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Is bigger better? Dyadic and multiparty integrative negotiations

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Is bigger better?

Dyadic and multiparty integrative negotiations

Abstract

Purpose- The purpose of the study is to empirically investigate the similarities and differences between dyads and four party groups in an integrative negotiation.

Design/methodology/approach- Data are collected in a between subjects experiment. 182 participants completed a negotiation role play and questionnaire. Hypotheses are tested using *t*-tests, MANOVAs and two multiple regression analyses.

Findings- Results demonstrate that dyads do outperform groups on both the economic and subjective measures of outcomes. Sharing of priority information and the fixed pie bias was higher in groups than in dyads. For dyads the procedure used (considering more than one issue at a time) led to higher economic outcomes, and both procedure and problem solving were important for subjective outcomes. For four party negotiations, problem solving was significantly related to higher outcomes, on both economic and subjective outcomes, and procedure was moderately related to economic outcomes. Problem solving was significantly more important for the groups than for dyads on economic outcomes.

Research limitations/implications- The controlled experimental setting could limit the generalizability of the findings. Measures of the intermediate variables could be improved by including additional items and observations. Future research is required in field settings using multiple measures of the process.

Practical implications- In multiparty negotiation information sharing and the presence of cognitive biases may not be as important as focusing on a problem solving approach.

Originality/value- An empirical investigation that groups underperform dyads in an integrative negotiation has not been conducted before.

Keywords- negotiation, dyads, multiparty, group, integrative, Nash solutions

Paper type- Research

1. Introduction

In the organizational behavior field negotiation research has proliferated over the last three decades, with the majority of studies investigating dyads-two parties (Beersma and DeDreu, 2002). In recent years there has been a notable increase in the amount of research on group and multiparty negotiations (cf. Beersma and De Dreu, 1999, 2002, 2005; Schei and Rognes, 2005), however there has been virtually no studies which directly compare multiparty and dyadic negotiations. This lack of comparison could limit our ability to apply the wealth of research on dyads to larger groups in organizations. It has been argued that larger groups will underperform dyads in a negotiation situation (Kramer, 1991) but direct empirical tests of this hypothesis have not been carried out.

Negotiations are ubiquitous in organizations. A negotiation can be understood as a type of decision making task or conflict resolution technique in which two or more parties, who have partially differing preferences, attempt to reach a joint agreement. Negotiations are different from other decision making tasks because parties are motivated to achieve their own interests, and at the same time are required to cooperate with the other party to reach a joint agreement (McGrath, 1984). In organizational life numerous decision situations can be characterized as mixed motive and many involve small groups (Brett, 1991). For example, decisions relating to, salary, budgeting, alliances, purchasing, and strategic issues, where parties have non identical preferences.

In the negotiation research both group and multiparty labels have been used to refer to more than two parties. Group negotiation has been used to describe a myriad of activities among and between organizational members. For example it has been used to denote both team to team negotiation (cf. O'Connor, 1997; Thompson, Petterson and Brodt, 1996) and negotiations with more than two principals (those having a direct stake in the outcome of a negotiation) (Weingart,

Bennett, and Brett, 1993; Arunachalam, and Dilla, 1995; Beersma and De Dreu, 1999, 2002, 2005). Multiparty negotiation has also been used to describe both team to team negotiation or group decision making with multiple parties (Lewicki, Barry, and Saunders, 2010). Thompson and Fox (2001) created a typology of group negotiation based on seven levels of analyses: individual, dyad, polyad, intermediary, collateral relationship, intragroup, and intergroup. Polyadic negotiation, which is the level directly above dyads, is defined by more than two principals. It is this specific type of group negotiation which is of interest in the present study. In this paper multiparty and group labels will be used interchangeably to refer to polyadic negotiations where there are more than two principals.

As the number of parties in a negotiation increase, from dyads to groups, which variables become more or less important for achieving good outcomes? By empirically comparing and contrasting dyadic and multiparty negotiations this question can be answered. The addition of parties to a negotiation increases the informational, interpersonal, strategic and procedural complexity (Bazerman, Mannix, Sondak, and Thompson, 1990; Bazerman and Neale, 1992; Crump and Glendon, 2003; Kramer, 1991) which in turn, is postulated to lead to lower outcomes (Kramer, 1991). The possibility of coalition formation in multiparty negotiations is perhaps the most fundamental difference between dyads and groups (Thompson, 2005) and an important source of complexity (Polzer, Mannix, and Neale, 1999). A coalition can be defined as “a (sub) group of two or more individuals who join together in using their resources to affect the outcome of a decision in a mixed-motive situation involving at least three parties” (Thompson, 2005: 209). Coalitions are unique to multiparty negotiations and have received substantial research attention (cf. Polzer *et al.*, 1998; Komorita and Parks, 1995). Studies demonstrate that coalitions can be either beneficial or deleterious to negotiation outcomes depending on the task and the motivation of the players (Beersma and De Dreu, 2002; Thompson, Mannix, and

Bazerman, 1988; Mannix, 1993; Ten Velden, Beersma, and De Dreu, 2007). Although coalitions are a central consideration in group negotiations, the possibility of forming coalitions might not always exist. Beersma and De Dreu (2002) investigated both symmetrical task structure (where stable coalitions across issues were not possible) versus asymmetrical negotiation (where stable coalitions could be formed) and argued the importance of understanding both types of structures in group negotiation (Beersma and De Dreu, 2002).

Even though coalitions are one source of dissimilarity between dyads and groups they are not the only difference, nor are they always present. It is critical to examine differences and similarities between dyads and groups on comparable tasks (symmetrical) with the same structural properties and uncover whether variables and mechanisms for achieving good outcomes are equally important. The next section defines high quality outcomes and examines factors which lead to good outcomes in both dyads and groups.

