

# Negotiation concordance and its modeling with SEM<sup>♦</sup>

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## Abstract

Negotiation is a process that attempts to bring two or more parties into agreement. Based on this concept, a model that includes both partners of a negotiation is proposed. The model incorporates a concordance factor, which describes the degree of accord between the partners. Using structural equation modeling (SEM), the effects of the factor on the evaluation of the partner's negotiation approach and the evaluation of the negotiation, are estimated from a large set of negotiation experiments. The empirical results indicate that factors which are supposed to measure such things as the partner's negotiation approach are in fact mostly measuring the concordance factor. The results also show that there is no significant effect of the buyer's own negotiation approach evaluation on the seller's evaluation of the buyer's negotiation approach and vice-versa. There are however, significant positive effects of the concordance factor on the counterpart negotiation approach evaluation. These results point to a certain commonality between the buyer and the seller which influences the measurements.

<sup>♦</sup> This work has been partially supported by the Natural Sciences and Engineering Research Council, Canada and the Social Sciences and Humanities Research Council, Canada.

## 1. Introduction

Negotiation is a part of everyday life and business and an important market mechanism. It is a process that involves persons with differing preferences regarding the allocation of resources. The negotiators engage in joint decision-making to arrive at an agreed allocation. Negotiation research has been concerned with the various aspects of the individual and joint decision-making activities and their results. Researchers have studied relationships between the negotiators (their psychological traits, culture and education, negotiation modes, approaches and strategies) and the negotiation process and its results (Druckman 1977; Pruitt 1981; Bazerman, Curhan et al. 2000). They have also studied roles of the third parties (Herrman 2006) and more recently, decision and negotiation support tools (Holsapple, Lai et al. 1998; Ströbel 2002).

Social interactions often involve the establishment and/or change of relationship among the participants. The quality of relational behavior includes affective factors which have been found to play an important role in shaping the negotiation process, influencing its outcomes, including the negotiators' assessment of the process and their counterparts (Loewenstein, Thompson et al. 1989; Druckman and Broome 1991; Greenhalgh and Chapman 1995). Affect may thus be considered as moderating the cognitive rational assessment, including the assessment of facilitators and mediators, and the decision and negotiation support systems (Lai, Doong et al. 2006; Li, Etezadi et al. 2006).

Research on the influence of affect has concentrated on one party and this party affect towards the counterpart. Barry and Oliver (1996) propose a model in which affect takes three forms; each for one of the three negotiation phases (pre-negotiation, negotiation and post-negotiation). Lai, Doong et al. (2006) observed that the negotiators' assessment of the system and its ease of use and usefulness are influenced by their perception of their counterpart behavior.

Pre-negotiation affect which is based on the negotiators' earlier experiences influences their decision to negotiate and the selection of the negotiation approach (Druckman and Broome 1991; Baron 1993). Baron (1984) reports that positive affect contributes to the negotiators' preference for collaboration over avoidance in conflict resolution. Numerous experiments showed that there is a relationship between negotiation approaches selected by the negotiators and the agreements and other results. The dyads who collaborate were found more often achieving an agreement and being more satisfied with the process and the results than other dyads. Because affect influences the initial approach selection, if there is a relationship between the affect of the parties and the approaches used in the negotiation.

The inter-relationships between affect and approaches, and their influences on the process and outcomes suggest the possibility of a construct which takes into account the degree or type overall relationship between the negotiators. The purpose of this paper is to describe an exploratory study regarding such a relationship. We call this general relationship the *negotiation concordance*; it measures the degree of accord or harmony between the negotiators. The construct concordance is general in that it includes both own and perceived psychological traits, affects and approaches.

For the purpose of this study we use data obtained from an on-line negotiation experiment with the Inspire system (Kersten and Noronha 1999; Koeszegi, Vetschera et al. 2004; Vetschera,

Kersten et al. 2006). Because the experiments have been conducted since 1996 and the questionnaires have not been prepared with the purpose of our study in mind, the possibility to measure negotiation concordance is limited. On the other hand, we are able to use a large and rich data set. Its analysis may lead to experiments specifically designed to measure the proposed construct.

