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Interpersonal disagreement has been linked to a variety of democratic outcomes, and classic theories of social influence place it at the heart of opinion formation. We examine the relationship between exposure to disagreement and information seeking during elections, while developing and testing a theory of heterogeneous effects based on recent work on personality and discussion (e.g., Gerber et al. 2012). Using a simulated campaign experiment (Lau and Redlawsk 2006) and data from the 2008–9 ANES panel study, we find consistent evidence that personality conditions responses to disagreement in expected ways—it enhances effects for those with certain traits, while suppressing it for those with others. We close by reflecting on this pattern of results, discussing broader implications while moving toward a more general theory of social influence.

Social scientists have long placed political communication at the center of democratic politics. One important type of communication comes in interpersonal discussion (Downs 1957; Katz and Lazarsfeld 1955), particularly as it involves exposure to different points of view (Lazarsfeld, Berelson, and Gaudet 1968). Indeed, the study of socially supplied political disagreement has deep roots (see, e.g., Zuckerman 2005) and has been linked to a variety of behavioral outcomes (e.g., Klofstad, Sokhey, and McClurg 2013; Sinclair 2012), including higher propensities to vote across party lines (e.g., Huckfeldt and Sprague 1995).

Although scholars have long posited that disagreement has important political consequences, Mutz's works (2002a, 2002b, 2006) have advanced this point especially forcefully, arguing that interpersonal disagreement presents a mix of positive and negative results—a "democratic dilemma"—for the mass public, simultaneously promoting levels of tolerance while suppressing levels of political participation. Others have helped keep attention focused squarely on dis-agreement, even while striking a less cautionary tone about its role in democratic functioning (e.g., Huckfeldt, Johnson, and Sprague 2004) or positing that any deleterious effects on participation may be minimal (Nir 2005), conditional (Bello 2012; Nir 2011), potentially reversed (Jang 2009), or countered by discussant expertise (McClurg 2006a).

At present, the consequences of disagreement remain the subject of intense scholarly debate. We join this conversation but follow recent efforts in recognizing the potential for heterogeneous effects. While the literature has noted that social influence works differently based on the interplay of individual choice and constraint (Klofstad et al. 2013; McClurg 2006b; Sokhey and Djupe 2011), much of the work in this vein focuses on the construction of social "barriers" with respect to coercive environments, such as those in majority/minority contexts (Finifter 1974; Huckfeldt and Sprague 1995; McClurg 2006a). We advance a conditional approach that stresses the contribution of individual traits in moderating interpersonal disagreement

(see Testa, Hibbing, and Ritchie [2014] for complementary work using conflict avoidance). Such a perspective can help us make sense of mixed findings regarding disagreement, for it points not toward uniformly positive or negative effects in the electorate. Rather, it raises the possibility that disagreement may be more (less) important for some and underscores the need for nuanced understandings of conditional effects.

We focus our efforts on understanding how personality constrains social influence. Personality is a relatively static trait within individuals that potentially guides a host of political attitudes and behaviors (Mondak 2010; Winter and Barembaum 1999), including political discussion (Gerber et al. 2012; Hibbing, Ritchie, and Anderson 2011; Mondak 2010; Mondak et al. 2010). Scholars have long recognized the potential for heterogeneity in responses to disagreement (for a discussion, see Ahn, Huckfeldt, and Ryan 2014) and considered treatments of conflict avoidance (e.g., Mutz 2006), including recent examinations of positive orientations to conflict (Testa et al. 2014). However, we know less about how personality traits affect the relative impact of disagreement, even if scholars have linked certain personality types to exposure to it (e.g., Mondak et al. 2010).

The existing literature raises the possibility that personality traits function as key moderators of social influence (Gerber et al. 2012). For certain personality types, disagreement may drive information seeking (McPhee, Ferguson, and Smith 1963; Sprague 1982) or produce ambivalence (Mutz 2002b, 2006); for others, effects may be reversed or nonexistent. For example, agreeable individuals prioritize the maintenance of social harmony and the avoidance of discord, while extroverted individuals relish social interactions of all kinds. One can imagine that these two types of individuals approach and respond to political discussions in diverging ways—this simple contrast suggests that responses to disagreement are likely to be heterogeneous. In this article we argue that personality helps to explain varied reactions, adding important qualifications to existing perspectives on the democratic consequences of "informal" deliberation (e.g., Jacobs, Cook, and Delli Carpini 2009; Mutz 2006).

We employ an experimental design uniquely suited to addressing these questions, before considering the external validity of our results using the 2008–9 ANES panel study. Our experimental treatment randomly primes political disagreement (McClurg, Sokhey, and Seib 2011) before a simulated campaign (Lau and Redlawsk 1997, 2006). When we pair this with measures of the "Big 5" personality traits, we gain leverage not only on the potential causal effects of interpersonal discussion but on how different types of people respond to primes tapping socially supplied disagreement.

Between the experimental and survey results, we find consistent evidence that personality moderates the relationship between disagreement and political information seeking. For some interpersonal disagreement seems to drive information acquisition, while for others, it produces largely different (sometimes null) consequences.

DISAGREEMENT AND ELECTORAL INFORMATION SEEKING

Interpersonal disagreement has been linked to a wide range of behaviors and attitudes, such as participation (McClurg 2006b; Mutz 2006) and candidate evaluations (Huckfeldt et al. 2004; Huckfeldt and Sprague 1995). Here we focus on a fundamental aspect of democratic citizenship: information seeking about politics. Our approach is informed by the information search process central to McPhee et al.'s (1963) classic model of social influence. This model begins as an individual receives information about politics (e.g., a message about candidates), which leads to an initial preference. The individual then checks her preference with members of her network. If the individual finds agreement, she has no reason to look for additional information and the process of consultation ends; if she encounters disagreement, it creates uncertainty about her preference and the process continues. The principal implication of this model is that those experiencing disagreement in their social network question their prior beliefs and therefore engage in additional search behavior and interaction—disagreement drives information acquisition.

There is a large literature that builds on this model of social influence (e.g., Ahn et al. 2014; Huckfeldt et al. 2004; Huckfeldt and Sprague 1995; McClurg 2003). We advance this approach by taking the idea of social interaction and focusing not on how disagreement drives subsequent network engagement but on how exposure to interpersonal disagreement affects more general patterns of information-seeking behavior during campaigns. As information seeking is perhaps the most important characteristic in assessing the quality of political behavior (Lau and Redlawk 2006), it is important to understand the conditions that trigger the process. Recent work finds that individual traits such as orientations toward conflict condition the effects of disagreement (Testa et al. 2014); here we speak to these efforts, exploring different outcomes and individual moderators. To what degree do personality traits exaggerate (mute) social pressures when it comes to information seeking?