2. High quality outcomes in integrative negotiations

The term integrative has been used in the literature to refer to, the approach or strategy (high concern for own and other's outcomes), the structure of the task (variable sum), and/ or by the type of agreement achieved (Thompson, 2005). For the purposes of this present study an integrative negotiation refers to the structure of the task, which is variable sum (Raiffa, 1982) and introduces the possibility for an integrative solution (high joint benefit).

Negotiation tasks are often studied and classified as fixed or variable sum. A fixed sum negotiation, also referred to as distributive, represents a situation where an increase in one party's resources means a decrease in resources for the other party. High quality outcomes at the individual level are measured by how much of the limited resource a party obtains (Lewicki, *et al.*, 2010) and the quality of the joint outcome is determined by whether an agreement is reached when there is a positive bargaining zone and no agreement when there is a negative bargaining

zone. For variable sum negotiations resources are not fixed, and an increase in one party's resources does not necessarily lead to a decrease in the other party's resources. A high quality outcome in an integrative, variable sum task is defined as an agreement which incorporates, and reconciles, the parties' interests and produces high joint benefit (Follet, 1925; Neale and Northcraft, 1991; Pruitt, 1983; Pruitt and Carnevale, 1982; Walton and McKersie, 1965). Within organizations many decision situations can be characterized as integrative and most negotiations contain a variable sum dimension (Thompson, 2005).

In the present study I have chose to study variable sum negotiations since they are most relevant for organizations. In this type of negotiation the quality of the outcomes is understood as the degree of integrativeness of an agreement. Integrativeness has been conceptualized and measured in both objective economic terms and the subjective perceptions of the parties involved.

Objective measures of the integrativeness of outcomes has been greatly assisted by economic theories and models. In the 1940's the field of game theory emerged which modeled strategic behavior in interdependent choice situations (Von Neumann and Morgenstern, 1944). Analysis of these games evolved to include multiparty variable sum situation and models were developed which identified optimal solutions (highest joint gain for rational players and most efficient use of resources) (Nash, 1950). The negotiation literature combined the concept of integrative, high joint benefit, with exact economic models to understand and measure high quality outcomes.

The quality of outcomes in integrative negotiations has been typically measured using joint profit, efficiency, the Pareto optimality of the agreement (cf. Bazerman, Mannix, and Thompson, 1988; Clyman, 1995; Thompson, 1991; Tripp and Sondak, 1992) and the equality of the distribution of resources (Arunachalam and Dilla, 1995). Thompson *et al.*, (1988) suggest that

more equal distributions among group members, when power is equal, is a desirable goal. The emphasis with the economic measures has been to measure high quality outcomes by the degree to which an agreement maximizes both individual and joint outcome.

Subjective measures of high quality agreement have used self report measure of social psychological well being, such as satisfaction and fairness perceptions (Thompson, 1990; Curhan, Elfenbein and Xu, 2006).

The quality of the outcome in dyadic and group integrative negotiation can be measured in terms of high joint benefit, both economic and subjective. In the next section I review which variables and mechanisms have been identified as central for realizing these outcomes.

3. Achieving high quality outcomes

The majority of negotiation studies have investigated dyads and a considerable amount of knowledge about processes and outcomes between two parties exists, however much less is known about multiple parties. Fortunately, there has been an increasing interest in group negotiations (Beersma and De Dreu, 1999, 2002, 2005; Olekalns, Brett and Weingart, 2003; Ten Velden *et al*, 2007). The findings from this research generally support that variables which have been found to be important in dyads, such as information exchange, accurate perceptions of the negotiation structure, type of procedure, motivation and emotion (Bazerman, Curhan, Moore, and Valley, 2000; Thompson, 1990, 1991, 2005; Thompson *et al*. 1988; Weingart, *et al*, 1993) are also relevant for groups.

However, what is still not known is whether these variables are of differing importance for dyads and groups. Based on Kramer's (1991) propositions about the differences between dyads and groups (information, procedural and strategic complexity), the need for comparable symmetrical tasks (so that stable coalitions are not possible and dyads and groups can be compared on the same task structure), and the variables identified as important for integrative

outcomes, four central variables were chosen. Two variables associated with increased information complexity, information exchange and the fixed pie bias, and two variables associated with procedural complexity, the agenda used and problem solving.

Information exchange is an important component of integrative negotiation behavior as it can facilitate finding outcomes that are of high joint benefit (Arunachalam and Dilla, 1995; Pruitt and Lewis, 1975; Pinkley, Griffith, and Northcraft, 1995; Schulz and Pruitt, 1978; Thompson, 1990; Thompson, Peterson, and Brodt, 1996). Specifically, information about the negotiator's priorities and preferences has been studied and shown to positively affect the quality of negotiation outcomes (Pruitt and Lewis, 1975; Pinkley *et al.*, 1995; Schulz and Pruitt, 1978; Thompson, 1990; Thompson *et al.*, 1996).

Explicit information sharing has been shown to be positively associated with insight and joint benefit (Pruitt and Lewis, 1975; Pinkley, Griffith, and Northcraft, 1995; Schulz and Pruitt, 1978; Thompson, 1990; Thompson and Hastie, 1990a; Thompson *et al.*, 1996). Studies have demonstrated that even when only one party reveals information, joint outcome increases and there is a strong reciprocation effect (Thompson, 1991; Thompson *et al.*, 1996). In groups information exchange has been measured as an important integrative behavior (Beersma and De Dreu, 1999, 2002) and shown to mitigate judgment errors and increase outcomes (Arunachalam and Dilla, 1995)

Although priority information exchange can be advantageous and give insight into the integrative potential of the negotiation, it may not occur naturally or at sufficient levels (Pruitt and Lewis, 1975; Thompson, 1991) to achieve higher outcomes. Kimmel, Pruitt, Magenau, Konar-Goldband, and Carnevale (1980) found no relationship with explicit information sharing and judgment accuracy or joint profit. Pinkley *et al.* (1995) demonstrated that explicit information sharing led to higher joint outcome only when parties had expectations that the

preference structures were variable. Pruitt and Carnevale (1982) also state that explicit information sharing contributes most to high quality outcomes when three conditions exist: negotiators are high in cognitive complexity, both have a co-operative orientation, and both have low accountability to a constituency. Most of the empirical studies show that explicit information sharing contributes to obtaining integrative agreements (Beersma and De Dreu, 1999, 2002).

