

# How Do Coalition Signals Shape Voting Behavior? Revealing the Mediating Role of Coalition Expectations<sup>★</sup>

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## ABSTRACT

Existing empirical research suggests that there are two mechanisms through which pre-electoral coalition signals shape voting behavior. According to these, coalition signals both shift the perceived ideological positions of parties and prime coalition considerations at the cost of party considerations. The work at hand is the first to test another possibility of how coalition signals affect voting. This *coalition expectation mechanism* claims that coalition signals affect voting decisions by changing voters' expectations about which coalitions are likely to form after the election. Moreover, this paper provides the first integrative overview of all three mechanisms that link coalition signals and individual voting behavior. Results from a survey experiment conducted during Sweden's 2018 general election suggest that the coalition expectation mechanism can indeed be at work. By showing how parties' pre-electoral coalition behavior enter a voter's decision calculus, the paper provides important insights for the literature on strategic voting theories in proportional systems.

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## 1. Introduction


In proportional systems, coalition governments are the norm as single-party governments rarely exist. Elections in those systems are typically followed by negotiations about forming a coalition government. It is a common phenomenon that parties react to the predictable necessity of post-election coalition formation by communicating their coalition preferences already during electoral campaigns. These *coalition signals* are made by the party leadership or other party members in the context of party events, press releases, social media statements, or interviews. As part of its campaign coverage, the media gratefully picks up on these signals and adds speculations of political observers. Coalition signals differ in their commitment, as some are vague declarations of intent while others involve the formation of pre-electoral coalitions with strong electoral coordination, such as joint lists (Golder; 2005, 2006).

Given that coalition signals are frequent in election campaigns, a comprehensive body of empirical research investigates how coalition signals affect voting behavior. This literature shows that coalition signals can shape voting decisions. Evidence from economic experiments (Goodin, Güth and Sausgruber; 2008; Meffert and Gschwend; 2007), a psychological experiment (Meffert and Gschwend; 2011), survey experiments (Bytzek, Gschwend, Huber, Linhart and Meffert; 2012; Gschwend, Meffert and Stoetzer; 2017; Irwin and van Holsteyn; 2012; Falcó-Gimeno and Muñoz; 2017), and counterfactual simulations (Linhart; 2009) shows that voting decisions can change when voters are confronted with coalition signals. Coalition signals can lead a voter to depart from their most-preferred party and cast a strategic, coalition-directed vote. This defection might depend on the characteristics of the signaled parties and the initially preferred party (Gschwend and Hooghe; 2008) or the consistency of coalition signals from potential partners (Gschwend, Stoetzer and Zittlau; 2016).

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*How* do coalition signals influence voting behavior? So far, two different individual-level mechanisms find empirical support. First, Falcó-Gimeno and Muñoz (2017) show that coalition signals change voting behavior by updating the voters' perception of the ideological position of parties and, thus, provide evidence of the existence of a *party position mechanism*. Second, Gschwend et al. (2017) reveal that pre-electoral coalition signals can make coalition considerations in a voter's decision more influential, while party considerations become less important; hence a *coalition priming mechanism* seems to be at work as well.

In this paper, we provide an integrative framework to study the mechanisms that link coalition signals to voting behavior on the basis of the coalition-directed voting model proposed by Duch, May and Armstrong (2010). Based on this framework, we derive an additional mechanism of how coalition signals affect voting: the *coalition expectation mechanism*. According to this mechanism, parties' pre-electoral coalition statements alter the perceptions of coalition likelihoods, i.e., the probabilities that a party will end up in a certain government coalition. Changes in the coalition likelihoods affect what government voters can expect when they cast a vote for the party, thereby influencing their party voting decisions. Initially, Duch et al. (2010, p. 702) speculated about the existence of this mechanism, arguing that "[e]lection campaigns, particularly the explicit communication efforts by the competing parties, provide voters with information about coalition formation likelihoods". Likewise, the theoretical coalition-directed voting model of Linhart (2009) entails the idea that voters' perceptions of coalition likelihoods are influenced by coalition signals.

We conducted a coalition vignette survey experiment during the Swedish general election campaign in 2018 to investigate the coalition expectation mechanism as well as the other two mechanisms. Following a between-subject design, respondents were randomly assigned to either a hypothetical coalition signal or to a control condition in which we showed no coalition signal. We presented participants in the treatment group with one of four different coalition signals of the Social Democratic Party and the Moderate Party. Afterwards, we asked about respondent's propensity to vote for all political parties. This enables us to estimate the effect of coalition signals on vote choice. With additional post-treatment survey questions about coalition likelihoods and perceived party positions, we are able to test implications of the different mechanisms.

The results corroborate existing findings that coalition signals can influence voting decisions. For one of the four coalition signals we find evidence in line with the coalition expectation mechanism. Respondents are more likely to vote for the Social Democratic Party when they get a coalition signal according to which the Moderates intend to enter a coalition with the Sweden Democrats. Particularly, among voters disliking this coalition, we find tentative evidence that part of the total effect is mediated by an increase in the perceived likelihood of a coalition between the Moderates and the Sweden Democrats. However, for the other coalition signals we find neither clear evidence of direct nor mediated effects. At the same time, there is no evidence supporting the party position mechanism for any of the signals: the perceived party positions of the Moderates and the Social Democrats do not change when people are exposed to coalition signals. We find some evidence of the coalition priming mechanism, however, as coalition considerations become a stronger predictor of voting propensities.

Our results contribute to the literature on strategic voting theories by exhibiting how parties' pre-electoral coalition behavior enters voters' decisions. This has a set of important implications. If coalition signals help voters to anticipate which governments they will get, it is less challenging for voters to hold coalition governments accountable and replace them with alternative coalition governments. In this regard, our results particularly inform research that studies the conditions under which parties should be willing to communicate their coalition preferences already during electoral campaigns. In the following section, the coalition expectation mechanism is introduced and contrasted with two further ones, the party position mechanisms as well as the coalition priming mechanism. Subsequently, we outline the design of our survey experiment and describe the results before we conclude.

## 2. How Coalition Expectations Regulate the Effect of Coalition Signals on Voting

In this section, we formally introduce the framework to study the link between coalition signals and voting behavior. Employing the coalition-directed voting theory developed by Duch et al. (2010), we show how coalition signals can activate the coalition expectation mechanism and how the mechanism operates differently from both, the party position and coalition priming mechanism.

Strategic voting theories for proportional systems start from the premise that voters do not only consider party preferences but also factor in their anticipation of the government formation process (e.g., Duch et al.; 2010; Gschwend et al.; 2017; Kedar; 2005; Linhart; 2009). The models commonly have two components. First, a party-centered component assumes that sincere party preferences influence a citizen's vote decision. It appears to be very reasonable to

include a voter's evaluation of parties into the vote choice function, since parties are real entities, which are eventually visible on the ballot. Voters' party evaluations might then, for instance, be based on the ideological distance between voters and parties in a uni- or multi-dimensional space, as it is assumed in spatial models (e.g., Downs; 1957). Second, models of this type feature a coalition-centered component, implying that coalition considerations also play a pivotal role in the decision calculus. The underlying assumption is that voters care about the final policy output following the election. Accordingly, voting solely on the basis of party considerations is no longer rational (Austen-Smith and Banks; 1988). Instead, voters anticipate the government building process, which in proportional systems often involves the formation of coalitions, and cast their ballot in ways that increase the likelihood of producing desired coalition governments.

A prominent strategic voting theory for proportional systems is the coalition-directed voting model of Duch et al. (2010), in which voters' party and coalition considerations are based on spatial distances to parties and coalitions, respectively. Specifically, the utility that voter  $i$  derives from party  $j$  is given by

$$u_i(j) = \lambda \left[ \beta \left[ U - \sum_{n=1}^{N_{c_j}} (x_i - Z_{c_{j_n}})^2 \gamma_{c_{j_n}} \right] + (1 - \beta) [U - (x_i - p_j)^2] \right] + W_i. \quad (1)$$

$U$  is a constant ensuring that utilities do not take on negative values,  $x_i$  represents the ideological position of voter  $i$ , and  $Z_{c_{j_n}}$  is the ideological position of coalition  $c_{j_n}$ , where  $c_{j_1}, \dots, c_{j_{N_{c_j}}}$  are all coalitions party  $j$  could enter. The factor  $\gamma_{c_{j_n}}$  is the likelihood of coalition  $c_{j_n}$  forming, conditioned on  $j$  entering a governing coalition, which implies that  $\sum_{n=1}^{N_{c_j}} \gamma_{c_{j_n}} = 1$ . The term  $p_j$  represents the ideological position of party  $j$ . The first right-hand term in curly braces represents a coalition-centered component according to which voters compare their ideological position with the positions of all coalitions a party could be member of whilst taking into account that some coalitions are more likely to form than others. The second right-hand term in curly braces represents a party-centered component stating that voters also assess their ideological distance to a party itself. The parameter  $\beta$  then represents the weight that is put on coalition considerations as compared to party considerations, where  $\beta \in [0, 1]$ . For  $\beta = 0$ , a voter does not take the government formation process into account, whereas  $\beta = 1$  implies that sincere party preference plays no role in a voter's utility calculus. In addition to this spatial contemplation,  $W_i$  is a vector of non-spatial variables that also affect a citizen's vote choice. Finally, parameter  $\lambda$  indicates the overall importance of the spatial components, while vector refers to the influence of the non-spatial variables.

Based on the model of Duch et al. (2010), we portray the coalition expectation mechanism that explains how coalition signals influence voting behavior. This mechanism suggests that coalition signals affect voting utilities by influencing voters' information about the coalition likelihoods,  $\gamma_{c_{j_n}}$ . If campaign statements reveal that parties prefer some coalitions over others, rational voters should take this into consideration when assessing the likelihoods of different coalitions forming after the election (Duch et al.; 2010, p. 702). Particularly, voters should take these signals seriously, since parties might face electoral sanctions for any deviations from these commitments. Thus, voters can expect parties to act in the post-election period according to the coalition signals. Formally, if party  $j$  sends a signal that is in favor of coalition  $c_{j_k}$  with  $k \in [1, N_{c_j}]$  (this signal is denoted by  $s_{c_{j_k}}$ ), the perceived likelihood of this coalition,  $\gamma_{c_{j_k}}$ , should increase by factor  $\tau$ , where  $\tau > 1$ .<sup>1</sup> Thus, the updated perceived likelihood of this particular coalition is given by

$$\gamma_{c_{j_k}} \delta s_{c_{j_k}} = \gamma_{c_{j_k}} \tau. \quad (2)$$

Simultaneously, all other coalitions that party  $j$  could end up in should exhibit decreasing perceived formation likelihoods. Since all these likelihoods have to add up to 1, the updated perceived likelihood of the other coalitions is given by

$$\gamma_{c_{j_p}} \delta s_{c_{j_k}} = \gamma_{c_{j_p}} \frac{1 - \tau \gamma_{c_{j_k}}}{1 - \gamma_{c_{j_k}}}, \quad (3)$$

<sup>1</sup>Some coalition signals are stronger than others. Some signals contain just a vague sympathy, while others indicate a strong preference for a certain coalition. The absolute value of parameter  $\tau$  should positively depend on the signal strength.

where  $\beta \in [1; N_{q_j}]$ .<sup>2</sup> Analogously, if party  $j$  sends a signal expressing reluctance towards coalition  $k$ , the perceived likelihood of this particular coalition should decrease, while all other perceived likelihoods should increase, which implies that  $\beta < 1$ . Plugging in Equations (2) and (3) into Equation (1) directly displays that the altered perceived coalition likelihoods change the voting utility for party  $j$ .

