


What causes the Strength-is-Weakness effect in coalition formation: Passive adoption or active selection of self-serving allocation rules?

Joeri Wissink¹  | Ilja van Beest¹ | Tila Pronk¹ | Niels van de Ven²

¹Department of Social Psychology, Tilburg University, Tilburg, Netherlands

²Department of Marketing, Tilburg University, Tilburg, Netherlands

Correspondence

Joeri Wissink, Department of Social Psychology, Tilburg University, Warandelaan 2, 5037 AB, Tilburg, Netherlands.
Email: j.wissink@tilburguniversity.edu

Abstract

In coalition formation, bargainers with many resources are often excluded from coalitions (the Strength-is-Weakness effect). Literature suggests this effect is driven by high-resource bargainers using self-serving allocation rules that backfire, as they prefer equity over equality (while low-resource bargainers prefer the opposite). Four studies test (1) whether this is actually the case and (2) whether high-resource bargainers solely consider equitable allocations or whether they consider both equity and equality but actively choose equity as an allocation rule. We find the Strength-is-Weakness effect even when equality rules are made salient, strengthening the idea that the high-resource bargainers actively select equity as their framework for fairness to attempt to maximize their outcomes. The studies, also suggest an additional reason for the exclusion of high-resource bargainers. We find that high-resource bargainers are likely avoided because they are *expected* to bargain self-servingly, making the low-resource bargainers seek each other out.

KEYWORDS

coalition formation, self-serving allocation rules, strength-is-weakness

1 | INTRODUCTION

People often form coalitions to reach goals that cannot be attained individually. Examples are political parties that form governments, workers that form unions, and companies that engage in joint ventures. A seemingly paradoxical finding is that those adding most resources to a coalition are surprisingly often excluded; an observation called the *Strength-is-Weakness* effect (van Beest et al., 2004a, 2011; Caplow, 1956; Chaney & Vinacke, 1960; Gamson, 1964; Kelley & Arrowood, 1960; Murnighan, 1978; Vinacke & Arkoff, 1957; Wissink et al., 2021). Scholars have proposed that the self-serving use of distributive justice notions underlies this effect; bargainers with many resources apply a proportional allocation rule, whereas bargainers with

fewer resources favor equality (e.g., Bediou & Scherer, 2014; Komorita & Chertkoff, 1973; Messick & Sentis, 1979). In the current article, we investigate why high-resource bargainers make these (self-defeating) proportional offers: do they passively adopt the most salient allocation rule, without even considering equality, or do they actively select this rule in a failed attempt to maximize their outcomes?

1.1 | Coalition formation and the strength-is-weakness effect

A formal definition of coalition formation is “the joint use of resources to determine the outcome of a decision in a mixed-motive

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situation involving more than two units" (Gamson, 1964, p. 85). This means that, first and foremost, a party needs to be included in a coalition to use their resources (e.g., money, seats) to influence the outcome that is at stake (e.g., the allocation of profits or influence on policy). Moreover, coalition members need to reach a consensus on how to allocate the outcomes generated by the coalition.

Which coalitions are formed and how outcomes are allocated is for a large part influenced by the resources coalition bargainers bring to the bargaining table. Often there is a minimum number of resources (*a decision point*) that needs to be held by a coalition in order to attain the coveted outcomes (Komorita, 1984). For example, in governmental coalition formation parties often have to form a majority coalition, meaning that political parties need to find coalition partners with whom they capture at least 51% of the total votes.

Intuitively, one might assume that having many resources is advantageous when trying to form a coalition. However, having many resources does not always equate to having more bargaining opportunities and, depending on whether or not this is the case, having more resources can either be a strength or a liability (van Beest et al., 2004a; Murnighan, 1978). If having more resources leads to having more alternatives, this can lead to more bargaining power and a higher likelihood of being included in a coalition (Gamson, 1964; Murnighan, 1978; Shapley & Shubick, 1954). If, however, the number of resources parties hold does not dictate their alternatives, having more resources leads to a seemingly paradoxical phenomenon in which those with most resources are disproportionately excluded from coalitions, an observation dubbed the *Strength-is-Weakness* effect (van Beest et al., 2004b, 2011; Caplow, 1956; Chaney & Vinacke, 1960; Gamson, 1964; Kelley & Arrowood, 1960; Murnighan, 1978; Vinacke, 1959; Vinacke & Arkoff, 1957; Wissink et al., 2021).¹

The observation that having more resources can lead to worse outcomes has important consequences. Those who, following equity norms, expect to have more influence may end up having no influence at all. In governmental coalition formation it might mean that the largest parties actually turn out to have little to no influence on policy. This idea is supported by studies of West European parliamentary democracies, showing that parties with a higher seat share—but without a first mover advantage—are less likely to be included in governmental coalitions than parties with fewer seats (Bäck & Dumont, 2008; Warwick, 1996).

Better insight into the mechanisms behind the *Strength-is-Weakness* effect might help to explain why it occurs or perhaps even what people can do to prevent it. The present research contributes to uncovering the underlying causes of the *Strength-is-Weakness* effect by pitting two possible reasons for the effect against each other: a passive adoption of focal self-serving allocation rules or an active choice of these allocation rules in an attempt to maximize

payoffs. To better explain these two accounts, we will first describe the experimental situations in which the *Strength-is-Weakness* effect has typically been studied.

1.2 | Prior findings on the strength-is-weakness effect

Coalition bargaining and outcomes are often studied using coalition games such as modified *Parcheesi* games (Vinacke & Arkoff, 1957), political convention games (Gamson, 1961b), and landowner games (van Beest et al., 2003). In these games, multiple bargainers individually do not have enough resources to attain an outcome alone² hence, a subset of bargainers need to form a coalition to attain the outcomes together. To do so, bargainers need to negotiate on how they will distribute the outcomes among the members of the coalition.

A typical game in which the *Strength-is-Weakness* effect has been studied is the 4(322) game. In this game, three bargainers—A with 3 resources, B with 2 resources, and C with 2 resources—attempt to form a coalition with at least 4 combined resources by bargaining about the distribution of 100 points or dollars. Although all bargainers have equal bargaining power, bargainers with more resources—henceforth referred to as high-resource bargainers—are less often included than low-resource bargainers—those with fewer resources (van Beest et al., 2004b, 2011; Chaney & Vinacke, 1960; Gamson, 1964; Kelley & Arrowood, 1960; Murnighan, 1978; Vinacke, 1959; Vinacke & Arkoff, 1957; Wissink et al., 2021).³ In the classic demonstration of the *Strength-is-Weakness* effect, the high-resource bargainer A was included in only 28.9% of the cases, versus low-resource bargainer's inclusion rates of 86.5% and 85.4% (Vinacke & Arkoff, 1957). A recent high-powered replication of the *Strength-is-Weakness* effect shows that the effect is robust across student lab samples and an Amazon Mechanical Turk sample (Wissink et al., 2021).

1.3 | Self-serving application of allocation rules

A likely cause of the *Strength-of-Weakness* effect is provided by bargaining theory (Komorita & Chertkoff, 1973). This theory postulates that coalition bargainers apply self-serving allocation rules when bargaining for their share of the payoffs, leading to the preference for coalition partners with few rather than many resources. These allocation rules are rooted in two different notions of distributive justice. First, the notion of equity dictates that one's payoff should be proportional to one's input (Adams, 1965; Walster et al., 1973). In coalition bargaining, this translates to a

²In the modified *Parcheesi* game, the bargainer with most resources can attain the outcomes alone. In the classic demonstration of the *Strength-is-Weakness* effect, this, however, only happened in two out of 180 observations (Vinacke & Arkoff, 1957).

³We avoid the terms strong and weak bargainers used in previous research to avoid suggesting that these bargainers differ in terms of power.

¹We limit our scope to simple situations (as opposed to multi-valued situations, see Komorita, 1984) in which the number of resources does not influence the size of the payoffs of a coalitions. See General Discussion.

proportional allocation rule in which one's payoff is proportional to the resources one brings to a coalition. A second notion of distributive justice is equality (e.g., Deutsch, 1975), meaning payoffs are divided equally across coalition members, regardless of the resources they contribute. Bargaining theory postulates that high-resource bargainers apply the proportional allocation rule, because their higher contribution in terms of resources means this allocation rule allows them to claim more than an equal share of the payoffs. Conversely, low-resource bargainers favor the equal allocation rule, as their claim based on the proportionality rule would be less than the equal share.