Of course, our focus on this question raises several additional points. First, what do we mean by the term "information seeking"? Conceptually, we follow the work of Lau and Redlawsk (2006, 32): information is anything (e.g., party

affiliations, issue positions, candidate backgrounds, etc.) that might be used to make a political decision. "Information-seeking behavior" then refers to what individuals do to control the amount and nature of the information they obtain. Empirically, political scientists have many indirect measures that are related to the concept, such as individuals' expressed "interest in information" during elections. A more satisfactory measure might record the actual information that people look at as they navigate the candidates, issues, events, and polls of a campaign. In the analyses that follow, we employ both approaches.

Second, why focus on personality? While examining the relationship between network disagreement and information seeking speaks to established models of social influence (e.g., McPhee et al. 1963; see also Sprague 1982), such a focus only takes us so far in addressing the (mixed) state of the literature when it comes to the effects of disagreement. To help resolve current debates we need to take the less common step of presenting an "integrative framework"—one that simultaneously incorporates the "three pillars of behavior of behavior—elements of the environment, individuals' basic traits, and interactions between traits and the environment" (Mondak et al. 2010, 85).

Personality traits are a good place to look when it comes to individual moderators of social effects; they identify differences between individuals that predispose them to think and behave divergently. Personality traits may cultivate and influence the formation of ideology (Carney et al. 2008; Gerber, Huber, Doherty, Dowling, and Ha 2010; Mondak 2010), partisanship (Gerber, Huber, Doherty, and Dowling 2010), issue attitudes (Gerber, Huber, Doherty, Dowling, and Ha 2010; Mondak and Halpernin 2008), and the decision to vote (Gallego and Oberski 2011; Gerber, Huber, Doherty, and Dowling 2010; Mondak 2010; Mondak and Halpernin 2008). Important for our purposes, evidence suggests that personality traits predispose individuals to seek and obtain information about politics in different ways (Gerber, Huber, Doherty, and Dowling 2010). Personality may drive some individuals to seek specific sources for political discussion, while it may drive others to avoid the same contacts (Hibbing et al. 2011; Mondak 2010; Mondak et al. 2010). Notably, personality may predispose citizens to discuss politics more (less) in response to the distribution of disagreement within their networks (Gerber et al. 2012).

PERSONALITY, DISAGREEMENT, AND POLITICAL BEHAVIOR

The "Big 5" personality types—conscientiousness, openness to experience, extroversion, emotional stability, and agreeableness—have been increasingly linked to a host of po-

litical attitudes and behaviors, including the ways in which people interact, behave, and are influenced (Gerber, Huber, Doherty, and Dowling 2010, 2011; Gerber, Huber, Doherty, Dowling, and Ha 2010; Gerber, Huber, Doherty, Dowling, Raso, and Ha 2011; Gerber et al. 2012; Hibbing et al. 2011; Jost 2006; Jost et al. 2003; Mondak 2010; Mondak and Halpernin 2008; Mondak et al. 2010). Mondak (2010) describes personality as the individual's "central tendency," noting that there are fundamental differences between people that predispose them to approach the political world differently. There are several components to the narrative with respect to disagreement, personality, and information seeking. It is important to underscore that we conceptualize this as a story about the ways in which personality moderates the effects of disagreement on information seeking; we focus less on the direct relationship between personality and political discussion (Hibbing et al. 2011; Mondak 2010).

Individuals who score highly in terms of the personality trait "openness to experience" are often characterized as being willing to seek out novel information, as having relatively weak attachments to prior convictions, and as enjoying cognitively demanding situations and interactions (Mondak 2010). There is evidence that openness to experience results in more discussion and larger social networks (Mondak et al. 2010) but not necessarily more information seeking from sources such as the media (Mondak 2010) or more influence from social sources (Hibbing et al. 2011). That said, some work suggests that openness also results in a tendency to avoid frequent discussion with those who hold dissimilar views (Gerber et al. 2012). Overall, then, it seems that such individuals are prone to seeking new information but are also predisposed to avoid disagreement. While it is hard to say how such a predisposition will structure reactions to disagreement, the tendency to seek and to be open to new information leads us to believe that, on balance, information seeking will be the outcome. Thus, we expect these characteristics to result in enhanced susceptibility to social influence—that means engaging in greater information-seeking behavior (as gauged by a deeper search).

The extroverted individual is characterized as being outgoing, talkative, and participatory (Mondak 2010). Extroverted citizens appear to engage in more information seeking from media sources (Mondak 2010) and engage in more discussion with peers across a range of contexts (Gerber et al. 2012; Hibbing et al. 2011; Mondak 2010), and in larger social networks (Mondak et al. 2010). Because of the highly social nature of the extroverted individual, she may be more prone to seek information, in large part due to the fact that she wants to be able to talk to people and wants to have things to talk about (Mondak 2010)—this includes having informa-

tion about opposing views when she encounters disagree-able viewpoints. As with open personalities, we expect those scoring high in extroversion to display greater information seeking-behavior in response to disagreement.

Agreeable citizens are highly concerned with having positive relations with others, with avoiding conflict, and with collaborating when differences arise (Mondak 2010). They seek to avoid conflict wherever possible, and perceive high social costs from disagreement. Interpersonal disagreement presents an uncomfortable situation that is to be avoided—as a result, the agreeable are less likely to discuss politics with close social ties (Gerber et al. 2012). Thus, when confronted with disagreement, we expect an agreeable citizen to "shut down" and not engage in additional information-seeking behavior.

We do not have strong theoretical expectations for how the remaining two Big 5 personality types—conscientious-ness and emotional stability—may guide individuals in their responses to interpersonal disagreement; thus, we do not consider them further in this article. It is fairly common in personality research to have expectations for a subset of personality types but not for all five (see, e.g., Mondak 2010).[1]

STUDY 1: PRIMING POLITICAL DISAGREEMENT IN AN EXPERIMENT

We first test the moderating effects of personality via an experiment administered using Amazon Mechanical Turk, one uniquely suited to examining the aforementioned hypotheses. Amazon Mechanical Turk is an interface that allows Amazon users to perform tasks online for money, making it a cost-effective and efficient way to administer experiments. Further, MTurk produces samples that are more representative of the US population than student samples and other in-person convenience samples (Berinsky, Huber, and Lenz 2012), which are the standard for much experimental work.

Our study began with a pretreatment questionnaire that included a personality battery, after which participants were randomly assigned into one of three experimental conditions.[2] Two conditions were designed to prime participants to think about either agreement or disagreement from their own social network; the third group was a control, so respondents were asked no social network items. In treatment conditions each respondent was administered an "important matters" (Marsden 1987) name generator and asked to

provide up to three discussants. After providing these names, participants were then asked to identify which of the named persons they most agreed (agreement condition) or disagreed with (disagreement condition). In order to ensure the salience of the agreement or disagreement prime, participants were asked how much they either agree or disagree with the named individual on two issues (one economic and one social). These primes represent the experimental stimulus for participants in the treatment groups.

