 2001). Hence, the new puzzle: How do citizens utilize social cognition to reason about mass political issues in the anonymous, abstract, and information-scarce context of mass politics? The analysis presented in this article provides evidence that when utilizing social cognition in the formation of political opinions, citizens rely on decoupled cognition to generate the kind of vivid cues upon which their social cognition operates.

Using psychological research on personality and individual differences, we have developed and validated a short imagination scale, the S-IM scale, that tracks basic individual differences in how vividly information is simulated (Studies A–D). Testifying to the discriminant validity of the S-IM scale, the scale does not overlap substantially with previously established moderators in political science and its effects are robust to control for differences in cognitive abilities and in closely related personality constructs. In establishing the convergent validity of the S-IM scale, we have shown that self-reported answers on the S-IM scale correlate with non-verbal, behavioral measures of imaginative capacity (including mental rotation ability and skin conductance sensitivity). An alternative strategy for future research will be to compare the predictive effects of the explicit S-IM scale with the predictive effect of these implicit measures to establish whether they each account for unique variance in relevant dependent variables (see, e.g., Smith et al. 2011).

Using the S-IM scale, we have compared two very different countries, the United States and Denmark, revealing how imaginative people form more coherent social welfare opinions, engage in more thorough memory searches during opinion formation, and generate more elaborate and consistent mental representations of welfare recipients as input to the inferential mechanisms behind social welfare opinions (Studies 1–2). We have also provided a more specific investigation of the effects of imagination on the precise engagement and output of social cognitive mechanisms. The findings from the US and Danish cases indicated that imaginative individuals exhibited stronger links between the laziness stereotypes that the deservingness heuristic takes as input and the emotions of anger and compassion it produces and regulates as output (Studies 3–4). Using the implicit association test, we replicated the basic effect using an implicit measure of stereotypes, which lends further

confidence in the obtained results (Study 5). We then demonstrated that when presented with cues lacking detail, imaginative individuals fill in the gaps using their prior stereotypes to a much greater extent than unimaginative individuals. Importantly, the findings also supported that when vivid social cues are provided, the cognitive advantages of imaginative people are inhibited. Here, both imaginative and unimaginative individuals rely less on their prior stereotypes in the interpretation of the available information (Study 6). Finally, we demonstrated that the role of imagination extends beyond attitudes to actual incentivized behavior. Due to its role in planning and scenario simulation, imagination facilitates the ability of the individual to commit to and act on the basis of their political principles in the face of contrasting short-term incentives (Study 7). This latter finding could suggest that imagination is a key part of the personality profiles of those who are engaged and participate in democratic politics despite the often low economic returns to the self.

Some of these findings may seem to run counter to folk intuitions about the effects of being imaginative. We have, for example, shown that when imaginative individuals say that they think welfare recipients are ‘lazy’, this representation generates more opposition towards welfare than is the case among the unimaginative. Similarly, when imaginative people say that they think welfare recipients are ‘making an effort’, this representation generates more support. Does this suggest that imaginative people are caught within the confines of their prior stereotypes? No. Rather it suggests that the semantic association between, for example, ‘welfare recipient’ and ‘lazy’ is embedded in a richer, more vivid and more detailed set of associations among the imaginative (cf. Studies 1 and 2) and, hence, allow for a stronger activation of affective responses (cf. Studies 3-5). In fact, as evidenced in Study 6, the imaginative are more moved by information that counters their stereotypes and, hence, quickly absorb and generate alternative representations. At the same time, it should be noted that the concept of imagination is sometimes used to refer uncontrollable, wild flights of fantasy. In this article, in contrast, we have equated imagination with the more technical term, decoupled cognition, and the S-IM scale was specifically designed to measure individual differences

in this regard. Hence, the effects we observe originate specifically from individual differences in abilities for generating a mental simulation of events, people, places etc. that are not directly present.