To illustrate how this self-serving application of allocation rules can lead to the Strength-is-Weakness effect, recall the 4(322) game which is often used to study coalition formation. In this game, high-resource bargainer A has 3 resources, which is 60% of the resources in both possible coalitions with the low-resource bargainers with 2 resources. The use of the proportional allocation rule means that the high-resource bargainer would claim 60% of the payoffs in either coalition. As low-resource bargainers, B and C gain most from applying the equal allocation rule in each possible coalition; even when paired with A, the equal allocation rule would ensure them 50% of the payoffs. Although bargaining theory acknowledges that bargainers will not always strictly apply these allocation rules, these rules do provide reference points, biasing high-resource bargainers' offers to be closer to proportionality and low-resource bargainers' offers closer to equality (Komorita & Chertkoff, 1973).

Bargaining theory provides a plausible account for the existence of the Strength-is-Weakness effect. Given the use of self-serving allocation rules, it is clear that low-resource bargainers would rather form a small coalition and obtain an equal share of the payoff than forming a larger coalition in which they obtain less, leading to exclusion of high-resource bargainers and thus the Strength-is-Weakness effect. Previous literature, however, has not provided a reason for this use of self-serving allocation rules. As high-resource bargainers are clearly worst off, the most important question seems to be why they use a proportional allocation rule when this clearly seems to backfire. We will discuss the broader body of literature concerning the origin of self-serving biases in distributive justice below, as it points at two possibilities: a passive adoption of the most salient allocation rule or an active selection of the most self-serving rule.

1.4 | Two possible causes for the self-serving bias in distributive justice

The concept of distributive justice—and the use of allocation rules based on notions of it—is far from solely a central concept in coalition formation. Distributive justice has been defined as “the fair share-out of rewards” (Adams, 1965, p. 272) and “the distribution of the conditions and goods which affect individual well-being” (Deutsch, 1975, p. 137). Distributive justice is an important concept in various areas, determining outcomes in, among others, the workplace (e.g., Hu & Han, 2020), bargaining (e.g., Druckman &

Wagner, 2016), and, more generally, situations in which individuals distribute or exchange goods or payoffs (e.g., Cappelen et al., 2007; Loewenstein et al., 1989; McClintock et al., 1984). Similarly, the existence of a self-serving bias in distributive justice is a widespread and pervasive phenomenon (e.g., Babcock & Loewenstein, 1997; Bediou et al., 2012; Bediou & Scherer, 2014; DeScioli et al., 2014; Feng et al., 2019; Komorita & Chertkoff, 1973; Messick & Sentis, 1979).

Researchers have identified two possible causes of the self-serving bias in distributive justice. In some situations, the difference in application of distributive justice norms seems to be the product of a distorted view of fairness due to the bargaining position one occupies. According to Babcock and Loewenstein, one's bargaining position can lead one to engage in biased information processing, leading to the perception that a self-serving distribution is also a fair one (Babcock & Loewenstein, 1997; Babcock et al., 1997). This distortion in the perception of fairness has recently been corroborated in an fMRI study (Feng et al., 2019). Besides this unconscious distortion of fairness principles, other research provides support for the strategic use of fairness norms in which bargainers seem to use their bargaining position as a justification for claiming a higher payoff, while being aware that it is not necessarily the fairest thing to do (Otto & Bolle, 2015; see also Pillutla & Murnighan, 1995).

1.5 | Passive adoption or active selection of the proportional allocation rule?

Mirroring the above two explanations, we pit two possibilities for the self-serving use of the proportional allocation rule by high-resource coalition bargainers against each other. On the one hand, we acknowledge the possibility that high-resource bargainers apply a proportional allocation rule, not because they think this is the fairest rule to use, but because it maximizes their outcomes when accepted, and there is a likelihood that they overestimate this. In other words, it could be that they realize that an equal allocation is perceived to be a fairer allocation by low-resource bargainers, but actively select equity over equality. We will refer to this possibility as the *active selection* account.

On the other hand, it could be that high-resource bargainers are motivated to make fair offers to their counterparts, but that they myopically focus on the allocation rule that is most salient to them (i.e., proportionality) and simply fail to consider different allocation rules. If this is the case, high-resource bargainers do not realize that their proportional offers are perceived as unfair and would change their behavior if the situation would enable them to look beyond the focal allocation rule provided by their bargaining position. We will refer to this notion as the *passive adoption* account.

Following this line of reasoning, introducing an intervention that minimizes the opportunity for a passive adoption of a salient proportional allocation rule addresses the question why high-resource bargainers' make self-serving offers that lead to the Strength-is-Weakness effect. If high-resource bargainers start from either a position in which no specific allocation rule is particularly salient,

or a situation in which *another* allocation rule (i.e., equality) is more salient, but still make self-serving offers, this provides evidence for the idea that high-resource bargainers are aware of multiple allocation rules and actively select the proportional allocation rule in an attempt to maximize their outcomes. However, if in these situations, high-resource bargainers temper their demands to match those of low-resource bargainers, this provides evidence for the idea that, usually, high-resource bargainers passively adopt the salient proportional allocation rule, but change their behavior once this passive adoption is made difficult.

1.6 | Overview of studies

In the current article we present four studies, which all contribute to one research question: do high-resource bargainers make proportional offers because they passively adopt equity (without considering equality) or do they actively select equity over equality? Rather than aiming to compare the results of the different studies, the studies are designed to complement each other in answering this overarching research question.

In Study 1, we employed our first of two methods to minimize the possibility of a passive adoption of the proportional allocation rule. Instead of directly assigning participants to a bargaining position, we allowed participants to read and process the study's instructions from a neutral viewpoint that was unbiased by a salient allocation rule, after which participants selected their bargaining position themselves. Giving bargainers this neutral viewpoint, from which passive adoption of a self-serving allocation rule is not possible, allows us to interpret the use of the proportional allocation rule as an actively selected rule. Conversely, if high-resource bargainers apply the equal allocation rule in Study 1, the use of the proportional allocation rule in previous research should be regarded as passively adopted, as its use is inhibited when this is no longer possible.

An intervention similar to the one we employ in Study 1 has been used in a study by Loewenstein et al. (1993) in which it has been shown to decrease biased information processing and subsequent self-defeating bargaining behavior. In a simulated settlement of a tort case, participants who were assigned a role of plaintiff or defendant after reading the case files showed less biased information retrieval, less biased estimate of what a judge would award, and less bargaining impasse, than participants who read the case file while knowing their role in the upcoming negotiation. Using our similar intervention, we expect to find a similar decrease in self-serving behavior, but only when this self-serving behavior is due to a biased view on what a fair allocation rule is.

In Study 2, we employed a second method with the exact same goal as Study 1: minimize the possibility of a passive adoption of the proportional allocation rule. In Study 2, we did this by assigning participants to a low-resource position and allowing them to switch to the high-resource position. Previous literature has shown that bargainers in high-resource positions are most likely to use the

proportional allocation rule, whereas those with fewer resources often opt for equality (Bediou et al., 2012; Bediou & Scherer, 2014; DeScioli et al., 2014; Komorita & Chertkoff, 1973; Messick & Sentis, 1979). Hence, placing participants in low-resource situations should increase the salience of the equality rule. Consequently, the use of the proportional allocation rule by those who have switched from the low-resource to a high-resource position cannot be attributed to a passive adoption of the equity norm and should thus be considered support for an active selection of the most self-serving allocation rule. Conversely, if those who switched from a low-resource to a high-resource position make offers that are similar to offers made by those who stay in their low-resource position, this should be considered support for the passive adoption account. In this case, high-resource bargainers who have been in the low-resource position realize that equity will be perceived to be less fair than equality and adjust their bargaining behavior accordingly.

In Study 3, we shifted our focus from the reason why high-resource bargainers use the proportional allocation rule to the consequences of using this rule. Specifically, we investigated the assumption that self-serving offers from high-resource bargainers are a mechanism driving the Strength-is-Weakness effect (Gamson, 1961a; Komorita & Chertkoff, 1973). We did this by assigning participants to a low-resource position and having them choose between an equal offer from a low-resource bargainer and, depending on condition, either a proportional offer or an equal offer from a high-resource bargainer. This design allowed us to investigate whether high-resource bargainers are excluded indiscriminately or only when they used the proportional allocation rule.

Finally, in Study 4 we employed the same method as in Study 1: participants were given a neutral viewpoint from which to read and process the instructions, after which they selected a bargaining position themselves. Other than the hypothetical nature of Study 1, in Study 4 participants engaged in actual bargaining with a real monetary payoff. Hence, it allowed us to test the same question as Studies 1 and 2—whether proportional offers from high-resource bargainers are passively adopted or actively—in a situation with actual interaction and real monetary stakes.