The goal of this experimental prime is to get people to think about social interactions and then to test the influence of such social considerations outside the context of an actual/immediate encounter. Priming these "relationship schemas" allows us to assess the effects of individual network encounters—effects that people may not be cognitively aware of (e.g., Baldwin, Carrell, and Lopez 1990). When people discuss politics with individuals in their network with whom they disagree, it is unlikely that the effects are immediate and limited to the duration of the conversation. Rather, people engage in a conversation that raises a set of internal reactions (reactions that presumably endure beyond the conclusion of the discussion), as Ahn et al. (2014, 11) note: "influence occurs not only when individuals are persuaded to change their preferences in response to divergent information but also when individuals must 'counter-argue'—either socially or internally." Priming respondents to think about disagreement in their networks is designed to mimic the enduring effects of disagreement and the ways in which exposure to parts of a network can structure the ways that people process the political world around them.[3]

Following the pretest questionnaire and the administration of the treatment, each participant was exposed to a simulated campaign environment of our own making; this was patterned on Lau and Redlawsk's (1997, 2006) dynamic process-tracing approach. The environment consists of a scrolling information board that presents the participant with a series of boxes; these boxes are labeled to indicate whether they contain issue or background information about a candidate and to signal to which parties' candidate they pertain (red boxes for the Republican, blue for the Democrat). The participant can click on these items to read more information about a topic in a pop-up window (see the fifth section of the appendix, available online for the campaign informational content). As she reads the information in a pop-up, other boxes continue to scroll down the screen in the background, imposing costs and tradeoffs for choosing to

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1. Our expectations are summarized in table 1 of the appendix, available online. Please see the appendix for robustness checks, alternative model specifications, and additional discussion.

2. Our study is diagrammed in figure 3 of the appendix.

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3. Please see the appendix for a manipulation check/discussion of the effectiveness of the manipulations.

read one piece of information over another (this is intended to reflect the choices that individuals must make during real campaigns (Lau and Redlawsk 1997, 2006). The simulated campaign takes place for 15 minutes. Importantly, we record much of the participants' behavior in this environment via a data drop, allowing us to assess a host of elements about information searching in light of experimental conditions. Following the simulated campaign, the participant responds to a voting section where they report perceptions of the candidates and make a decision.

VARIABLES AND MEASUREMENT

Given our interest in electoral information seeking, our dependent variable is the number of items that respondents accessed during the campaign. This measures the depth of the information search and is simply a sum of the number of boxes that the participant clicked on during the course of the simulated campaign (Huang and Price 2001; Jacoby et al. 1976; Lau and Redlawsk 2006; Redlawsk 2004).[4] Participants who want more information (i.e., those who are exhibiting greater information-seeking behavior) have to click on more of the boxes that arise during the simulated campaign; we are able to capture this behavior with a count of the number of boxes that are opened. One concern that arises with such a measure is that participants may not be taking the task seriously or may be clicking on items randomly. To this end, we have removed the few "extreme" participants—that is, those who accessed fewer than 10 items or (the one person) who accessed 150 items during the simulated campaign. While we are certain that some variation in attention/effort exists among participants, the random assignment to conditions should produce similar quantities of noise across conditions, allowing us to assess treatment effects (despite such behavior). If anything, participants clicking on items in an uninterested or random fashion should make it harder to find treatment effects and to show that personality moderates these effects.

The personality items consist of 10 questions that are used to construct five variables, two for each of the "Big 5" types. The use of 10 trait pairs—commonly called the "Ten-Item Personality Inventory" or TIPI—to capture the Big 5 personality types has become common in the study of personality and political behavior (e.g., Gerber, Huber, Doherty, Dow-

ling, and Ha 2010). The 10 questions ask the participant about the extent to which a pair of traits applies to them on a 7-point scale ranging from strongly disagree to strongly agree. For example, the measure of extroversion is constructed from a question asking the participant the extent to which "extroverted, enthusiastic" as well as "reserved, quiet" applies to them. In this example, the second trait pair is designed to capture the low end of the extroversion dimension. Given this two-pair approach, we reverse code the second trait pair (so that high values are extroverted and low values are reserved) and add it to the "extroverted, enthusiastic" pair. Thus, our extroverted measure is "extroverted, enthusiastic" added to reverse coded "reserved, quiet." Measures of the remaining personality types are constructed in a similar fashion. For the agreeableness variable, the trait pairs "sympathetic, warm" and "critical, quarrelsome" are used. Finally, the openness to experiences measure contains questions regarding "open to new experiences, complex" and "conventional, uncreative."[5]

RANDOMIZATION CHECK

We first present the results of a randomization check to determine the degree to which assignment was successful in achieving balance across conditions for all of the personality items, as well as for the major characteristics of education, strength of partisanship, age, and political knowledge. A total of 212 participants were recruited to participate in the experiment. As noted, we removed several observations who were (extreme) outliers on the dependent variable; such individuals either accessed so much information that they could not have possibly been reading it/paying attention, or they accessed less than 10 items (meaning that they did not take the task seriously). This reduces our observations to 202. Table 1 shows the mean values on items across the three experimental conditions. We use analysis of variance models to assess the significance of the differences between conditions, finding that the randomization largely eliminated differences. The only item for which we observe a significant difference is political knowledge. As a result, we include this covariate as a control in all of the following analyses for this experiment (to ensure that differences in knowledge levels between conditions are not driving any results).

EXPERIMENTAL RESULTS

First, we present baseline models with no personality items or interactions; these show the effects of the treatment conditions on the respondent's depth of search during the simulated campaign. While we do not have theoretical

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4. Please see the appendix for analysis of an alternative dependent variable: average time spent with a piece of information. We find complementary results to the "depth" estimates—personality traits interact with disagreement to not only condition the amount of information that respondents access but the amount of time that they spend with accessed information.

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5. Alpha scale reliability coefficients for these items are as follows: Extroversion = .78, openness to experience = .62, agreeableness = .52.

Table 1. Descriptives by Experimental Condition

	Depth of Search (Number of Campaign Items Accessed)			
	Mean	SD	Min	Max
Experiment 1: September 2011				
Depth of search (DV)	43.09	17.95	10	132

	Respondent Characteristics (by Condition)			
	Control	Agreement Before	Disagreement Before	Significance
Experiment 1: September 2011				
Extroversion	6.12	5.51	5.51	
Openness	8.49	9.07	8.58	
Agreeableness	8.65	8.61	8.49	
Education	3.30	3.42	3.51	
Strength of party ID	1.26	1.39	1.26	
Age	31.1	32.8	33.4	
Political knowledge	66.1	73.7	80.1	*

Note. DV = dependent variable; SD = standard deviation.
* $p < .05$, *F*-test.

priors on the agreement condition, we present the effects of both the disagreement and agreement conditions. The control condition becomes the baseline, and the coefficient estimates for agreement and disagreement represent the effect of each of these treatments relative to the control. As noted previously, we account for political knowledge, as the randomization procedure failed to achieve balance across conditions on this variable.