How is the coalition expectation mechanism different from the party position and coalition priming mechanism? The party position mechanism claims that coalition signals alter voting utilities not by modifying coalition expectations but by changing the perceived ideological positions of parties. This argument was first introduced and extensively described by Falcó-Gimeno and Muñoz (2017). The fact that a party seeks to enter a specific coalition should suggest that the signaling party is somewhat similar to its desired coalition partners with respect to political ideology. This should affect voters' perception of the parties involved in the coalition signal. In terms of Equation (1), voters change their perception of party position  $\theta_j$  if party  $j$  sends a signal favoring coalition  $k$ . The new party position is then a weighted average of the old party position and the position of the signaled coalition partners  $\theta_{j,n}^{*j}$ . Ultimately, the updated party position directly changes the voting utility for party  $j$ . Note that this mechanism is also at work if parties send signals about undesired coalitions; in this case, voters would perceive the ideological position of the signaling party as shifted away from the unwanted coalition partners.

The coalition priming mechanism, in contrast, contends that coalition signals affect the weight voters place on coalition considerations relative to party considerations. Following Gschwend et al. (2017), coalition signals remind voters of the government formation process following the election. The fact that parties talk about coalitions brings to mind that single parties are usually not able to achieve an electoral majority. Instead, coalitions have to be formed. Thus, voters should increasingly think about potential future coalitions and place more importance on how much they prefer potential coalitions. Simultaneously, party considerations should become less important for voting utilities. In other words, parameter  $\alpha$  in Equation (1) increases: voters give more weight to the coalition-centered component and less to the party-centered component of their utility calculus.

It is crucial to stress the difference between the coalition priming mechanism and the coalition expectation mechanism. The priming mechanism, taken by itself, suggests that the evaluation of every single coalition becomes more important for a voter's utility calculation when any coalition is signaled. In contrast, the coalition expectation mechanism implies that the evaluation of some coalitions become more important while those of other coalitions become less relevant for a voter's utility function. This is best illustrated by an example. Assume that there are three parties, denoted by  $X$ ,  $Y$  and  $Z$ . A voter's utility for party  $X$  is then given by  $u_j(X) = \alpha_{xy} C_{i;xy} + \alpha_{xz} C_{i;xz} + \beta \cdot \theta_j / P_{i;x}$ .<sup>4</sup> If  $X$  signals to aim for a coalition with  $Y$ , the coalition priming mechanism implies an increase in  $\alpha_{xy}$ , which directly extends the effect of all coalition evaluations ( $C_{i;xy}$ ;  $C_{i;xz}$ ) on voting utility. The coalition expectation mechanism, on the contrary, involves increasing  $\alpha_{xy}$  and decreasing  $\alpha_{xz}$ . Accordingly, a voter's evaluation of the signaled coalition becomes more important for their voting calculus, while the other coalition evaluation loses significance. Two other differences between both mechanisms are visible. First, the priming mechanism affects the influence of party evaluations on voting utility, while the expectation mechanism does not. Second, the priming mechanism has an impact also on voting utilities for parties  $Y$  and  $Z$ , since parameter  $\alpha$  is party-unspecific. In contrast, the expectation mechanism should not affect voting utility for party  $Z$ : the coalition likelihoods for party  $Z$  should not change, since party  $Z$  is not involved in the signaled coalition. Finally, the expectation mechanism is at work only if there is at least some weight on coalition considerations.

Now that we laid-out how coalition signals should affect coalition expectations, party position perceptions and the importance of coalition considerations, we can also derive expectations about the overall effect of coalition signals on voting utilities. On the basis of the coalition expectation mechanism, we want to stress how this overall effect depends on a voter's spatial proximity to the signaled coalition. It is easy to see by means of Equation (1) that the change in coalition expectations,  $\Delta q_n$ , induced by a coalition signal has a positive impact on the voting utility of the signaling party for those voters who are spatially closer to the signaled coalition than to all other coalitions the signaling party

<sup>2</sup>The right-hand side term of Equation (3) directly results from solving equations  $\sum_{n=1}^{N_{q_j}} q_n = 1$  and  $(2) \sum_{n=1}^{N_{q_j}} q_n \cdot \alpha_{q_k} / \beta = 1$  for  $q_n \cdot \alpha_{q_k}$ . Note that we assume all likelihoods of not-signaled coalitions to decrease by the same factor.

<sup>3</sup>Certainly, coalition signals are not the only factors that contribute to voters' perceptions of coalition likelihoods. For instance, opinion polls provide information about which coalitions are arithmetically realizable and which not (Fredén; 2017; Stoetzer and Orlowski; 2019). Moreover, as Armstrong and Duch (2010) show, prior coalition history can give some indication of coalition likelihoods, since, for many countries, coalition formation patterns are considerably stable over time.

<sup>4</sup>In order to simplify Equation (1), we define coalition evaluation  $\alpha_{i,m} := \alpha \cdot x_i \cdot Z_m / 2$  and party evaluation  $\beta_{i,m} := \alpha \cdot x_i \cdot p_m / 2$  and set parameters to one and  $\beta$  as well as constant  $\theta_j$  to zero.

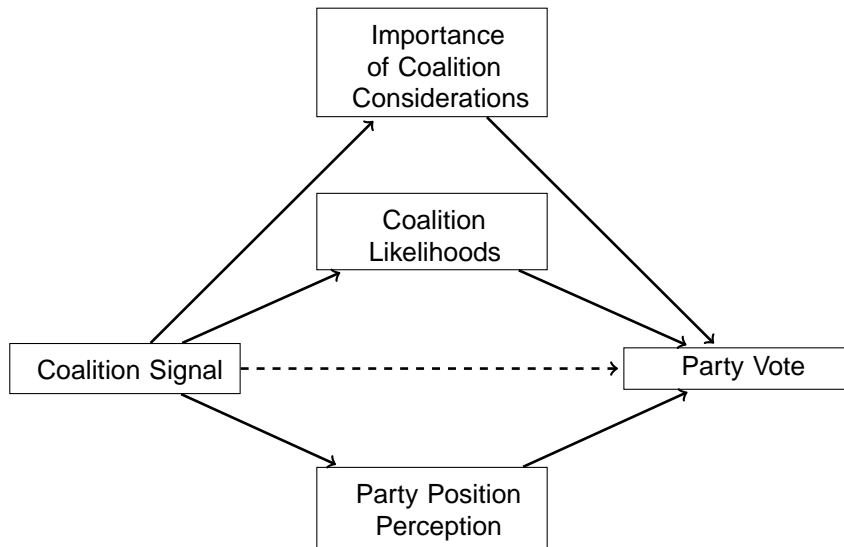


Figure 1: Three mechanisms how coalition signals can influence party voting decisions.

Note The coalition priming mechanism changes the importance of coalition considerations in decision-making. The coalition expectation mechanism changes the coalition likelihoods (perceived probability of a party ending up in a specific coalition). The party position mechanism changes the perceived positions of parties.

could end up in. Thinking in terms of the example above, suppose that party X sends a coalition signal to party Y. For voters who are more ideologically proximate to a coalition of party X and party Y than to a coalition of party X and party Z ( $C_{i,xy} > C_{i,xz}$ ), the voting utility for party X,  $u_i(X)$ , increases. This holds because more weight is put on  $C_{i,xy}$  (increases) than on  $C_{i,xz}$  ( $u_i(X)$  decreases) due to the signal. At the same time, as argued above, the coalition expectation mechanism should not affect voting utilities for parties which are not part of the signaled coalition, in the example this is party Z. This implies that, compared to other parties, the signaling party should become a more attractive voting option among voters who are more proximate to the signaled coalition than to all other coalition options of the signaling party. Analogous reasoning yields that the voting utility of the signaling party decreases for those voters who are spatially more distant to the signaled coalition than to all other coalitions which the signaling party could join. Thus, the signalling party becomes a less attractive voting option for these voters. To sum up, as consequence of the coalition expectation mechanism, a coalition signal increases (decreases) the appeal of the signalling party for voters who are proximate (distant) to the signalled coalition relative to other coalition options of the signalling party.

In sum, the theoretical framework generates a causal graph how coalition signals influence voting decisions, which is illustrated in Figure 1. Coalition signals can influence party vote through three mechanisms. The coalition priming mechanism changes the importance of coalition considerations in decision-making. The coalition expectation mechanism changes the coalition likelihoods (perceived probability of a party ending up in a specific coalition). The party position mechanism changes the perceived position of the party. Based on this framework and the described implications, we can test and compare the coalition expectation mechanism against the party position and the coalition expectation mechanism.

### 3. Design of the Survey Experiment

How can we empirically investigate mechanisms through which coalition signals causally shape voting behavior? Naturally, voters are either exposed to a certain coalition signal or not. Since we can not observe the counterfactual

<sup>5</sup>Additionally, the moderating role of coalition proximity for the effect of coalition signals on voting utilities also follows from the party position mechanism (see Falcó-Gimeno and Muñoz; 2017, for related reasoning). For a voter who is ideologically very proximate to the signaled coalition, the coalition signal can shift the perceived position of the signalling party closer to the ideological position of that voter. This yields an increase of the voting utility derived from the signalling party for these voters. Analogously, the perceived position of the signalling party can be shifted away from the voter's position if the voter is spatially very distant to the signaled coalition resulting in a decrease of the voting utility of the signalling party.

scenario, we rely on a survey experiment in which a respondent is randomly assigned to either a hypothetical coalition signal or to a control condition in which we present no coalition signal. This design is based on prior coalition vignette studies in the Netherlands (Irwin and van Holsteyn; 2012), Austria, Germany (Gschwend et al.; 2017), and in a regional election campaign in Spain (Falcó-Gimeno and Muñoz; 2017). In order to maximize external validity, we embedded the experiment into a survey conducted during a real election campaign.

We chose to hold our experiment in the context of a 2018 Swedish election, since Sweden has a long history of campaigns featuring pre-electoral coalition signals. Therefore, Swedish voters are familiar with coalition signals and can be assumed to know the implications of these statements for government formation. Especially since the late 1990s, when coalition governments rather than single-party minority governments became the norm (Bäck and Bergman; 2016), Swedish parties have talked very explicitly about their preferred coalition constellations prior to elections. In 2004, the Moderate Party (M), the Centre Party (C), the Christian Democratic Party (KD) and the Liberal Party (L) declared that they intend to form the next government (Aylott and Bolin; 2007). In all Swedish general elections from 2006 to 2018, this so-called Alliance presented common policy positions. In the 2010 Swedish election campaign, the parties of the left, i.e., the Social Democratic Party (SAP), the Green Party (MP), and the Left Party (V), also clearly stated their intention to form a government together (Fredén; 2013). This red-green deal and the Alliance strongly signaled the coalition preferences of the parties involved. Tillman (2015) classifies these blocks as pre-electoral coalitions.

The Swedish general election of 2018 is particularly suitable for the investigation at hand because several new cross-block coalitions were conceivable. Traditional block politics seemed to have come to an end ever since the right-wing populist Sweden Democrats (SD) were able to receive significant support from voters. Prior to the 2018 election, all major opinion polls suggested that neither the left nor the right block would obtain an electoral majority (Poll of Polls; 2018). Figure 3 illustrates the Swedish party system at the time of the 2018 election with regard to the strength and ideological placement of the parties. Party strength was measured by the 2018 general election results. For the ideological placement of parties, we relied on the perception of parties' positions that the respondents of our experiment expressed on a 7-point scale from 1 ("very left") to 7 ("very right").