Besides investigating the use of allocation rules, the research designs of Studies 1, 2, and 4 also allowed us to gauge participants' preferences for specific bargaining positions. From previous research we know that those in high-resource positions are often worse off than those in low-resource positions. However, to our knowledge, no previous research has investigated which bargaining positions individuals prefer and are thus likely to self-select into advantageous or disadvantageous bargaining positions. Moreover, if the majority of participants were to self-select into high-resource positions, we would interpret this as additional evidence for the active selection account: participants would not only select a self-serving allocation rule but also select a bargaining position that allows them to maximize the outcome of this allocation rule.

Note that in all studies we used *simple* situations in which all coalitions yield the same payoff rather than *multivalued* settings in which larger coalitions yield higher payoffs (see Komorita, 1984).

One could argue that the latter setting is more realistic and that the incentive to include the high-resource bargainer could offset the Strength-is-Weakness effect (this does not always seem to be the case, see Komorita et al., 1989). The use of equitable allocation rules and preferences for certain coalitions—leading to the Strength-is-Weakness effect—have been studied for years in simple settings, exactly because they are puzzling (e.g., Kelley & Arrowood, 1960; Vinacke & Arkoff, 1957; Wilke, 1985). As people seemingly behave irrationally and in a self-defeating manner, we (and others before us) believe it is particularly interesting to study why people behave like this in this setting. Moreover, these simple settings have their real-world counterparts in governmental coalition formation in which the payoffs (ministerial portfolios) are fixed and there is evidence of the use of equitable allocation rules and a Strength-is-Weakness effect in which large parties without a first-mover advantage are less likely to be part of the coalition than smaller parties (Bäck & Dumont, 2008; Warwick, 1996).

In all our studies we report how we determined our sample size, all manipulations and all dependent variables. A data package including (meta)data, analysis scripts, stimulus materials, and preregistrations is available here: <https://doi.org/10.34894/FCLGKP>.

2 | STUDY 1

Study 1 was the initial test of our research question whether high-resource bargainers passively adopt the proportional allocation rule or actively select it. We presented participants with a hypothetical coalition bargaining scenario in which three bargainers—one high-resource bargainer with 3 resources and two low-resource bargainers with each 2 resources—bargained for inclusion in a two-party coalition and the subsequent allocation of €100. In order to provide an unbiased view point from which information about the bargaining setting could be processed, participants attained a bargaining position only after they had read all instructions (cf. Loewenstein et al., 1993). They then selected one of the three bargaining positions and made a first offer to one of their counterparts.

If the Strength-is-Weakness effect is mainly driven by a passive adoption of the proportional allocation rule, starting from a neutral position—opposed to starting from an assigned position—should reduce proportional first offers. Consequently, there should be no difference in allocations between self-selected high- and low-resource bargainers. If, conversely, the Strength-is-Weakness effect is caused by an active selection of proportional allocation rules, as in prior research, high-resource bargainers should allocate more to themselves than low-resource bargainers.

Moreover, we reasoned that the selection of bargaining positions would provide additional insight. If the majority of participants selects the high-resource position—and make lower offers to other bargainers than low-resource bargainers do—this suggests that individuals actively select this position because it rationalizes allocating more to themselves.

2.1 | Method

2.1.1 | Participants and design

We recruited 204 Dutch psychology undergraduate students ($M_{\text{age}} = 19.43$ years, age range 17–26, 161 females, 43 males) in our laboratory. The study was embedded in an hour-long session for which participants received course credit. Using maximum lab time allowed per session, we collected data for two weeks. Sensitivity analyses conducted with G*Power (Faul et al., 2007) revealed that this sample size allowed us to detect a small to medium effect size ($w = 0.22$) when testing for a preference for bargaining positions, a small to medium effect size ($d = 0.38$) when testing for differences in allocations, and a medium to large effect size ($w = 0.36$) when testing for low-resource bargainers' preferences for small or large coalitions—all with a power of 0.80.

2.2 | Materials and procedure

2.2.1 | Game structure

Participants read a scenario in which we asked them to imagine that they were one of three individuals—A with 3 votes, B with 2 votes, or C with 2 votes⁴—about to negotiate how to allocate €100. They also read that *any coalition of two bargainers* could secure the outcome of €100 and that payoffs could only be allocated between members of the coalition. Next, they read that bargaining is done by sending offers to another bargainer regarding the allocation of the €100. If all opening offers were rejected, no coalition would be formed and a new bargaining round would start by making new offers.

2.2.2 | Comprehension check

Next, participants completed a multiple-choice quiz (correct answers in *italics*) asking (1) which coalitions could be formed (*AB, AC, and BC / AB, AC, BC, and ABC*), (2) the minimum number of votes necessary to secure and allocate the sum of money (2 votes or more / 3 votes or more / 4 votes or more), and (3) the amount of money to be allocated (€40 / €50 / €100). Participants received feedback on whether they had answered all questions correctly or whether they had made at least one mistake and, in both situations, received the correct answers.

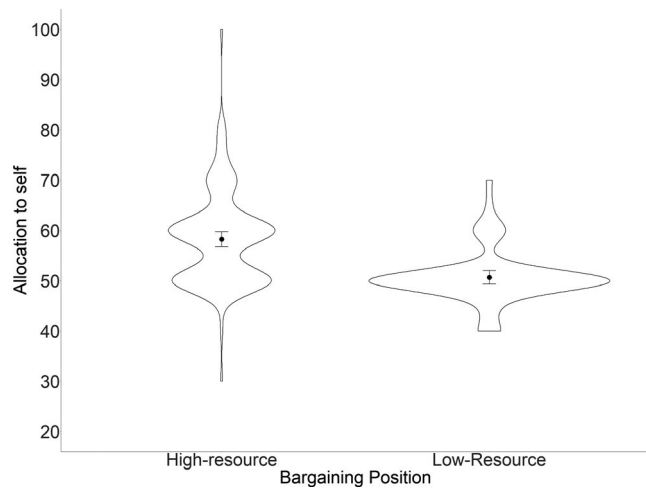
2.2.3 | Choice of bargaining position

Next, participants selected the bargaining position they wanted to occupy. To ensure participants had an overview of the situation, they

⁴In the stimulus materials, these positions were referred to as positions M, K, and P. For simplicity, the letters A, B, and C will be used throughout this article.

TABLE 1 Chosen positions, proposed coalitions and average proposed allocations in Study 1

Selected Position	n	%	Proposed Coalition	n	%	Proposed Allocation in Euros			
						M_A	M_B	M_C	SD
A (3 votes)	144	70.6%	AB	67	46.5%	59.34	40.66	—	10.32
			AC	77	53.5%	57.27	—	42.73	8.05
B (2 votes)	26	12.7%	AB	0	0%	—	—	—	—
			BC	26	100%	—	50.00	50.00	4.90
C (2 votes)	34	16.7%	AC	4	11.8%	49.00	—	51.00	6.38
			BC	30	88.2%	—	48.83	51.17	5.68

**FIGURE 1** Violin plot of allocation to self by different bargaining positions in Study 1 with means (dot), CI⁹⁵ (line), and probability density (width)

saw a table containing everyone's number of votes, possible coalition partners, and possible coalitions.

2.2.4 | Opening offer

Finally, participants indicated: (1) to which other bargainer they wanted to make an opening offer, and (2) their proposed allocation (out of the €100, how much did they propose to keep for themselves and what to give to the other bargainer).

2.3 | Results

2.3.1 | Comprehension check

Nine out of 204 participants gave at least one wrong answer. Having made errors was unrelated to the choice of bargaining position, $\chi^2(2, N = 204) = 2.30, p = .32, w = 0.11$, nor did the statistical interpretation of all subsequent analyses change when excluding those who had made errors. For the sake of completeness, we report analyses conducted on the full sample.

2.3.2 | Choice of bargaining position

A total of 144 (70.5%) participants preferred position A, the high-resource position with 3 votes, 26 (12.7%) preferred position B, and 34 (16.7%) preferred position C; the low-resource positions with 2 votes each. A chi-square test of independence shows that these proportions differed significantly from 0.33, the expected proportion when participants would be indifferent to each position and would have chosen one randomly, $\chi^2(2, N = 204) = 127.88, p < .001, w = 0.79$. See Table 1 for chosen positions, coalition partners selected to make the first offer to, and the proposed allocations.

2.3.3 | Allocation of outcomes

High-resource bargainers ($M = 58.24, SD = 9.20$) allocated more money to themselves than low-resource bargainers did ($M = 50.65, SD = 5.33$), $t(181.26) = 7.36, p < .001, d = 1.13$. Moreover, we can visually compare the distributions of allocations by high- and low-resource bargainers by looking at the width of the violin plots in Figure 1 (the width indicates the probability density of the distribution, i.e., the predicted distribution in the population). As can be seen, low-resource bargainers' allocations are relatively straightforward: they display a preference for the 50–50 allocation. High-resource bargainers show more variation in their offer. Two common strategies stand out: a preference for (1) 50–50 and (2) 60–40 offers.