Table 2 displays the negative binomial regression estimates, which explore the causal effects of the disagreement (and agreement) primes for information seeking.[6] The evidence in this table both supports our expectations and surprises us. First, information seeking is indeed stimulated in the disagreement condition. This result is consistent with research by McPhee et al. (1963), Mutz (2006), and other studies mentioned previously. Throughout our analyses, we use one-tailed tests as we have strong directional hypotheses with respect to disagreement and personality; we find results that are significant at both the $p < .05$ and $p < .1$ levels of significance. The disagreement coefficient is significant at the $p < .1$ level. Those in the disagreement condition access roughly five more items (41.6 items in the

control condition vs. 46.4 items in the disagreement condition) over the course of the simulated campaign.

Second, and interestingly, we find that the same effect occurs in the agreement condition. The magnitude of the effect is similar to that for disagreement—we observe an increase of about five items accessed (41.6 in the control condition vs. 46.1 in the agreement condition). Previous

Table 2. A First Look at Treatment Effects, Campaign Experiment

	Depth of Search (Number of Items Accessed)
Disagreement prime	.110**
	(.072)
Agreement prime	.101**
	(.071)
Political knowledge	.001
	(.001)
Constant	3.60*
	(.092)
N	202

Note. Negative binomial regression estimates, one-tailed. Model is statistically significant (LR χ^2 test).
* $p < .05$.
** $p < .1$.

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6. Poisson estimation was not used due to the dependent variable being overdispersed (Long 1997).

research does not provide clear expectations with respect to the agreement condition and the control group, though the implication of the McPhee model is that agreement is the opposite of disagreement. So although the disagreement hypothesis is confirmed, the observed agreement effect leads us to consider other potential explanations for our results.

It is possible that priming any part of a network encourages subjects to consider the mix of political considerations from social contacts. And this could play out in (at least) three different ways. One potential explanation is that both primes get subjects to think about both agreement and disagreement. This seems unlikely given these are core networks characterized by generally agreeable interactions. Also, because the participants were asked about the relative position of agreeable/disagreeable discussants on economic and social issues, we can test the levels of agreement/disagreement that were produced by the primes. The mean level of disagreement for those who received the disagreement prime was 2.4 on social issues and 2.1 for economic issues—this translates into roughly "a little" or "some" disagreement. The mean level of agreement for those who received the agreement prime was 2.9 for social issues and 3.1 for economic issues; that is roughly "some" agreement on these issues.

Accordingly, two other possibilities seem more likely to us. First, it is possible that agreement can stimulate information search but that it usually does not. The idea here is that because agreement is usually assumed by people in regular interactions (e.g., Huckfeldt and Sprague 1995), it is the norm and therefore does not lead to more engagement with the information environment. In this experiment, we have done something people do not usually do—we went out of our way to emphasize agreement. Second, it is possible that network effects in the realm of information seeking do not depend upon the substance of conversations. Although previous observational research on the effects of disagreement in other areas would suggest that the first interpretation is more likely, we can see some potential for the second explanation in our experimental data.

We next present the results of models testing the moderating effects of personality on the relationship between disagreement and the depth of electoral information seeking. All of the models follow the same structure: we include both the disagreement and agreement prime variables (as well as the political knowledge control) along with one personality item and one interaction between the personality item and the disagreement/agreement prime.[7] Thus,

for each personality item we show two models: an interaction with the disagreement prime (which is our primary substantive interest) and a model with the personality item interacted with the agreement prime (which is presented for comparison). All models are negative binomials, and table 3 displays the results.

Because we are most concerned with the moderating effect of personality on disagreement (as it relates to information seeking), we focus our attention on the interactions, not solely the effect of personality.[8] Recall from table 2 that there is a significant relationship between the disagreement prime and the depth of search variable (with a positive coefficient). Introducing the interaction between disagreement and personality traits complicates this—altogether, the results are consistent with the idea that personality traits moderate the impact of interpersonal disagreement. Specifically, they are consistent with our hypotheses that disagreement effects on information seeking depend on subjects' personalities.

To fully interpret these conditional effects, in figure 1 we plot the marginal effects of the disagreement prime across the full range of the personality measures. We are interested both in the magnitude of the effect, as well as the range of the moderating variables across which we have a relationship that is different from zero (e.g., Berry, Golder, and Milton 2012). As our main focus is on disagreement (vs. agreement), we only show interaction plots for the disagreement interactions. In figure 1, we plot the marginal effect lines (notably, these are not flat). But rather than display confidence intervals, below the x-axis we provide the reader with the z-scores of the marginal effect at each of the values of the moderating personality measure. We take this tack because we are using one-tailed tests in the tables (as we have directional hypotheses); rather than display confidence intervals given one-tailed tests, we present z-scores to allow the reader to draw her own conclusions about the statistical significance of the marginal effect across the range of the personality measures. While a z-score of greater than or equal to 1.29 is statistically significant at the 90% confidence level using a one-tailed test, here we believe that showing the raw test statistics is a useful and transparent approach. Importantly,

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7. As a robustness check, we reestimated each model with a specification that included all of the Big 5 personality traits simultaneously. These

results are substantively similar to those presented here. For full estimates and a discussion, please see the first section of the appendix.

8. To be fair, we would note that establishing causality with interaction terms in an experimental framework is not always straightforward. Interacting the treatment (disagreement prime) with pretreatment characteristics of the participants (personality) can produce treatment effect heterogeneity, which is typically only indirect evidence of the causal moderation, unless one makes strong assumptions regarding the nature of the relationship between the pretreatment covariates and the average direct effect of the treatment (Imai et al. 2011).

Table 3. Disagree/Agree Prime, Personality, and Depth of Search, Campaign Experiment

	Negative Binomial Regression Estimates					
	(1)	(2)	(3)	(4)	(5)	(6)
Disagreement prime	−.039 (.141)	.117** (.073)	−.117 (.265)	.110* (.072)	.326 (.264)	.109** (.073)
Agreement prime	.102** (.071)	.016 (.135)	.085 (.072)	−.137 (.259)	−.109 (.254)	−.109 (.252)
Extroversion	.005 (.012)	.007 (.013)	…	…	…	…
Extroversion × disagree before	.028** (.021)	…	…	…	…	…
Extroversion × agree before	…	.015 (.020)	…	…	…	…
Openness	…	…	.011 (.015)	.010 (.015)	…	…
Openness × disagree before	…	…	.026 (.030)	…	…	…
Openness × agree before	…	…	…	.024 (.028)	…	…
Agreeableness	…	…	…	…	−.013 (.016)	−.031 (.017)
Agreeableness × disagree before	…	…	…	…	−.025 (.030)	…
Agreeableness × agree before	…	…	…	…	…	.026 (.028)
Political knowledge	.001 (.001)	.001 (.001)	.001 (.001)	.001 (.001)	.001 (.001)	.001 (.001)
Constant	3.58* (.125)	3.55* (.125)	3.50* (.163)	3.50* (.161)	3.71* (.178)	3.88* (.184)
N	199	199	199	199	195	195

Note. One-tailed; all models are statistically significant (LR χ^2 tests).
* $p < .05$.
** $p < .1$.

in addition to the z-scores, we also show a histogram of the distribution of observations across the personality variables (e.g., Berry et al. 2012); this is again intended to help the reader draw her own (substantive) conclusions, as it shows that these measures are not evenly distributed, and that where we have more observations we tend to see stronger effects.