Following this introduction, in Section 2 we briefly discuss the Inspire negotiation experiment and present the negotiation concordance model. The dataset which we use to study the model is presented in Section 3, followed by the analysis in Section 4 in which we used the structural equation modeling technique. We present short conclusions and directions for future research in Section 5.

## 2. Proposed model and research questions

Current research has identified that the negotiator's evaluation of the counterpart's negotiation approach correlates with the evaluation of the system (Lai, Doong et al. 2006). This may suggest that the perception of the system is affected by other aspects than those pertaining to the system, its ease of use and usefulness. Similarly, the negotiators' assessment of their counterparts and their negotiation approach may include more than their perception of the counterparts and their behavior. This assessment may be affected by the negotiators' evaluation of the process and its final results.

It appears that at the center of every negotiation, there is an abstract concept of overall agreement/disagreement between both negotiation partners. This concept has a strong relation to the outcome of the negotiation. Following this, the evaluation of the counterpart may not be directly measuring the partner's characteristics; it may be more of a measurement reflecting the concept of the overall concordance between negotiators. We anticipate that if there is a general positive concordance during the negotiations there will be a positive partner evaluation, and if there is general negative concordance during the negotiations there will be a negative partner evaluation. This can be tested by modeling the overall concordance as a second-order factor that explains the relationship among various aspects of a participant's own evaluation and the corresponding partner evaluation by the counter. Negotiation behavior and counterpart behavior evaluation had been examined previously, however, the research only considered each side of the negotiation separately, and did not include any central concordance or cross evaluation accuracy (Lai, Doong et al. 2006).

In order to further investigate the negotiation process and this overall concordance concept, measurements of the parties' evaluation of the negotiation process, evaluation of their partners, and of the outcome of negotiation have been considered together. In addition, it is expected that the concordance has a strong positive effect on the negotiation outcome. We expect that the positive value of the negotiation concordance leads to a high probability of the negotiators reaching an agreement. Conversely, a negative concordance makes reaching an agreement less likely.

The model which we use to study the negotiation concordance is presented in Figure 1. The model is symmetric because both sides of the negotiation (buyer and seller) are represented in it.