As an alternative way of looking at the offers, we categorized offers into egalitarian offers (allocating 50 or less to oneself) and self-serving offers (allocating more than 50 to oneself) and compared them between bargaining positions (see Table 2 for the prevalence of the different types of offers in each study). The results of a chi-squared test of independence lead to the same interpretation as the above continuous analysis: high-resource bargainers employed more self-serving offers (and fewer egalitarian offers) than low-resource bargainers, $\chi^2(1, N = 204) = 41.02, p < .001, w = 0.45$.

2.3.4 | Choice of bargaining partner

A large majority of the low-resource bargainers (56 out of 60) made an offer to the other low-resource bargainer, $\chi^2(1, N = 60) = 45.07$,

TABLE 2 Percentage of bargainers making egalitarian and self-serving offers by bargaining position

Study	Bargaining Position	≤50	>50
Study 1	High-Resource (3 votes)	37.5%	62.5%
	Low-Resource (2 votes)	86.7%	13.3%
Study 2	Stay High (3 votes)	69.8%	30.2%
	Switch to High (3 votes)	66.5%	33.5%
	Stay Low (2 votes)	87.9%	12.1%
Study 4	High-Resource (3 votes)	52.0%	48.0%
	Low-Resource (2 votes)	91.0%	9.0%

$p < .001$, $w = 0.86$. As high-resource bargainers could only make an offer to a low-resource bargainer, we did not analyze their choice of bargaining partner.

2.4 | Discussion

The results of Study 1 suggest that the Strength-is-Weakness effect is driven by active selection of proportional allocation rules rather than a passive adoption of the most salient allocation rule. Despite starting from a neutral position—which minimized the salience of particular allocation rules—high-resource bargainers allocated more money to themselves than low-resource bargainers. More support for this active selection account comes from the finding that the high-resource position is preferred over low-resource positions. Individuals seem to choose a bargaining position strategically because they think it will somehow benefit them.

Additionally, the results from Study 1 showed that the vast majority of low-resource bargainers made their first offer to the other low-resource bargainer. This suggests that, aside from high-resource bargainers who might be excluded due to their unattractive offers, some of them might be excluded from the outset due to the initial attraction between low-resource bargainers.

Finally, an interesting finding is that, even though high-resource bargainers allocated more to themselves on average, a substantial number made an equal rather than a proportional offer. We will address this finding in Study 3.

3 | STUDY 2

In Study 2, we tested the robustness of our findings. Instead of placing participants in a neutral position, as we did in Study 1, we assigned participants to a high- or low-resource position, but then allowed them to switch to a different position prior to making their opening offer. This eliminated an alternative explanation for our findings from Study 1. Although participants in Study 1

had a neutral position before choosing a bargaining position, a possibility is that those who coveted the high-resource position immediately imagined themselves in that position. Consequently, those choosing a high-resource position might have already passively adopted the proportional allocation rule from their imagined bargaining position. In Study 2, we eliminated this possibility by assigning some participants to the low-resource position. As postulated by bargaining theory (Komorita & Chertkoff, 1973) and supported by empirical studies (e.g., Bediou & Scherer, 2014; DeScioli et al., 2014; Messick & Sentis, 1979), participants assigned to a low-resource position should be more likely to adopt an equal allocation rule as a reference point for subsequent bargaining.

Our intervention in Study 2 thus provided a stricter test of our research question. If participants initially assigned to a low-resource position were to choose to switch to a high-resource position and make a proportional offer—despite the initial salience of the equal allocation rule the low-resource position elicited—this would be additional support for the idea that high-resource bargainers' self-serving offers are actively selected in an attempt to maximize outcomes. If, on the other hand, high-resource bargainers' self-serving offers are usually due to a passive adoption of a salient allocation rule, we would expect that the initially low-resource bargainers who decide to switch positions would use equal rather than proportional allocation rules, as initially equality would be the salient allocation rule.

Finally, as in Study 1, we interpret switching from a low-resource to a high-resource position as indicative of the active selection account. If those assigned to a low-resource position switch to a high-resource position more often than those from a high-resource position switch to a low-resource position—and make lower offers than those who remain in the low-resource position—this suggests that they switch to this position because it rationalizes more demanding first offers.

3.1 | Method

3.1.1 | Participants and design

We recruited 452 US-based respondents ($M_{\text{age}} = 34.8$ years, age range 18–69, 183 females, 266 males, 3 other) recruited via Amazon Mechanical Turk in exchange for \$1. On the basis of a pilot study (see Data S1) we expected that only a few participants would switch from a high-resource to a low-resource position. Hence, we determined our sample size so that there would be enough participants in the remaining three cells (Switch to High-Resource, Stay Low-Resource, and Stay High-Resource) to detect a $d = 0.4$ between conditions using Tukey HSD. According to Brooks and Johanson (2011), this required cell sizes of $n = 127$. From the pilot study we expected that about 50% of participants that were assigned to a low-resource position would switch to a high-resource position. To account for fluctuations in switching behavior and participant dropout, we assign

TABLE 3 Chosen positions, proposed coalitions and proposed allocations in Study 2, split by assigned position

Assigned Position	Final Position	n	%	Proposed Coalition	n	%	Proposed Allocation in Dollars			
							M_A	M_B	M_C	SD
High-Resource (n = 145)	A (3 votes)	129	89%	AB	67	52%	52.91	47.09	–	11.71
				AC	62	48%	53.63	–	46.37	11.29
	B (2 votes)	8	5.5%	AB	4	50%	45.25	54.75	–	10.18
				BC	4	50%	–	41.25	58.75	11.81
	C (2 votes)	8	5.5%	AC	4	50%	59.40	–	40.50	19.00
				BC	4	50%	–	53.75	46.25	4.79
Low-Resource (n = 307)	A (3 votes)	158	51%	AB	69	44%	54.09	45.91	–	11.27
				AC	89	56%	57.37	–	42.63	13.36
	B (2 votes)	11	4%	AB	6	55%	45.00	55.00	–	13.78
				BC	5	45%	–	54.00	46.00	5.48
	C (2 votes)	138	45%	AC	38	28%	51.05	–	48.95	8.55
				BC	100	72%	–	51.73	48.27	5.75

307 participants to a low-resource position (2 votes) and 145 to a high-resource position (3 votes).

3.2 | Materials and procedure

3.2.1 | Game structure and assigned position

As in Study 1, participants imagined that they were one of three individuals—A with 3 votes, B with 2 votes, or C with 2 votes—about to negotiate how to allocate \$100. In the *Low-Resource Assigned* condition (n = 307), individuals learned that they were C and had 2 votes. In the *High-Resource Assigned* condition (n = 145) individuals learned that they were A and had 3 votes.⁵ They received the same instructions relating to the game's structure as in Study 1. Next, we informed participants via the table on how many votes each bargaining position controlled, which coalition partners could be approached, and which coalitions could thus be formed. To prompt participants to reflect on the bargaining situation from the perspective of the assigned position, they could only continue to the following screen after 30 s.

3.2.2 | Comprehension Check

Individuals answered the same questions as in Study 1, as well as two additional questions asking how many votes they had themselves (2 / 3 / 4) and how many votes the other two individuals had (both hold 2 votes / one holds 2 and one holds 3 votes / both hold 3 votes). Again, after completion, participants received feedback and the correct answers.

⁵In the stimulus materials, we referred to positions M, K, and P, instead of A, B, and C. For standardization, in Study 2, participants were always assigned to position M. In the Low-Resource assigned condition, M had 2 votes, K had 2 votes, and P had 3 votes. In the High-Resource assigned condition, M had 3 votes and K and P both 2 votes.

3.2.3 | Choice of bargaining position

Next, participants chose either to retain their assigned position or to switch to one of the other two positions. While making this decision, participants saw the same table as before the quiz.

3.2.4 | Opening offer

Finally, participants indicated: (1) to which other bargainer they wanted to make an opening offer, and (2) their proposed allocation of the €100.

3.3 | Results

3.3.1 | Switching

A total of 158 of 307 (51%) initially low-resource participants switched to a high-resource position, versus 16 of 145 (11%) initially high-resource participants who switched to a low-resource position, $\chi^2(1, N = 452) = 68.00, p < .001, w = 0.39$. As in Study 1, this reveals that participants preferred high-resource over low-resource positions.

Because only 16 high-resource participants switched to a low-resource position, the remaining analyses were conducted on 436 participants in three conditions: Stay Low-Resource (participants assigned to a low-resource position who stayed in a low-resource position, n = 149),⁶ Switch to High-Resource (participants assigned

⁶The Stay Low-Resource condition includes 11 participants who were assigned to a low-resource position (position C) but switched to another low-resource position (position B). Note that excluding these participants would not have changed the interpretations of the reported results. Anecdotally, an explanation given by a participant when given the option to provide a remark seems to suggest that switches were made out of aesthetic reasons: the participant wanted to stay in a low-resource position but changed to a position that was labeled with the first letter of their name.