The results largely confirm our expectations. Looking first at the extroversion plot, we see a positive moderating effect on the disagreement prime. That is, when confronted with disagreement, the extroverted seek out more information than the reserved/introverted. For those who are reserved, we observe no effect of the disagreement prime—such individuals do not engage in a deeper information search when confronted with socially supplied disagreement. However, as one becomes increasingly extroverted, the disagreement

prime becomes more consequential for information seeking, and for those who are higher on this scale there is a statistically significant marginal effect of disagreement. This aligns with our expectations regarding extroversion and offers evidence to suggest that the effects of disagreement are indeed moderated by individual traits. Further, this change from a null effect for the reserved to a positive and significant effect for the extroverted does not appear to be driven by the distribution of the personality measure.

Turning to the openness to experience plot, a similar story emerges. Again, we see that there is a positive marginal effect, suggesting that those who are characterized by openness to experience respond to disagreement with more information-seeking behavior compared to those who are more "closed." For those who are closed there is no effect of
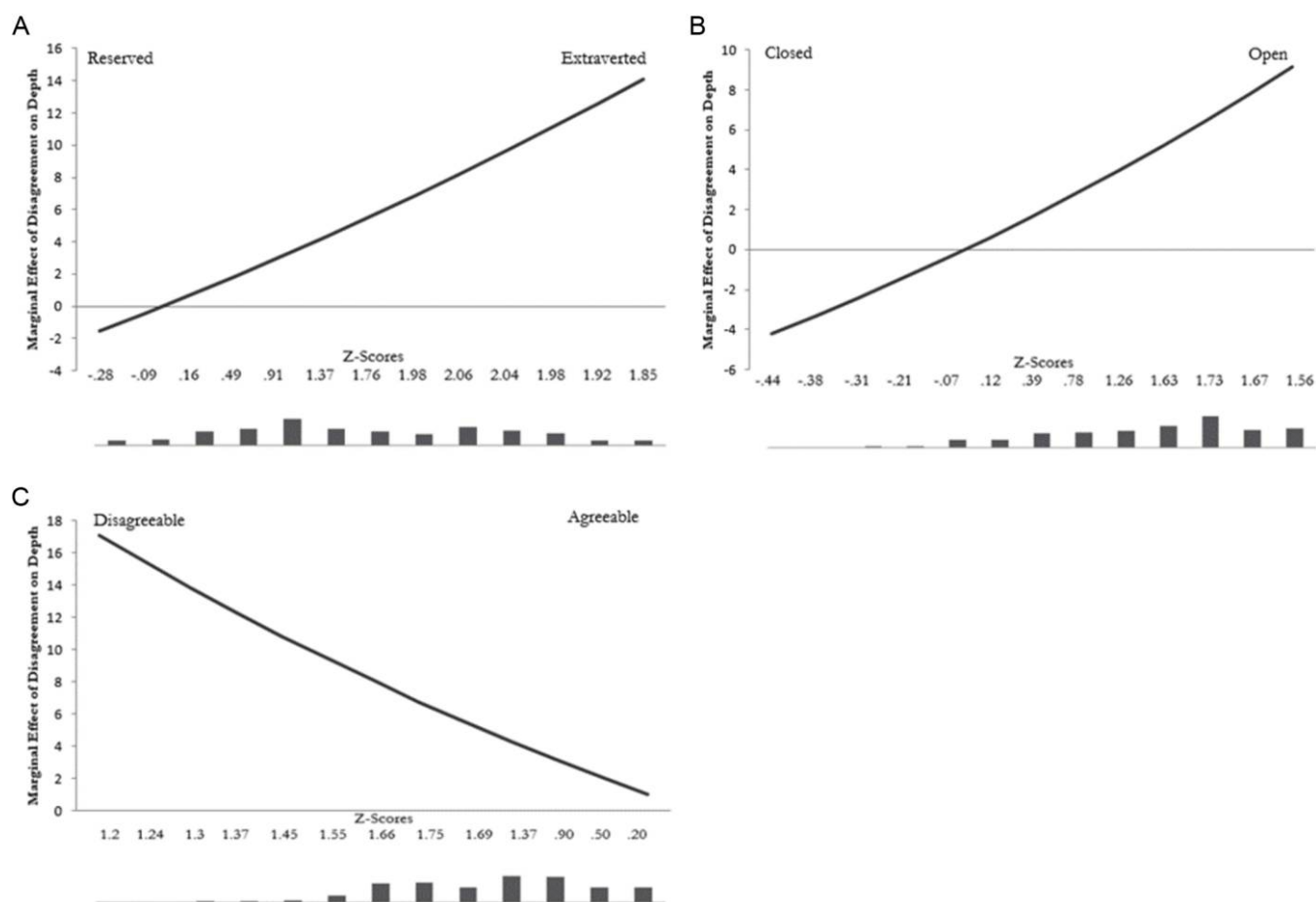
Figure 1. Personality, disagreement, and depth of search (campaign experiment). Panel *A* shows how extroversion moderates, panel *B* shows how openness moderates, and panel *C* shows how agreeableness moderates. Two pieces of information are shown below the *x*-axis. The first is the *z*-score of the marginal effect at that value of personality measure. The second—beneath the *z*-scores—is a histogram showing the distribution of the personality measure. We are not showing traditional confidence intervals as we are evaluating the effects with one-tailed tests (see table 4); in the interest of allowing the reader to evaluate significance levels for herself, we present the plots (notably, none of the lines are flat), the *z*-scores at different levels of the conditioning variable (i.e., the personality item) and the distribution of the raw data.

disagreement on depth of search, but as openness increases, so does information-seeking behavior. For those who are on the upper third of the openness scale, there is a significant marginal effect with a one-tailed test (at the 90% level, though a couple of places on the scale achieve significance at higher thresholds). Looking at the histogram, we see that observations are not evenly distributed across this personality measure; rather, they are clustered in the upper one-half of the variable. However, it is also worth noting the low numbers of observations for those who are closed is not what is driving the effect. That is, even if we focus entirely on the portion of the personality measure where we have observations, it appears that the conditioning effect exists. Those who are in the middle of the measure (who might perhaps be characterized as neither open or closed) do not respond to disagreement with deeper searches, but those who are on the higher end (certainly characterized as open

to experience) respond with greater information seeking. Observing significant results across the range of the moderating variable where we have observations makes us more confident in concluding that the marginal effect plot offers supportive evidence (e.g., Berry et al. 2012).