The current knowledge about information exchange and the similarities and differences between dyads and groups is limited. Thompson et al.'s (1996) work examining teams of negotiators versus solos in dyadic negotiations indicated the importance of only one member on a team sharing the priority information, which then set in motion the exchange of priority information between the parties. Implications are that in multiparty negotiations if one party initiates the sharing of priority information then this action will lead others to share their information. Knowing that priority information is an important integrative behaviour and has been related to higher outcomes, it is time now to investigate and compare the natural emergence of explicit information exchange in dyads and groups.

The increase in information complexity in multiparty negotiations can also lead to more cognitive biases. Research has demonstrated that many judgment errors are present in negotiations (cf. Bazerman and Chugh, 2006; Bazerman and Neale, 1983; Thompson and Hastie, 1990ab), and that these biases are linked with lower negotiation outcomes (Arunachalam and Dilla, 1995; Thompson and Hastie, 1990a; Thompson, 1991). The judgment errors or biases found in dyadic negotiation are many: the impact of framing (Bottom and Studt, 1993; De Dreu and McCusker, 1997; Neale and Bazerman, 1985), the "fixed pie" bias (Bazerman, Magliozzi, and Neale, 1985; Thompson and DeHarpport, 1994; Thompson and Hastie, 1990b), the anchoring effect (Galinsky and Mussweiler, 2001; Ritov, 1996; Whyte and Sebenius, 1997), overconfidence (Bazerman, Moore, and Gillespie, 1999), falsely assume preference

incompatibility (Thompson and Hrebec, 1996), and the self serving biases (Babcock and Lowenstein, 1997). Among the biases studied, the fixed pie, falsely assuming a distributive negotiation when the potential for integrative solutions exist, is one of the most problematic and common biases in integrative agreements (cf. Bazerman *et al*, 2000). No research to my knowledge, has empirically investigated whether the fixed pie bias is more or less likely to occur in group negotiations. From a behavioral decision perspective, the increases in information complexity in multiparty negotiations would lead to an increased prevalence of biases in groups compared to dyads. Are biases more prevalent in groups than dyads?

Procedural complexity has also been assumed to grow as the number of parties increase, escalating the challenges of coordination and communication (Bazerman *et al*. 1988; Bazerman and Neale, 1992; Kramer, 1991). A robust finding from the literature is the way in which negotiators structure the negotiation process, the procedure, can have a large impact on integrative outcomes. The consideration of issues and decision rules, have been found to greatly affect the outcomes in a negotiation (cf. Thompson, 2005). Studies at the group and dyadic level have shown that integrative solutions occur more often when a simultaneous rather than sequential (one by one) consideration of issues occurs (Mannix *et al.*, 1989; Weingart *et al.*, 1993; Yukl *et al.*, 1976). Most of the research has manipulated the type of agenda of the parties rather than observing which type of agenda emerges. At present there is little research that informs us how the addition of more parties to a negotiation, affects the type of agenda which emerges.

In addition to managing the agenda, negotiating units, can adopt integrative behaviors to tackle procedural complexity. A problem solving approach which reflects concern for both self and others interests, is a type of integrative behavior (Beersma and De Dreu, 2002). Problem

solving approaches highlight the cooperative, not the competitive aspects of negotiations and have been associated with high joint outcomes in integrative negotiations (Beersma and De Dreu, 2002; Pruitt and Carnevale, 1982; Pruitt and Lewis, 1975; Walton and McKersie, 1965). No research has directly compared whether this type of behavior is more or less prevalent in dyads or groups, nor if it is equally important for both.

The four variables mentioned above have been found to contribute to high quality integrative agreements in negotiations, and have been shown to be important for both dyadic and group negotiation. However, research is needed that investigates how these variables manifest themselves in dyads and groups. Do these variables emerge similarly in dyads and groups, and are they of equal importance for groups and dyads to achieve high quality outcomes?

4. Hypotheses

Six hypotheses were proposed to investigate similarities and differences between dyadic and group negotiation. The first hypothesis tests whether groups reach lower joint outcomes than dyads in an integrative negotiation task. Due to the combined increases in complexity, as argued for by Bazerman *et al.* (1988) and Kramer (1991), the hypothesis proposed is that that groups will achieve lower outcomes than dyads. To check that group and dyadic differences held across negotiation tasks two symmetrical negotiation tasks were used with a varied number of issues to be negotiated (four or ten).

H1: Groups will achieve lower outcomes than dyads in an integrative negotiation across negotiation tasks.

The next four hypotheses explored differences between dyads and groups in: explicit information sharing, fixed pie bias, procedure (consideration of issues) and problem solving. All hypotheses are presented as null hypotheses that groups and dyads do not differ.

In a multiparty negotiation the amount of information that can be exchanged and the information required to reach an integrative outcome is higher than in a similar dyadic negotiation. How does this increase affect groups in their explicit sharing of priority information? It could be argued that individuals will have less time to share information in a group than in a dyad, which in turn would reduce the exchange of priority information. Alternatively, groups are more likely to have at least one member share his/her priority information since there are additional parties involved. From Thompson *et al*'s (1996) work there is empirical evidence that if one member shares information this can lead to a snowball effect in which other parties also share their information. The null hypothesis presented is:

H2. There will be no differences between groups and dyads in the sharing of priority information.