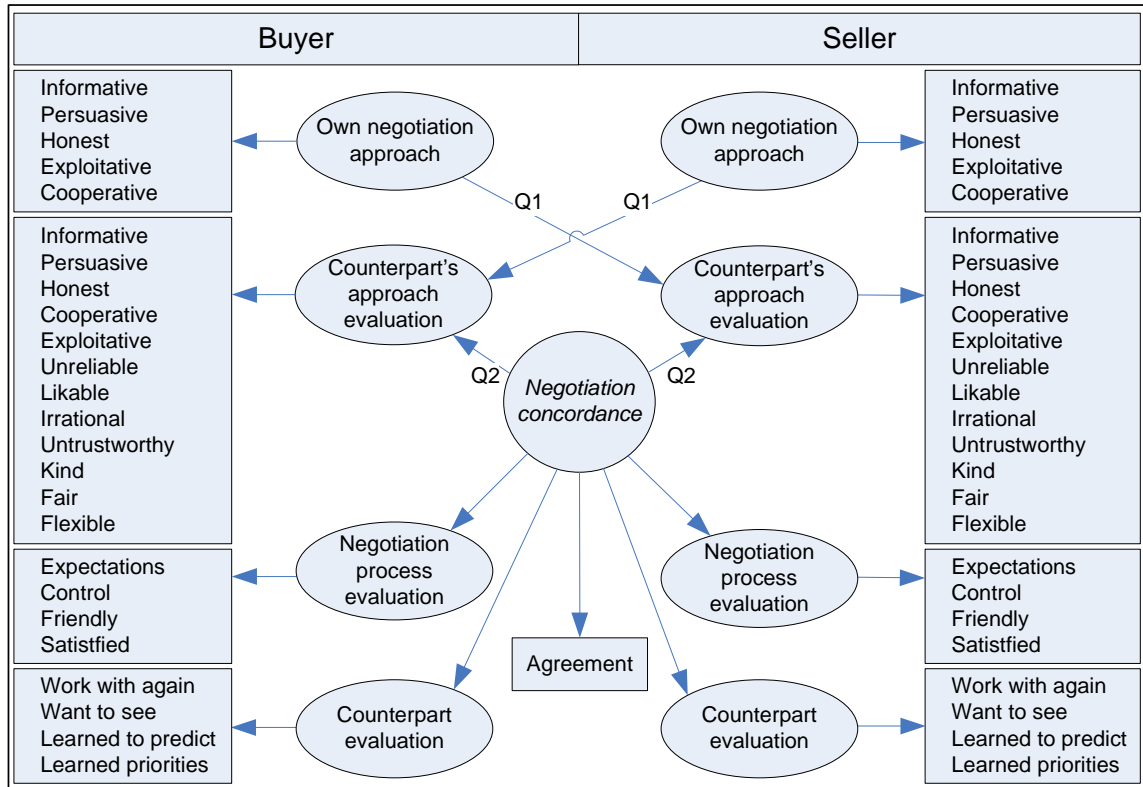


Figure 1. Negotiation concordance model and hypotheses

The concordance factor is positioned centrally in the model (Figure 1). Concordance influences seven factors: three factors on the buyer’s side, three identical factors on the seller’s side, and the negotiation outcome.

Additionally, one may expect that there is certain similarity between the self evaluation of the negotiator's approach and the evaluation of this approach made by the negotiator's counterpart. While there may be some differences due to insufficient communication and use of negotiation tactics, there should also be similarities in these two assessments. The measurement of central concordance is measured by both sides of the negotiation and by the final negotiation results. We will test validity of this model through structural equation modeling techniques (SEM). Given the overall fit indices are acceptable, we expect that the central concordance factor have a strong effect on all other factors as well as the negotiation outcome.

To summarize, we will examine the following two research questions (Figure 1):

- Q1: Does the buyer’s evaluation of the seller’s negotiation approach reflect the seller’s own negotiation approach evaluation, and vice-versa?

Q2: Do the buyer's evaluation of the seller's negotiation approach and the seller's evaluation of the buyer's negotiation approach reflect the overall negotiation concordance?

### 3. Data

The data source for evaluating the current model is the Inspire negotiation systems. Inspire is a negotiation support system which permits parties from around the world to negotiate over the internet. Negotiation experiments have been conducted using this system since 1996, therefore they provide a rich source of negotiation data. In order to avoid the complication and heterogeneity that may occur when data from different cases is used, only negotiations for the Itex-Cypress case (which represents over 97.5% of all experiments) are retained. Additionally, only negotiations in which both sides completed the post negotiation questionnaire (relevant questions are available in

Appendix A – Measurement Instrument) and in which at least two offers were made are considered. This provides a total of 675 negotiations for analysis.

To simplify interpretation of the results, the response range for some questions was inverted. All, except for two, questions were on either a 5 or 7 point Likert scale and had a positive sense to them and the encoding resulted in a negative correlation with two binary variables (“Work with Opponent” and “Agreement”) which were coded as 0 or 1. To compensate for this, all positively worded questions were inverted to make them have a positive correlation with both the positive binary variables and the outcome variables. Measurements that were already negatively worded, such as “Untrustworthy”, were left unchanged. The final list of variables, their reversal status, type and range is presented in Table 1. Other than the negotiation outcome variable, this list of variables is used twice: once for each side of the negotiation.

#### 4. Analysis

The proposed model is fitted using LISREL 8 (Jöreskog and Sörbom 2001). Before examining the details of the fitted model, the overall fit of the model must be evaluated. In structural equation modeling there are many statistics measuring goodness of fit. The Root Mean Square Error of Approximation (RMSE) proposed by Steiger (1990) with a close fit being under 0.05 and up to 0.08 for reasonable approximation in the population (Browne and Cudeck 1993).