Figure 2: The Swedish party system in the 2018 general election campaign.

Note: For the left-right placement of parties, we use the perceptions of parties' positions that the respondents of our survey experiment expressed on a uni-dimensional scale from 1 ("very left") to 7 ("very right"). Only respondents assigned to the control group were considered. V = Left Party; MP = Green Party; SAP = Social Democratic Party; C = Center Party; L = Liberal Party; KD = Christian Democrats; M = Moderate Party; SD = Sweden Democrats. This figure was inspired by the illustration of the 2014 Swedish party system by Fredén (2017, p. 254).

Parties responded to this development in the 2018 campaign by carefully speaking about new government conste

<sup>6</sup>Since we hypothesized that coalition signals alter parties' positions, we only used party placements of voters in the control group.

lations. This made it more credible to use cross-block coalition signals for the experimental vignettes. For instance politicians of the Social Democratic Party were positive to a center coalition, involving the Center Party and the Liberals, as long as they lead this coalition (Aylott and Bolin; 2019). Already in the 2014 election campaign, the Social Democrats declared that they were open to make a government deal with the Center Party and the Liberal Party (Aylott and Bolin; 2015). At the same time, the Center and the Liberals signaled their willingness to cooperate with the Social Democratic Party in case the Alliance would be smaller than the red-green block (Aylott and Bolin; 2019). Several political observers also speculated that the Green Party would be part of such a potential coalition between the Social Democrats, the Center and the Liberals (e.g. SEB; 2018). Furthermore, the Moderates did not rule out cooperating with the Sweden Democrats, while politicians of the Sweden Democrats, conversely, stated that they were open to such a constellation (Henley; 2018). The Center Party and the Liberals vehemently opposed any collaboration with the Sweden Democrats (Henley; 2018). The fact that many Swedes voted in the 2018 general election for a party other than their preferred one (Fredén; 2019) may indicate that voters took these developments into account when casting their ballot.

Coalition Type	Signaling Party	
	Moderate Party (M)	Social Democratic Party (SAP)
Usual Coalition	Treatment M-C-L-KD: M in favor of Alliance coalition (M-C-L-KD)	Treatment SAP-MP: SAP in favor of red-green coalition (SAP-MP)
Unusual Coalition	Treatment M-SD: M in favor of right-wing coalition (M-SD)	Treatment SAP-MP-L-C: SAP in favor of center coalition (SAP-MP-L-C)
Control: No coalition signal		

Table 1: Treatment and control groups.

Note MP = Green Party; SAP = Social Democratic Party; C = Center Party; L = Liberal Party; KD = Christian Democrats; M = Moderate Party; SD = Sweden Democrats.

Our experiment was implemented in a survey conducted by the Laboratory of Opinion Research (LORE) at the University of Gothenburg during the 2018 Swedish election campaign between June 12 and August 6, 1,907 respondents participated in our survey experiment with 381 respondents per experimental group, on average. At the beginning of the experiment, respondents rated parties and coalitions on a 7-point scale from 1 ("strongly dislike") to 7 ("strongly like"). Subsequently, respondents were randomly assigned to one of four treatment groups or to a control group.<sup>8</sup> Table 1 provides an overview of the different experimental groups and the employed coalition signal vignettes. Regarding the wording of the vignettes, we follow the choice of Falcó-Gimeno and Muñoz (2017). In the treatment groups, respondents were exposed to the following coalition signal vignettes:

As you might know, an election is coming up on September 9. Several political observers agree that, given the statements and signals sent by the [signaling party], there is a high probability of this party joining a coalition government with [signaled coalition partners] after the election .

In the first treatment group, the Moderate Party signaled a usual Alliance coalition (M-C-L-KD) while in the second treatment group, the Moderate Party signaled a unusual right-wing coalition (M-SD). In the third treatment group, the Social Democratic Party signaled a usual red-green coalition (SAP-MP) while in the fourth treatment group, the Social Democratic Party signaled a unusual center coalition (SAP-MP-L-C). In the control group, the respondents did not receive any coalition signal. Instead, they were exposed to the following general statement: As you might know, an

<sup>7</sup>More precisely, our survey experiment was fielded as part of the 30th wave of the LORE Citizen Panel. The sample of this online panel study consists mainly of non-probability participants (84% of all participants), who were recruited primarily via advertising on social media platforms. 16% of the Citizen Panel sample consists of probability participants recruited through telephone interviews and postal invitations.

<sup>8</sup>Appendix B shows that respondents were indeed randomly assigned to either one of the treatment groups or the control group.

election is coming up on September<sup>9</sup>.

After reading the coalition signal vignettes, the respondents indicated their propensity to vote for the different parties on a 7-point scale from 1 ("not likely at all") to 7 ("very likely"). Subsequently, they stated their perceived likelihood of the Moderates entering an M-C-L-KD and an M-SD coalition, conditional on the Moderates being part of the government. Respondents reported the perceived likelihood on a 7-point scale from 1 ("not likely at all") to 7 ("very likely"). Analogously, we measured the respondents' perceived likelihood of the Social Democrats forming an SAP-MP and an SAP-MP-L-C coalition, conditional on the Social Democrats being part of the government. With these measures, we can assess the coalition likelihoods. Afterwards, respondents placed all parties, the four addressed coalitions, and themselves on a 7-point scale from 1 ("very left") to 7 ("very right"). This provides us with a measure to evaluate the perceived party positions.

In order to gain insights about the baseline preferences and expectations of our respondents, Appendix A shows descriptive statistics for the respondents in the control group. As can be seen from the descriptive table, they perceive the right-wing M-SD coalition (average of 3.2 on the 1 to 7-point scale) indeed as more unusual than the Alliance M-C-L-KD coalition (5.1). Moreover, respondents in the control group consider the SAP-MP-L-C coalition on average as a more unusual, i.e. less likely, coalition option for the Social Democrats (3.6) than the usual SAP-MP coalition (4.0). Regarding the popularity of the four signaled coalitions, the centrist M-C-L-KD (average of 3.3 on the 1 to 7-point scale) and SAP-MP-L-C coalitions (3.2) are on average more liked than the leftist SAP-MP (2.9) or the rightist M-SD coalition (2.7).

With the experimental design, we can estimate the total effect coalition signals (operationalized through our vignettes) have on voting decisions. We further investigate whether the perceptions of coalition likelihoods mediate the relationship between coalition signals and voting behavior. In a first step, we compare the mediating role of the perceived coalition likelihoods with that of the perceived party positions. In a second step, we check the coalition expectation mechanism against the coalition priming mechanism.

#### 4. Results: Coalition Signals Matter

In this section, we present the results of our survey experiment. Before finding out coalition signals affect voting behavior, we examine whether our coalition signals matter. Do they systematically change respondents' voting propensities? As stated in the theory section, we expect the overall effect of coalition signals on voting for the signaling party to depend on the ideological proximity of respondents to the signaled coalition. These expectations followed from the coalition expectation and party position mechanism. As a proxy for ideological closeness to coalitions, we use our pre-treatment coalition rating measurement. Hence, we estimate average causal treatment effects of coalition signal treatments on propensities to vote for the Moderates and the Social Democrats dependent on ratings of the treatment coalition, providing us with conditional average treatment effects.<sup>10,11,12,13</sup>

<sup>9</sup>As these constellations have been prominently discussed during the campaign, using them in the vignettes should be more credible to respondents than the use of other signals not discussed during the campaign. One might wonder whether it causes problems for our design that the parties in coalition SAP-MP are a subset of the parties in coalition SAP-MP-L-C. Note, however, that our theory does not preclude the use of such coalition signals. The coalition-centered component in the model of Duch et al. (2010) contemplates a party could enter, where some coalitions are inevitably a subset of other coalitions. All those coalitions are different constellations and signaling one of them should, according to this model, make all the other ones less likely.

<sup>10</sup>For unconditional average treatment effects see Appendix C.

<sup>11</sup>We thereby assume that respondents rate coalitions higher the closer they are perceived ideologically. Note that respondents also placed themselves and all four coalitions on left-right scale. As these measurements were taken after displaying the coalition vignettes and, thus, might suffer from post-treatment bias, we do not use these variables here.

<sup>12</sup>Specifically, we employ separate linear regression models restricted on respondents who (1) are either in the respective treatment group or in the control group and (2) exhibit a high (low) rating of the treatment coalition. As our theoretical considerations suggest that coalition ratings moderate the treatment effect, we consider a respondent to have a high rating of certain coalition if she rated this coalition at least as high as any other coalition for that we measured respondent ratings. Similarly, a respondent is regarded as having a low rating of certain coalition if she rated this coalition at least as low as any other considered coalition. Furthermore, note that socio-demographics and all party ratings were included as control variables. Due to the random assignment, controlling for these variables is strictly not necessary in order to obtain an unbiased treatment effect. However, using further pre-treatment covariates allows us to estimate the average causal effect of the treatments more precisely (e.g., Gelman and Hill; 2006, p. 177). These variables are strongly related to the propensity to vote for the parties while being unrelated to a respondent's treatment status.

<sup>13</sup>Appendix E shows the conditional average treatment effects for a stricter definition of high and low coalition evaluations. This stricter definition considers a respondent to have a high (low) rating of certain coalition if she rated this coalition higher (lower) than any other coalition for that we measured respondent ratings. The results are similar to the effects shown in Figure 3.



Figure 3 displays the conditional average treatment effects of four different coalition signals on the propensities to vote for the Moderates and the Social Democrats. The results indicate that coalition signals affect the respondents' vote choice as some conditional average treatment effects are significantly different from zero. The right panel shows the effects we find on voting decisions for the Social Democrats. The coalition signal which indicates that the Social Democrats want to form a coalition with the Green Party, the Liberal Party, and the Center Party (i.e., Treatment SAP-MP-L-C) increases the propensity to vote for the Social Democrats for those respondents with a high rating of the SAP-MP-L-C coalition. This effect is significant on the 95% confidence interval. Additionally, for respondents with a low rating of the coalition between the Moderates and the Sweden Democrats (i.e., Treatment M-SD), we find a significant effect of Treatment M-SD on the propensity to vote for the Social Democrats. The left panel shows the effects we find on voting decisions for the Moderates. Somewhat surprisingly, for respondents with a high rating of the SAP-MP-L-C coalition we find a significant positive effect of Treatment SAP-MP-L-C on the propensity to vote for the Moderates<sup>14</sup>. All other conditional average treatment effects are statistically indistinguishable from zero. The results line up with prior findings of coalition vignette experiments: coalition signals can influence voting decisions (Gschwend et al.; 2017; Falcó-Gimeno and Muñoz; 2017).

A coalition signal between the Moderates and the Sweden Democrats and a signal between the Sweden Democrats, Greens, Liberals and the Center Party can affect the propensity to vote for the Social Democrats and the Moderates. With this, we are in a position to examine the underlying mechanisms in order to understand how coalition signals change respondents' voting behavior. Figure 1 in the theory section outlines the three mechanisms we intend to test. Our strategy to distinguish the three pathways is as follows. In Section 4.1, we assess the coalition expectation and the party position mechanism. Specifically, we conduct causal mediation analyses relying on direct measures of coalition expectations,  $c_n$  and party positions,  $p_j$ . Evaluating the coalition priming mechanism is more challenging. We do not have a direct measure of the relative weight of voters' coalition considerations and applying a mediation analysis for the evaluation of the coalition priming mechanism is not feasible. Hence, in Section 4.2, we employ another empirical strategy in order to compare the coalition expectation with the coalition priming mechanism.