From a behavioral decision perspective, as complexity of the decision making task increases the use of heuristics increases (Payne, 1993). Based on this theory it is expected that the fixed pie bias would be present to a higher degree in groups than in dyads. However, a dyadic negotiation task might be sufficiently complex that it evokes the use of the fixed pie bias. The null hypothesis is:

H3. Groups and dyads will have the same degree of the fixed pie bias.

Kramer (1991) postulated that the increased procedural complexity was a primary reason for lower outcomes in group negotiation. In negotiations the complexity of the task greatly increases when deliberating all the issues at once. The increased procedural complexity of a group negotiation with more people and more preferences to take into account, could lead to difficulty in processing all the information. To reduce the complexity groups might be more likely to adopt a procedure that reduces the information load, such as using sequential agendas.

However, a dyadic negotiation might be complex enough so that parties resort to using sequential agendas. To investigate this the null hypothesis is:

H4. Groups and dyads will use the same degree of sequential agendas.

Groups have been shown to face many challenges in the negotiation process. There could be more occasions for conflict, more uncertainty and negotiators might perceive that they have less control over the process (Kramer, 1991). Bazerman *et al*, (1988) also propose that it is more difficult to problem solve than to compete. With increases in the number of people the need to simplify could lead to a less cooperative approach. Alternatively the group context could cue more cooperative behavior since it might not be clear who is competing with whom.

H 5. Dyads and groups will use equal levels of problem solving.

Lastly, to investigate whether these four variables are equally important for dyads and groups to reach high quality outcomes a null hypothesis is put forward.

H 6 The intermediate variables (information exchange, fixed pie bias, procedure, and problem solving) will be equally important for dyads and groups to reach high quality outcomes.

5. Method

Participants and design

182 participants from undergraduate business courses, or a seminar on negotiations took part in the study. The sample was collected from three educational institutions and one placement agency for students. To ensure that collecting the data from the different institutions did not affect the intermediate and dependent variables, one way ANOVAs were run. The results were non-significant for all the variables and showed no systematic differences across data collection sites.

The design was a simple post test only design between dyads and groups. The negotiating unit was the unit of analysis. The dependent variables were economic and subjective social psychological outcomes and the intermediate variables were used as dependent and independent variables.

Procedure

A total of five sessions were run with the number of participants in each session ranging from 18 to 60. The same experimenter was present in each data collection meeting. The researcher arrived at each class or seminar and began by giving the participants a short introduction to the session. The introduction stated that they would be divided into groups, and would be negotiating with either one or three others in a negotiation role-play and that afterwards they would receive a lecture on negotiations. After the introduction, subjects were divided into male and female subgroups and the number of groups and dyads possible was determined. For example, if there were six females in a subgroup one dyad and one group could be formed. Participants were randomly assigned to dyadic or group conditions and to a negotiating role. No significant differences on outcomes or intermediate variables for gender were detected, so no further analysis involving gender was conducted.

The participants were told that they would receive a confidential preference sheet, which would give them a role and preferences on each alternative in the role play. Preferences for the different alternatives were indicated by points, which in turn represented the amount of profit associated with each alternative. The profit each role could earn for their respective department in the organization was represented by the number of points. In the role play the participants were told that reaching agreement would be better than the alternative of no agreement. They were instructed to read through the confidential preference sheet, and not to show this information to any other person.

The participants were given fifteen minutes to read through the general information describing the simulation which explained the roles, the issues to be negotiated, and the alternatives on each issue. At the end of the fifteen minutes they were asked if they had any questions. Pretests were conducted and it was deemed fifty minutes was enough time required to complete the different versions of the negotiation task. After finishing the negotiation they were asked to fill out the agreement they had reached and to individually complete the questionnaire. If groups were still negotiating fifteen minutes before time was out in the negotiation, they were told they had fifteen minutes to finish. They were then instructed to complete the questionnaire which took approximately ten minutes. Afterwards, participants were debriefed, thanked, and given a lecture on negotiation.

Negotiation tasks and manipulation of group and dyad

Negotiation role plays were specifically created which were symmetrical in structure and could be used for both dyads and groups. Previous negotiation tasks used for dyads (cf. Kelley, 1966; Kimmel *et al.* 1980; and Pruitt and Lewis, 1975; Thompson and Hastie, 1990), and groups (Arunachalam and Dilla, 1995; Beersma and De Dreu, 2002) are built on structural and conceptual similarities to the task created by Kelley (1966) and developed by Pruitt and Lewis (1975) and Carnevale and Pruitt (1992). However, to my knowledge there has not been any negotiating task that has been designed and used both for comparing dyads and groups. In this study I created four negotiation tasks which were similar in structure (the number of alternatives, symmetrical, no stable coalition formation across issues possible), but differed in terms of the number of negotiators (two or four), issues (four or ten), and number of trades necessary to achieve an integrative agreement (one, two, and four). The number of issues and trades were varied in order to ensure results were not due to the specific task used. A two-way ANOVA (dyadic/group, by four and ten issues task) was run and no significant differences between the

four and ten issue tasks were found on the dependent variables. The profit schedules given to the participants represented their utilities allowing economic outcomes to be calculated. The role plays were designed so that economic outcomes could be measured using a Nash solution which facilitated comparisons across dyads and groups and tasks.

Across all simulations a symmetrical structure, similar to many other dyadic negotiation and group simulations, was used. Symmetrical task structures do not allow for stable coalitions across the issues (Beersma and De Dreu, 2002). For example, if there are four issues and four negotiators on each issue, the structure of the task does not make it advantageous for three of the parties to join together. In addition, preference alignment with the different roles change. For example, Role A on issue one would be aligned with Role C, and on issue two with Role D .

