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Improving negotiations with bar charts: The advantages of priority awareness

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ABSTRACT

Negotiations seldom lead to optimal results for the negotiators. The missing knowledge about the priorities of the negotiating parties is one known reason for this. This experimental study examines the effects of priority awareness on different measures of negotiation outcomes. Priority awareness is the awareness of one negotiator about the priorities of the other negotiator. One hundred thirty-two participants were randomly assigned to negotiation pairs in an experimental condition with priority awareness – created implicitly through the usage of an ordinary bar chart – or a control condition without priority awareness. They took over the roles of a car seller or buyer and negotiated within an experimental negotiation support system. They were neither explicitly instructed to use the bar chart in the negotiation or about its benefits, nor were they restricted in sharing any kind of information. The experimental condition showed not only a significantly higher negotiation performance in the form of joint outcome and pareto efficiency than the control condition, but also a higher impasse rate. Creating awareness about each other's priorities in a negotiation has a positive effect on the negotiation performance without noticeable negative effects on satisfaction with, or fairness and duration of, the negotiation.

1. Negotiations and priorities

Differences in priorities play a major role in successful negotiations, whether we are aware of them or not. Whenever there is a conflict based on different interests or different beliefs on what is more important, negotiations may resolve it. Negotiations are not only of concern for salespersons and professional life but also for one's personal life and everyday human interaction – from trade agreements between organizations to workers trying to agree on how to proceed with a construction or students trying to agree on the best approach to solve a task. Both parties have their preferences, both parties have their priorities, but most often, they cannot have their own way without the consent of the other. They have to negotiate because one party does not just give in to the other's wishes and there is no chance to achieve at least a partial win without giving in on some issues. If both parties give in on some issues and if they concede, it would be best for them if these issues were of lower importance to them, so they will then lose less by giving in. Giving in on issues that are less important and instead receiving concessions on issues that are more important is known as *integrative agreement* or *integrative negotiation* (Barry & Friedman, 1998; De Dreu, Beersma, Steinel, & van Kleef, 2007). For such mutually beneficial *trade-offs* to take place, the negotiators must somehow be aware of their different priorities. However, they rarely are aware of their different priorities and how to integrate them into an optimal solution (Hyder, Prietula, & Weingart, 2000; Thompson & Hastie, 1990). In many cases they agree on an equal split on each topic that is negotiated, meeting in the middle for every negotiated issue. This seems fair but leads to a lower common negotiation performance in the sense of *joint outcome* –the sum of the *individual outcomes* of both negotiators represented by point scores given to their agreement – than the trade-off of less important issues against more important ones (Van der Schalk, Beersma, VanKleef, & De Dreu, 2009). The lack of integrative negotiation also leads to less *pareto efficient* agreements, in other words, to agreements in which at least one party could have achieved a better individual outcome without the other party doing worse (Hyder et al., 2000).

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Two reasons why negotiations often lead to worse outcomes are the *fixed-sum error* or *fixed-pie error* and its subordinate, the *incompatibility error* (Thompson & Hastie, 1990). The fixed sum error is the tendency of a negotiator to assume the same priorities of issues for the other negotiator, assuming similarities where there are none. The incompatibility error is the belief of one negotiator that his or her priorities of preferences differ from those of the other negotiator, assuming differences where there are none. Due to the lack of underlying knowledge about the priorities of the other party, negotiators agree on a lower joint outcome (Thompson & Hastie, 1990) and sometimes even arrive at *lose–lose agreements* in which both negotiation parties agree on an unnecessary common loss (Thompson & Hrebec, 1996). Not even experienced negotiators are safe from these fallacies (Thompson, 1990).

When the negotiators do know about each other's priorities in some way, either by freely giving information about priorities (Schei, Rognes, & Mykland, 2006), simply asking the other negotiation party (Hyder et al., 2000; Schei et al., 2006; Thompson & Hastie, 1990) or being guided by a computer program to estimate the others priorities (Foroughi, Perkins, & Jelassi, 1995), they agree on a higher joint outcome. The exchange of priority information in computer-supported negotiations is a "major prerequisite for reaching integrative negotiation outcomes" as discussed by Gettinger and Koeszegi (2012, p. 26), emphasizing the need for further research.

As seen in these studies, the exchange of priorities depends on the negotiators personal experiences with previous negotiations, on their knowledge about the benefits of priorities, and coming up with the idea of giving or asking for information about priorities. Otherwise the exchange of priorities depends on a prestructured computer program explicitly instructing the negotiators to think about the others priorities.