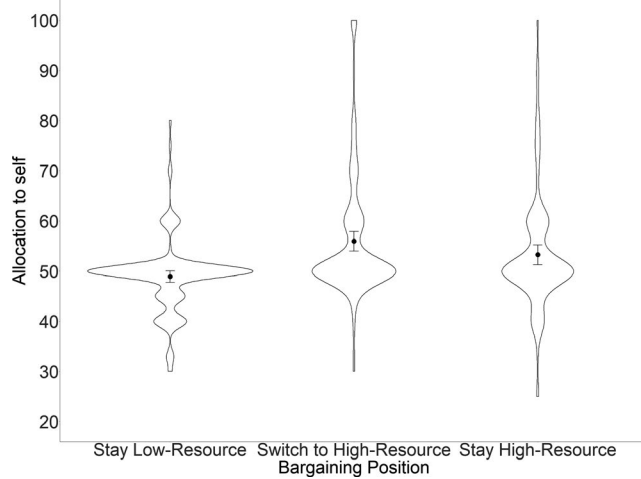


FIGURE 2 Violin plot of allocation to self by three cells in Study 2 with means (dot), CI⁹⁵ (line), and probability density (width)

to a low-resource position who switched to a high-resource position, $n = 158$), and Stay High-Resource (participants assigned to a high-resource position who stayed in a high-resource position, $n = 129$). See Table 3 for chosen positions, preferred coalition partners, and proposed allocations.

3.3.2 | Comprehension check

Out of 436 participants, 101 gave at least one wrong answer. Although this looks like a high number, only 9.6% made more than one error and all participants received feedback on what the correct answers were. Having made errors was unrelated to being in one of the three remaining conditions, $\chi^2(2, N = 436) = 3.25, p = .20, w = 0.06$, nor did the statistical interpretation of all subsequent analyses change when excluding those that had made errors. For the sake of completeness, we report analyses conducted on all 436 participants.

3.3.3 | Allocation of outcomes

Figure 2 shows the means, confidence intervals and distributions of allocation to oneself in each of the three conditions. A one-way ANOVA comparing these means revealed a main effect of condition, $F(2,433) = 16.95, p < .001, \eta_p^2 = 0.07$. Tukey HSD tests show that those who switched from a low-resource to a high-resource position ($M = 55.94, SD = 12.56$) allocated more to themselves than those who stayed in a low-resource position ($M = 48.91, SD = 7.09$), $p < .001, d = 0.69$, and also allocated more to themselves than those who stayed high-resource ($M = 53.26, SD = 11.47$), albeit non-significantly, $p = .09, d = 0.22$. Moreover, those who stayed high-resource allocated more to themselves than those who stayed low-resource, $p = .002, d = 0.45$.

As in Study 1, we categorized offers into egalitarian offers (allocating 50 or less to oneself) and self-serving offers (allocating more

than 50 to oneself) and compared them between bargaining positions (see Table 2). Analyses on these categories lead to the same interpretation as the above continuous analysis. An overall chi-square of independence shows that bargainers differed in the types of offers they made, $\chi^2(2, N = 307) = 21.16, p < .001, w = 0.19$. Post-hoc pairwise chi-square tests show that this significance is driven by the differences in offers between low-resource and high-resource bargainers, regardless of the starting position of the latter. Low-resource bargainers make significantly fewer self-serving offers than those who stayed in a high-resource position, $p < .001$, and those who switched to the high-resource position, $p < .001$. The two groups of high-resource bargainers did not differ in their offers, $p = .64$.

3.3.4 | Choice of bargaining partner

Similar to Study 1, the majority of low-resource bargainers (105 out of 149) made an offer to the other low-resource bargainer, $\chi^2(1, N = 149) = 24.97, p < .001, w = 0.40$. As high-resource bargainers could only make an offer to a low-resource bargainer, we did not analyze their choice of bargaining partner.

3.4 | Discussion

Study 2 provided additional support for the idea that proportional offers made by high-resource bargainers are due to active selection of proportional allocation rules rather than passive adoption of this rule. First, those switching from a low-resource to a high-resource position asked for a higher share of the outcomes than those staying in a low-resource position. Even though the equal allocation rule should initially be equally salient in both above-mentioned groups, this salience did not impede the now high-resource bargainers to ask for a higher share of the outcomes than those staying in the low-resource position. This implies that the high-resource bargainers' tendency to propose self-serving offers is unlikely to be caused by a passive selection of a proportional allocation rule, but more likely an active selection of the seemingly most beneficial allocation rule.

Second, about half of the initially low-resource bargainers switched to a high-resource position, substantially more than the 11% of high-resource bargainers who switched to a low-resource position. This strengthens the notion of an active selection account, in which individuals seem drawn to positions from which they can rationalize a large claim on the payoffs of the coalition.

4 | STUDY 3

In Study 3, we shifted our focus from the reason why high-resource bargainers use the proportional allocation rule to the consequences of using this rule. Specifically, we investigated the assumption that

the Strength-is-Weakness effect mainly exists due to high-resource bargainers' use of proportional allocation rules and low-resource bargainers' rejection of these offers. In Studies 1 and 2 we found that high-resource bargainers made more egalitarian offers (see Table 2) than expected according to bargaining theory (Komorita & Chertkoff, 1973). In Study 3, we investigated if high-resource bargainers are included more often when they make equal offers rather than the proportional offers. Is 'strength' only a weakness when one behaves as a dominant coalition partner (i.e., makes a proportional offer), or is 'strength' even a weakness when one behaves as an attractive coalition partner (i.e., makes an equal offer)? As low-resource bargainers and high-resource bargainers both compete for inclusion in a coalition—and low-resource bargainers often propose an equal allocation—the critical test is as follows: if both high- and low-resource bargainers use an equal allocation rule, which offer is most likely to be accepted?

On the one hand, there is reason to believe that the offer from the low-resource bargainer will be accepted more often. Previous literature shows that individuals are more positive and cooperative towards similar others, even when this similarity is superficial (Tajfel & Turner, 1979). As the two low-resource bargainers are more similar to each other than to the high-resource bargainer, this might make the low-resource bargainers more likely to form a coalition. On the other hand, it is possible that the high-resource bargainer's offer will be preferred. The observed avoidance of high-resource bargainers by low-resource bargainers suggests that they are expected make less attractive offers than low-resource bargainers. If, counter to this expectation, high-resource bargainers ask much less than expected, this could signal generosity. This resonates with attribution theory (Jones & Davis, 1965); actions seemingly made out of a selection of several options and that seem *out-of-role* (e.g., an egalitarian offer from a high-resource bargainer) are seen as more reflective of individuals' dispositions than actions that seem to be less freely chosen and more *in-role* (e.g., an egalitarian offer from a low-resource bargainer).

In Study 3, we assigned individuals to a position with 2 votes in the same coalition scenario used in Studies 1 and 2. In the *High-Resource Equal Offer* condition participants learned that both the high-resource (with 3 votes) and low-resource (with 2 votes) bargainer proposed to keep \$50 and give \$50 to the participant. In the *High-Resource Proportional Offer* condition participants learned that the high-resource bargainer proposed to keep \$60 and give \$40 to the participant, and that the other low-resource bargainer proposed to keep \$50 and give \$50 to the participant. Participants then indicated which offer they would accept, enabling us to use the acceptance rates as an indicator of whether an equal offer from a strong player would help to overcome the Strength-is-Weakness effect.

4.1 | Method

4.1.1 | Participants and design

We recruited 402 US-based respondents ($M_{\text{age}} = 35.13$ years, age range 19–70, 173 females, 228 males, 1 non-binary gender) via

Amazon Mechanical Turk in exchange for \$0.60. Participants were randomly assigned to one of two conditions: the *High-Resource Equal Offer* condition, in which both bargaining partners made the same (equal) offer, and the *High-Resource Proportional Offer* condition, in which the high-resource bargaining partner made a proportional offer and the low-resource bargaining partner made an equal offer. According to a power analysis conducted in G*Power 3.1 (Faul et al., 2007) we needed 200 participants to detect a small to medium effect ($w = 0.2$) with a power of 0.8 in the High-Resource Equal Offer condition. To create equal cell sizes we aimed for a total of 400 participants.