The setting of the role play was a leader meeting in a pharmaceutical company. There were either two roles in the dyadic condition or four roles in the group condition, and each role was a leader of a department in the organization. The departments in the dyadic condition were finance and research and development, and for the multiparty condition two additional departments were added, marketing and production. The leader group was instructed to reach agreement on either four or ten management issues. They were told that they should reach agreement otherwise a decision would be made by outside consultants and the outcome would be worse than any agreement they could achieve together (making their reservation point zero). The issues included reporting in the company, production responsibility, location, marketing campaign, distribution of their products, a director candidate, and division of the profit. On each issue there were nine alternatives which were constructed with a logical sequence of decreasing or increasing utility. Each role received a profit schedule that gave information about the role's profits (represented by a number of points) for each alternative on each issue, but no information was given about the other roles' profits. The role's preferences were represented by profits

(points) their department would attain if they reached an agreement with a particular combination of alternatives. In the four issues negotiation the roles could achieve agreements between 0 – 11 250 points each and in the ten issue outcomes ranged from 0 - 28 050.

The task allowed for negotiators to integrate their interests through logrolling (trading a less valuable issue for a more valuable issue). In the four issue task all four issues could be traded. In the ten issue negotiation task eight issues could be traded. A Nash solution could be calculated for dyads and groups in both tasks.

6. Measures

Integrative agreements

Integrative agreements were measured using the objective economic performance of the negotiating units and subjective social psychological perceptions. As stated previously integrative agreements are defined as those that reconcile the parties' interests and produce high benefit for all parties (Follet, 1925; Neale and Northcraft, 1991; Pruitt and Carnevale, 1982). The Nash solution gives a bargaining solution that includes both the actions of rational and self interested players and the joint fairness of the agreement (Bovens, 1987; Nash, 1950; Tripp and Sondak, 1992) and was used to measure economic outcomes. The Nash solution has been used previously (Eliasberg, LaTour, Rangaswamy and Stern, 1986; Greenhalgh and Neslin, 1983; Greenhalgh, Neslin, and Gilkey, 1985) and best represents an optimal solution for parties with equal power. In the negotiation literature integrative agreements have often been defined and operationalized by using either joint profit or economic efficiency or Pareto optimality (cf. Bazerman, *et al.*, 1988; Clyman, 1995; and Thompson 1990, 1991). Although joint profit has been criticized for lacking a theoretical foundation, there has been little debate about whether the theoretically robust economic efficiency criterion is sufficient to understand the integrativeness of an agreement. The disadvantage with only assessing individual utility maximization and the efficiency of

agreements is that valuable information is lost about the distribution of resources and the maximum benefit to both parties. Key to understanding integrative agreements is the emphasis on joint benefit not just individual maximization. In some negotiation tasks a high Pareto efficient score can represent a very uneven distribution of resources and mirror a distributive agreement, where one party gains a great deal more than the other party. The role plays were designed so that one Nash solution was possible for each role play which represents individual rationality, highest joint benefit, and symmetry. For this type of task, with the equal power of the roles, a Nash solution represents both a theoretically and practically relevant measure for high joint benefit in the group.¹

Some negotiating groups did not reach an agreement. Previously negotiating units who reached an impasse have been excluded from analysis or not reported (Beersma and DeDreu 1998; Mannix *et al.* 1989), given a numeric score based on either reservation points (Carnevale and Lawler, 1986) or compromise solutions (Pruitt and Lewis, 1975) or given the lowest agreed outcome (Beersma and De Dreu, 2002; Kimmel *et al.*, 1980) or a score of zero (Yukl *et al.*, 1976). There has not been a systematic approach to treating impasses in the negotiation research.

¹ The Nash solution maximizes the product of the parties' outcomes. To calculate the solution requires that the utilities be rescaled to the utility of the point where the negotiator would prefer no settlement. The no settlement point in the role plays are zero. In the negotiation task there was one Nash solution for each task and agreements were calculated by the distance from this solution. For example, for the four issue dyad role play the calculation would be $\sqrt{\frac{(x+y)^2 - 4xy}{2}}$, where x is equal to the party 1's score and y equals party 2's score. The Nash solution would be \sqrt{xy} where scores of 7500 for each party is the solution for maximizing the product of both parties. The Nash solution is therefore 7500 points. All agreements in the research were measured as the distance from the unique Nash solution for each task. The scores were then standardized and reversed for ease of interpretation. For example, if in the dyadic four issues negotiation party 1 received a profit score of 6000 and party 2 received a profit score of 3750. The distance of this agreement from the Nash solution is calculated by simply subtracting \sqrt{xy} from $\frac{x+y}{2}$, $(7500 - \sqrt{6000 \times 3750}) = 4743.42$. The score for this example would be $(7500 - 4743) = 2757$. In this example, I set the Nash solution and dyad scores to one by dividing both solutions by 7500 so scores are comparable across tasks. This gives the result of 36.75. Finally, the score was reversed so higher scores represented higher quality outcomes. In this example the dyadic outcome was 63.25 which reflects the percentage of the Nash solution (the maximum outcome) the agreement obtained. If a dyad achieved the Nash solution of 7500 they would receive a score of 100. For group negotiation tasks the same procedure was used to calculate distances except that a root of four ($\sqrt[4]{xy}$) was used (maximizing all four parties).

Deciding on how to treat impasses is both a theoretical and statistical issue and one that demands more attention (Tripp and Sondak, 1992). Theoretically, I was concerned that the measure accurately reflected the quality of the negotiation outcomes and therefore it was imperative that non agreements were included in the analysis. If impasses were excluded a selection bias in the results would have been created and meaningful information and power would have been lost from the analysis. From a statistical perspective, if there is a differential rate of impasse across conditions, assigning impasses a score of zero causes increased heterogeneity of variance, which can lead to problems interpreting the results (Yukl, *et al.* 1976). Based on theoretical, statistical, experimental considerations, and previous studies, impasse information was included in the calculation of economic outcomes and I report both a parametric test where negotiating units were given the lowest score achieved in the sample (a point furthest away from the Nash solution) which is consistent with previous research (Beersma and De Dreu, 2002; Kimmel *et al.*, 1980) and also a non parametric test where negotiating units were given a zero score, which is compatible with their reservation points and previous research and does not pose problems of interpretation.

