



How individual preferences are aggregated in groups: An experimental study[☆]



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ABSTRACT

This paper experimentally investigates how individual preferences, through unrestricted deliberation, are aggregated into a group decision in two contexts: reciprocating gifts and choosing between lotteries. In both contexts, we find that median group members have a significant impact on the group decision, but the median is not the only influential group member. Non-median members closer to the median tend to have more influence than other members. By investigating the same individual's influence in different groups, we find evidence for relative position in the group having a direct effect on influence. These results are consistent with predictions from spatial models of dynamic bargaining, for members with intermediate levels of patience. We also find that group deliberation involves bargaining and compromise as well as persuasion: preferences tend to shift towards the choice of the individual's previous group, especially for those with extreme individual preferences.

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1. Introduction

Many important decisions, in various contexts, are made by groups, such as committees, governing bodies, juries, business partners, teams, and families. Group decisions are typically preceded by deliberation among members, who enter the process with varying opinions and preferences. The expansion of democratic institutions and rapid progress in communication technology further highlight the prevalence of group decisions – in politics and business, among other facets of society – and the importance of investigating the process of such decisions (see the related discussion in Charness and Sutter, 2012).

This paper presents an experimental investigation of group decision-making in two settings that are stylized versions of important real-

world decision problems: (i) choosing how much to reciprocate as the second mover in a sequential gift-exchange game (Brandts and Charness, 2004; Fehr et al., 1993), and (ii) choosing between (comparatively) safe and risky lotteries, using a version of the risk-preference elicitation questionnaire of Holt and Laury (2002). Gift-exchange games are often used as a stylized framework for employment relationships with incomplete labor contracts, in which the employee performance is not always enforceable (for example, see Brown et al., 2004; Charness, 2004; Charness et al., 2012; Fehr and Gächter, 1998; Fehr et al., 1993), while the lottery choice can be considered a simplified version of financial portfolio or investment decisions. For both of the tasks above, there is no clear normative criterion for evaluating the quality of decisions.¹ In the gift-exchange game, a group's chosen reciprocation level (conditional on the first-mover's gift) should depend on members' social preferences, while lottery choices should depend on members' risk preferences. Hence, in our experiments the main focus is how different preferences shape the group decision, through bargaining and/or persuasion.

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¹ Such tasks are dubbed “non-intellective” by Laughlin (1980) and Laughlin and Ellis (1986). For recent experimental investigations of group decision-making with intellective tasks, see Blinder and Morgan (2005) and Cooper and Kagel (2005) and Kocher and Sutter (2005). Glaeser and Sunstein (2009) provide a related theoretical analysis.

Experimental investigation of group decisions has long been a central research area in social psychology, and has recently attracted more attention in experimental economics.² A novel feature of our design is that before deliberation, we solicited each member's opinion on what she thought the group's choice should be. It was randomly determined whether the eventual group choice or one of the initial individual opinions was implemented, making the solicited initial opinions payoff-relevant. In either case, the implemented outcome applied to all members with respect to payoffs. Hence, the solicited opinions can be interpreted as the outcome for the group that the individual would have chosen before deliberation, as a dictator. Another distinguishing aspect of our experiment is that groups consist of five individuals, unlike most existing studies, which investigate three-person groups.³ Five-person groups allow us to compare the influence of the extreme group members to the non-median members who are not at the extremes.⁴

Our central empirical investigation regresses the group decision on the ordered individual decisions by the group members.⁵ This regression provides a detailed picture of how a member's influence on the group decision depends on her relative position within the group. In contrast, most of the existing literature focuses on comparing aggregate statistics of group and individual decisions.⁶

Conceptually, our empirical methodology is motivated by the influential work of Davis (1973), who defines social decision schemes as mappings between individual preferences and the group decision.⁷

To provide a more formal conceptual framework, we consider two types of dynamic spatial bargaining models considered in the literature. Both approaches feature multi-period games, such that in each period

² The investigation of risk attitudes of groups versus individuals started with Stoner (1961). See also Teger and Pruitt (1967), Burnstein et al. (1973), and Brown (1974). Recent papers in economics include Shupp and Williams (2008), Baker et al. (2008) and Masclot et al. (2009). Groups' attitudes towards cooperation and reciprocity were first examined in the context of prisoner's dilemma games: see Pylyshyn et al. (1966), Wolosin et al. (1975), Lindsokold et al. (1977), Rabbie (1982), Insko et al. (1990), and Schopler and Insko (1992). Wildschut et al. (2003) provide a meta-analysis of the subject, while Charness et al. (2007) is a more recent contribution in economics. Other treatments investigate centipede games (Bornstein et al., 2004), ultimatum games (Bornstein and Yaniv, 1998; Robert and Carnevale, 1997 and dictator games (Cason and Mui, 1997; Luhan, Kocher and Sutter, 2009). Closest to our work is Kocher and Sutter (2007), who investigate gift exchange games similar to ours.

³ Among the papers closest to our experimental design, Cason and Mui (1997) use two-person groups, while Luhan et al. (2009) use three-person groups.