4.1.2 | Materials and procedure

Again, participants imagined being one of three individuals—A with 3 votes, B with 2 votes, and C with 2 votes—negotiating how to allocate \$100. In both conditions, participants were assigned to position C and received offers from bargainers A and B. In the *High-Resource Equal Offer* condition ($n = 200$), both bargaining partners made them a 50–50 offer. In the *High-Resource Proportional Offer* condition ($n = 202$), the low-resource bargainer made them a 50–50 offer and the high-resource bargainer made them a 60–40 offer. Participants then selected the offer they wanted to accept. Finally, to explore whether perceived generosity or similarity indeed steered participants' choices, we asked them to explain their choice in one or two sentences.

4.2 | Results

Selected offer. A chi-square test of independence indicated that there was a statistically significant difference in selected offers between conditions, $\chi^2(1, N = 402) = 120.79, p < .001, w = 0.54$. When the high-resource bargainer made a 60–40 offer, a large majority selected the low-resource bargainer's offer: only 13.5% accepted the high-resource bargainer's offer. Conversely, when both high-resource and low-resource bargainers made a 50–50 offer, this preference flipped: 67.3% now accepted the high-resource bargainer's offer.

4.2.1 | Reasons for selected offer

The reasons participants gave for selecting the offer were coded by the first author. Of interest to us was whether choices in the *High-Resource Equal Offer* condition were guided by perceived generosity or similarity. Results showed that five (3.6%) participants accepted the high-resource bargainer's offer because they perceived it to be generous. Of those choosing the low-resource bargainer's offer, 14 (21.2%) indicated choosing it due to perceived similarity. The largest response category, however, was that participants accepted the high-resource bargainer's offer because they had more votes (50.7%).

4.3 | Discussion

First, Study 3 makes clear that making proportional offers from a high-resource position clearly yields worse outcomes than proposing an equal split from a low-resource position: 50–50 offers from low-resource bargainers were accepted more often than 60–40 offers from a high-resource bargainer. This supports the idea that when high-resource bargainers make proportional offers, this leads to a Strength-is-Weakness effect.

Second, a comparison between the acceptance rates of high-resource and low-resource bargainers who both propose an equal split reveals that high-resource bargainers making this offer are more attractive than low-resource bargainers making the same offer; 50–50 offers from high-resource bargainers were twice as likely to be accepted than low-resource bargainers' 50–50 offers. The reasons given by participants why they accepted this offer did not provide a clear-cut reason for this attraction. Nevertheless, we speculate that high-resource bargainers are generally avoided because they are expected to use proportional allocation rules. When, counter to these expectations, high-resource bargainers make more egalitarian offers, this general avoidance seems not only to dissipate but to be replaced by a preference for the high-resource bargainer. This resonates with attribution theory, which postulates that non-stereotypical behavior is seen as more reflective of one's disposition than stereotypical behavior (Jones & Davis, 1965). Moreover, given that the answers to our open question reveal that individuals to a certain extent seem to value a larger coalition, it could be that they actually prefer the idea of a larger coalition, but only when this coalition yields outcomes similar to what a low-resource bargainer would offer.

5 | STUDY 4

In Studies 1 to 3 we found that (a) individuals prefer high-resource positions, (b) high-resource bargainers often make less attractive offers than low-resource bargainers—even when no allocation rule is especially salient or equality is more salient, in line with the idea that proportionality is actively selected and not passively adopted—and (c) these offers are often rejected. In Study 4, we conducted an incentivized, interactive experiment programmed in oTree (Chen et al., 2016; Wissink et al., 2021) to test the entire process. Participants were matched in groups of three bargainers, one participant chose a bargaining position out of one high-resource position (3 resources) and two low-resource positions (2 resources), the other two were assigned the two remaining positions, and the three participants bargained for a real monetary bonus. This allowed us to test whether—when there are actual stakes—participants starting from a neutral position still use the high-resource position to make a proportional offer (or at least a less attractive offer than the low-resource bargainer), which subsequently leads to their exclusion.

5.1 | Method

5.1.1 | Participants and design

We recruited 150 US-based respondents (Mage = 34.97, age range 21–99, 59 females, 90 males, 1 other) via Amazon Mechanical Turk in exchange for a base fee of \$2.40. Participants were randomly matched into triads. One participant was randomly selected to select a high-resource (3 resources) or low-resource (2 resources) position, and the other two participants were randomly assigned to the remaining two positions. According to power analysis conducted in G*Power 3.1 (Faul et al., 2007), we needed 40 observations to find the $d = 1.01$ we found in Study 1—assuming a similar distribution of selected positions—for the allocation to self between high-resource and low-resource bargainers. To account for fluctuations we decided to sample 50 triads, meaning 50 participants who have selected a position and made an offer from this self-selected position.

5.2 | Materials and procedure

5.2.1 | Game structure

In Study 4, participants bargained in an interactive landowner game (van Beest et al., 2003) programmed in oTree (Chen et al., 2016). Structurally, this game was similar to the hypothetical settings from Studies 1–3. The difference is that participants take the role of a landowner who has a parcel of either 3 (landowner A) or 2 acres (landowner B and C) of land. A project developer wants to buy a minimum of 4 acres of land for \$100,000 and landowners need to form a coalition to sell their parcels of land together. For each \$1,000 obtained in the game, participants received a real bonus of \$0.05, meaning a \$5 bonus was distributed among the coalition members.

5.2.2 | Comprehension check

Participants completed a multiple-choice quiz (correct answers in *italics*) about: (1) the price offered for at least 4 acres of land (*Always \$100,000/This depended on the parcel of land sold*), (2) the payoff for the excluded landowner (*This depends on which offer is accepted/This landowner does not receive any money*), and (3) the permitted coalitions (*AB and AC/AB and BC/AC and BC/AB, AC, and BC*). They could only continue after having given the correct answers.

5.2.3 | Choice of bargaining position

Next, participants were randomly grouped into triads. In each triad, one participant selected one of the three positions: A (with 3 acres

TABLE 4 Chosen positions, proposed coalitions and average proposed allocations in Study 4

Selected Position	<i>n</i>	%	Proposed Coalition	<i>n</i>	%	Proposed Allocation in Euros			
						<i>M_A</i>	<i>M_B</i>	<i>M_C</i>	<i>SD</i>
A (3 votes)	26	52%	AB	21	80.8%	56.33	43.67	–	6.59
			AC	5	19.2%	55.00	–	45.00	18.03
B (2 votes)	20	40%	AB	0	0%	–	–	–	–
			BC	20	100%	–	50.95	49.05	8.06
C (2 votes)	4	8%	AC	0	0%	–	–	–	–
			BC	4	100%	–	51.25	48.75	2.50

of land), B (with 2 acres of land), or C (with 2 acres of land). The other two participants were randomly assigned to the two remaining positions. Participants who could not be grouped within 5 min ($n = 72$) could not continue and received their base fee.

5.2.4 | Bargaining

Participants bargained in one or multiple rounds, which existed of three phases. In phase I, every landowner made an offer to one of the other landowners on how to allocate the \$100,000 between the two of them (in increments of \$1,000). In phase II, all landowners saw all offers made by themselves and the other two landowners, and selected the offer they wanted to execute. In phase III, all landowners saw which offers were selected. If two landowners selected the same offer, the proposed coalition was formed and the \$1,000 was allocated as agreed upon. If no offer was selected by both involved coalition bargainers, a new round of bargaining would begin. This continued until a coalition was formed.

5.3 | Results

5.3.1 | Comprehension check

Out of 150 participants, 21 participants gave at least one wrong answer. Of the 50 participants who could select their position, 11 participants gave at least one wrong answer. Having made errors was unrelated to the choice of bargaining position, $\chi^2(2, N = 50) = 1.54$, $p = .46$, $w = 0.12$, nor did the statistical interpretation of all subsequent analyses change when excluding those who had made errors. For the sake of completeness, we report analyses conducted on the full sample.

5.3.2 | Choice of bargaining position

Of the 50 participants who selected a bargaining position 26 (52%) selected position A (3 acres), 20 (40%) selected position B (2 acres),

and 4 (8%) selected position C (2 acres).⁷ Although this was a significant departure from random selection, $\chi^2(2, N = 50) = 15.52$, $p < .001$, $w = 0.56$, this significant difference disappeared after combining positions B and C, which are equivalent positions in terms of acres, $\chi^2(1, N = 50) = 0.08$, $p = .78$, $w = 0.04$. Contrary to the previous studies, the high-resource position was thus not preferred above the low-resource position. See Table 4 for chosen positions, chosen coalition partners, and proposed allocations.

5.3.3 | Allocation of outcomes

As in previous studies, we were interested in differences in first offers between low-resource and high-resource bargainers. Moreover, having both self-selected and assigned participants in this sample allowed us to make a comparison between the two groups. If self-selected high-resource bargainers were to make higher offers than assigned high-resource bargainers, this would be evidence for the passive adoption of a salient allocation rules account, as it would indicate an increase in attractive offers when such a passive adoption is impossible. On the other hand, similar offers between the two groups would be evidence for the idea that high-resource bargainers actively select a proportional allocation rule, as their offers would be equally self-serving when a proportional allocation is salient and when it is not.