Our approach is different: We want to make negotiators only aware of each other's priorities in a tacit and unobtrusive way. A way that does not explicitly prompt to do something in a specific manner or that does not stand as an obstacle between the negotiators. Regular bar charts as seen in business reports, TV commercials, and so on, are one possible way. We do not depend on the negotiators previous experience with negotiations and their knowledge about the benefits of priorities for the negotiation outcomes, and we do not explicitly instruct them to think about this. Our focus lies clearly on the human aspect, tacitly fostering awareness of differences in priorities between negotiators in order to achieve a better negotiation performance for both. It is not about algorithms or software agents that negotiate in the absence of human interaction by predefined rules. We want to enhance real human negotiations in which two parties attempt to reach an agreement collaboratively with the support of computers.

In the following two sections, we will explain what we mean by *priority awareness* and how the experiment was set up. Also we will explain what exactly the different measures of negotiation performance are before we state our hypotheses and research questions.

2. Priority awareness

Being aware of the priorities of the other negotiator is what we call priority awareness. In fact, the term "priority awareness" has already been coined by De Jong, Tuyls, Verbeeck, and Roos (2008) as a means to take human fairness into account in modelling software agents for a multi-agent system. De Jong et al. (2008) have shown that adding priority awareness to a software agent gave a much better prediction of human behavior, as humans sometimes take different priorities into account and make trade-offs based on them. Our understanding of priority awareness is the same but from a human perspective.

The adaptation of an awareness approach to negotiations seems promising. Previous studies that made spatially separated individuals in computer-supported work groups aware of each other's different knowledge enhanced the effectiveness and efficiency of their solution to a complex problem (Engelmann & Hesse, 2010; Engelmann, Tergan, & Hesse, 2010; Schreiber & Engelmann, 2010). This approach also reduced the undesirable effect of too much trust between the group members in such tasks in which they would not question the decisions of the others and achieve an inferior result (Engelmann, Kolodziej, & Hesse, 2014). It also guided their communication (Dehler, Bodemer, Buder, & Hesse, 2011) and increased the discussion and processing of unshared information (Engelmann & Hesse, 2011).

However, just making humans aware is not a guarantee that they will change their behavior. They will not necessarily act in a perfectly rational way and try to maximize their utility (Henrich et al., 2001; Kahneman & Tversky, 1979). But humans do commonly use awareness as a tool: Potential employees for a job resolve the asymmetric distribution of information about their qualification between them and the employer by using their acquired education credentials as a signal about their ability level (Spence, 1973).

Creating priority awareness is about tacitly making each party aware of the other's priorities in a negotiation. The awareness tool with which priority awareness is created must first be perceived as something that the negotiators can make use of, and then they have to understand that it is about different priorities, and finally they have to use it to integrate their different priorities in a beneficial way. Priority awareness creates the possibility to bypass an otherwise trial and error search for integrative issues.

3. Experimental study

The goal of our experimental study was to create awareness of the differences in priorities between the negotiating parties, thus promoting more integrative negotiations and, in the end, a better negotiation performance. For this we refrained from explicit instructions or specific training for the negotiators to test if only the awareness is sufficient to change the behavior and improve the performance.

We aimed to foster priority awareness in a computer-supported bilateral (two parties) negotiation. The experimental negotiation support system falls into the definition of an *e-negotiation system* (Kersten & Lai, 2007) as it relies on internet technology for the purpose of facilitating and supporting activities undertaken by negotiators. This experimental negotiations support system was made solely for the purpose of testing the effects of priority awareness and is therefore far away from the functionality of a real live negotiation support system such as "Smartsettle" (iCan Systems Inc., 2015) or other experimental negotiation support systems such as "Inspire" (Kersten & Noronha, 1999) or "Negoisst" (Schoop, Jertila, & List, 2003).

Bar charts seem to be a good choice for fostering priority awareness because they have already been used to visualize priorities of issues (Rangaswamy & Shell, 1997). Rangaswamy and Shell (1997) did not examine its effects because their negotiation support system as a whole was their main research topic. Further, Weber, Kersten, and Hine (2006) discussed the potential use of bar charts to visualize priorities as a means to achieve more integrative agreements. Bar charts lead to better comparisons of values than tables (Jacobs, 1994, 1999) and to more accurate judgments of proportions (Simkin & Hastie, 1987) as well as shorter response times in an information retrieval task (Quispel & Maes, 2014) than other forms of visualization. They are also the advised visualization format for larger numerators (McCaffery et al., 2012). Additionally,