#### 4.1. Testing Observable Implications of the Coalition Expectation and Party Position Mechanism

This section tests the coalition expectation mechanism and the party position mechanism. According to the corresponding theoretical arguments, coalition signals affect propensities to vote by altering coalition expectations or perceived party positions. Our treatments should change either the perceptions of coalition likelihoods or the respective party positions. We are able to test this because we have post-treatment measures of the respondents' perceived coalition likelihoods and left-right placements of parties.

First, we analyze if our vignette treatments affect the coalition likelihoods. Figure 4 displays the treatment effects on the perceived coalition likelihoods. The two upper panels show the perceived likelihoods of the Moderates forming an M-C-L-KD (to the left) and an M-SD (to the right) coalition. As expected, a signal favoring an M-SD coalition (i.e., Treatment M-SD) significantly increases the perceived likelihood of an M-SD coalition on average by 0.30 [0.07; 0.52] points on the 7-point scale. At the same time, the M-SD signal significantly reduces the likelihood of an Alliance coalition by 0.22 [0.46; 0.02] points on average. Contrary to our expectations, signaling an M-C-L-KD coalition (i.e., Treatment M-C-L-KD) does not have significant effect on the perceived coalition likelihoods for the Moderate Party. However, the direction of the effect is as expected, since an M-C-L-KD coalition is perceived as more likely to form given Treatment M-C-L-KD and, at the same time, a potential M-SD coalition is perceived as less likely to form given the same treatment.

The two lower panels in Figure 4 show the average treatment effect of the treatments on the perceived likelihoods of the Social Democrats forming an SAP-MP (to the left) and an SAP-MP-L-C (to the right) coalition. As expected, the

<sup>14</sup>This finding deviates from our expectations about the moderating role of ideological proximity to the signaled coalition. This could be explained by the fact that we derived these expectations from the coalition expectation and the party position mechanism. However, also the coalition priming mechanism should be at work. In fact, the coalition priming mechanism could explain why respondents with a high rating of the centrist SAP-MP-L-C coalition increase their propensity to vote for the Moderates when primed with a coalition signal. Thinking in terms of the Duch et al. (2010) model, these respondents' coalition-centered evaluations of the Moderates might be higher than their party-centered evaluation of that party. A coalition priming implies that more weight is put on coalition-centered and less on party-centered considerations, their utility from voting for the Moderates could therefore increase after being exposed to a coalition signal. We are unable to test this suspicion since we only measured the ratings for some of the coalitions that the Moderates could join (namely for M-C-L-KD and M-SD) which is not sufficient to assess the coalition-centered evaluation of the Moderates. However, 65.6% of the respondents who reported high ratings for the SAP-MP-L-C coalition also rated the M-C-L-KD coalition higher than or equal to the Moderate Party, which may indicate the veracity of this claim.

<sup>15</sup>As Appendix D shows, the coalition signals sent by either the Moderates or the Social Democrats can also change the propensity to vote for other Swedish parties.

Figure 3: Conditional average treatment effect of coalition signals on propensities to vote by treatment coalition ratings.

Note Respondents answered the following question: "How likely is it that you will vote for the following parties?" Respondents answered on a scale from 1 ("not likely at all") to 7 ("very likely"). M = Moderate Party; SAP = Social Democratic Party. Estimates come from separate linear regressions restricted on respondents who are either in the respective treatment group or in the control group. For each party and coalition treatment, two model variants are calculated: one for respondents rather liking the coalition (rating of treatment coalition is at least as high as any other measured coalition rating) and one for respondents rather disliking the coalition (rating of treatment coalition is at least as low as any other measured coalition rating). We excluded respondents from the analyses who gave the same rating to each coalition. Age, age squared, sex, education, and party ratings were used as control variables. 95% (90%) confidence intervals are indicated with thin (thick) bars.

SAP-MP coalition signal (i.e., Treatment SAP-MP) significantly increases the perceived likelihood of SAP entering a red-green coalition. This signal also seems to entail the expected negative effect on the likelihood of SAP forming an SAP-MP-L-C coalition. Similarly, the effect of the SAP-MP-L-C coalition signal (i.e., Treatment SAP-MP-L-C) shows the anticipated direction; however, the corresponding effects are not statistically different from zero. It might be surprising that Treatment SAP-MP affects coalition expectations while there is no conditional average treatment effect on the propensities to vote for Treatment SAP-MP. Likewise, Treatment SAP-MP-L-C has no effect on coalition expectations while we found significant conditional average treatment effects for Treatment SAP-MP-L-C. Note, however, once again, that it is not necessary that the overall treatment effect patterns shown in Figure 3 are only attributable to a change in coalition expectations. The conditional average treatment effects should be understood as result of the interplay of all three mechanisms<sup>16</sup>.

Second, we move to the party position mechanism and estimate the average treatment effect of the various coalition signals on the perceived positions of the Moderates and the Social Democrats. Figure 5 shows the average treatment effects of the coalition signals on perceived party positions of the Moderates and the Social Democrats. Contrary to our expectations about the party position mechanism, none of the coalition signal vignettes alter the perceived left-right positions of the Moderates systematically. For the Social Democrats, signals in which the SAP wants to join a coalition government with the more leftist MP lead to a slight shift to the left of the perceived SAP position. In turn, signaling a coalition of the SAP with the MP together with the more centrist parties C and L slightly moves the perceived position

<sup>16</sup>Moreover, we can relate the findings displayed in Figure 4 to the baseline coalition expectations of respondents in the untreated control group (see Appendix A). Apparently, the treatment effect on coalition likelihoods is strongest for the most unexpected coalition scenario, M-SD, while it appears to be weakest for the most expected one, M-C-L-KD.

Figure 4: Testing observable implications of the coalition expectation mechanism. Average causal treatment effect of coalition signals on perceived coalition likelihoods.

Note Respondents answered the following question: "Suppose the [Moderate Party, Swedish Social Democratic Party] is part of the next government. Which coalition government is the party likely to be part of?" Respondents answered on a scale from 1 ("not likely at all") to 7 ("very likely"). M = Moderate Party; SAP = Social Democratic Party. Estimates come from separate linear regressions restricted on respondents who are either in the respective treatment group or in the control group. Age, age squared, sex, education, and party ratings were used as control variables. 95% (90%) confidence intervals are indicated with thin (thick) bars.

of the SAP to the right. While the direction of these effects is as expected, they are not statistically significant.

Figure 5: Testing observable implications of the party position mechanism. Average causal treatment effect of coalition signals on perceived party positions.

Note Respondents answered the following question: "In politics people sometimes talk about left and right, where would you place the following parties on the scale?" Respondents answered on a scale from 1 ("very left") to 7 ("very right"). M = Moderate Party; SAP = Social Democratic Party. Estimates come from separate linear regressions restricted on respondents who are either in the respective treatment group or in the control group. Age, age squared, sex, education, and party ratings were used as control variables. 95% (90%) confidence intervals are indicated with thin (thick) bars.

Where does this leave us? The results provide strong evidence that coalition signals can change respondent coalition expectations. However, we do not find any systematic effects on perceived party positions. The ultimate aim of this investigation is to assess the causal mechanisms stated in Figure 1. We are interested in whether coalition

expectations and party positions causally mediate the effect of coalition signals on the propensities to vote. Since we do not find a causal effect of coalition signals on party position perceptions, we do not investigate this path any further. If the coalition signals do not change perceived party positions, they cannot work as a causal mediator of party vote. Hence, our experiment does not yield support for the party position mechanism. Given that we find evidence of the effect of coalition signals on coalition likelihoods, we still can investigate the coalition expectation mechanism. In the next section, we therefore report on the causal mediation analysis.

#### 4.1.1. Causal Mediation Analysis

Within the potential outcome framework, the relevant causal mediation effect is defined as the change in the propensities to vote that arises from the change from the potential value of the mediator under control to the potential value of the mediator under treatment, holding the treatment status constant (Imai, Keele, Tingley and Yamamoto; 2011). We follow Imai et al. (2011) in order to estimate average causal mediation effects (ACMEs). Therefore, we fit two linear regression models. For respondent  $i$  and given certain coalition signal  $c_{kn}$ , we specify linear regression models for the expectation that the signaled coalition is likely to form,  $ic_{kn}$  (mediator), and the propensity to vote for party  $j$ ,  $ptv_{ij}$  (outcome), in the following way:

$$ic_{kn} = \beta_1 + \beta_2 t_{is_{qkn}} + \beta_3 W_i + \beta_4 ic_{kn}; \tag{4}$$

$$ptv_{ij} = \beta_5 + \beta_6 t_{is_{qkn}} + \beta_7 ic_{kn} + \beta_8 W_i + \beta_9 ij; \tag{5}$$

where  $t_{is_{qkn}}$  states whether an individual was exposed to the corresponding coalition signal (1) or assigned to the control group ( $t_{is_{qkn}} = 0$ ).

For the identification of the average causal mediation effect, the conventional assumption of independence between treatment assignment and outcome variables (which is fulfilled in our case due to randomized treatment assignment) is not sufficient. Additionally, we have to statistically control for covariates that might confound the relationship between the mediators and the propensity to vote (sequential ignorability assumption, Imai et al.; 2011, p.770). We add a matrix of covariates ( $W_i$ ) along effect parameters  $\beta_1$  and  $\beta_2$  to the mediator and outcome model. We include sex, age, age squared, education, and party ratings as relevant covariates, since those variables could influence both the coalition likelihoods and the propensities to vote for parties.

We evaluate the coalition expectation by estimating the average causal mediation effect for voters with high as well as for voters with low ratings of the treatment coalition. According to our theoretical considerations in Section 2, we expect for these subgroups that changes in coalition expectations translate to changes in the propensities to vote. By estimating these average causal mediation effects we investigate the contribution of the coalition expectation mechanism to the earlier investigated conditional average treatment effects. Note that we do not calculate average causal mediation effects for Treatments SAP-MP-L-C and M-C-L-KD as these signals did not change expectations. If the treatment has no effect on the mediator, the average causal mediation effect is, by definition, zero.

The average causal mediation effects of Figure 6 yield suggestive evidence in favor of the existence of the coalition expectation mechanism. The confidence intervals display the average causal mediation effects for Treatments M-SD and SAP-MP on the propensities to vote for the Moderates and the Social Democrats through the coalition expectations.<sup>19</sup> We calculate average causal mediation effects both for respondents with low ratings of the treatment coalition as well as for those with high ratings of the treatment coalition. The change in the coalition expectations induced by the M-SD signal makes the Social Democrats a more attractive voting option for respondents with low ratings of this coalition, significantly on the 90% confidence interval. While not significant on conventional levels, there is also suggestive evidence that the coalition expectation mechanism leads to an increase in the voting propensities for the Moderates when respondents with a high rating of a M-SD coalition are confronted with a M-SD coalition signal. Likewise, there is weak evidence that, due to the coalition expectation mechanism, voting propensities for the Social Democrats decrease when respondents with a low rating of a SAP-MP coalition are exposed to a SAP-MP coalition signal.

<sup>17</sup>For the computation of the average treatment effects, the R package was employed (Tingley, Yamamoto, Hirose, Keele and Imai; 2014).