Previous research has emphasized the role of external information sources in the generation of political behavior and attitudes. We have extended this research by showing how indirect experiences become vivid and elaborate through an *internal* process, decoupled cognition, which allows basic processes of social cognition to become active and inform political cognition. Becoming engaged in mass politics is like becoming engaged in fiction and depends critically on one's ability to imagine the unseen. The importance of this finding lies in particular in its capacity to facilitate the dialogue between two literatures that have come to very different conclusions regarding the competences of citizens: the classical public opinion literature and the emerging literature on the biological foundations of politics. Whereas the former has focused on citizens' lack of political knowledge and interest and the instability and incoherence of their opinions, the latter has emphasized how the nature of the political animal gives rise to stable attitudes and deep intuitions about modern mass politics. Our findings suggest that both conclusions are valid but that they apply to different individuals. Because social cognition does not influence political cognition in an unmediated manner, imaginative individuals will—to a much larger extent than the unimaginative—apply social cognition to politics and find politics easy, intuitive, and fun. Not because the latter segment is not naturally endowed with profound social and moral intuitions but because they are less capable of applying them to modern mass politics. Hence, the political animal's views on mass politics come from the minds' eye.

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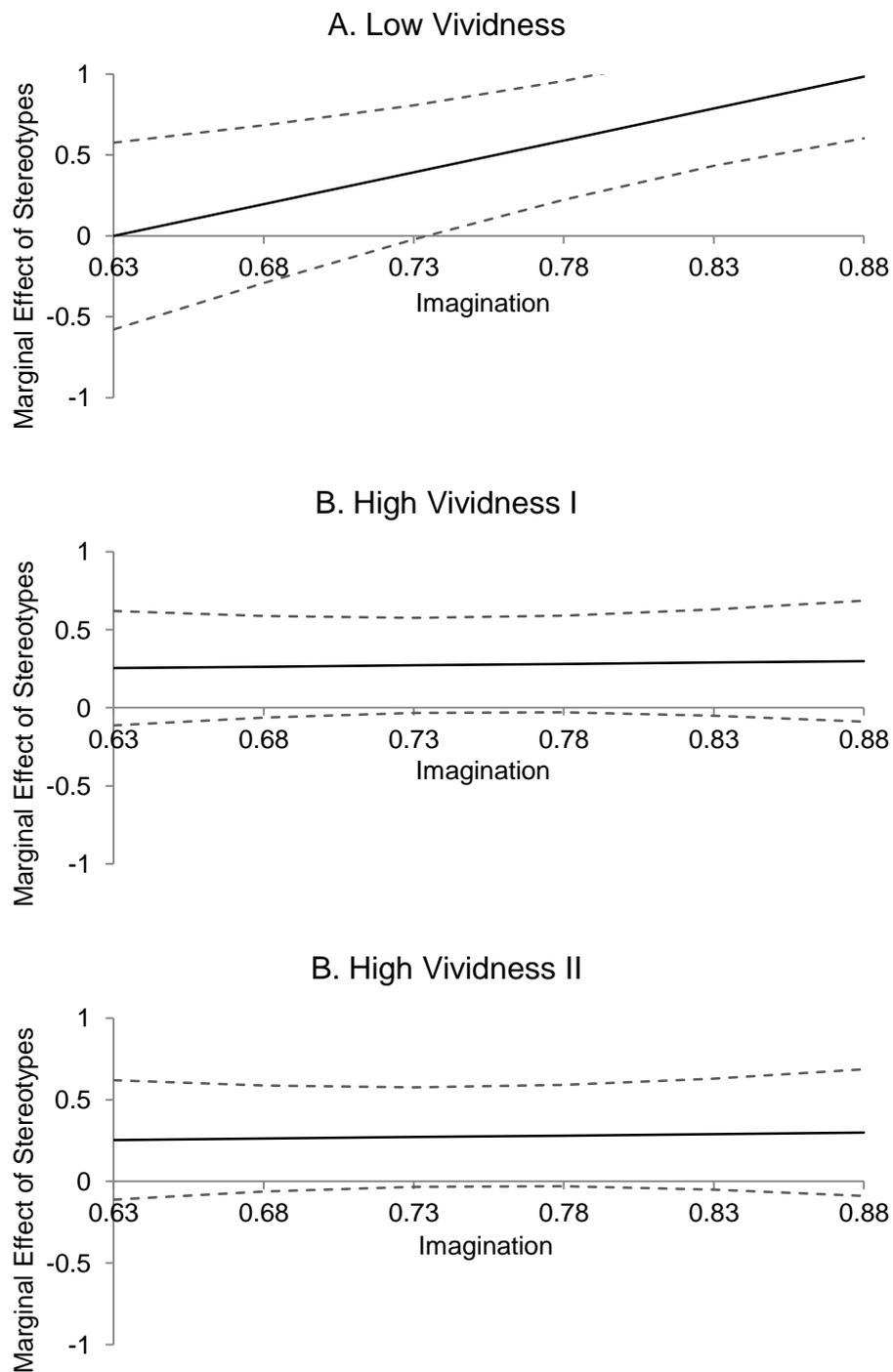
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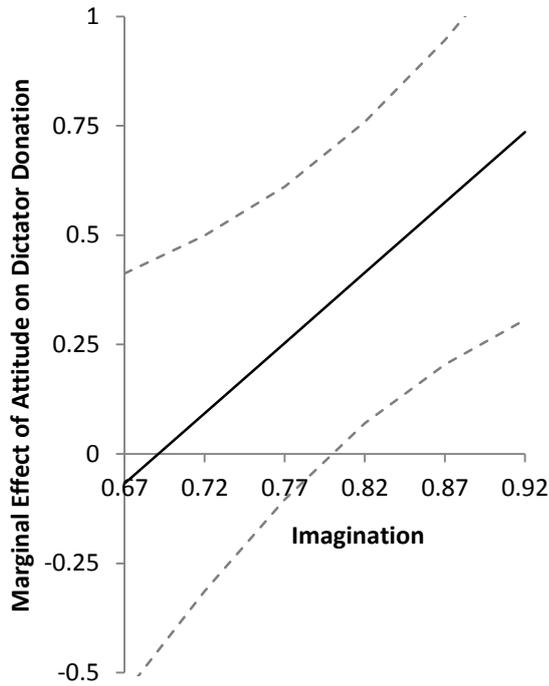
**Figure 1. Predicted Marginal Effect of Stereotypes on Support for Tougher Means Testing by Vividness Condition and Imagination**



