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The dyadic analysis of the impact of conflict-handling style on negotiation outcomes in software supported negotiations

Mróz Jakub and Tomasz Wachowicz

University of Economics in Katowice, Poland

SOR 2021, virtually, 22.09.2021

Outline

- Motivation
- Conflict resolution style
- Thomas-Kilmann Test
- Inspire
- Data preparation
- Actor-Partner Interdependence Model (APIM)
- Clustering

Motivation

- Observing various negotiation processes (e.g. negotiations on the so-called "Brexit"), it is not difficult to notice that many agreements favour some signatories of the agreement, usually at the expense of other entities.
- In practice, the negotiation process and result, as a rule, depend, among others, on the parties' negotiation power and their negotiation skills as well as their behavioral characteristics. *(Thomson, 2005)*



One of the key aspects of any negotiation process is the appropriate selection of negotiators (agents).

Motivation

- Due to economic and epidemiological conditions, more and more often negotiation processes are carried out with the support of information technologies.
- **Goal:**
 - From the research point of view, a significant challenge is therefore to verify whether remote negotiations generate similar cause-and-effect relationships, as it occurs during negotiations conducted in a traditional manner, i.e. behavioural characteristics affect outcome.



Conflict resolution style

- Conflict resolution style is understood as a set of methods, rules of conduct or behavior, the purpose of which is to resolve a conflict and obtain specific benefits (e.g. economic or social benefits). *(Strelau, 2000)*
- The elements that make up the style of conflict resolution, include, among others: willingness to make concessions, empathy and ability to make quick decisions.
- There are several different methodologies for verifying the style of conflict resolution, among which the Thomas-Kilmann Test and the Rahim Test deserve special attention. *(Kilmann and Thomas, 1977; Rahim 2002)*

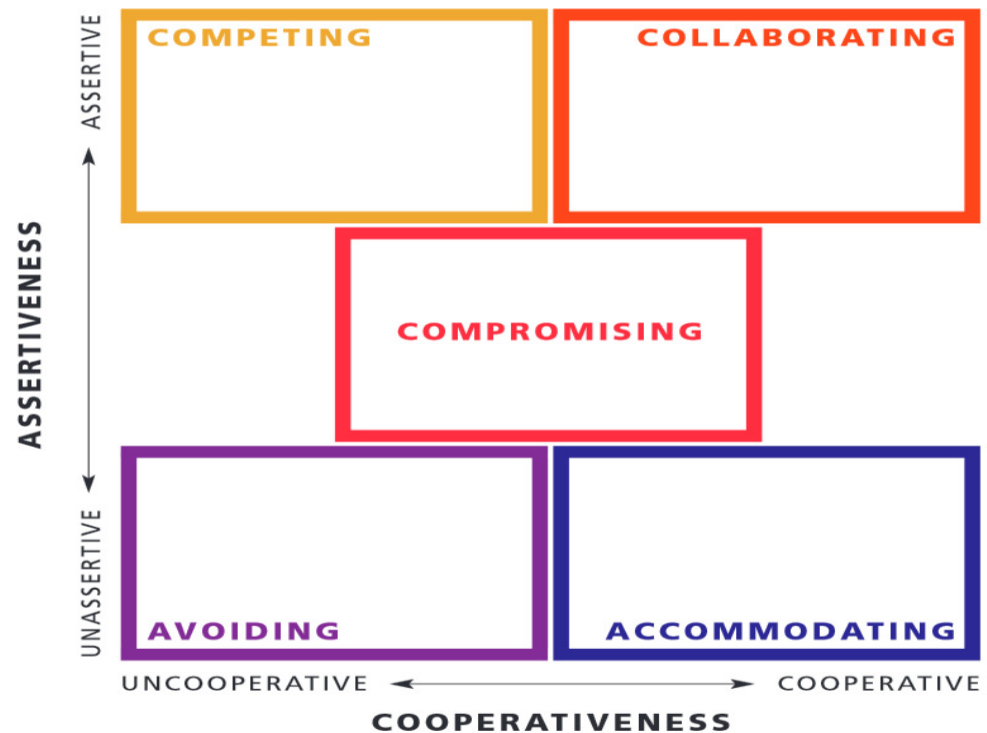
Thomas–Kilmann Test

- The Thomas-Kilmann test (*Kilmann and Thomas, 1977*) is one of the most frequently used tests examining the style of conflict resolution.
- TKI test consists of a set of **30** questions related to making decisions in a conflict situation.
- Each question contains **exactly two possible answers**, from which the respondent must choose the one whose content better reflects his behaviour in a given situation.

2.	A	I try to find a compromise situation.	Compromising
	B	I attempt to deal with all of his and my concerns.	Collaborating

Thomas Kilmann Test

- TKI identifies negotiation profile in two-dimensional space of **assertiveness** and **cooperativeness** using five conflict modes.
- The intensity of each mode is determined based on the answers the responder give in questionnaire.
- The result obtained in the test can be presented using a five-element vector of modes.