The value of RMSE is 0.0668 and a 90% confidence interval of 0.0648 to 0.0687 for the current model. Therefore, it would seem to be in the mid-range of a tight fit to a reasonable fit. Indices such as the Non-normed Fit Index (NNFI = 0.914), Comparative Fit Index (CFI = 0.918) and the Incremental Fit Index (IFI = 0.919) all present a consensus of an acceptable fit but not a very close one. The Chi-Square is 4249 with 1213 degrees of freedom.

The results of the fitted model are presented in Figure 2 and in the simplified factor model in Figure 3. The results indicate that there is no significant effect of the buyer’s own negotiation approach evaluation on the seller’s evaluation of the buyer negotiation approach and vice-versa. However, there are highly significant positive effects of the central concordance factor on the counterpart’s negotiation approach evaluation.

Table 1 – Measurement variable overview

<b>Name</b>	<b>Reversed</b>	<b>New meaning for model interpretation</b>	<b>Range: Disagree/Agree (N/Y)</b>
Own Bargaining			
Informative	Y	Informative	1-5
Persuasive	Y	Persuasive	1-5
Honest	Y	Honest	1-5
Exploitative	N	Not Exploitative	1-5
Cooperative	Y	Cooperative	1-5
Negotiation Evaluation			

Expectations	Y	Expectations	1-7
Control	Y	Control	1-7
Friendly	Y	Friendly	1-7
Performance	Y	Performance	1-7
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Partner Evaluation			
Informative	Y	Informative	1-5
Persuasive	Y	Persuasive	1-5
Honest	Y	Honest	1-5
Exploitative	N	Exploitative	1-5
Cooperative	Y	Cooperative	1-5
Unreliable	N	Reliable	1-5
Likeable	Y	Likeable	1-5
Irrational	N	Rational	1-5
Untrustworthy	N	Trustworthy	1-5
Kind	Y	Kind	1-5
Fair	Y	Fair	1-5
Flexible	Y	Flexible	1-5
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Partner Negotiation Eval.			
Work with Opponent	N	Work with Opp.	0-1
Seeing Opponent	Y	Seeing Opponent	1-5
Predict Opponent	Y	Predict Opponent	1-5
Underst. Opp. Priorities	Y	Underst. Opp.Prior.	1-5
Agreement	N	Agreement	0-1

Research question Q1 is not supported because the effect of the buyer's own negotiation approach evaluation on the seller's evaluation of the buyer's negotiation approach has no significant positive effect (p-value = 1.000) and also the effect of the seller's own negotiation approach evaluation on the buyer's evaluation of the seller's negotiation approach has no significant positive effect (p-value = 0.969).