A 2 (Position: Low-resource vs. High-resource) \times 2 (Means of attaining position: Assigned vs. Chosen) ANOVA revealed no significant interaction, $F(1,146) = 0.36$, $p = .55$, $\eta^2_p < 0.01$, nor a significant main effect of means of attaining position, $F(1,146) = 2.46$, $p = .12$, $d = 0.42$. Corroborating the previous studies, high-resource bargainers ($M = 54.54$, $SD = 8.93$) allocated more money to themselves in their first offers than low-resource bargainers ($M = 49.44$, $SD = 7.14$), $F(1,146) = 14.41$, $p < .001$, $d = 0.66$. As can be seen in

⁷Although it seems that, on the basis of chosen positions, position B was deemed more attractive than position C, we think this difference is an artefact of our response format in which the options were listed vertically, with A (3 resources) on top, followed by B (2 resources) and C (also 2 resources). We assume that participants viewed positions B and C as equivalent (both 2 resources), and suspect that most participants selected the first position they came across that they preferred. As position B was listed above position C, we think that most participants who wanted to have 2 resources simply picked B because it was the first preferred option they encountered.

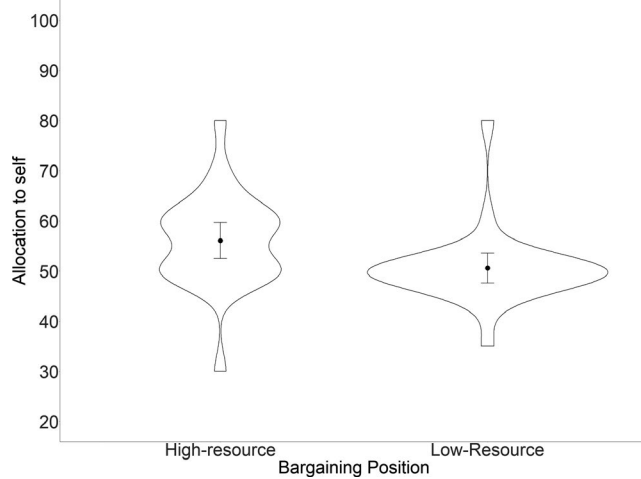


FIGURE 3 Violin plot of allocation to self by different bargaining positions in Study 4 with means (dot), CI⁹⁵ (line), and probability density (width)

Figure 3, again, low-resource bargainers seemed to mainly focus on an equal distribution, whereas many low-resource bargainers made either a proportional or an equal first offer.

As in Studies 1 and 2, we categorized offers into egalitarian offers (allocating 50 or less to oneself) and self-serving offers (allocating more than 50 to oneself) and compared them between bargaining positions (see Table 2). To avoid too small cell sizes, and because the interpretation of results did not differ between chosen and assigned positions, we examined the main effect of bargaining position, regardless of how bargainers attained their position. The results of a chi-squared test of independence lead to the same interpretation as the above continuous analysis. High-resource bargainers employed more self-serving offers (and fewer egalitarian offers) than low-resource bargainers, $\chi^2(1, N = 150) = 29.55, p < .001, w = 0.44$.

5.3.4 | Choice of bargaining partner

Out of the 100 low-resource bargainers—both self-selected and assigned—87 made a first offer to the other low-resource bargainer, $\chi^2(1, N = 100) = 54.76, p < .001, w = 0.74$. This again points out that high-resource bargainers are disadvantaged from the outset. As high-resource bargainers could only make an offer to a low-resource bargainer, we did not analyze their choice of bargaining partner.

5.3.5 | Formed coalitions

Replicating the Strength-is-Weakness effect, a chi-square test of independence showed that BC-coalitions ($n = 34$; 68%) were formed more often than AC-coalitions ($n = 4$; 8%), and AB-coalitions ($n = 12$; 24%), $\chi^2(2, N = 50) = 28.96, p < .001, w = 0.76$. To illustrate how these results support the Strength-is-Weakness effect: A was only included in 32% of all coalitions, whereas B and C were included in 92% and 76% respectively.

5.3.6 | Payoff

Finally, the payoff between high-resource ($M = 49.06, SD = 8.21$) and low-resource ($M = 50.18, SD = 5.51$) coalition bargainers who were included in a coalition did not differ, $t(17.66) = 0.52, p = .61, d = 0.14$. In other words, in the limited cases that a high-resource bargainer did manage to be included, their 'strength' in resources did not lead to an increase in outcomes. See Table 5 for mean allocations per formed coalition.

5.4 | Discussion

The results of Study 4 largely corroborated the results of Studies 1 and 2. High-resource bargainers again allocated more to themselves than low-resource bargainers, regardless of whether their position was chosen or assigned. Moreover, low-resource bargainers again more often approached low-resource bargainers than high-resource bargainers. Contrary to Studies 1 and 2, high-resource and low-resource positions were preferred equally in Study 4. This discrepancy might be due to the smaller number that chose a position in Study 4 ($n = 50$) than in Study 1 ($n = 204$), possibly leading to a lack of statistical power to find a difference in Study 4 (but not in Study 1). As in Study 1, however, many who chose the high-resource position in Study 4 did not make an attractive offer to the low-resource bargainers. Together, this suggests that a substantial portion of our sample still actively selected a self-serving allocation rule, as self-selected high-resource bargainers made higher demands than low-resource bargainers—and similar demands to those assigned to a high-resource position—despite their neutral starting position without a single salient allocation rule.

Taken together, the results from Study 4 strengthen the idea that high-resource bargainers are excluded due to both expected self-interested bargaining and actual self-interested bargaining. First, high-resource bargainers made lower first offers than low-resource bargainers. Second, 22 out of 50 high-resource bargainers made a first offer which was at least equally as attractive as the offers made by low-resource bargainers, but only 16 high-resource bargainers ended up included. This suggests that some high-resource bargainers may be excluded due to self-defeating offers, whereas others are already excluded despite their—more generous—offers. On the one hand this seems at odds with the results from Study 3, which suggested that high-resource bargainers who make equal offers are

TABLE 5 Average payoffs in formed coalitions per coalition and position

Formed Coalition	n	%	Proposed Allocation in Euros			
			M_A	M_B	M_C	SD
AB	12	24%	50.42	49.58	—	6.20
AC	4	8%	45.00	—	55.00	12.10
BC	34	68%	—	48.82	51.18	4.62

more attractive than low-resource bargainers who make the same offers. However, of all 100 low-resource bargainers in Study 4, only 13 made a first offer to the high-resource bargainer, suggesting that low-resource bargainers' initial attraction—presumably due to expected use of allocation rules—overrides this increased attraction. In Study 3, no such initial attraction, nor assessments of risk (not sticking to one's own first offer may seem risky, see General Discussion), played a role, meaning participants' choices were likely a reflection of their preferences, without any strategic or sentimental considerations. These considerations likely played a role in the actual interactive bargaining in Study 4.

6 | GENERAL DISCUSSION

The Strength-is-Weakness effect in coalition formation is the observation that individuals who have most resources are often excluded (van Beest et al., 2004a, 2011; Caplow, 1956; Chaney & Vinacke, 1960; Gamson, 1964; Kelley & Arrowood, 1960; Murnighan, 1978; Vinacke & Arkoff, 1957; Wissink et al., 2021). The current studies have investigated a likely cause of this Strength-is-Weakness effect—the use of proportional allocation rules by high-resource bargainers—and the question *why* they use these allocation rules. In this article we have proposed two possible reasons. A first possible reason is that bargainers passively adopt the allocation rule that is made most salient by their bargaining position, thereby overlooking allocation rules that are more likely to be accepted by their counterparts. A second possible reason is that high-resource bargainers do consider multiple allocation rules, but actively select an allocation rule that would maximize their outcomes if their offer is accepted.

Overall, the results from our studies support the second explanation. In Studies 1, 2, and 4, we found that high-resource bargainers allocated a larger share of the outcomes to themselves than low-resource bargainers, and, especially in Study 1 and Study 4, a substantial portion of high-resource bargainers used a proportional allocation rule. This pattern of results was obtained despite the fact that participants started from a neutral viewpoint from which no allocation rule should have been particularly salient (Study 1 and Study 4), and even when they started from a low-resource position in which the equal allocation rule should have been more salient (Study 2). This indicates that high-resource bargainers' self-serving allocations are unlikely to be due to a passive adoption of the proportionality rule, as an equal allocation could be equally salient (Study 1 and Study 4) or even more salient (Study 2). On the contrary, it suggests that high-resource bargainers take into account multiple allocation rules and actively select the one they think would benefit them the most.