Finally, for agreeableness, we observe a negative interactive effect (as hypothesized). Looking at those who are disagreeable, we see that there is a significant and positive effect of the disagreement prime, but that this effect diminishes and eventually disappears for those who are increasingly agreeable. Again, we see that respondents are not evenly distributed across the measure. However, focusing on the range of the personality variable where we do have a sizeable number of observations, we see this moderating effect emerge. For the most agreeable individuals, there is no effect of the disagreement prime on information-seeking behavior, but for those who are in the middle of the dis-

tribution (i.e., those who we might characterize as neither agreeable nor disagreeable), a significant and positive effect exists.

In sum, the picture with respect to our experimental assessment of disagreement, personality, and information seeking is generally supportive of our expectations. We find that personality moderates the relationship between disagreement and information seeking about politics. Personality appears to structure the ways in which people respond to disagreement, and specifically, in how they then respond by either seeking out new information, or by not seeking out additional information. Openness to experience and extroversion predispose the citizen to behave much as McPhee et al. (1963) posited (with an increased information search). Conversely, agreeableness appears to produce a very different kind of effect; when confronted with disagreement, the agreeable individual shuts down and searches for less information than her disagreeable counterpart.

OBSERVATIONAL DESIGN: THE 2008–2009 ANES PANEL STUDY

While the experimental results present consistent and compelling evidence, we acknowledge that questions remain about the degree to which these findings generalize beyond the experimental setting. To begin to address these concerns, we employ observational data from the 2008–9 American National Election Panel Study. The 2008–9 ANES is well suited for testing the hypotheses presented here for several reasons. First, it contains an egocentric discussion network battery (wave 9) with a question asking about the extent to which a respondent disagrees with her named discussants. With this information we are able to create a measure of the average amount of network disagreement to which a respondent is exposed.

Second, while the 2008–9 ANES does not include a battery of personality items, the ANES 2010 Panel Re-Contact Study is a re-interview of the 2008–9 ANES Panel respondents and does include such a battery. Since personality traits "exhibit tremendous stability over time" (Mondak 2010, 5)—and evidence of trait stability is widespread (Winter and Barenbaum 1999; Allen 1994)—the observed personality traits that are recorded in the June 2010 Panel Re-contact Study should be good measures of the personality characteristics held by respondents during their interviews in September and November of 2008.

Finally, we have measures of the desire to seek information in wave 10 of the 2008–9 ANES. Since the network disagreement questions are in wave 9, we have temporal ordering where we are measuring disagreement first and then the outcome of information seeking about politics second. As is

typical with survey data of this sort, we cannot say for certain that disagreement preceded the desire to seek information, but our setup is at least suggestive of such a dynamic.

To construct the measures of network disagreement, we use the aforementioned egocentric network battery from wave 9 of the 2008–9 ANES. Each main respondent is asked to name up to three discussants and to report on a number of characteristics of these individuals. We use the question asking the respondent "How different the opinions" of the discussant are from his or her own. This creates a measure of disagreement between the main respondent and each discussant. We then sum the amount of disagreement with each individual across all reported discussants, and divide by the number of discussants to create a measure of the average level of disagreement in the respondent's discussion network. The measure ranges from 0 to 1, where 0 is no disagreement with any of the reported discussants and 1 is a lot of disagreement with all of the named discussants.[9]

The personality measures in the 2010 Panel Re-Contact Study use the same 10-question battery employed in our experiment. The variables were constructed in the same fashion, where each personality trait is constructed from two summed trait pair questions (one of which is first reverse coded). Since we are interested in the moderating effects on personality on the relationship between disagreement and several outcomes, we interact average network disagreement with the personality measures, as was done in the experiment.[10]

The dependent variable we use to capture respondents' desire to seek information comes from wave 10 of the 2008–9 ANES. Specifically, we use a question asking about the respondent's level of interest in information about government and politics. The measure is coded from 0 to 4, where 0 is "not interested at all" and 4 is "extremely interested." While not a perfect representation of information-seeking behavior as measured in our experiment, it does capture the desire to learn and presumably acquire information (please see the second section of the appendix for an exploration of an alternate dependent variable using the 2008–9 ANES).

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9. We use a "general disagreement" measure vs. a "partisan disagreement" measure (Klofstad et al. 2013). The results are substantively similar, regardless of approach. While the general disagreement measure captures disagreement with all discussion partners on a 1–5 scale, we have recoded each to range from 0 to 1 (hence the distribution of the network average ranges from 0 to 1).

10. Please see the third section of the appendix for a discussion of the extent to which personality traits may drive levels of individual exposure to disagreement. An analysis provides some evidence that agreeableness may reduce the amount of disagreement in one's network (as we might expect), but we do not find an association between openness or extroversion and network disagreement.

Table 4. Disagreement and the Moderating Effects of Personality Traits, 2008–2009 ANES

	DV: "Interest in Information"			
	(1)	(2)	(3)	(4)
Network disagreement	.361*	.076	.594**	1.07*
	(.095)	(.288)	(.439)	(.453)
Extroversion	…	.038*	…	…
		(.014)		
Extroversion × disagreement	…	.032	…	…
		(.041)		
Openness to experience	…	…	.080*	…
			(.017)	
Openness × disagreement	…	…	−.038	…
			(.050)	
Agreeableness	…	…	…	.041*
				(.018)
Agreeableness × disagreement	…	…	…	−.090*
				(.050)
Strength of partisanship	.035	.029	.012	.023
	(.022)	(.027)	(.027)	(.027)
Political knowledge	.159*	.138*	.137*	.131*
	(.022)	(.028)	(.028)	(.028)
Education	.069*	.079*	.064*	.085*
	(.021)	(.027)	(.027)	(.027)
Gender (male = 1)	.013	.032	.002	.018
	(.041)	(.052)	(.051)	(.054)
Age	.012*	.012*	.012*	.011*
	(.006)	(.002)	(.002)	(.002)
Income	.012*	.006	.009	.008
	(.006)	(.007)	(.007)	(.007)
Constant	.750*	.697*	.308*	.634*
	(.128)	(.195)	(.219)	(.227)
N	2,241	1,411	1,411	1,410
R^2	.11	.11	.11	.09

Note. Ordinary least-squares regression estimates, one-tailed. DV = dependent variable.

* $p < .05$.

** $p < .10$.

We estimate these models using OLS regression, adding controls for strength of partisanship, political knowledge, education, gender, age, and income.[11]

2008–2009 ANES RESULTS

The left-most column of table 4 shows the direct effect of network disagreement (wave 9) on interest in information

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11. Strength of partisanship is taken from wave 9 and ranges from 0 to 3 (0 = independent, 3 = strong partisan). Political knowledge is constructed from a wave 11 battery. While there are 12 knowledge items, we use only the first six (W11V1–W11V6), due to missing data on the last six (W11V7–W11V12).

(wave 10). We continue using one-tailed tests of significance (as we are testing the same directional hypotheses), though we place more emphasis on the 95% confidence level given the number of observations afforded by the ANES.