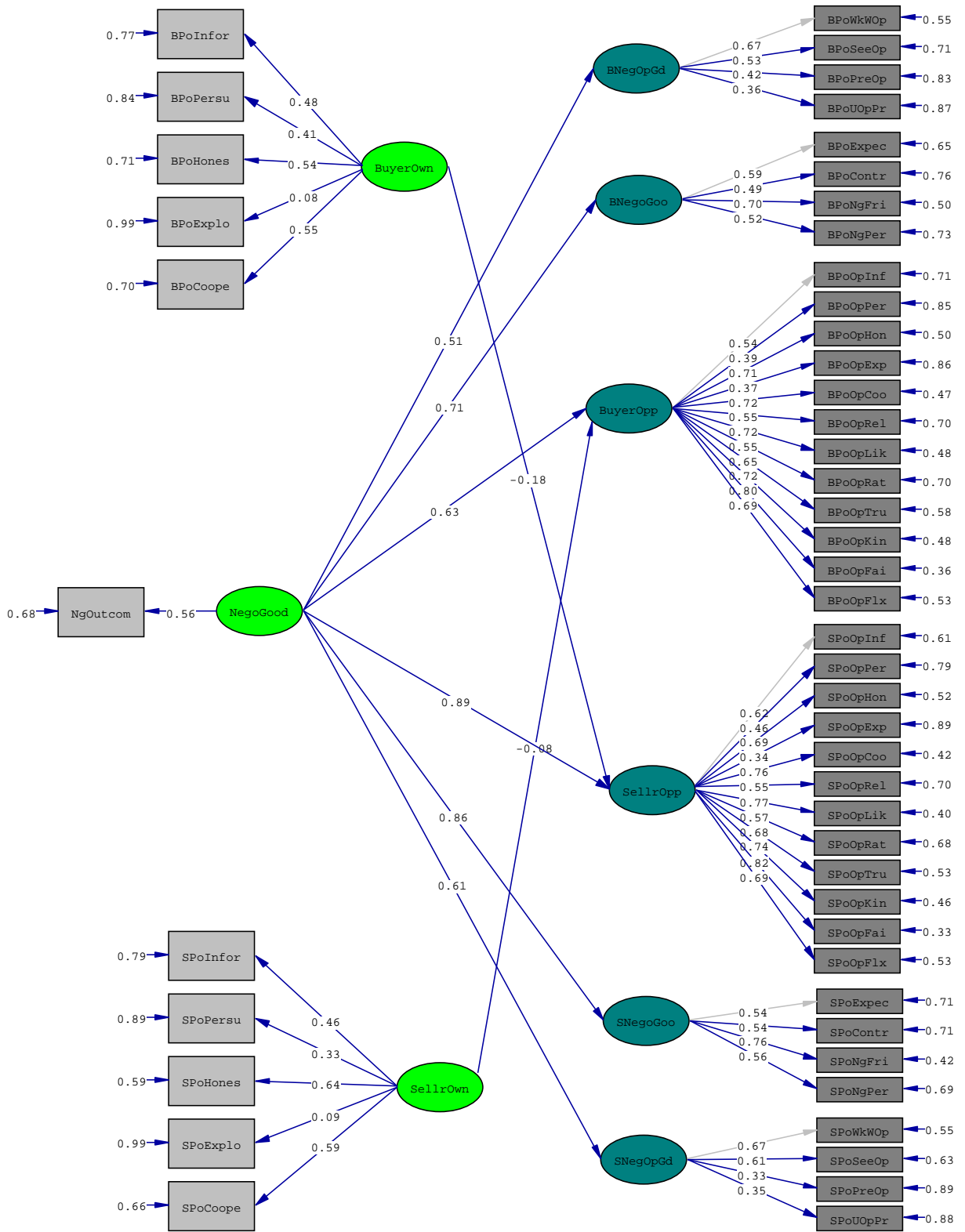


Figure 2 - Fitted buyer/seller negotiation structural equation model



Research question Q2 is supported because the effect of the central concordance factor on the seller’s evaluation of the buyer’s negotiation approach has a significant positive effect (p-value = 0.000) and the effect of the central concordance factor on the buyer’s evaluation of the seller’s negotiation approach has a significant positive effect (p-value = 0.000). This appears to be an important result because it demonstrates that the evaluation of the counterpart’s is mostly measuring the negotiation’s overall concordance.