6.1 | A second pathway to the strength-is-weakness effect

Results from Study 3 support the idea that when high-resource bargainers make proportional offers, they are likely to be excluded from

coalitions. Moreover, in Studies 1, 2, and 4, high-resource bargainers' offers were clearly lower than those of low-resource bargainers. A closer look at our results, however, suggests this is not the only mechanism underlying the Strength-is-Weakness effect. Given that (a) a sizable proportion of high-resource bargainers made equal offers, (b) Study 3 suggests that these offers should be very conducive for forming coalitions, and (c) more high-resource bargainers in Study 4 were excluded than expected solely because of their first offers, it seems that Strength-is-Weakness effect is not only driven by the use of proportional allocation rules.

If self-serving allocations are not the sole cause of the Strength-is-Weakness effect, what could be an additional cause? Looking at low-resource bargainers' inclination to make opening offers to other low-resource bargainers, it seems some high-resource bargainers are already disadvantaged before having had an opportunity to make a generous offer. This suggests that the Strength-is-Weakness is not only driven by *actual* self-serving offers from high-resource bargainers, but also by the offers that low-resource bargainers *expect* them to make. That is, before anyone has made an offer, low-resource bargainers might already form expectations about the kind of allocations others will favor. Given that people often expect others to mainly propagate their own self-interest (Miller, 1999), low-resource bargainers might expect others to make self-serving offers. This expectation is a likely reason for low-resource bargainers to seek out other low-resource bargainers with whom they expect to obtain an equal rather than a proportional share. Even when a high-resource bargainer, against expectations, turns out to make an attractive offer, low-resource bargainers may have a tendency to stick to the small coalition they aimed for rather than switching their attention to the high-resource bargainer. One reason might be that participants simply feel committed to carrying out the coalition offer they proposed themselves. Another explanation could be that moving away from a mutually proposed coalition might be perceived to be risky. Bargainers do not know if they might have the same option in subsequent bargaining rounds and sticking to their original choice—which is often reciprocated by the other low-resource bargainer—might be less risky.

6.2 | Broader theoretical implications

Besides providing insights on the Strength-is-Weakness effect, the current studies also provide general insights on the use of allocation rules in coalition formation. Different theories on coalition formation (for an overview, see Komorita, 1984) aim to predict which coalitions will form and how outcomes are allocated on the basis of certain allocation rules. Both minimum resource theory and bargaining theory predict that high-resource bargainers use proportional allocation rules, thereby making higher demands than low-resource bargainers, who—depending on theory—should use either proportional or equal allocation rules (Gamson, 1961a; Komorita & Chertkoff, 1973).

Whereas we indeed find that low-resource bargainers predominantly use equal allocation rules and high-resource bargainers on average make higher demands than low-resource bargainers,

high-resource bargainers used both proportional and equal allocation rules. These findings presuppose more heterogeneity in the use of allocation rules at the initial stages of coalition bargaining than prior theories have assumed. One reason for this heterogeneity might be due to a pluralism of fairness ideals in the population as well as differences in disposition to use external cues (such as held resources) to determine appropriate payoff allocations. This idea meshes with previous findings showing that some people can be identified as *strict egalitarians* who always equalize outcomes, whereas others take sources of inequality into account when deciding whether or not to implement unequal allocations (Cappelen et al., 2007; Frohlich et al., 2004). Moreover, previous research shows that the extent to which participants engage in self-serving bargaining might be determined by their social value orientation: whereas prosocials are shown to have fairly stable preferences in allocation of outcomes, prosocials self-servingly use equity when their input is high but equality when their input is lower in an ultimatum bargaining game (Bediou & Scherer, 2014). Future research could elucidate whether offers by high-resource bargainers can be similarly predicted on the basis of their social value orientation or personal fairness ideals.

We also think our findings provide interesting insights for scholars beyond the field of coalition formation. First, we think that our findings are relevant to scholars who study distributive justice using dyadic paradigms such as the Ultimatum Bargaining Game. Research using this paradigm shows that both equal and proportional offers are generally accepted (e.g., Bediou et al., 2012). The current findings show the importance of considering the possibility of comparing competing offers: whereas a proportional offer might be accepted in isolation, it might not be sufficient when alternative offers are more generous.

We also think our findings are of interest to scholars who study ostracism and belonging. Previous theorizing has provided many insights on the negative consequences of ostracism and the related threats to the need to belong (Baumeister & Leary, 1995; van Beest & Williams, 2006; Hartgerink et al., 2015; Williams, 2007). Coalition formation research complements these findings by providing more insight on who is at risk of being excluded and suffering the consequences.

Finally, we think our findings are relevant to those studying the effects of power and perspective taking. Previous research has shown that those in powerful positions engage in less perspective taking than those in less powerful positions (Fiske & Dépret, 1996; Galinsky et al., 2006), a skill important in achieving good bargaining outcomes (Galinsky et al., 2008). The current research complements this by showing that differences in resources do not have to lead to power differences in order to lead to different bargaining approaches and outcomes. Merely the possibility to justify self-serving offers based on one's resources seems enough to engage in self-defeating bargaining behaviors.

6.3 | Alternative explanations

A possible alternative explanation for the Strength-is-Weakness effect is that it stems from our use of a one-shot situation in

which it would be easy to misperceive the role of resources. An argument that has been previously brought forward is that the Strength-is-Weakness exists because bargainers falsely equate differences in resources with power differences and that repeated bargaining should lead to a decrease of the effect (Kelley & Arrowood, 1960). Although repetition indeed seems to have the potential to decrease the Strength-is-Weakness effect (Chertkoff & Braden, 1974; Kelley & Arrowood, 1960), previous research provides little support for the notion that the bargaining situation is initially misperceived and that the increased inclusion of high-resource bargainers is due to an increased understanding of the situation (Vinacke et al., 1964; Wilke & Mulder, 1971, 1974). It rather seems to be the case that high-resource bargainers become included more often due to feedback on their bargaining behavior (Chertkoff & Braden, 1974). Moreover, the main goal of this article is to understand why high-resource bargainers initially use equitable allocation rules. Given that this behavior is likely to change in subsequent bargaining, an iterative approach would not have been conducive to answering our research question.

Another possible limitation is that we relied only on the 4(322) game in which one bargainer has 3 resources and two others have 2 each. A possible disadvantage of using this game is that one could also argue that the high-resource bargainer not only has more resources but is also unique and that this could account for participants' preferences for this position. To rule out this alternative explanation we ran a study ($N = 76$) in which participants selected a position in a 5(432) game, in which three bargainers had 4, 3, and 2 resources respectively (see Data S1). Like the 4(322) game, in this game, resources and alternatives are not correlated and a Strength-is-Weakness effect has been previously observed (Chaney & Vinacke, 1960; Kelley & Arrowood, 1960; Vinacke, 1959; Vinacke & Arkoff, 1957). The crucial difference is that in this game all three positions are unique. Again, the majority (75%) of all participants chose the position with most resources, ruling out that our earlier findings are driven by a need for uniqueness rather than a preference for having most resources. Moreover, the finding that the two low-resource bargainers are now dissimilar in votes but still make offers mostly to each other (74%) strengthens the idea that attraction between low-resource bargainers is due to expected bargaining behavior, rather than due to similarity.

7 | CONCLUSION

The four studies presented here suggest that one presumed driving force behind the Strength-is-Weakness effect—the use of self-serving allocation rules by high-resource bargainers—persists in situations in which a passive adoption of this allocation rule cannot explain the effect. This suggests that high-resource bargainers actively select proportional allocation rules in an attempt to maximize their outcomes. Furthermore, the studies suggest that the use of self-serving allocation rules is not the only cause of

the Strength-is-Weakness effect. First, we see that many low-resource bargainers make first offers to each other. Second, many high-resource bargainers apply equal allocation rules which—while making them more attractive—does not seem to dampen the Strength-is-Weakness effect. A likely second mechanism behind the Strength-is-Weakness effect is thus that low-resource bargainers expect high-resource bargainers to bargain self-servingly, leading to an initial attraction between low-resource bargainers. Together, these results suggest that high-resource bargainers who use their 'strength' in resources as basis to claim a higher share of the outcomes—or those who are expected to do so—are very likely to end up excluded from a coalition.

CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

ETHICAL STATEMENT

The authors comply with APA ethical publication standards and our studies are approved by the Ethics Review Board of the School of Social and Behavioral Sciences of Tilburg University.

TRANSPARENCY STATEMENT

A data package including (meta)data, analysis scripts, stimulus materials, and preregistrations is available here: <https://doi.org/10.34894/FCLGKP>.

ORCID

Joeri Wissink  <https://orcid.org/0000-0002-7097-2230>

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