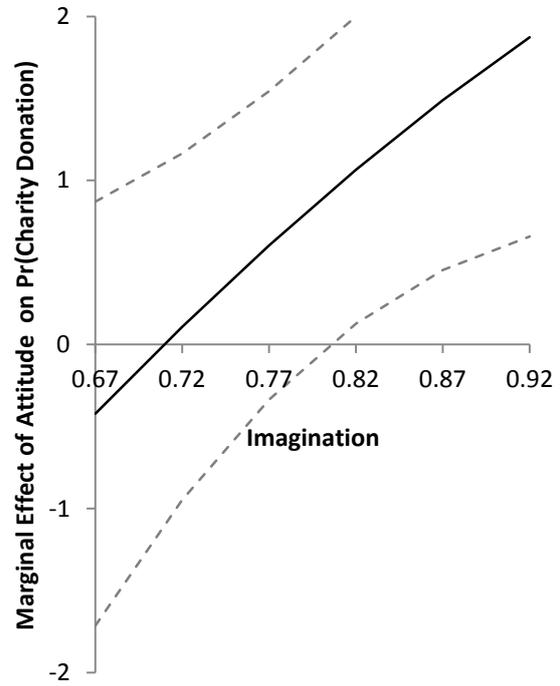
*Notes:* Graphs are created from separate multiple regressions for each experimental condition, including imagination, laziness stereotype, and their two-way interaction. Marginal effects are shown for the interquartile range of values on the imagination scale. F- and p-values for the interaction terms: Panel A:  $F = 10.45$ ,  $p = 0.002$ ; Panel B:  $F = 0.10$ ,  $p = 0.76$ ; Panel C:  $F = 0.04$ ,  $p = 0.84$ .