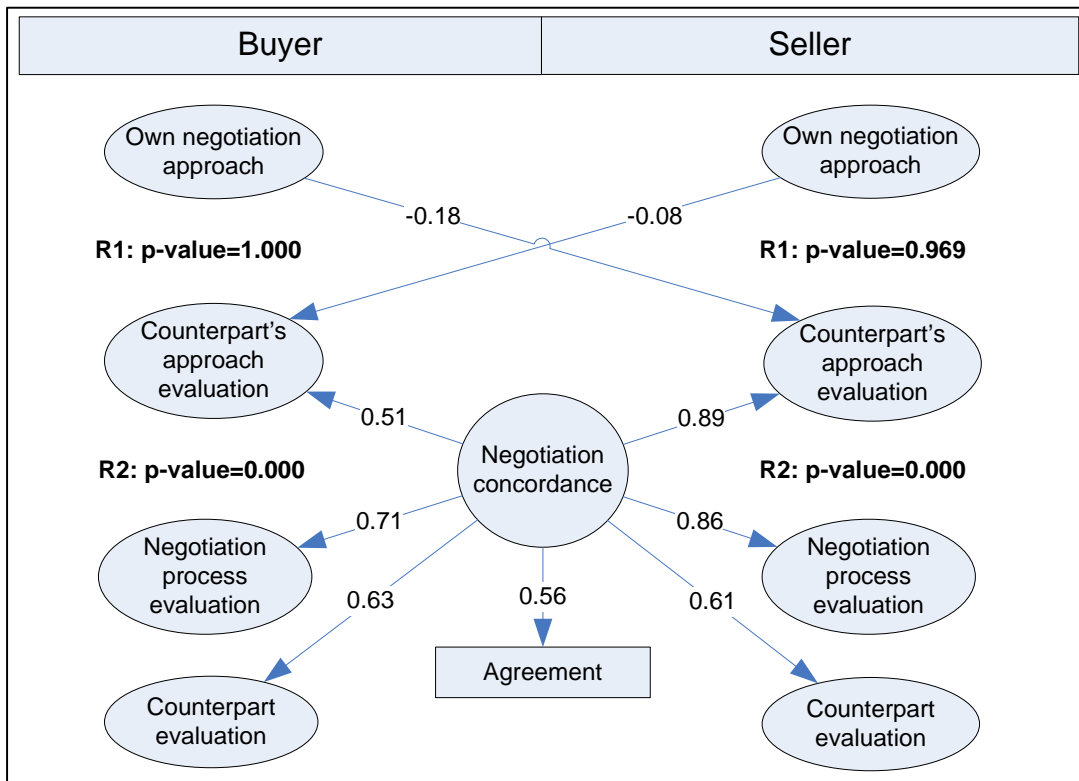


Figure 3 - Fitted Buyer/Seller Negotiation Structural Equation Factor Model

Because there does not seem to be a specific reason why only the counterpart’s negotiation approach evaluation should be influenced by the central concordance factor, it is likely that other measurements are also affected by this concordance factor or other related common factors such as the negotiation affect (Lai, Doong et al. 2006; Li, Etezadi et al. 2006). It should be noted here that this is an initial exploratory work that uses both sides of the negotiation. Further research may require changes of the negotiation concordance factor. However, it does seem that the results reported here indicate an interesting effect which is related to both sides of a negotiation and is influencing some of the measurements.

As one would expect from negotiation literature the participants’ approach influences negotiation (Lax and Sebenius 1986; Loewenstein, Thompson et al. 1989; Lewicki, Saunders et al. 2003). Indeed, adding the path which permits the overall concordance to be influenced by

each participant's own bargaining evaluation does have some effects which are significant (BuyerOwn = 0.41, SellerOwn = 0.42, p-value = 0.000 for both). Additionally, there is no change in the answers to the two research questions.

An alternative perspective on this would be that the perceived own negotiation approach of both buyers and sellers are also influenced by the central concordance factor. That is, own negotiation approach may be considered as additional measures of the overall concordance factor. For example, if the negotiations have high concordance, each negotiator will have a higher self evaluation. This could be controlled in future experiments by obtaining own bargaining evaluations both before and after the negotiation session.

Another question we consider is about the difference in the negotiation approach evaluation of females and males. This question arises from the observation that most negotiators incorrectly evaluated their partner or incorrectly evaluated themselves. Previous research on the AMIS model using the Inspire data has identified that the male and female participants provide different model estimates (Etezadi, Kersten et al. 2006). The theory indicates that females should be better at accurately evaluating their negotiation partners than males. To evaluate this, the model is fitted with various subsets of the data in an attempt to isolate the female/male differences in partner evaluation.