Looking at the table, we see that network disagreement has a significant and positive effect on interest in information seeking, as suggested by classic theories of social influence (McPhee et al. 1963; Sprague 1982). The direct result resembles what we saw previously—the effect on information seeking is similar to the depth of search dependent variable in the experiment. In short, the survey results from the 2008–9 ANES suggest that network disagreement increases interest in information about government and poli-

tics. We would note that these observational data do not contain a great parallel for the agreement condition included in our experiment (and we are acutely aware of differences in our dependent variable)—thus, we are cautious in discussing how agreement and disagreement may contrast in this analysis. However, based on the results from the average disagreement measure, we might surmise that when agreement is not explicitly primed—that is, when it is the default, or norm—that it does not produce the same kinds of information seeking effects.

How does personality moderate the relationship between disagreement and (our indicator of) political information seeking in these observational data? Estimates are reported in the other columns of table 4—of particular interest are the coefficients on the "personality trait × disagreement" interactions. Figure 2 graphs the marginal effect of network disagreement on interest in information across the full range

of values for extroversion, openness to experience, and agreeableness (once again we see that these lines are not flat). As before, we provide the z-scores and a histogram showing the distribution of the personality measure to assist the reader in drawing her own conclusions (z-scores greater than or equal to 1.65 are statistically significant at the 95% confidence level with a one-tailed test). We see that there are significant moderating effects for all three personality types at some range of their values. For both extroversion and agreeableness we find evidence supporting our hypotheses—evidence that is also consistent with the results of the experiment. As individuals score higher on extroversion, the effect of disagreement on interest in information increases. The extrovert responds to disagreement with greater interest in information relative to the introvert; the interaction is statistically significant for just over half the range of the measure. And as we observed in the experimental results, the shift from an insignificant effect
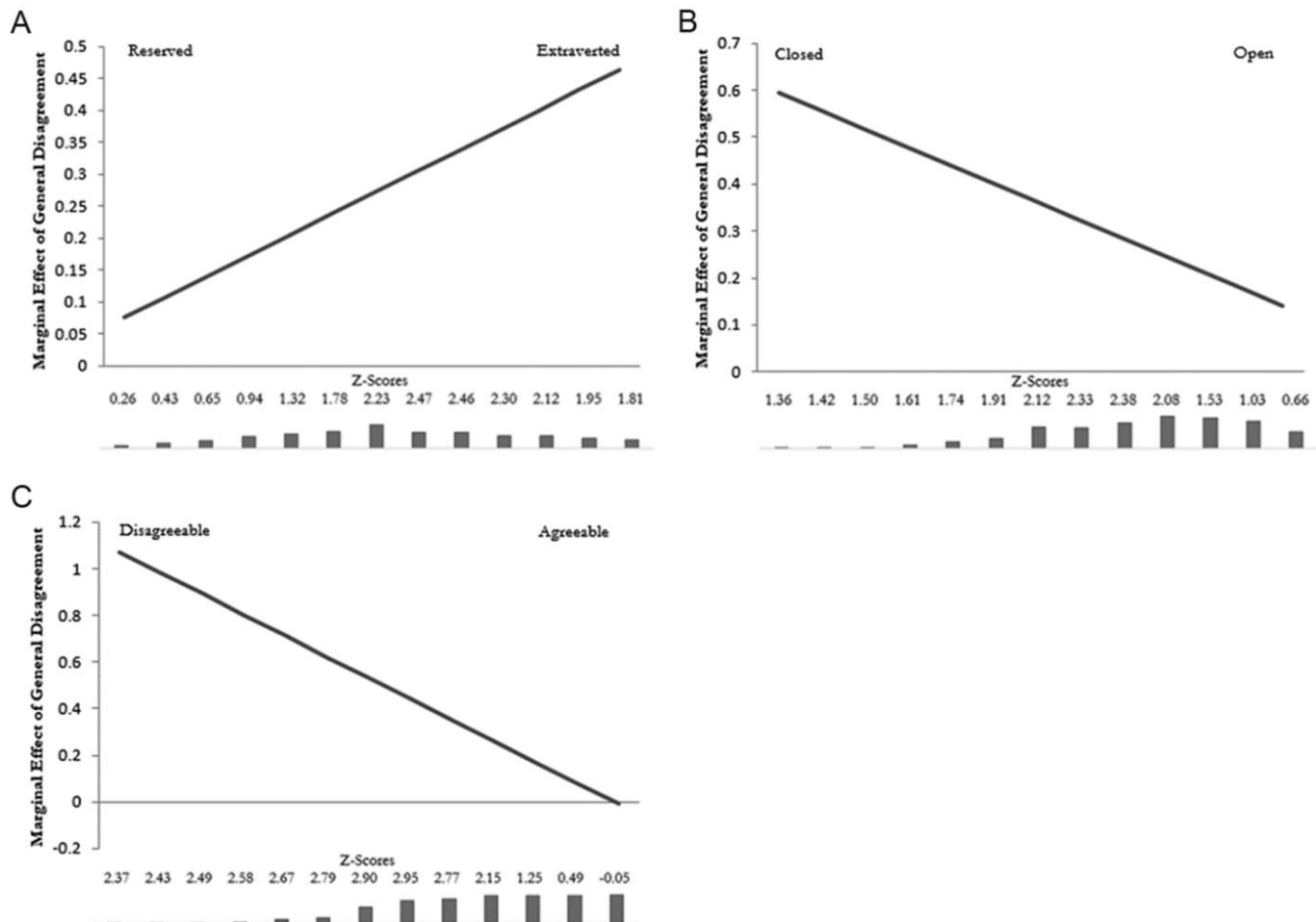

Figure 2. Personality, disagreement, and "interest in information" (2008–2009 ANES). Panel *A* shows how extroversion moderates, panel *B* shows how openness moderates, and panel *C* shows how agreeableness moderates. Two pieces of information are shown below the *x*-axis. The first is the *z*-score of the marginal effect at that value of personality measure. The second—beneath the *z*-scores—is a histogram showing the distribution of the personality measure. We are not showing traditional confidence intervals as we are evaluating the effects with one-tailed tests (see table 4); in the interest of allowing the reader to evaluate significance levels for herself, we present the plots (notably, none of the lines are flat), the *z*-scores at different levels of the conditioning variable (i.e., the personality item), and the distribution of the raw data.

for the reserved to a significant effect for the more extroverted does not appear to be driven solely by the distribution of the personality item.

Also consistent with the experimental findings, agreeableness exerts a negative effect on the relationship between disagreement and interest in information. As an individual scores higher on this measure, there is a decreasing effect of disagreement on interest in information. The interaction effect is significant for most of the range—from the minimum value of agreeableness (0) to about 10 on the scale. For the highly agreeable (those scoring above 10), disagreement does not appear to engender any significant effects on interest in information. This is again suggestive of the notion that the agreeable citizen shuts down when confronted with disagreement, as their predispositions toward maintaining harmony and avoiding conflict override any desires to engage in further political exchange. Because a relatively large number of respondents classified themselves as highly agreeable, it appears that the lack of a significant effect here is likely a real moderating effect (and not an artifact of the distribution of the measure).