<sup>18</sup>We consider a respondent to have a high rating of certain coalition if she rated this coalition higher than any other coalition for that we measured respondent ratings. Similarly, a respondent is regarded as having a low rating of certain coalition if she rated this coalition lower than any other considered coalition.

<sup>19</sup>The confidence intervals of some average causal mediation effects (ACMEs) are asymmetric with respect to the point estimate. In point of fact, the sampling distribution of a ACME is not necessarily symmetric (MacKinnon, Lockwood and Williams; 2004).

Figure 6: Average causal mediation effects (ACME) of treatments via likelihood of treatment coalition on propensities to vote by treatment coalition ratings.

Note: M = Moderate Party; SAP = Social Democratic Party. Models for the mediator and the propensity to vote were estimated through ordinary least squares. Age, age squared, sex, education, and party ratings were used as control variables. For each party and coalition treatment, two models are estimated: one for respondents who like the coalition (rating of treatment coalition is higher than any other measured coalition rating) and one for respondents who dislike the coalition (rating of treatment coalition is lower than any other measured coalition rating). 95% confidence intervals are indicated with thin (thick) bars.

These patterns are consistent with our expectations and indicate that the coalition expectation mechanism seems to operate. Most clearly, the causal mediation analysis suggests that the coalition expectation mechanism explains part of the increased voting propensities for the Social Democrats among opponents of the M-SD coalition when the Moderates signal a coalition with the Sweden Democrats. When receiving the coalition signal, those voters increase the prospects that the Moderates end-up in a right-wing coalition and as a result turn to the Social Democrats. However, overall our evidence is not strong and oftentimes merely suggestive.

#### 4.2. Testing Observable Implications of the Coalition Expectation and Coalition Priming Mechanism

In this section we further test observable implications of the coalition expectation mechanism and the coalition priming mechanism. In contrast to the previous mechanisms, we cannot analogously compute average causal mediation effects for the coalition priming mechanism, because we do not directly measure the weight that is put on coalition considerations as compared to party considerations. Instead, we employ another empirical strategy in order to jointly assess the coalition expectation and coalition priming mechanism.

To generate observable implications, we exploit that both mechanisms supposedly change the impact of the coalition evaluations on voting utilities in different ways (see the example in Section 2). Remember, that our theory assumed that only spatial proximity determines how voters evaluate coalitions. According to the coalition priming mechanism, any coalition signal increases the importance of coalition evaluations (i.e., increases them), and, at the same time, decreases the importance of party evaluations in voters' decision calculus. Thus, coalition evaluations should have a larger effect for respondents in the treatment condition than for respondents in the control condition, who do not get a

<sup>20</sup>Additionally, we evaluated the coalition expectation mechanism by estimating ACMEs for centrist voters, i.e. voters ideologically placed between the leftist Social Democratic Party and the rightist Moderate Party. The results are discussed in Appendix G and deliver additional evidence in favor of the coalition expectation mechanism.

<sup>21</sup>As addressed before, the unbiasedness of average causal mediation effect depends on whether the sequential ignorability assumption holds. The sensitivity analysis displayed in Appendix H shows how ACMEs change if one departs from this assumption. More specifically, we investigate how nonzero correlation between the error terms in the mediator and outcome regression models affects the AMCEs. This investigation shows that the results of the mediation analysis are sensitive to a violation of the sequential ignorability assumption.

coalition signal. This, however, contrasts nicely with the coalition expectation mechanism. According to this mechanism, coalition signals increase the perceived likelihood of a particular coalition and thereby the importance of this coalition at the cost of other coalition evaluations. A coalition that, given the particular coalition signal, appears to become more likely should obtain a greater weight in a voter's utility calculus (increase of  $c_{j,n}$ ). Analogously, the evaluation of a coalition that appears to become less likely (decrease of  $c_{j,n}$ ) should have a diminishing effect on voting utilities. If a signal does not change the perception of a coalition likelihood (certainly remains unchanged), the effect of that coalition's evaluation on voting utilities should not change. Consequently, the way how coalition signals affect the influence of coalition evaluations on voting utilities should depend on the coalition signal.

Given that we now generated different observable implications for both mechanisms we contrast them using the voting utility for the Liberal Party as an example. The utility a voter derives from voting for the Liberals depends on evaluations of coalitions involving this party, e.g. the center-right Alliance (M-C-L-KD) coalition and the SAP-MP-L-C coalition. How should the respective weights of those coalition evaluations change in a voter's utility function to vote for the Liberals according to both mechanisms? We summarize the expectations according to both mechanisms for the effects of the various coalition signals on the weights of M-C-L-KD coalition evaluation in Table 2 and on the weights of SAP-MP-L-C coalition evaluation in Table 3.

What does, for instance, Table 2 tell us? If the coalition priming mechanism operates, the presence of coalition signals should increase the impact of the M-C-L-KD coalition evaluation on the utility a voter derives from voting for the Liberals. Note that this should apply for any coalition signal, that is, irrespective of which party signals which coalition. If the coalition expectation mechanism operates, however, we get different predictions. According to the coalition expectation mechanism the impact of the Alliance evaluation on the utility from voting for Liberal Party should increase only subsequent to a M-C-L-KD coalition signal while it should decrease for a SAP-MP-L-C coalition signal. Why is that? A coalition signal in favor of a M-C-L-KD coalition changes a voters' expectation that the Liberal Party will end up in this constellation rather than in any another coalition. Therefore, the weight of the Alliance evaluation in the utility function for the Liberal Party should increase and, consequently, the weight of coalition evaluations for any other coalition the Liberal Party can be part of, such as a SAP-MP-L-C coalition, should decrease. Conversely a SAP-MP-L-C coalition signal should lead voters to expect that the Alliance coalition is less likely to form resulting in a decreasing weight of the Alliance coalition evaluation. At the same time such a signal should lead voters to expect that the SAP-MP-L-C coalition is more likely to form, hence the weight of the SAP-MP-L-C coalition evaluation in the utility function for the Liberal Party should consequently increase. Signaling coalitions of which the Liberals are not a member, such as the M-SD and SAP-MP coalition, should not immediately affect voter's expectations that the Liberals enter the Alliance coalition. Thus, these signals should not affect the impact of the M-C-L-KD coalition evaluation on the voting utilities for the Liberal Party.

Mechanism	Coalition Signal			
	M-C-L-KD	M-SD	SAP-MP	SAP-MP-L-C
Coalition Expectation	Increase	No difference	No difference	Decrease
Coalition Priming	Increase	Increase	Increase	Increase

Table 2: Expected effects of coalition signals on the weight of the M-C-L-KD coalition evaluation on the utility from voting for the Liberal Party.

Note Cells show expected changes as compared to the control group.

We derived observable implication that allow us to distinguish which mechanism is likely to operate. In order to test them, we employ linear regression models of voting utilities and allow coalition signals to moderate the effect of coalition and party evaluations. As a measure for voting utilities, we follow van der Eijk, van der Brug, Kroh and Franklin (2006) and rely on our post-treatment measure of the propensities to vote. In order to operationalize

<sup>22</sup>Yet, one can hypothesize that such coalition signals indirectly influence voters expectations. For instance, a signal suggesting a coalition between the Moderates and Sweden Democrats could reduce, in the eyes of voters, the likelihood that the Liberals will end-up in a government constellation with the Moderates. Since we find no indication of such effects on voters' coalition expectations, we expect these indirect influences to be negligible.

Mechanism	Coalition Signal			
	M-C-L-KD	M-SD	SAP-MP	SAP-MP-L-C
Coalition Expectation	Decrease	No difference	No difference	Increase
Coalition Priming	Increase	Increase	Increase	Increase

Table 3: Expected effects of coalition signals on the weight of the SAP-MP-L-C coalition evaluation on the utility from voting for the Liberal Party.

Note: Cells show expected changes as compared to the control group.

ideological closeness to coalitions and parties, we again take our pre-treatment measures of coalition and party ratings as proxies. We estimate the following model for respondent  $i$  given certain coalition signals  $t_{is_{\alpha_{kn}}}$  in the following way:

$$ptv_{ij} = \sum_{m=1}^M \beta_m C_{ic_{j,m}} + P_{ij} + t_{is_{\alpha_{kn}}} + \sum_{m=1}^M \beta_m C_{ic_{j,m}} \cdot t_{is_{\alpha_{kn}}} + P_{ij} \cdot t_{is_{\alpha_{kn}}} + W_i + \epsilon_{ij}; \quad (6)$$

where  $ptv_{ij}$  is the propensity of voter  $i$  to vote for party  $j$ ,  $C_{ic_{j,1}}, \dots, C_{ic_{j,n}}$  are her observed coalition ratings of coalitions that party  $j$  would be member of<sup>23</sup> and  $P_{ij}$  is her rating of party  $j$ .  $t_{is_{\alpha_{kn}}}$  again indicates whether respondent  $i$  was exposed to the corresponding coalition signal ( $= 1$ ) or to the control group ( $= 0$ ); and  $W_i$  are socio-demographic control variables.

On the basis of simulations utilizing an observed-value approach, Figure 7 shows the effect of the M-C-L-KD coalition rating (upper panel) and the SAP-MP-L-C coalition rating (lower panel) on the expected propensity to vote for the Liberal party by treatment and control status. The upper panel shows that signaling the coalition M-C-L-KD significantly increases the effect of the M-C-L-KD coalition rating on the expected propensity to vote, as compared to the control group.<sup>24</sup> Both the coalition expectation and the coalition priming mechanism expect this pattern as illustrated in Table 2. Signaling the SAP-MP-L-C coalition does not change the effect of the M-C-L-KD coalition rating on the propensity to vote for the Liberals. This observation indicates that both mechanisms are jointly at work: while the coalition expectation mechanism expects this signal to decrease the effect of the M-C-L-KD coalition rating, the coalition priming mechanism predicts an increasing effect. Thus, no change in the effect of the coalition rating may suggest that both mechanisms operate simultaneously and cancel each other out. The M-SD and SAP-MP coalition signals both significantly increase the effect of the M-C-L-KD coalition rating on the propensity to vote for the Liberals in the respective treatment groups as opposed to the control group. Again, these observations are consistent with the joint working of both mechanisms: the coalition priming mechanism expects an increase, while the coalition expectation mechanism expects no difference between treatment and control groups.

As the lower panel of Figure 7 reveals, the expected patterns are less apparent with regard to the effect of the SAP-MP-L-C coalition rating on the expected propensity to vote. Contrary to the predictions made by both mechanism (see Table 3), the treatment using an SAP-MP-L-C coalition signal does not increase the effect of the respondents' SAP-MP-L-C coalition evaluation on the propensity to vote for the Liberals. Also, the treatments using coalition signals M-SD and SAP-MP do not increase this effect compared to the control group, as expected by the coalition priming mechanism. However, according to the coalition expectation mechanism, an M-C-L-KD coalition signal decreases the effect of the SAP-MP-L-C coalition rating compared to the control group on the propensity to vote for the Liberals.

To sum up, the results provide some evidence consistent with the coalition expectation as well as the coalition priming mechanism. Comparing our expectations (Table 2 and Table 3) with the empirical patterns (Figure 7), we conclude that the coalition expectation and coalition priming mechanisms are jointly at work. As Appendix J illustrates, we also find these patterns for parties other than the Liberals.<sup>25</sup>

<sup>23</sup>Note that we did not measure all coalition ratings but only those for coalitions M-C-L-KD, M-SD, SAP-MP, SAP-MP-L-C. Hence, for instance, the systematic component for the Liberal Party includes two coalition ratings: the rating for coalition M-C-L-KD and for coalition SAP-MP-L-C.