A post negotiation questionnaire was used to measure both the subjective social psychological outcomes and intermediate variables. The negotiating unit, dyad or group, served as the unit of analysis and measures were both at the negotiation unit and individual levels. Missing data at the individual level accounted for less than six percent of the sample, and showed no systematic differences between the conditions. As there is no commonly accepted criteria for the response rates of group level data, I deemed that at least fifty percent of the negotiating unit had to respond in order to measure the group level. Previous research has used thirty-three percent response rate to measure the group level (Vodosek, 2007). Given the nature of the data, the small number of missing items at the individual level and previous research I used the

averages from individual data, to estimate group level scores. There was no missing data for the group level measures.

A five item scale, derived from the general negotiation literature and similar to those used by Shapiro and Bies (1994), measured subjective social psychological outcomes. Five questions addressed the individual's satisfaction and perceptions of fairness with the negotiation by asking how satisfied or how fair they thought the negotiation was. A five point scale (1= dissatisfied and 5= satisfied, and 1= unfair and 5 = fair respectively). The scores on each question were summed to create a group level indicator of the negotiation unit and then an average was used to standardize the scores across dyads and groups. A higher score represented higher subjective social psychological outcomes in the unit. The Cronbach's alpha for these items was $\alpha = .78$. I ran a one way ANOVA to check that there was more variation between groups than within groups on social psychological outcome and found more variation between groups indicating a group level phenomenon: ($F(59, 115) = 1.75, p < .006$).

Intermediate variables. Intermediate variables were measured with a post negotiation questionnaire. Previous research has measured negotiation behavior either by coding verbal transcripts (Adair, Okumura and Brett, 2001; Pruitt and Lewis, 1975; Weingart *et al*, 1993) or through self or peer reports (Beersma and De Dreu, 1999; Beersma and De Dreu, 2002). A post negotiation questionnaire was chosen, with self and peer reports, to measure both behaviors and perceptions. Our two behavioral intermediate variables, were information exchange, and procedure. In groups and dyads participants were asked whether they shared which issue was most important for them. Answers were either yes or no. A group score represented the percentage of the group who shared priority information.

Three items were used to measure the degree to which groups and dyads considered issues simultaneous or sequentially. Respondents were asked to report the behavior of the group. Answers could be given on a five point scale where 1= to a small degree and 5= to a large degree. The higher the score, the more the procedure could be characterized as simultaneous consideration of issues. The three items were: the group decided to go through the negotiation issue by issue (reversed score); members in the group traded issues (I will give you issue 2 if you give me issue 4); and the group agreed to decide on more than one issue at a time. The Cronbach's alpha for these items was $\alpha = .85$. Before aggregating the individual items to the group level I ran a one way ANOVAs to check that there was more variation between groups than within groups. I found that on all three items there was more variation between than within groups indicating that there was a group level phenomenon: sequential issue consideration ($F(59, 111) = 3.241, p < .000$; traded issues ($F(59, 113) = 6.953, p < .000$; and, agreeing on more than one issue at a time $F(59, 113) = 8.79, p < .000$).

The problem solving variable was assessed by having individuals in the negotiating unit recall the degree to which the negotiation process in the dyad or group could be described as constructive problem solving. Using a five point scale with 1= small degree and 5= to a large degree, the problem solving approach in the group was measured. A higher score represented a greater degree of problem solving. Negotiating unit scores were computed by calculating the average for the unit from individual reports. Although only one item was used to measure problem solving there were two to four informants on this variable. Reliability was assessed by examining the agreement among the individuals in the unit. A one way ANOVA demonstrated that perceptions within the units were more similar ($F(59, 111) = 1.89, p = .002$) than between the units .

To measure the presence of the fixed pie bias past researchers have asked subjects about the other parties' priorities (Carnevale and Isen, 1986; Kimmel *et al.*, 1980; and Thompson and Hastie, 1990a). The measure chosen for this study is similar to one used in Arunachalam and Dilla, (1995) and Thompson and Hastie (1990a). To calculate the group level measure of the fixed pie bias respondents were asked whether other parties in the role play had the same priority issue as they did. This general question indicates whether the respondents thought of the negotiation as fixed or variable. At the individual level the answers were either yes or no, a correct answer was no. The role play was structured so that no other party had the same most important issue. At the group level a fixed pie bias score was computed based on the percentage of members who had incorrectly answered yes. Summing individual scores to calculate the degree of accuracy in dyads and groups has been used in previous studies (Arunachalam and Dilla, 1995; Thompson, 1991; Thompson and Hastie, 1990a). Although a conservative measure of bias, the group score correlated significantly with joint profit ($r^2 = .28, p < .032$) indicating the validity of this measure in relation to previous research.

7. Results

Treatment of the Data and Descriptive Statistics

Outcome data were first analyzed using two-way (group/dyad) x (task four/ten issues) ANOVAs for both economic and subjective social psychological outcomes. The effect of task type proved not to be significant and will not be discussed or analyzed further. Differences between dyads and groups on the dependent variables were analyzed using *t*-tests. Differences between dyads and groups on the intermediate variables (priority information sharing, fixed pie bias, procedure and problem solving) were analyzed using a Multivariate Analysis of Variance (MANOVA). Two sub-group multiple linear regressions were run to investigate which intermediate variables were

most important for achieving high quality outcomes in dyads and groups. Table 1 provides the descriptive statistics for all the intermediate and dependent variables. Consistent with past research, simultaneous consideration of issues and problem solving were positively related to economic outcomes, and fixed pie perceptions were negatively related to economic outcomes.