Negotiation outcome

- Negotiations can be single-criteria or multi-criteria.
- In the case of the latter, the outcome is measured using the MCDA tools:
 - Inspire (*Kersten and Noronha, 1999*) – **hybrid conjoint**
 - eNego (*Wachowicz and Roszkowska, 2021*) – **UTA**
 - WebHYPRE (*Mustajoki and Hamalainen, 2000*) – **AHPT**

Experimental setup

Inspire bilateral negotiation experiments

- A series of bilateral negotiation experiments were conducted in Inspire system from 2014 to 2016. (*Kersten and Kersten, 1998*)
- Students participating in individual negotiation experiments played the role of agents representing the interests of their principals - **Mrs. Sonata** (career-beginning singer) or **World Music** (music label).
 - There were five issues to negotiate, predefined resolution levels – **240** offers.
- Before starting the experiment, participants had to complete pre-negotiation questionnaires (including the TKI test).
- In the pre-negotiation phase, participants had to additionally build a rating system using hybrid conjoint (**SMART**).
- Participants was **696** students mainly from Poland, Austria, China and France.

Data preparation

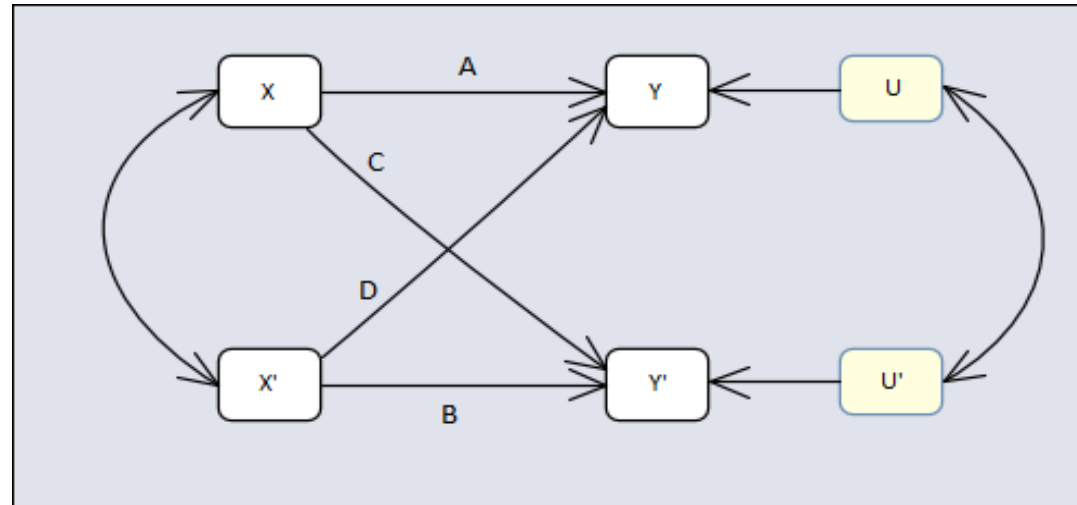
- As a result of the data preprocessing (removing outliers, eliminating empty records, etc.), it was possible to describe **320** negotiation experiments.
- **88.4%** (283) of the analyzed experiments ended with an agreement and only **11.6%** of bilateral negotiations ended without agreement.
- It is also worth mentioning that all the analyzes described in the following presentation concern only those negotiators for whom the negotiation experiment ended with an agreement.

Actor-Partner Interdependence Model

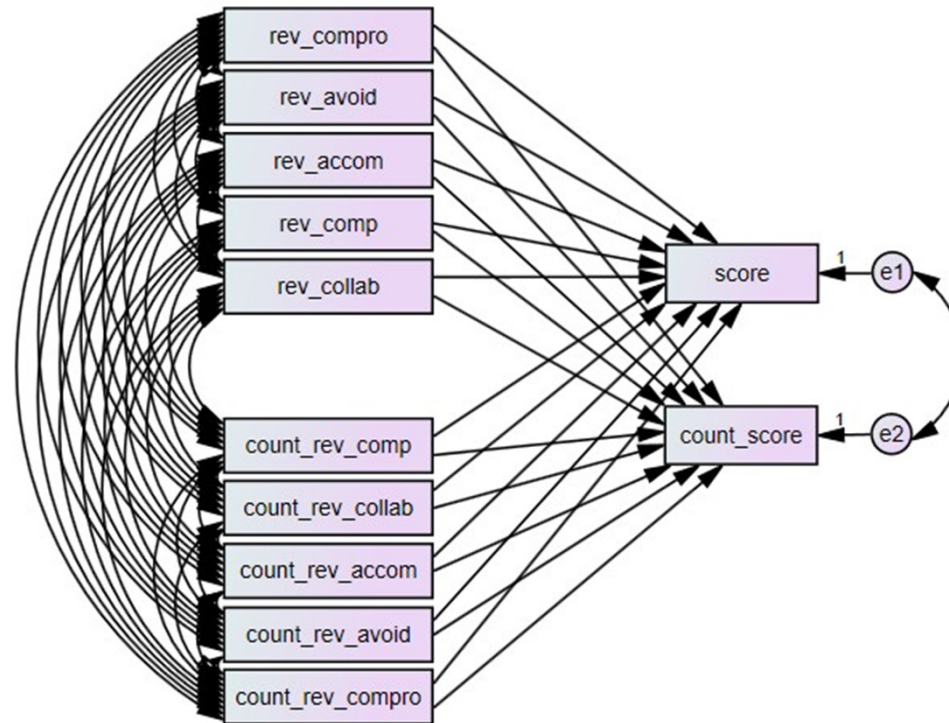
- The Actor-Partner Interdependence Model (APIM) focuses on two main components - **actor effect** and **partner effect** (*Cook and Kenny, 2005*):
 - The **actor effect** measure how much a person's current behaviour is predicted by his or her own behaviour.
 - The **partner effect** measure how much one person is influenced by a partner.
- APIM model also takes into account the correlations that occur between the explanatory and explained variables.
- The APIM models contain also a random term component.