<sup>24</sup>Appendix I shows that this increase is significant as the respective interaction term is significantly different from zero at the 95% level of confidence.

<sup>25</sup>Additionally, we estimated combined models in which the propensities to vote were stacked. The results are displayed in Appendix K and

Figure 7: Effect of coalition ratings on expected propensity to vote for Liberal Party by treatment and control status.

Note Model was estimated through ordinary least squares. Age, age squared, sex and education were used as control variables. For the simulation we employ an observed-value approach. The shaded areas display 95% confidence intervals. The corresponding regression table is shown in Appendix I.

## 5. Conclusion

We employed a coalition vignette survey experiment in which individuals were randomly assigned to either a hypothetical coalition signal or to a control condition. The results provided empirical evidence for the existence of the coalition expectation mechanism in one of the treatment coalition signals: the change in voters expectation, the perceived coalition likelihoods induced by a Moderate-Sweden Democrats coalition signal, systematically mediates the effect on the propensity to vote for the Social Democrats. While we uncovered a causal mediation effect for one treatment consistent with the coalition expectation mechanism, for the other treatments we are unable to find clear evidence for both mechanisms.



results. We also found some evidence for the priming mechanism, but none for the party position mechanism. Overall, our results show that coalition signals can matter for vote choice and highlight the importance of coalition expectations as a link between coalition signals and voting behavior.

Our results provide several implications for how parties should embed potential coalition signals into their campaign communication. While further research is still necessary to work out the particular boundary conditions in order to make specific recommendations, our general results indicate that parties should be more likely to send positive coalition signals if the respective coalition of parties is not completely unlikely to obtain a majority on election day. According to the coalition expectation mechanism, the coalition signal increases the perceived likelihood that this coalition forms, but realistically it will not push citizens' perception around such that every coalition will become viable through such a coalition signal. Thus, given our results, coalition signals should be employed by parties to activate existing positive prior attitudes about coalitions of parties that might have not yet been perceived as a viable contender to form the new government after the election.

Moreover, we like to mention that other research designs in different contexts could even yield larger effects. It cannot be ruled out that the effect sizes are small in the context of our experiments due to the fact that the same two pre-electoral coalitions, the red-green coalition and the Alliance, have existed for a long time and that cross-bloc coalitions have so far not occurred in Sweden's coalition history. Thus, our signals suggesting new coalition constellations might have appeared implausible to respondents, while signalling a red-green or an Alliance government might not have updated their pre-existing attitudes. In that sense, we picked a hard case to study the impact of coalition signals on vote choice. Another source that potentially weakened the estimated effects is that we used speculations made by political observers for our treatments. Coalition vignettes can be expected to be more influential if actual statements by politicians can be used that signal their commitment to form such a coalition. Finally, the lack of evidence of the party position mechanism may be attributable to the fact that some party positions were very close together on the measured unidimensional policy space and, thus, hard to find evidence for this mechanism in the first place. Thus, taking the multidimensionality of the political space into account might be a fruitful endeavor for future research.

Finally, we would like to note an alternative path way that has not been part of this study: valence considerations. It could be that parties can use coalition signals to show their competence or reliability and as a result become more attractive to voters. If, for example, two parties mutually signal their willingness to govern together, this could influence the evaluation of the second party's competence among supporters of the first party. It could also be that if a party is not consistent in its signals over time, voters might perceive them as an unreliable political actor. However, as valence is neither part of the theoretical framework, nor the survey experiment, we have to leave it to further research to explore arguments in this direction further.

## References

- Armstrong, D. A. and Duch, R. M. (2010). Why can voters anticipate post-election coalition formation likelihoods? *European Studies* 29(3): 308-315.
- Austen-Smith, D. and Banks, J. (1988). Elections, coalitions, and legislative outcomes. *American Political Science Review* 82(2): 405-422.
- Aylott, N. and Bolin, N. (2007). Towards a two-party system? The Swedish parliamentary election of September 2006. *European Politics* 30(3): 621-633.
- Aylott, N. and Bolin, N. (2015). Polarising Pluralism: The Swedish Parliamentary Election of September 2014. *European Politics* 38(3): 730-740.
- Aylott, N. and Bolin, N. (2019). A party system in flux: the Swedish parliamentary election of September 2018. *European Politics* pp. 1-12.
- Bäck, H. and Bergman, T. (2016). The parties in government formation. In Pierre (ed.), *The Oxford handbook of Swedish politics*. Oxford University Press, Oxford, pp. 206-223.
- Bytzek, E., Gschwend, T., Huber, S., Linhart, E. and Meert, M. F. (2012). Koalitionssignale und ihre Wirkungen auf Wahlentscheidungen. R. Schmitt-Beck (ed.), *Wählen in Deutschland, Sonderheft PVS, Nomos eLibrary*, [Baden-Baden], pp. 400-425.
- Downs, A. (1957). *An economic theory of democracy*. Harper and Row, New York.
- Duch, R. M., May, J. and Armstrong, D. A. (2010). Coalition-directed voting in multiparty democracies. *American Political Science Review* 104(4): 698-719.
- Falcó-Gimeno, A. and Muñoz, J. (2017). Show Me Your Friends: A Survey Experiment on the Effect of Coalition Signals. *Journal of Politics* 79(4): 1454-1459.
- Fredén, A. (2013). Threshold Insurance Voting in PR Systems: A Study of Voters' Strategic Behavior in the 2010 Swedish General Election. *Journal of Elections, Public Opinion and Parties* 24(4): 473-492.
- Fredén, A. (2017). Opinion polls, coalition signals and strategic voting: Evidence from a survey experiment. *Scandinavian Political Studies* 40(3): 247-264.

<sup>26</sup>We thank an anonymous reviewer for pointing this out.

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- Fredén, A. (2019). Strategisk röstning i riksdagsvalet 2018. Swedish National Election Studies Program working report series 2019:1. Stockholm: Swedish National Election Studies Program.
- Gelman, A. and Hill, J. (2006). *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge University Press, Cambridge.
- Golder, S. N. (2005). Pre-electoral coalitions in comparative perspective: A test of existing hypotheses. *Electoral Studies* 24(4): 643-663.
- Golder, S. N. (2006). *The Logic of Pre-Electoral Coalition Formation*. Ohio State University Press.
- Goodin, R. E., Güth, W. and Sausgruber, R. (2008). When to coalesce: Early versus late coalition announcement in an experimental democracy. *British Journal of Political Science* 38(1): 181-191.
- Gschwend, T. and Hooghe, M. (2008). Should I Stay or Should I Go? An Experimental Study on Voter Responses to Pre-Electoral Coalitions. *European Journal of Political Research* 47(5): 556-577.
- Gschwend, T., Meert, M. F. and Stoetzer, L. F. (2017). Weighting Parties and Coalitions: How Coalition Signals Influence Voting Behavior. *Journal of Politics* 79(2): 642-655.
- Gschwend, T., Stoetzer, L. and Zittlau, S. (2016). What Drives Rental Votes? How Coalitions Signals Facilitate Strategic Coalition Voting. *Electoral Studies* 44: 293-306.
- Henley, J. (2018). Sweden faces political impasse after inconclusive election. *The Guardian* September 10, 2018  
URL: <https://www.theguardian.com/world/2018/sep/10/swedish-left-and-right-stake-claims-to-form-next-government>
- Imai, K., Keele, L., Tingley, D. and Yamamoto, T. (2011). Unpacking the black box of causality: Learning about causal mechanisms from experimental and observational studies. *American Political Science Review* 105(4): 765-789.
- Irwin, G. A. and van Holsteyn, J. J. M. (2012). Strategic electoral considerations under proportional representation. *Electoral Studies* 31(1): 184-191.
- Kedar, O. (2005). When moderate voters prefer extreme parties: Policy balancing in parliamentary elections. *American Political Science Review* 99(2): 185-199.
- Linhart, E. (2009). A rational calculus of voting considering coalition signals: The 2005 German Bundestag election as an example. *World Political Science Review* 5(1).
- Mackinnon, D. P., Lockwood, C. M. and Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate behavioral research* 39(1): 99-128.
- Meert, M. F. and Gschwend, T. (2007). Strategic voting under proportional representation and coalition governments: A simulation and laboratory experiment. Working Paper.
- Meert, M. F. and Gschwend, T. (2011). Polls, coalition signals and strategic voting: An experimental investigation of perceptions and effects. *European Journal of Political Research* 50(5): 636-667.
- Poll of Polls (2018). Die Blöcke im schwedischen Parlament. September 9, 2018  
URL: <https://de.pollofpolls.eu/SE/54/koalitionen-in-schweden>
- SEB (2018). Sweden's election strong, decisive government still unlikely. *Macro & FICC - SEB Research* August 16, 2018 1-4.  
URL: [https://sebgroupp.com/siteassets/press\\_sv/bilagor/veckans\\_tanke/sebeconomicinsights\\_swedenelection\\_aug2018\\_en.pdf](https://sebgroupp.com/siteassets/press_sv/bilagor/veckans_tanke/sebeconomicinsights_swedenelection_aug2018_en.pdf)
- Stoetzer, L. F. and Orłowski, M. (2019). Estimating coalition majorities during political campaigns based on pre-electoral polls. *Journal of Elections, Public Opinion and Parties* 29(1): 1-12.
- Tillman, E. R. (2015). Pre-Electoral Coalitions and Voter Turnout. *Party Politics* 21(5): 726-737.
- Tingley, D., Yamamoto, T., Hirose, K., Keele, L. and Imai, K. (2014). mediation: R Package for Causal Mediation Analysis. *Journal of Statistical Software* 59(5).
- van der Eijk, C., van der Brug, W., Kroh, M. and Franklin, M. (2006). Rethinking the dependent variable in voting behavior: On the measurement and analysis of electoral utilities. *Electoral Studies* 25(3): 424-447.

## A. Descriptive Statistics

Variable	N	Mean	St. Dev.	Min.	Max.
Prop. to Vote for V	391	2.719	2.323	1.000	7.000
Prop. to Vote for MP	392	1.911	1.651	1.000	7.000
Prop. to Vote for SAP	392	2.855	2.206	1.000	7.000
Prop. to Vote for C	393	2.321	1.855	1.000	7.000
Prop. to Vote for L	390	2.287	1.739	1.000	7.000
Prop. to Vote for KD	392	1.778	1.530	1.000	7.000
Prop. to Vote for M	392	2.732	2.271	1.000	7.000
Prop. to Vote for SD	391	2.512	2.331	1.000	7.000
Rating of Party V	395	3.359	2.163	1.000	7.000
Rating of Party MP	395	2.871	1.759	1.000	7.000
Rating of Party SAP	394	3.680	1.765	1.000	7.000
Rating of Party C	395	3.367	1.596	1.000	7.000
Rating of Party L	395	3.506	1.495	1.000	7.000
Rating of Party KD	392	2.804	1.698	1.000	7.000
Rating of Party M	394	3.520	1.845	1.000	7.000
Rating of Party SD	395	2.661	2.211	1.000	7.000
Rating of Coalition M-C-L-KD	394	3.302	2.062	1.000	7.000
Rating of Coalition M-SD	394	2.685	2.272	1.000	7.000
Rating of Coalition SAP-MP	393	2.921	1.977	1.000	7.000
Rating of Coalition SAP-MP-L-C	394	3.246	1.927	1.000	7.000
Likelihood M entering Coalition M-C-L-KD	391	5.128	1.641	1.000	7.000
Likelihood M entering Coalition M-SD	393	3.186	1.724	1.000	7.000
Likelihood SAP entering Coalition SAP-MP	391	3.962	1.803	1.000	7.000
Likelihood SAP entering Coalition SAP-MP-L-C	391	3.627	1.503	1.000	7.000

Table 4: Descriptive statistics: Baseline propensities to vote, party ratings, coalition ratings and coalition expectations of the control group.