⁴ Besedes et al. (2014) also feature a design (in the context of an intellectual task) in which individual opinions for what the group decision should be are solicited, and afterwards it is randomly determined which individual decision applies to all group members. However, in this treatment team members do not deliberate and make a group decision. In our experiment we observe both what the individuals would choose for the group before deliberation, and the group decision that the same individuals agree upon after deliberation.

⁵ In the gift-exchange games, ordering is based on the extent of reciprocation of the first mover's gift. In the lottery choice problem, ordering is based on the frequency of choosing the safer (low-spread) lottery over the high-spread lottery in a list of lotteries with increasing odds of the higher outcome. In the main text we report results from OLS specifications, as the interpretation of regression coefficients is clearer in this case. In the Supplementary Appendix we also provide Tobit specifications and show that all our results qualitatively remain the same.

⁶ For example, Teger and Pruitt (1967) and Myers and Arenson (1972) focus solely on comparing mean individual and mean group decisions. We are aware of five papers that examine the relationship between individual preferences and the group decision: Fiorina and Plott (1978), Corfman and Harlam (1998), Arora and Allenby (1999), Zhang and Casari (2012), and Casari et al. (2012). In the first three of the above papers preferences are exogenously imposed by the experimenter, essentially constructing pure bargaining situations. Zhang and Casari report on experiments in a lottery choice context, conducted in parallel to ours, in which subjects offer proposals to each other until an agreement is reached, where members' initial proposals are interpreted as their individual preferences. Casari et al. consider a very similar design in the context of an intellectual task, bidding for a company takeover. However, the proposals in these experiments are suggestions to other group members, and might reflect strategic considerations to influence the subsequent group discussion, and hence cannot be interpreted as bids members would choose if they were dictators for the group. In contrast, the opinions solicited in our experiment before group discussions are not revealed to other members.

⁷ For a detailed discussion on how various social decision schemes affect the ways in which the distributions of group and individual choices might differ, see Kerr et al. (1996).

members consider and vote on a proposed action. The first approach, by Banks and Duggan (2000), assumes that a proposal is endogenously selected by a proposer, the identity of whom is determined randomly and independently across periods. We show that the model generates similar predictions both for the case of simple majority rule and unanimity rule. In particular, the expected group decision is a convex combination of individual opinions, and depending on the level of patience, it can span the range between the mean individual opinion (in the case of low levels of patience) and the median individual opinion (in the case of high levels of patience). In general, the model predicts that relative position within the group matters in how much influence the individual has on the group decision, and in particular members closer to the median member have more influence than extreme group members. An alternative modeling approach for group decision making over spatial policy outcomes is proposed by Compte and Jehiel (2010). They assume that proposals to be voted on emerge according to an exogenous process.⁸ The main prediction from this model is that if some player can influence the expected group choice (which is when members are not too impatient) then it is either only the median member (in case the group adopts a simple majority voting rule) or exactly two members. In case of the group adopting a unanimity rule, the latter two members are the ones with extreme ideal points. For supermajority voting rules other than unanimity, the influential members can be closer to the median.

Our empirical findings are as follows. First, we find that the coefficient of the constant is insignificant, and we cannot reject the hypothesis that the sum of the coefficients of members' individual decisions is one. This is consistent with the group decision being a convex combination of the members' decisions. A constant significantly different from zero would indicate a level shift in group decisions, suggesting that the group decision situation itself sways members' preferences in a particular direction, independently of initial opinions. Second, the median group member always has a significant effect on the group choice. However, some (but not all) of the other group members also have an impact on the group choice. In the gift-exchange context, the members immediately above and below the median have a significant impact, but the members at the extremes do not. In the lottery choice context, besides the median, the second least risk-averse and the most risk-averse group members seem to be influential. Overall, while there is a tendency for groups to ignore extreme individual opinions, the most risk-averse member has some influence on the group decision, possibly because the arguments that can be brought up to support risk-averse choices are particularly persuasive.⁹ In both settings we can reject the "mean hypothesis" that all members' opinions matter equally, and the "median hypothesis" that only the median member's opinion matters,¹⁰ even though our results confirm that the median member has a significant influence.

The empirical results are broadly consistent with the predictions of the spatial bargaining models summarized above, for cases when members' patience is from an intermediate range. In the Banks and Duggan (2000) model this is the case when the acceptance set is likely to include the ideal points of members next to the median, but less likely to include the ideal points of extreme members. The Compte and Jehiel (2010) model can also explain the observed outcomes if members are not too impatient and groups tend to adopt a supermajority rule but not unanimity rule. In this case the theoretical prediction is that there are exactly two influential members, but their identities depend on the

⁸ They also examine cases when members can exert costly effort to influence the proposal process.

⁹ The persuasive argument theory (Brown, 1974; Burnstein et al., 1973), which originated in social psychology, posits that deliberation drives group decisions in a particular direction because arguments in that direction are more persuasive. A related explanation is that people with certain preferences tend to be more persuasive than others (for example, more selfish individuals are also more aggressive in deliberation).

¹⁰ The latter would hold theoretically under a simple majority voting rule provided preferences are single-peaked (see Moulin, 1980).

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