**Figure 2. Predicted Marginal Effect of Social Welfare Attitudes on Monetary Donations by Imagination**

**A. Dictator Game**



**B. Charity Donation**



*Notes:* Marginal effects are shown for the interquartile range of values on the imagination scale. Test statistics and p-values for the interaction terms: Panel A:  $F = 7.08$ ,  $p = 0.01$ ; Panel:  $\chi^2 = 6.49$ ;  $p = 0.01$ . Marginal effects in Panel A are unstandardized regression coefficients calculated on the basis of the OLS regression in Table A12 Model 1 which is reported in Online Appendix A13. Marginal effects in Panel B are changes in predicted probabilities calculated on the basis of the binary logistic regression in Table A12, Model 5, reported in Online Appendix A13.

**Table 1. Effect of Imagination on Ambivalence, Response Latency, Number of Associations, and Association Consistency**

	<u>Study 1 – the United States</u>				<u>Study 2 – Denmark</u>			
	Attitude Strength M1	Response Latency M2	Number of Associations <sup>1</sup> M3	Association Consistency <sup>2</sup> M4	Attitude Strength M5	Response Latency M6	Number of Associations <sup>1</sup> M7	Association Consistency <sup>2</sup> M8
Intercept	0.02 (0.04)	0.23 (0.05)***	0.97 (0.41)*	1.06 (0.31)**	0.26 (0.06)***	0.39(0.05)***	0.28 (0.32)	0.04 (0.25)
Imagination	0.20 (0.06) ***	0.22 (0.05)***	1.84 (0.42)***	0.82 (0.32)**	0.13 (0.06)*	0.14 (0.05)**	1.42 (0.32)***	1.17 (0.25)***
Female	-0.05 (0.02)**	0.02 (0.02)	0.43 (0.16)**	0.22 (0.12)	-0.08 (0.02)***	0.02 (0.02)	0.26 (0.11)*	0.13 (0.09)
Education	0.07 (0.03)*	-0.14 0(.04)***	0.54 (0.30)	0.29 (0.23)	0.14 (0.04)***	-0.08 (.03)*	0.75 (0.21)***	0.48 (0.16)**
Age	0.003 (0.001)***	0.004 (0.001)***	0.01 (0.01)	0.002 (0.004)	0.000 (0.001)	0.001 (0.001)*	0.01 (0.004)**	0.007 (0.003)*
Adjusted R <sup>2</sup>	0.05	0.07	0.03	0.01	0.04	0.02	0.04	0.03

*Notes:* Entries are unstandardized OLS regression coefficients. Standard errors are reported in parentheses. To investigate the potential existence of national differences in the reported effects of imagination, we have tested for the significance of two-way interactions between imagination and nationality on all dependent variables using a pooled data set. None of the interactions are significant (p-values are between .26 and .41).

<sup>1</sup> Number of associations is measured on a scale ranging from 0 to 20 associations.

<sup>2</sup> Association consistency is measured on a scale ranging from 0 to 20, higher scores indicating a higher consistency of either deserving or undeserving associations.

All other variables range from 0 to 1 except for age which is measured in years. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. All p-values are two-tailed.

**Table 2. Effect of Imagination on the Impact of Laziness and Unintelligence Stereotypes on Anger, Compassion, and Concern**