Insert Table 1

Economic and social psychological subjective outcomes

One tail *t*-tests were run to test hypothesis 1, which predicted that groups would achieve lower outcomes than dyads in an integrative negotiation. Four impasses occurred in the dyad condition and ten in the group condition. A chi squared test showed there were no significant differences in impasse rates between the conditions. Impasses were given the lowest negotiated score (Beersma and De Dreu, 2002; Kimmel *et al.* 1980). Hypothesis 1 was supported ($t(58) = 1.76, p = .041$), dyads achieved higher economic outcomes measured as distance towards the Nash solution ($M = 77.9, SD = 8.91$) than groups ($M = 73.89, SD = 8.65$) with a Cohen's $d = .46$. A Mann-Whitney two-sample rank-sum test was also run where impasses were given a 0 score and results were significant ($U = 330, 500, z = 1.77, p = .038$ (one-tail)). Significant differences between conditions were also found when economic outcomes were measured with joint profit ($t(58) = 1.8, p = .039$) and impasses were substituted with the lowest score, and using a Mann-Whitney two-sample rank-sum test with impasses given 0 ($U = 324, 500, z = 1.86, p = .031$ (one-tail)).

Hypothesis 1 was supported for the subjective outcomes, dyads ($M = 3.60, SD = .54$) and groups ($M = 3.30, SD = .32$), $t(58) = 2.60, p = .013$ (one tailed), $d = .78$. When impasses were

excluded from analysis there were no significant differences between dyads and groups on economic or subjective outcomes, however results were in the predicted direction.

For hypotheses 2 to 5, a MANOVA was run to examine whether dyads and groups differed in the emergence of the intermediate variables associated with high quality outcomes in negotiations. The overall multivariate model was significant, Wilk's $\lambda = (.41)$, $F(4, 55) = 19.91$, $p < .000$, with an effect size $\eta^2 = .59$. The null hypotheses 2 and 3 were rejected. A higher percentage of members in groups ($M = 68.55$, $SD = 31.6$) shared priority information compared to dyads ($M = 44.83$, $SD = 43$) although the effect size of $\eta^2 = .09$ was small. Even though groups shared the most important issues they still had a higher degree of the fixed pie bias ($M = 63.16$, $SD = 28.06$) than dyads ($M = 12.07$, $SD = 21.77$) with an effect size of $\eta^2 = .51$. No significant differences were found between dyads and groups in the type of procedure followed or the perception of problem solving behavior, so the null hypotheses 4 and 5 could not be rejected.

Insert Table 2

Hypothesis 6 tested whether intermediate variables were equally important for achieving high quality outcomes in dyads and groups. Two sub-group multiple regressions were run for dyads and groups with the intermediate variables of information sharing, fixed pie bias, procedure and problem solving acting as independent variables. Both sub group regressions were significant for economic outcomes (dyads $F(4,24) = 4.52$, $p = .011$, $r^2 = .31$ and groups $F(4,26) = 3.73$, $p = .016$, $r^2 = .27$) and for social psychological subjective outcomes (dyads $F(4,24) = 5.9$, $p = .011$, $r^2 = .41$ and groups $F(4,26) = 6.1$, $p = .001$, $r^2 = .41$).

Procedure was significant for dyads on both economic ($\beta = .63$, $p = .001$, $t(24,4) = 3.81$) and subjective outcomes ($\beta = .34$, $p = .002$, $t(24) = 2.25$), and problem solving ($\beta = .55$, $p = .002$, t

(24) = 3.56) for subjective outcomes. For groups only problem solving was significant for both economic ($\beta = .47, p = .007, t(26) = 2.93$) and subjective outcomes ($\beta = .70, p = .000, t(26,4) = 4.87$). However, procedure was approaching significance for groups on economic outcomes ($\beta = .37, p = .07, t(26) = 1.90$).

To compare whether the variables that were equally important for groups and dyads *t*-tests were used to examine the differences between dyad and group coefficients. A significant difference was only found between the coefficients for problem solving on economic outcomes $t(58,2) = 4.64, p > .01$.

Insert Table 3

8. Discussion

In this study I compared two and four party integrative negotiations to gain insight into whether dyads outperform groups on similar negotiation tasks. The results on both economic and subjective social psychological measures supported this theoretical claim. Interestingly these results occurred without the added complexity of coalition formation, a central factor often cited to explain why groups might achieve less than dyads in a negotiation (Kramer, 1991; Mannix, 1993).

A closer look at the analysis reveals that although dyads did attain higher joint outcomes than groups, the differences were not large. When I removed the impasses from analysis the differences between dyads and groups became non-significant although they were in the expected direction. This was true for both the economic and subjective outcomes. Poorer outcomes in a group negotiation appear to be a combination of impasses and lower performance.

Hypotheses 2-5 investigated whether intermediate variables emerged equally in dyads and groups. Of the four intermediate variables studied only priority information and the fixed pie bias were significantly different between dyads and groups. Problems solving behavior was reported approximately equally in both dyads and groups, as was the level of simultaneous procedure (see table 2). Groups shared more priority information and had more of the fixed pie bias than dyads. The increase in priority information sharing is consistent with previous research which has found that if one person shares information then a snowballing effect occurs (Thompson and Hastie, 1990; Thompson, 1991; Thompson *et al.*, 1996). On the one hand this is good news for group negotiations, priority information is being exchanged. On the other hand this information sharing was not enough to lead to higher outcomes for groups. The finding of more bias in groups is commensurate with the negotiation and behavioral decision research (cf. Bazerman and Chugh, 2006; Kramer 1991; and Payne, 1993) which demonstrates that increases in information complexity, increase the prevalence of cognitive biases.