Note: Only respondents assigned to the control group were considered. V = Left Party; MP = Green Party; SAP = Social Democratic Party; C = Center Party; L = Liberal Party; KD = Christian Democrats; M = Moderate Party; SD = Sweden Democrats.

## B. Randomization Test

In this section, a multinomial logistic regression is used to test whether respondents were indeed randomly assigned to either one of the treatment groups or the control group. Table 5 displays that a model including pre-treatment characteristics as control variables does not fit better to the data than a null model. Thus, we conclude that respondents were randomly assigned to the experimental groups.

	M-C-L-KD coef/se	M-SD coef/se	SAP-MP coef/se	SAP-MP-L-C coef/se
M Party Rating	0.01 (0.07)	0.01 (0.06)	0.08 (0.07)	-0.01 (0.07)
SAP Party Rating	0.11* (0.06)	0.01 (0.06)	0.08 (0.06)	0.02 (0.06)
V Party Rating	-0.06 (0.06)	-0.06 (0.06)	0.05 (0.06)	-0.04 (0.06)
MP Party Rating	0.0008 (0.07)	0.05 (0.07)	-0.03 (0.07)	0.08 (0.07)
C Party Rating	0.03 (0.06)	-0.04 (0.06)	0.004 (0.06)	-0.06 (0.06)
L Party Rating	-0.02 (0.07)	-0.09 (0.07)	-0.008 (0.07)	0.01 (0.07)
KD Party Rating	0.01 (0.06)	-0.02 (0.06)	-0.007 (0.06)	0.02 (0.06)
SD Party Rating	-0.002 (0.05)	-0.01 (0.05)	-0.0005 (0.05)	0.01 (0.05)
Sex	0.25 (0.15)	0.16 (0.15)	0.14 (0.15)	0.11 (0.15)
Age	-0.32 (0.24)	-0.62** (0.24)	-0.11 (0.25)	-0.17 (0.24)
Age Squared	0.03 (0.03)	0.08* (0.03)	0.01 (0.03)	0.02 (0.03)
Constant	0.05 (0.70)	1.00 (0.68)	-0.75 (0.72)	0.11 (0.70)
N			1842	
log-likelihood			-2943.1	
$\chi^2$			40.586	
p-value			0.76748	

. p <0.1, \* p <0.05, \*\* p <0.01, \*\*\* p <0.001  
The control group is the reference category.

Table 5: Randomization test: Multinomial logit on treatment assignment.

### C. Unconditional Treatment Effect on Propensities to Vote

Figure 8 shows the average treatment effects of the coalition signals on the propensities to vote for the Moderates and the Social Democrats. The left panel shows the effects we find on voting decisions for the Moderates. The coalition signal, which indicates that the Social Democrats want to form a coalition with the Green Party, the Liberal Party, and the Center Party (i.e., Treatment SAP-MP-L-C), significantly increases the propensity to vote for the Moderates by 0.19 [0.01; 0.38] points on the 7-point scale. The other three coalition signals have no significant effect on voting for the Moderates. The right panel shows the effects on voting propensities for the Social Democrats. Respondents' propensity to vote for the Social Democrats increases on average by 0.20 [0.03; 0.37] points when the Moderates signal to form a coalition with the Sweden Democrats (i.e., Treatment M-SD). The other vignettes have no significant effect on voting for the Social Democrats. These results, again, indicate that some coalition signals indeed affect the voting decision of individuals.

Figure 8: Average causal treatment effect of coalition signals on the propensity to vote.

Note: Respondents answered the following question: "How likely is it that you will vote for the following parties?" Respondents answered on a scale from 1 ("not likely at all") to 7 ("very likely"). M = Moderate Party; SAP = Social Democratic Party. Estimates come from separate linear regressions restricted on respondents who are either in the respective treatment group or in the control group. Age, age squared, sex, education, and party ratings were used as control variables. 95% (90%) confidence intervals are indicated with thin (thick) bars.

As Figure 9 shows, the coalition signals sent by either the Moderates or the Social Democrats also change the propensity to vote for Swedish parties other than the Moderates or the Social Democrats. For instance, signaling a SAP-MP coalition increases the propensity to vote for the Christian Democrats and the Left Party. However, these effects are only significant at the 90% confidence interval.

Figure 9: Average causal treatment effect of coalition signals on propensity to vote for parties V, MP, C, L, KD and SD.

Note Respondents answered the following question: "How likely is it that you will vote for the following parties?" Respondents answered on a scale from 1 ("not likely at all") to 7 ("very likely"). V = Left Party; MP = Green Party; C = Center Party; L = Liberal Party; KD = Christian Democrats; SD = Sweden Democrats. Estimates come from separate linear regressions restricted on respondents who are either in the respect treatment group or in the control group. Age, age squared, sex, education, and party ratings were used as control variables. For the simulations, observed-value approach was employed. 95% (90%) confidence intervals are indicated with thin (thick) bars.

## D. Conditional Average Treatment Effects on Propensities to Vote for Other Parties

Figure 10: Conditional average treatment effects of coalition signals on propensities to vote for parties V, MP, C, L, KD and SD by coalition evaluations.

Note Respondents answered the following question: "How likely is it that you will vote for the following parties?" Respondents answered on a scale from 1 ("not likely at all") to 7 ("very likely"). V = Left Party; MP = Green Party; C = Center Party; L = Liberal Party; KD = Christian Democrats; SD = Sweden Democrats. Estimates come from separate linear regressions restricted on respondents who are either in the respect treatment group or in the control group. For each party and coalition treatment, two model variants are calculated: one for respondents rather liking the coalition (rating of treatment coalition is at least as high as any other measured coalition rating) and one for respondents rather disliking the coalition (rating of treatment coalition is at least as low as any other measured coalition rating). We excluded respondents from the analyses who gave the same rating to each coalition. Age, age squared, sex, education, and party ratings were used as control variables. 95% (90%) confidence intervals are indicated with thin (thick) bars.

As Figure 10 shows, the coalition signals sent by either the Moderates or the Social Democrats also change the propensity to vote for Swedish parties other than the Moderates or the Social Democrats. For instance, signaling an M C-L-KD coalition increases the propensity to vote for the Sweden Democrats among respondents disliking the Alliance

coalition.

## E. Conditional Average Treatment Effects on Propensities to Vote for a Stricter Definition of Low and High Coalition Evaluations

Figure 11: Conditional average treatment effects of coalition signals on propensities to vote for parties M and SAP by coalition evaluations (stricter definition of low and high coalition evaluation).

Note Respondents answered the following question: "How likely is it that you will vote for the following parties?" Respondents answered on a scale from 1 ("not likely at all") to 7 ("very likely"). M = Moderate Party; SAP = Social Democratic Party. Estimates come from separate linear regressions restricted on respondents who are either in the respective treatment group or in the control group. For each party and coalition treatment two model variants are calculated: one for respondents rather liking the coalition (rating of treatment coalition is higher than any other measured coalition rating) and one for respondents rather disliking the coalition (rating of treatment coalition is lower than any other measured coalition rating). Age, age squared, sex, education, and party ratings were used as control variables. 95% (90%) confidence intervals are indicated with thin (thick) bars.

Here we use another, stricter definition of low and high coalition evaluations for computing conditional average treatment effects. We now consider a respondent to have a high (low) rating of certain coalition if she rated this coalition higher (lower) than any other coalition for that we measured respondent ratings. In contrast, for the conditional average treatment effects displayed in Figure 3 and Figure 10 of Appendix D we used another definition: We regarded a respondent to have a high (low) rating of certain coalition if she rated this coalition at least as high (at least as low) as any other coalition for that we measured respondent ratings.

The results for the stricter definition of low and high coalition evaluations are displayed in Figure 11 and Figure 12.<sup>27</sup> The findings are very similar to those obtained from the less strict definition of low and high coalition evaluations (see Figure 3 and Figure 10 of Appendix D).

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<sup>27</sup>Note that only very few respondents have a low evaluation of the centrist SAP-MP-L-C and the M-C-L-KD coalition according to this definition. Thus, the confidence intervals for the conditional average treatment effects of these subgroups are very large and, thus, not displayed here.



Figure 12: Conditional average treatment effects of coalition signals on propensities to vote for parties V, MP, C, L, KD and SD by coalition evaluations (stricter definition of low and high coalition evaluation).

Note Respondents answered the following question: "How likely is it that you will vote for the following parties?" Respondents answered on a scale from 1 ("not likely at all") to 7 ("very likely"). V = Left Party; MP = Green Party; C = Center Party; L = Liberal Party; KD = Christian Democrats; SD = Sweden Democrats. Estimates come from separate linear regressions restricted on respondents who are either in the respect treatment group or in the control group. For each party and coalition treatment, two model variants are calculated: one for respondents rather liking the coalition (rating of treatment coalition is higher than any other measured coalition rating) and one for respondents rather disliking the coalition (rating of treatment coalition is lower than any other measured coalition rating). Age, age squared, sex, education, and party ratings were used as control variables. 95% (90%) confidence intervals are indicated with thin (thick) bars.

## F. Treatment Effect on Perceived Positions of Other Parties

Figure 13 displays treatment effects on the perceived positions of the Swedish parties other than the Moderates or the Social Democrats. Almost all of these effects are not significantly different from zero. This is in accordance with our expectations, since none of these parties are sending a coalition signal in any treatment. The party position mechanisms should only change the sender's perceived position.

Figure 13: Average causal treatment effect of coalition signals on perceived position of parties V, MP, C, L, KD and SD.

Note: Respondents answered the following question: "In politics people sometimes talk about left and right, where would you place the following parties on the scale?" Respondents answered on a scale from 1 ("very left") to 7 ("very right"). V = Left Party; MP = Green Party; C = Center Party; L = Liberal Party; KD = Christian Democrats; SD = Sweden Democrats. Estimates come from separate linear regressions restricted on respondents who are either in the respective treatment group or in the control group. Age, age squared, sex, education, and party ratings were used as control variables. 95% (90%) confidence intervals are indicated with thin (thick) bars.

## G. ACME for Centrist Voters

We evaluate the coalition expectation mechanism additionally by estimating the ACME for voters ideologically placed between the leftist Social Democratic Party and the rightist Moderate Party. For this group of voters, we can formulate observable implications for the mechanism. Consider, for instance, the M-SD coalition signal. According to the coalition expectation mechanism, signaling the right-wing M-SD coalition should make the Moderate Party less attractive to centrist voters. The M-SD coalition signal makes it more likely that the Moderates will end up in an M-SD coalition and less likely that they will join other constellations, such as the M-C-L-KD coalition. Thus, the ideological distance to coalition M-SD should become a more important factor in the voting utility for the Moderates, while the distance to other coalitions should become less important. This becomes immediately apparent by means of Equation (1). Since centrist voters can be assumed to be less ideologically proximate to the right-wing M-SD coalition than to other viable constellations, such as the centrist M-C-L-KD coalition, voting utility for the Moderate Party should decrease if the coalition expectation mechanism operates. At the same time, as argued in Section 2, this mechanism should not affect voting utilities for parties which are not part of the signaled coalition (e.g., for the Social Democrats). This implies that, compared to, e.g., the Social Democrats, the Moderate Party should become a less attractive voting option among centrist voters.

