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Group decisions under ambiguity: Convergence to neutrality

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ABSTRACT

This paper focuses on decisions under ambiguity. Participants in a laboratory experiment made decisions in three different settings: (a) individually, (b) individually after discussing the decisions with two others, and (c) in groups of three. We show that groups are more likely to make ambiguity-neutral decisions than individuals, and that individuals make more ambiguity-neutral decisions after discussing the decisions with others. This shift toward higher ambiguity neutrality in groups and after a group discussion is associated with a reduction in the rates of both ambiguity aversion and ambiguity seeking. We suggest that the results might be driven by effective and persuasive communication that takes place in groups.

1. Introduction

Keynes (1921) and Knight (1921) emphasized that most economic decisions involve imprecise probabilities (ambiguity)[1] as opposed to precisely defined probabilities (risk). Ellsberg (1961) showed that for decisions under ambiguity, individuals' preferences cannot always be reconciled with subjective expected utility (Savage, 1954). In a thought experiment, Ellsberg suggested that individuals prefer risky prospects over ambiguous ones, a phenomenon which is referred to as ambiguity aversion. This was confirmed in many studies (see review by Camerer and Weber, 1992), but the result is not universal. Ambiguity seeking has been commonly observed in the domain of losses (Abdellaoui et al., 2005; Du and Budescu, 2005; Einhorn and Hogarth, 1986; Kahn and Sarin, 1988) and for small probabilities of gains (Curley and Yates, 1989). For a complete list of references of heterogeneity in individual ambiguity attitudes, refer to Wakker (2010). Since the 1980s models focusing on attitudes to ambiguity have been introduced (Gilboa, 1987; Gilboa and Schmeidler, 1989; Klibanoff et al., 2005; Maccheroni et al., 2006; Neilson, 2010; Schmeidler, 1989).

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[1] Following Ellsberg (1961), imprecise probabilities are commonly referred to as "ambiguous". We follow this convention in our paper. However, see Budescu et al. (2002) for a discussion pointing out the inadequacy of ambiguity as a descriptive term and advocating the use of imprecision or vagueness instead.

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Prior studies have focused on decisions made by individuals. However many decisions in organizations are delegated to groups of decision makers (DMs), for example, committees, management teams and boards of directors. Our aim is to understand whether individuals and groups differ with respect to their attitudes to ambiguity. Standard economic theory is silent on the distinction between individual vs. group decision making and empirical work comparing individuals and groups with respect to deviations from normative models for decisions under risk has produced mixed results. Groups showed fewer violations of stochastic dominance and Bayesian updating rules (Charness et al., 2007), and made better investment decisions (Rockenbach et al., 2007; Sutter, 2007). Bone et al. (1999) reported that decisions under risk made by individuals and groups showed similar rates of expected utility violations such as the common ratio effect. Rockenbach et al. (2007) confirmed this result and also found no differences between individuals and groups with respect to rates of preference reversals.

Several studies have investigated differences between individual and group attitudes toward risk. Zhang and Casari (2009) found groups to be less risk averse than individuals. In contrast, Harrison et al. (2013), Ambrus et al. (2009) and Deck et al. (2012) found no differences between the risk attitudes of individuals and groups. Shupp and Williams (2008) showed that groups were less risk averse in low-risk situations, and more risk averse when decisions involved high levels of risk. Baker et al. (2008) and Masclet et al. (2009) found a similar pattern.

A small number of studies have investigated the effects of interpersonal interactions on decisions under ambiguity. Curley et al. (1986) found that individuals who were observed by uninvolved others during decision making and the resolution of uncertainty exhibited significantly more aversion to ambiguity than individuals who made decisions alone. Curley et al. attributed this finding to the participants' fear of being evaluated negatively in the event that the chosen ambiguous alternative had undesirable outcomes. Muthukrishnan et al. (2009) obtained a similar result: in their study, participants who expected to be informed in the presence of others about the true probability of winning a prize in an ambiguous gamble were more ambiguity averse than participants who expected to be informed in private. Trautmann et al. (2008) reported the results of an experiment in which the participants' preferences were withheld from the experimenters, so the possibility of a negative evaluation by others was ruled out. This treatment significantly decreased ambiguity aversion, supporting the interpretation proposed by Curley et al. (1986). Charness et al. (2013) studied the effect of direct communication on ambiguity attitudes and found that individuals were more likely to make ambiguity neutral choices after consulting with an ambiguity neutral participant. The shift toward ambiguity neutrality was particularly pronounced when the ambiguity neutral participant had a financial incentive to persuade others. Charness et al. concluded that ambiguity neutrality might have a "persuasive edge" over other attitudes during interpersonal interactions.

In contrast to these findings, Engle et al. (2011) who studied the effects of a computer-mediated discussion did not find an effect of communication with others on subsequent individual ambiguity attitudes.

Closest to our study, Keller et al. (2009) compared the willingness of individuals and dyads to pay for risky and ambiguous gambles. Dyads tended to be more risk averse than their individual members, but there was no difference with respect to ambiguity attitudes. Brunette et al. (2011) investigated the effect of group decision rules (unanimity vs. majority) on attitudes to risk and ambiguity, and found that under a unanimity rule the groups' risk attitudes differed significantly from those of individuals. However, like Keller et al. (2009), they found no difference between individuals and groups with respect to ambiguity attitudes (irrespective of the group decision rule).

Our study contributes to the existing literature in the following ways. First, we employ a design that allows us to test the effects of joint group decisions as in Keller et al. (2009) and Brunette et al. (2011) as well as the effects of communication between individuals as in Charness et al. (2013) and Engle et al. (2011). Second, whereas prior work on group decision making has been limited to the case of dyads (Keller et al., 2009) or did not allow for any verbal interaction between participants (Brunette et al., 2011) we explore the effects of group decision making with direct communication in three-person groups. Third, unlike previous studies that have mostly focused on the two classical Ellsberg problems, we consider a wide range of uncertain prospects that vary in their level of riskiness and ambiguity. This allows us to test for possible interactions between the effects of probability levels and group decisions on ambiguity attitudes, as prior studies have reported for the case of risk attitudes (Baker et al., 2008; Masclet et al., 2009; Shupp and Williams, 2008).

We conducted a laboratory experiment in which DMs (individuals or groups) made binary choices between sure amounts of money and different risky and ambiguous gambles. We distinguish between "regular" individual decisions, individual decisions made after exchanging information with others, and group decisions. This distinction allows us to disentangle two effects often confounded in studies of group decisions. The first is the influence of discussing decisions and exchanging information and opinions with others (Trautmann and Vieider, 2011). This factor affects both group decisions and individual decisions after a group discussion. The second is the process of aggregating individual preferences into a joint decision, and it affects only group decisions.

2. Experimental method

2.1. Experimental tasks

DMs (individuals or groups of three participants) made choices between sure amounts of money and 15 two-outcome gambles; outcomes were fixed at \$20 and \$0. Ambiguity in the probability p of winning \$20 was operationalized by considering probability ranges Δ. We varied the probability of winning (p = 0.20, 0.35, 0.50, 0.65 and 0.80) and considered different levels of imprecision Δ (Δ = 0, 0.05, 0.10, 0.20, 0.30, and 0.50). The degenerate case of Δ = 0 refers to decisions under risk.