After examining the differential emergence of these central intermediate variables, I then explored the effect that these variables had on the quality of negotiation outcomes. The results for dyads showed that the procedure used (considering more than one issue at a time) led to higher economic outcomes, and that both procedure and problem solving were important for subjective outcomes. For multiparty negotiations, problem solving was significantly related to higher outcomes, on both economic and subjective outcomes, and procedure was moderately related to economic outcomes. Problem solving has been cited as a central integrative behavior in the negotiation literature and appears to be especially important for groups (cf. Beersma and De Dreu 2002).

Comparing dyadic and group negotiations showed that there are both similarities and differences in the intermediate variables which emerge, and how important these behaviors are

for achieving integrative outcomes. Consistent with prior research, both dyads and groups improved their economic performance when they used a procedure that considered more than one issue at a time (Thompson, 2005; Weingart *et al.* 1993). Both dyads and groups benefited from a problem solving approach but interestingly, for dyads this was true only for the subjective outcomes not for economic outcomes where the relationship was non significant and negative. Problem solving was the only intermediate variable which differentially affected high quality economic outcomes for dyads and groups.

Several implications for management can be identified from the current study. The finding that dyads do outperform groups in a negotiation may require managers to focus on specific interventions for group negotiations. Interventions for groups should be directed towards procedures that emphasize groups reaching agreement, and group level goals that focus on the common interests in the organization. Management support should be directed at helping groups to avoid impasses. For example, in more complicated multiparty negotiations where quality solutions are sought, one recommendation is to reach a *first agreement*. A *first agreement* is one that can be modified, developed and upgraded (Lewicki *et al.* 2010). Other methods can be to assign a chairperson and draft tentative agreements (Lewicki *et al.* 2010).

To improve performance, structuring the group process and fostering a problem solving approach appears to be most important for groups. Groups share more information than dyads but do not seem to reap the benefits. Priority information needs not only to be shared but also used. Prior research demonstrated that structuring the group negotiation process and having parties actively use the information shared was associated with higher outcomes (Arunachalam and Dilla, 1995). Another central part of organizing the process is the agenda followed. Managers need to encourage both dyads and groups to consider packages rather than proceed issue by issue in the negotiation. The negotiation literature has argued that organizing the process will be more

critical for groups (Bazerman *et al.*, 1988 and Kramer, 1991) and the results from this study support this claim.

The final implication is that managers need to recognize the importance of problem solving for groups. Creating a group process that emphasizes cooperation and constructive problem solving can help groups find more integrative agreements. This finding might be related to the literature emphasizing that group norms can be critical in multiparty negotiations (Lewicki *et al.* 2010). Perhaps group negotiations will benefit more from norms rooted in a problem solving approach, rather than interventions that reduce biases.

Limitations and suggestions for future work

There are several limitations in this study. First, the self report measures used for the intermediate variables could lead to biases in reporting and common source bias. However, in the current study I have used aggregated data which helps reduce random error and increase reliability. Research also suggests that recall of past behavior tends to be quite accurate (Pearson, Ross, and Dawes, 1992). Second, using a questionnaire after the negotiation does not allow for causal inferences about the intermediate variables and the outcomes variables, and therefore the direction of the relationship between problem solving and outcomes cannot be ascertained. Groups that performed well might have perceived that they used more problem solving. Third, some of measures could be improved. For example information sharing only asked whether a party told their most important issue, but it did not measure whether others actually registered this information. The measure might not have been sensitive to the information sharing actually taking place in the negotiation. Future research should use observation as well as surveys to capture the information communicated, received and used. Fourth, using a laboratory experiment with students to understand the complexity of dyadic and group negotiation limits the

generalizability of my findings. Future research should study these groups and dyads in a field setting, using managers and executives with experience. Real life group negotiations are much more complex than the role play situation used in this study. The benefit of using the experiment is that a direct comparison between dyads and groups was possible and interesting differences were identified. The current study helps to empirically support the assumption that groups do underperform dyads. Future research needs to build on these findings and investigate which additional factors might influence the outcomes in a real life negotiation.

What works in dyads, also works well in groups, however the emphasis with groups should be on getting them to reach agreement and to use problem solving behavior along the way.

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Table 1 Means, standard deviations and bivariate correlations

Variable	M	SD	1	2	3	4	5	6
1. Group/dyad ^a	1.48	.50						
2. Economic outcomes	75.83	8.94	.23 ⁺					
3. Subjective outcomes	3.42	.46	.33*	.34*				
4. Priority information sharing	57.08	39.08	-.31*	.02	.04			
5. Degree of fixed pie bias	38.47	35.90	-.72*	-.22 ⁺	-.28 ⁺	.16		
6. Procedure	2.09	1.10	.10	.50*	.28 ⁺	.12	-.37*	
7. Problem solving	3.21	.79	.21	.26 ⁺	.65*	.15	-.16	.15

^a 1= group 2= dyad ⁺ $p < .10$, * $p < .05$.

Table 2 MANOVA of the process variables

Variable	Dyad ($n = 29$)		Group ($n = 31$)		df	F	η^2	P
Group/ Dyad	M	SD	M	SD				
Priority information sharing	44.83	43	68.55	31.6	1	5.99	.09	.02*
Degree of fixed pie bias	12.07	21.77	63.16	28.06	1	61.48	.51	.00**
Procedure	2.21	1.14	1.98	1.06	1	.62	.01	.43
Problem Solving	3.4	.94	3.05	.60	1	2.64	.04	.11

* significant $p < .05$ ** significant $p < .01$.

Table 3 Sub group regression analyses for dyads and groups

Variables	Dyads				Groups			
	Economic		Subjective		Economic		Subjective	
	β	R^2	β	R^2	β	R^2	β	R^2
Intermediate variables		.31		.41		.27		.41
Priority information sharing	.14		-.015		-.10		-.10	
Degree of fixed pie bias	.03		-.077		.076		-.056	
Procedure	.63**		.341*		.37 ⁺		-.116	
Problem solving	-.10		.55**		.47**		.70**	

Note ⁺ $p < .10$, * $p < .05$, ** $p \leq .001$.