	<u>Study 1- the United States</u>			<u>Study 2 – Denmark</u>		
	Anger M1	Compassion M2	Concern M3	Anger M4	Compassion M5	Concern M6
Intercept	0.59 (0.08)***	0.63 (0.07)***	0.73 (0.08)***	0.04 (0.12)	0.74 (0.12)***	0.47 (0.14)***
Imagination	-0.49 (0.10)***	0.25 (0.09)**	0.15 (0.10)	0.01 (0.15)	0.17 (0.15)	0.23 (0.17)
Laziness Stereotype	0.06 (0.13)	-0.19 (0.11)	-0.19 (0.12)	0.29 (0.16)	-0.14 (0.16)	0.01 (0.18)
Unintelligence Stereotype	-0.23 (0.17)	-0.22 (0.15)	-0.24 (0.16)	0.37 (0.24)	-0.49 (0.25)*	-0.25 (0.28)
Lazy × Imagination	0.56 (0.18)**	-0.34 (0.15)*	-0.21 (0.16)	0.36 (0.20)†	-0.47 (0.21)*	-0.36 (0.23)
Unintelligent × Imagination	0.28 (0.23)	0.06 (0.19)	0.15 (0.21)	-0.37 (0.31)	0.40 (0.32)	0.34 (0.25)
Female	0.01 (0.02)	0.05 (0.02)**	0.05 (0.02)**	-0.02 (0.02)	0.02 (0.02)	0.02 (0.02)
Education	0.09 (0.04)*	0.06 (0.03)	-0.01 (0.04)	-0.05 (0.03)	0.002 (0.03)	-0.01 (0.03)
Age	< 0.000 (0.001)	0.001 (0.001)*	0.001 (0.001)	< 0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)
Adjusted R <sup>2</sup>	0.24	0.34	0.21	0.34	0.31	0.10

*Notes:* Entries are unstandardized OLS regression coefficients. Standard errors are reported in parentheses. To investigate the potential existence of national differences in the reported interactions between imagination and laziness stereotypes, we have tested for the significance of two-way interactions between imagination and nationality on anger and compassion using a pooled data set. None of the interactions are significant (p-values are between .12 and .65). All variables range from 0 to 1 except age, which is reported in years. † p = 0.074, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. All p-values are two-tailed.

## Appendix 1

### Overview of Studies

Study	Purpose	Method	Main Results	Reported In
Validation Study A (n = 164)	Verify the predictive validity of the S-IM scale outside a political context	Online survey	The S-IM scale tracks how vividly people experience and recollect descriptions of unseen fictional people and events	Main text, OA <sup>1</sup> A2-5
Validation Study B (n = 81)	Verify the predictive validity of the S-IM scale using a behavioral task	Online survey	The S-IM scale tracks success rates in Mental Rotation Tasks	Main text, OA A2
Validation Study C (n = 58)	Verify the predictive validity of the S-IM scale in engaging deeper emotional mechanisms	Lab study using skin conductance response	The S-IM scale tracks physiological reactions to emotional images	Main text, OA A2-3
Validation Study D (n = 242)	Investigate scale reliability and potential overlaps with other well-used cognitive moderators in the political science literature	Pencil and paper survey	The S-IM scale tracks individual differences left untapped by other available measures	OA A2-3
Studies 1-2 (n <sub>US</sub> = 1009, n <sub>DK</sub> = 1006)	Investigate whether imaginative individuals form opinions on mass politics more easily	Online surveys in the US and Denmark	Imaginative individuals form stronger attitudes and have more vivid mental associations available regarding an issue relevant target group	Main text, OA A6 A10
Studies 3-4 (n <sub>US</sub> = 1009, n <sub>DK</sub> = 1006)	Investigate whether imaginative individuals engage social cognition to a greater extent during political opinion formation	Online surveys in the US and Denmark (same as above)	Social cognition links particular associations and particular emotional reactions and these links are stronger among imaginative individuals	Main text, OA A7
Study 5 (n = 61)	Replicate key findings from Studies 3-4 using implicit measures	Lab study using Implicit Association Test	The links between relevant implicit associations and opinions are stronger among imaginative individuals	Main text, OA A11
Study 6 (n = 146)	Investigate the interaction between external sources of information and imagination	Survey experiment	The cognitive advantages of the imaginative is decreased by the external presence of very vivid information	Main text, OA A8 A12
Study 7 (n = 58)	Investigate whether the effects of imagination extends to incentivized political behavior	Lab study	The imaginative show higher levels of attitude-behavior consistency	Main text, OA A9 and A13

*Note.*<sup>1</sup>OA abbreviated for Online Appendix. The table provides an overview of the studies included in the article by purpose, method and main results. The tables also indicate where the study description and findings are reported.