Figure 14: Average causal mediation effects (ACME) of Treatment M-SD via M-SD coalition likelihood on propensities to vote for centrist voters.

Note: M = Moderate Party; SAP = Social Democratic Party. Models for the mediator and the propensity to vote were estimated through ordinary least squares. Age, age squared, sex, education, and party ratings were used as control variables. The models were calculated with restriction voters ideologically placed between SAP and M. 95% (90%) confidence intervals are indicated with thin (thick) bars.

Figure 15: Average causal mediation effects (ACME) of Treatment SAP-MP via SAP-MP coalition likelihood on propensities to vote for centrist voters.

Note: M = Moderate Party; SAP = Social Democratic Party. Models for the mediator and the propensity to vote were estimated through ordinary least squares. Age, age squared, sex, education, and party ratings were used as control variables. The models were calculated with restriction voters ideologically placed between SAP and M. 95% (90%) confidence intervals are indicated with thin (thick) bars.

<sup>28</sup>The fact that about 73% of our centrist respondents are more ideologically proximate to coalition M-C-L-KD than to coalition M-SD seems to support this assumption.

The average causal mediation effects of Figure 14 support the outlined implications for centrist voters. The confidence intervals display the average causal mediation effects for treatment M-SD on the the propensities to vote for the Moderates and the Social Democrats through the coalition expectations. The change in the coalition expectation induced by the signal makes the Social Democrats a significantly more attractive voting option. At the same time, the Moderates do not gain any popularity through updating the coalition expectations. Though small, the effect indicates that the coalition expectation mechanism operates systematically for centrist voters. As Figure 15 shows, signaling the leftist SAP-MP coalition does not have the anticipated effects.

## H. Sensitivity Analysis

(a) ACME of treatment M-SD on propensity to vote SAP for opponents of M-SD coalition (see Figure 6)

(b) ACME of treatment M-SD on propensity to vote SAP for respondents ideologically positioned between SAP and M (see Figure 14 of Appendix G)

Figure 16: Sensitivity analysis for ACMEs found to be statistically significant on the 90% confidence interval.

Note: M = Moderate Party; SAP = Social Democratic Party. Models for the mediators and the propensity to vote were estimated through ordinary least squares. Age, age squared, sex, education, and party ratings were used as control variables. The models were calculated for voters ideologically placed between SAP and M.  $\rho$  is the correlation between the error terms in the mediator and outcome regression models. The shaded areas display 90% confidence intervals.

Figure 16 shows the results of sensitivity analyses for ACMEs found to be statistically significant at least on the 90% confidence interval. These sensitivity analyses investigate the consequences of a possible violation of the sequential ignorability assumption.  $\rho$  corresponds to the correlation between mediation and outcome models. In our case, it is the correlation between the coalition expectation model (Equation 4) and the propensity to vote model (Equation 5). Figure 16a displays the ACME of treatment M-SD on the propensity to choose SAP for opponents of the M-SD coalition (shown in Figure 6) given different values of the sensitivity parameter. If sequential ignorability is satisfied,  $\rho$  is zero. This implies that the ACME is exactly equal to the effect showed in Figure 6 and significant on the 90% confidence interval. Under weak positive correlation between the error terms (a small positive value), this statistically significant effect disappears. The point estimate of this ACME is zero for  $\rho = 0.11$ .

Figure 16b shows the sensitivity analysis for the ACME of treatment M-SD on propensity to vote SAP for centrist respondents (shown in Figure 14 of Appendix G). Again, small positive values of the sensitivity parameter lead to a disappearance of the effect. For  $\rho = 0.13$ , the point estimate of this ACME is zero.

Summarizing, these analyses indicate that the results of the mediation analysis are very sensitive to a violation of the sequential ignorability assumption.

## How Do Coalition Signals Shape Voting Behavior?

	Dependent variable:			
	Propensity to Vote for the Liberals			
	(1)	(2)	(3)	(4)
Treatment	M-C-L-KD	M-SD	SAP-MP	SAP-MP-L-C
Constant	* 1.026 <sup>&lt;&lt;</sup> (0.354)	* 0.820 <sup>&lt;</sup> (0.342)	* 0.825 <sup>&lt;</sup> (0.365)	* 1.157 <sup>&lt;&lt;</sup> (0.367)
Coalition Rating M-C-L-KD	0.039 (0.042)	0.045 (0.043)	0.044 (0.043)	0.036 (0.042)
Coalition Rating SAP-MP-L-C	0.087 <sup>&lt;</sup> (0.032)	0.086 <sup>&lt;&lt;</sup> (0.032)	0.087 <sup>&lt;&lt;</sup> (0.032)	0.089 <sup>&lt;&lt;</sup> (0.032)
Party Rating Liberals	0.797 <sup>&lt;</sup> (0.058)	0.797 <sup>&lt;&lt;</sup> (0.058)	0.799 <sup>&lt;&lt;</sup> (0.059)	0.798 <sup>&lt;&lt;</sup> (0.058)
Treatment	0.118 (0.257)	0.200 (0.254)	* 0.092 (0.269)	0.107 (0.252)
Treatment × Coalition Rating M-C-L-KD	0.114 <sup>&lt;</sup> (0.058)	0.128 <sup>&lt;</sup> (0.058)	0.124 <sup>&lt;</sup> (0.060)	0.001 (0.062)
Treatment × Coalition Rating SAP-MP-L-C	* 0.088 <sup>&lt;</sup> (0.047)	0.002 (0.047)	* 0.005 (0.050)	* 0.012 (0.047)
Treatment × Party Rating Liberals	* 0.044 (0.080)	* 0.182 <sup>&lt;</sup> (0.082)	* 0.069 (0.084)	0.015 (0.084)
Observations	747	765	731	750
R <sup>2</sup>	0.566	0.517	0.550	0.556
Adjusted R <sup>2</sup>	0.560	0.510	0.543	0.550
Residual Std. Error	1.168	1.180	1.191	1.175
F Statistic	87.162 <sup>&lt;&lt;</sup>	73.283 <sup>&lt;&lt;</sup>	79.978 <sup>&lt;&lt;</sup>	84.071 <sup>&lt;&lt;</sup>

Note: <sup>p</sup><0.1; <sup><<</sup>p<0.05; <sup><<<</sup>p<0.01

Table 6: Regression table: effect of coalition ratings on expected propensity to vote for Liberal Party by treatment and control status. Socio-demographic control variables are not displayed.

Note The coefficients for the socio-demographic control variables (age, age squared, education, sex) are not displayed.

### I. Regression Table: Effect of Coalition Ratings on Propensity to Vote for Liberals

Table 6 shows the result of the OLS regression described in Section 4.2 for the Liberal Party. As already suggested by Figure 7, signalling coalitions M-C-L-KD, M-SD and SAP-MP increases the influence of the M-C-L-KD coalition rating on the propensity to vote for the Liberals significantly on the 95% confidence interval, while signalling coalition SAP-MP-L-C does not affect the impact of the M-C-L-KD coalition rating. At the same time, coalition signals M-SD, SAP-MP and SAP-MP-L-C do not alter the impact of coalition rating SAP-MP-L-C on the propensity to vote for the Liberals, while signalling the M-C-L-KD coalition does decrease the influence of this coalition rating significantly on the 90% confidence interval.

### J. Effects of Coalition Ratings on the Propensities to Vote for Parties MP, SAP, C, KD, M and SD

As Figure 17 illustrates, we also find the expected effects of coalition ratings on the propensity to vote for parties other than the Liberals. Taking the Center Party as an example, Treatment SAP-MP-L-C increases the effect of the SAP-MP-L-C coalition rating on the expected propensity to vote for the Center Party, while Treatment M-C-L-KD does not change the impact of the SAP-MP-L-C coalition rating. Again, these results indicate that the coalition expectation and coalition priming mechanisms operate simultaneously.

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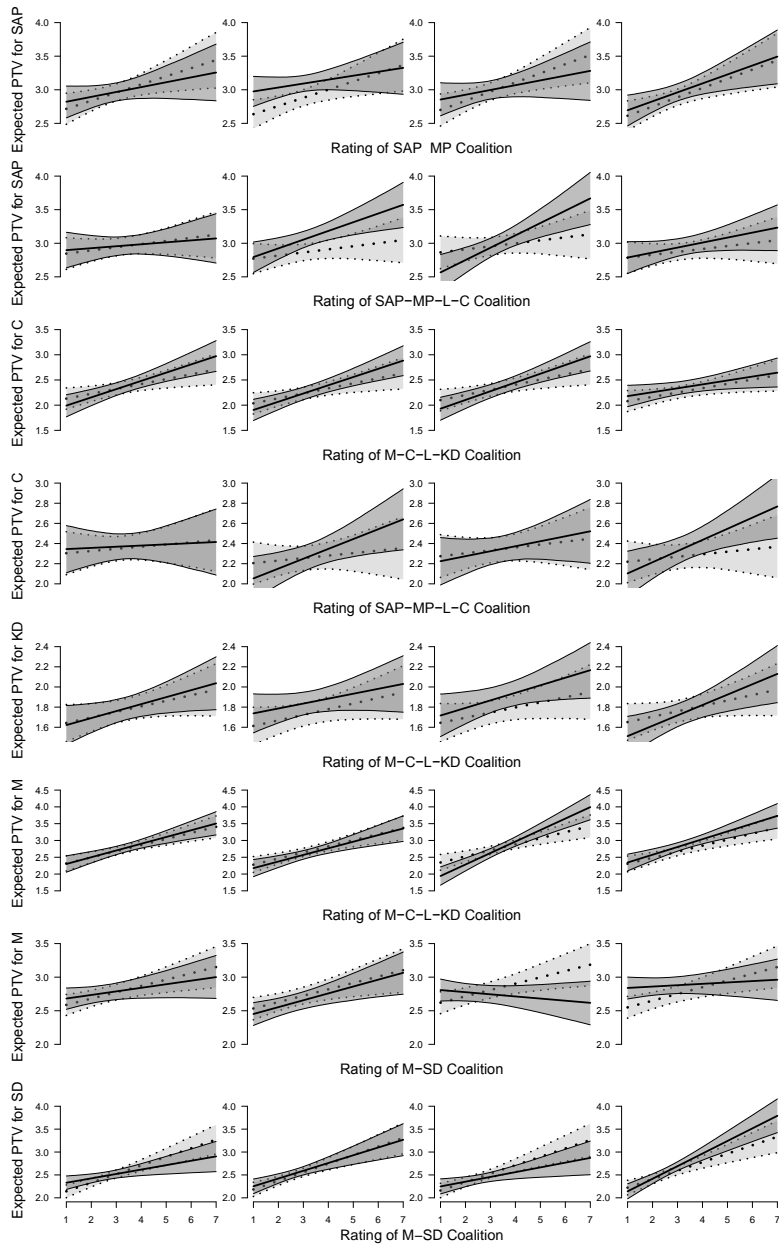


Figure 17: Effect of coalition ratings on propensity to vote for parties by treatment and control status.

*Note:* Model was estimated through ordinary least squares. Age, age squared, sex and education were used as control variables. For the simulations, an observed-value approach was employed. The shaded areas display 95% confidence intervals.