Table 2 - Female/male opponent evaluation analysis

Buyers	Sellers	Size	RMSEA	CFI	SellerOwn→ BuyerOpp	BuyerOwn→ SellerOpp
Male	Any	387	0.0620	0.923	-0.05	-0.06
Any	Male	411	0.0662	0.920	-0.01	-0.03
Male	Male	234	0.0682	0.914	0.02	0.00
Female	Any	288	0.0710	0.902	-0.00	-0.21
Any	Female	264	0.0683	0.898	-0.14	-0.32
Female	Female	111*	0.0790	0.857	0.03	-0.36

\*Total sample size is smaller than the number of parameters. Parameter estimates are unreliable.

The results are presented in Table 2, where six models are examined. In every model, we arrive at the same conclusion for both research questions (Q1 and Q2); the own evaluation is not reflected in the partner's evaluation and the central concordance factor is reflected in the partner's evaluation.

## 5. Conclusion

The empirical examination of the proposed model and its effects on various measurements, in particular the partner evaluation, provides some new insights into the relationships between self-assessed and perceived negotiation approaches, the process assessment, and the agreement achievement.

The measurement of the central concordance factor is particularly interesting because it accommodates both sides of the negotiation and the negotiation outcome. Contrary to the measurement intent the evaluation of the counterpart's approach does not really measure this approach but is shown to manifest the central concordance factor.

We need to note that it is possible that the non-significant effect of the buyer's own negotiation approach evaluation on the buyer's assessment of the seller's negotiation approach (and vice-versa) is a result of incorrect self evaluations. These effects, however, cannot be further examined with the current data. We plan to conduct an experiment which would be tailored to study these possible effects.

In this study we have not found a significant effect of the buyer's own negotiation approach evaluation on the seller's negotiation approach evaluation (and vice-versa) for the male and female subsets.

Overall, because this is an initial exploratory work involving both sides of the negotiation, it is likely that the negotiation concordance factor may be modified in future. However, the current results indicate existence of a higher order factor which unites a set of concepts (traits) that both sides of negotiation may exhibit. In summary, we find that:

1. The buyer's evaluation of the seller's negotiation approach does not reflect the seller's own negotiation approach evaluation, and vice-versa.
2. The buyer's evaluation of the seller's negotiation approach and the seller's evaluation of the buyer's negotiation approach reflect an overall negotiation concordance.

These results may provide new insights but they need to be verified in future negotiation research. They indicate that a double-sided concordance factor can be modeled and that its impact on various measurements should be taken into account.

**Acknowledgements.** This work has been supported by grants from the Natural Sciences and Engineering Research Council and the Social Science and Humanity Research Council Canada.