Actor-Partner Interdependence Model

- Y, Y' - values of the examined features (e.g. rating of person A and B).
- X, X' - explanatory variables (actor effect and partner effect).
- U, U' - residual components of the model.
- A, B - actor effect.
- C, D - partner effect.
- **Doubled-ended arrows** – correlation between two components (e.g. correlation between residuals).



Results of APIM - visualization



Results of APIM

- The table below contains the six statistically most important parameters of the APIM model.

Factor	Impact Direction	β - value	p-value
World Music competitive	World Music	1.04	0.029
World Music accomodation	World Music	-0.60	0.17
World Music accomodation	Mrs. Sonata	-2.23	0.20
World Music collaboration	Mrs. Sonata	-1.87	0.29
Pani Sonata collaboration	Mrs. Sonata	-0,44	0.33
Mrs. Sonata collaboration	World Music	2.15	0.38

- The only statistically significant effect ($p\text{-value} < 0.05$) was the one between **competitiveness** and outcome of the **World Music** negotiator.
- Analogous relationship for **Mrs.Sonata** was not confirmed ($\beta=1.2, p=0.57$).
 - No global actor effect for the relationship **competitiveness** and **outcome** was identified.

Clustering

- More general cluster analysis was used to find out whether the combination of some specific bargaining profiles of the two negotiators could explain the differences in their results.
- Clusters were defined using k-means method:
 - The first of the analyzed clusters was assigned primarily to people characterized by a high value of **collabration** and **accomodation (HC - HAc)**.
 - The second of the analyzed clusters was assigned mainly to persons characterized by a low value of the **collabration** and **competetive** characteristics (**Lcol - LComp**).
 - The third analyzed clusters were primarily assigned to people characterized by a high value of the **competitive** trait and a low value of the **avoiding** trait (**HComp – LAv**).

Clustering results

- The table below contains the clustering results with information about statistical significance:

Cluster	Competitive	Collaboration	Compromising	Avoiding	Accomodation
HC-HAc	6.08 *	6.53 *	7.17 *	6.56 *	3.58 *
LCol-LComp	5.60 *	5.19 *	5.97 *	6.17 *	6.76 *
HComp – LAv	6.67 *	6.46 *	7.42 *	4.37 *	5.01 *
Differences in clusters	p < 0.05	I – II p < 0.001 I – III p = 0.504 II – III p < 0.05	p < 0.05	p < 0.05	p < 0.05

Final results of analysis

- The table below contains the negotiation outcomes for dyads of various mixes of clusters:

	Mrs. Sonata HC-HAc	Mrs. Sonata Lcol - LComp	Mrs. Sonata HComp – Lav
World Music HC-HAc	(79.28;74.41) N = 46	(79.42; 74.19) N = 36	(81.97; 72.61) N = 37
World Music LCol - LComp	(77.07; 72.1) N = 28	(78.83; 68.11) N = 18	(76.18; 78.29) N = 16
World Music HComp – LAV	(77.0; 76.09) N = 42	(75.21; 75.5) N = 33	(75.67; 79.7) N = 27

- Results achieved by World Music representatives turned out to be, on average, higher than the results of the representatives of Ms. Sonata.
- Results of the representatives of World Music from the first cluster dominated the results achieved by people from the third cluster.

Conclusions

- Contextual aspect of the negotiations played a significant role.
- Using data clustering methods, it was possible to detect the existence of a relationship between a specific style of conflict resolution and the result achieved during negotiations.
- It is worth to repeating the research carried out using a larger data set in order to use the APIM model in the cluster analysis.



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