Contrary to our expectations and the findings from the simulated campaign experiment, we observe a negative moderating effect for openness to experience. The negative interaction effect is significant from roughly 3 to 9 on the openness scale (i.e., for much of the middle range). This suggests that as individuals become increasingly open, that they respond to disagreement with decreasing interest in information. Although caution is warranted (and we must reject our directional hypothesis in these observational data), it appears that for this personality trait there is a possible disconnect between the lab and the outside world—what happens in experimental settings where the open seek more information (through a deeper search in response to a prime) may be distinct from reported political behavior during an actual presidential campaign. There could be numerous reasons for this difference between the experimental and survey results (e.g., measurement/the DV used); more research is clearly needed to resolve this discrepancy.

DISCUSSION AND CONCLUSION

We began our inquiry with hypotheses about three personality traits; for two of these—extroversion and agreeableness—we find consistent evidence between our experimental and observational analyses. Disagreement drives information seeking/interest in information, and extroversion appears to increase this relationship, while agreeableness appears to decrease it. Although we find contradictory results for openness to experience when we look at the lab versus survey settings, the experimental result is consistent with our hypothesis.

Overall, we feel comfortable claiming that the patterns identified in our simulated campaign generally find support in observational accounts of everyday political interaction—that is, in responses to network disagreement measured in a nation-wide sample, across a presidential election. We gain purchase on questions of causality by demonstrating effects in the experimental setting, but we also demonstrate that these effects have some claim to external validity by pairing them with survey data. Whether people are randomly primed to think about socially supplied disagreement—or whether we use their survey reports on individuals' discussion partners—we observe consistent evidence that different types of citizens respond differently to disagreement. That is, personality appears to guide the individual in his or her responses to disagreement and, specifically, her responses as they pertain to political information seeking.

A concern with the 2008–9 ANES analysis—and one that accompanies many observational designs—is the presence of endogeneity. It is possible that interest in information about politics could be (at least partially) driving network composition, with those who have greater levels of interest being more prone to discuss politics with diverse groups of people. Our ability to address this problem thoroughly is somewhat limited, for we do not have measures of networks and interest across multiple waves of the study; this would allow us to estimate cross-lagged effects (e.g., Finkel 1995). That said, we do have temporal ordering (network items appear in wave 9, the interest DV in wave 10) and multiple measures of the dependent variable. Importantly, in additional specifications we find that the effect of disagreement on interest holds when we control for respondents' previous levels of interest. Thus, while we would cede that there is likely some reciprocal influence between networks and interest, these robustness checks give us confidence that the direction of the relationship is not wholly reversed from that which we have posited here.

Socially supplied disagreement has the potential to play a powerful role in the lives of ordinary citizens. In the present effort, we have addressed the ways in which different types of individuals may respond in the face of disagreement. In addition, we have focused on the consequences for information-seeking behavior during campaigns, given the importance of such dynamics for the quality of decision making (Lau and Redlawsk 2006).

In thinking about questions of quality, civic capacity, and process, it is worth noting that these results hold implications for aspects of the "democratic dilemma" posed by Mutz (2006). Our results suggest that the experience of disagreement is neither a social good nor a social bad, at least with respect to information-seeking behavior. Instead, dis-

agreement should be viewed as a factor that shapes the character of mass politics—one that does so depending on the distribution of personalities in the population and the probability of encountering disagreement. For example, to the extent that more extroverts and people "open to experience" are exposed to disagreement, we might expect to see a more deliberative public. At the same time, to the extent we see more agreeable individuals exposed to disagreement, we might expect to see less information seeking and exchange—the latter example might be thought of as being compatible with a more partisan public seeking more representation in politics. More generally, our work joins recent efforts (e.g., Testa et al. 2014) in calling attention to heterogeneity; this suggests that disagreement should not be seen as something that has mixed consequences for all individuals—it may hold negative consequences for some, but it may hold positive (or mixed, or effectively no real) consequences for others. Such a view of disagreement points away from clear societal trade-offs and toward the expectation that we should observe a blend of representational, deliberative and participatory democracy.

Of course, while our effort addresses several questions, it also raises a number of others. First, we find a discrepancy in the way in which openness to experience conditions the relationship between disagreement and information—the results reverse across the experimental and survey settings. Individuals characterized as being "open" respond to disagreement with a deeper and lengthier search in our simulated campaign but are predicted to have less interest in information when we examine their behavior during an actual election cycle. While we can only speculate at this point, the difference could be a function of different dependent variables. Future research could help clarify why we see such differences and help point ways forward.

Second, we have focused our attention on information seeking about politics and on two measures of such behavior—the depth of search in the simulated campaign and interest in information about politics in the survey-based analysis. We have explored some additional dependent variables that tap into information-seeking behavior, and these results can be found in the second section of the appendix. The general pattern of results presented here largely holds for the other measures we have examined, but we would note that there are many potential outcomes that one could examine, including items that get at "correct" voting (e.g., Lau and Redlaswk 1997). Indeed, one implication of our results is that some kinds of people may make "better" choices at the ballot box when exposed to heterogeneous views, while others may make worse decisions (see also Ryan 2011; Sokhey and McClurg 2012). Future work should look more closely at heterogeneous responses to disagreement as they relate to

the quality of decision making itself, along with other outcomes such as persuasion (e.g., Ryan 2013).

Third, geographic variation in the aggregate distribution of personality types (Plaut, Markus, and Lachman 2002; Rentfrow 2010; Rentfrow, Gosling, and Potter 2008) suggests that personality may drive very different kinds of social interactions across different contexts. If personality influences responses to disagreement (as it pertains to information seeking), but if networks are composed predominantly of one personality-type or another in different locales, then the implications of disagreement for democratic citizenship may be subject to contextual constraints. For example, information seeking could be the modal response to disagreement in the Northeast (where extroversion is more common; Rentfrow 2010) but may not be so in other places. Much of the data used in the study of social networks and social influence have come from community studies, and there could be additional benefits to similar designs (in that such information may be "richer"). Of course, such studies would also raise the possibility that observed responses to disagreement and personality may differ were the same study conducted in the Northeast, Pacific coast, or the Midwest; South Bend, Indiana, could produce different inferences on these dimensions than Elmira, New York.

As a final note, we return to democratic implications and would again underscore the potential significance of our findings. Personality-based moderation means that some may be better able to acquire information, that some may be more susceptible to persuasion, and as noted, that some may be predisposed to be better deliberative participants. These differences between people—in how they approach the political world and in the social sources that supply them with information—are fundamental to our understanding of democratic citizenship (Lau and Redlawsk 2006). Disagreement is not treated the same by all; additional information seeking happens for some but not others. Our conclusions do not call into question previous theories regarding disagreement and social influence (e.g., McPhee et al. 1963)—in fact, we find much support for them. Rather, our study adds nuance and builds on these foundations to promote an understanding of the circumstances under which disagreement has the potential to produce better citizens and of those circumstances under which it does not.

ACKNOWLEDGMENTS

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