## References

- Baron, R. A. (1984). "Reducing Organizational Conflict: An Incompatible Response Approach." *Journal of Applied Psychology* **69**: 272-279.
- Baron, R. A. (1993). Affect and Organizational Behaviour. When and Why Feeling Good (or bad) Matters. *Social Psychology in Organizations. Advances in Theory and Research*. J. K. Murnighan, Ed. Englewood Cliff, NJ, Prentice Hall: 63-88.
- Barry, B. and R. L. Oliver (1996). "Affect in Dyadic Negotiation: A Model and Propositions." *Organizational Behavior and Human Decision Processes* **67**(2): 127 - 143.
- Bazerman, M. H., J. R. Curhan, et al. (2000). "Negotiation." *Annual Review of Psychology* **51**: 279-314.
- Browne, M. W. and R. Cudeck (1993). Alternative Ways of Assessing Model Fit. *Testing structural equation models*. K. A. Bollen and J. S. Long, Eds. Newbury Park : Sage, Sage Publications: 320.
- Druckman, D. (1977). Social-Psychological Approaches to Study of Negotiations. *Negotiations: Social-Psychological Perspectives*. D. Druckman, Ed. Beverly Hills, CA, Sage: 15-44.
- Druckman, D. and B. J. Broome (1991). "Value Differences and Conflict Resolution: Familiarity or Liking." *Journal of Conflict Resolution* **35**: 571-593.
- Etezadi, J., G. E. Kersten, et al. (2006). User Assessment of E-negotiation Support Systems: A Confirmatory Study, INR02/06, Concordia University, InterNeg, <http://interneg.org/interneg/research/papers/index.html>.
- Greenhalgh, L. and D. I. Chapman (1995). Joint Decision Making: The Inseparability of Relationship and Negotiation. *Negotiation as a Social Process*. R. M. Kramer and D. M. Messick, Eds. Thousands Oaks, CA, Sage: 166-185.
- Herrman, M. S., Ed. (2006). *Mediation. Bridging Theory, Research, and Practice*. Oxford, Blackwell.
- Holsapple, C. W., H. Lai, et al. (1998). "A Formal Basis for Negotiation Support System Research." *Group Decision and Negotiation* **7**(3): 199-202.
- Jöreskog, K. G. and D. Sörbom (2001). *LISREL 8: User's reference guide*. Chicago: Scientific Software International
- Kersten, G. E. and S. J. Noronha (1999). "WWW-based Negotiation Support: Design, Implementation, and Use." *Decision Support Systems* **25**(2): 135.
- Koeszegi, S., R. Vetschera, et al. (2004). "National Cultural Differences in the Use and Perception of Internet-based NSS: Does High or Low Context Matter?" *International Negotiation* **9**(1): 79.
- Lai, H., H.-S. Doong, et al. (2006). "Understanding Behavior and Perception of Negotiators from Their Strategies." *Group Decision and Negotiation*: (to appear).
- Lax, D. A. and J. Sebenius (1986). *The Manager as Negotiator*. New York, The Free Press.
- Lewicki, R. J., D. M. Saunders, et al. (2003). *Negotiation*. Boston, McGraw-Hill.
- Li, H., J. Etezadi, et al. (2006). Understanding Users Attitudes Towards Electronic Negotiation Systems and Their Acceptance, InterNeg Seminar, John Molson School of Business, Concordia University.
- Loewenstein, G. F., L. Thompson, et al. (1989). "Social Utility and Decision Making in Interpersonal Contexts." *Journal of Personality and Social Psychology* **57**: 426-441.
- Pruitt, D. G. (1981). *Negotiation Behavior*. New York, Academic Press.
- Steiger, J. H. (1990). "Structural Model Evaluation and Modification: An Interval Estimation Approach." *Multivariate Behavioral Research* **25**(2): 173-180.
- Ströbel, M. (2002). *A Design and Implementation Framework for Multi-Attribute Negotiation Intermediation in Electronic Markets*. New York, Kluwer.
- Vetschera, R., G. E. Kersten, et al. (2006). "The Determinants of NSS Success: An Integrated Model and Its Evaluation." *Journal of Organizational Computing and Electronic Commerce* **16**(2): 123-148.



## Appendix A – Measurement Instrument

Rate your own bargaining strategies:

- Informative      Uninformative  
 Persuasive      Push-over  
 Honest      Deceptive  
 Exploitative      Accommodating  
 Cooperative      Self-interested

Did the outcome of the negotiation match what you thought it would be before you began exchanging offers?

- Yes, completely        No, not at all

How much control did you have over the negotiation process?

- Very much in control        Not at all in control

Would you call your negotiations:

- Very friendly        Very hostile

How satisfied are you with your performance as a negotiator in this exercise?

- Extremely satisfied        Extremely unsatisfied

What can you say about your partner in the negotiations?

- Informative      Uninformative  
 Persuasive      Push-over  
 Honest      Deceptive  
 Exploitative      Accommodating  
 Cooperative      Self-interested  
 Unreliable      Reliable  
 Liable      Unlikable  
 Irrational      Rational  
 Untrustworthy      Trustworthy  
 Kind      Unkind  
 Fair      Unfair  
 Flexible      Rigid

Would you like to work with your negotiation partner on some other project?

- Yes  No

How interested would you be in seeing the partner with whom you negotiated?  
Extremely interested      Not at all interested

Were you able to learn enough about your partner to be able to predict her/his next offer?  
Learned a lot      Learned nothing

Did you feel that you understood the priorities of your partner in the negotiation?  
Always      Never