

Media Effects on the Formation of Negotiator Satisfaction: The Example of Face-to-Face and Text Based Electronically Mediated Negotiations

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Abstract Recently, scholars have highlighted the importance of subjective negotiation outcomes such as negotiator satisfaction for future negotiations and the relationship between negotiators. This study considers the major antecedents of satisfaction formation in negotiation and analyses how the communication medium, i.e. the face-to-face (FTF) and the text based electronically mediated (TBEM) mode, influence satisfaction formation. Drawing on grounding in communication (Clark and Brennan in *Perspectives on socially shared cognition*. American Psychological Association, Washington DC, pp 127–149, 1991), hypotheses are developed and tested in an experimental gaming simulation in which graduate students negotiated in $n = 52$ dyads. The empirical analysis supports the notion that the communication medium has a mediated and a moderating effect on negotiator satisfaction. Aspirations, individual profit and positive relational messages mediate the medium's effect on satisfaction. Furthermore, the impact of contentious behaviour and positive relational messages on negotiator satisfaction is stronger in TBEM than in FTF negotiations. This study also contributes to the wider negotiation literature by employing a context-rich gaming simulation for experimental purposes.

Keywords Negotiation · Communication medium · Face-to-face · Electronically mediated · Negotiator satisfaction · Gaming simulation

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1 Introduction

Recent publications in the negotiation literature have highlighted the importance of the socio-emotional outcomes of negotiation (Curhan et al. 2009, 2010; Zerres and Hüffmeier 2011). Not only are such feelings of satisfaction, trust and pride considered intrinsically rewarding and a good in themselves (Curhan et al. 2006), they also influence learning and future behaviours, e.g. the implementation of an agreement (Gillespie et al. 2000; Thompson 1995) or the desire to negotiate in the future (Oliver et al. 1994), and even predict the future value of a relationship (Curhan et al. 2009) and the objective outcomes of subsequent negotiations (Curhan et al. 2010).

With this recent interest, our knowledge on the determinants of socio-emotional negotiation outcomes such as negotiator satisfaction and its mechanisms and processes has increased. However, most of those studies were conducted in a face-to-face (FTF) mode while today's business world witnesses many different communication media for negotiation (Cano et al. 2005; Ambrose et al. 2008) which either represent a conscientious choice or a necessity. Various theories on communication media (e.g., Carlson and Zmud 1999; Daft and Lengel 1984, 1986; Dennis et al. 2008; Kock 2005) and many empirical studies have shown that task performance may depend on the communication medium (e.g. Purdy et al. 2000). A first question is thus whether relationships established in FTF experimental designs, i.e. the variables and processes causing negotiator satisfaction, also hold in other media environments. Secondly, it is an important and interesting question whether—and if so in which way—antecedents of negotiator satisfaction are impacted by the communication medium, as different medium characteristics may suggest, and how these potential influences in turn impact negotiator satisfaction.

With regard to papers on the effects of communication media in negotiation and the related area of group decision making, no clear picture emerges: Those studies do not treat satisfaction at all or only as one among many other dependent variables to judge the suitability of different media for negotiation. For example, the meta-analysis by Baltes et al. (2002) on communication media influences in group decision making only includes three negotiation studies for none of which satisfaction was measured. Satisfaction is also not mentioned as an outcome variable in the review study on the same topic by Bordia (1997). In the studies that report satisfaction, media influences on satisfaction are far from unanimous with some authors reporting higher levels of satisfaction in the FTF mode compared to text based electronically mediated (TBEM) negotiations (e.g. Naquin and Paulson 2003; Purdy et al. 2000), others reporting no differences (e.g. Ocker and Yaverbaum 1999; Suh 1999) or higher satisfaction in TBEM communication in group decision making tasks (e.g. Jonassen and Kwon 2001; Valacich and Schwenk 1995; Simon 2006). Moreover, in none of the studies reviewed for this paper does the process of satisfaction formation take centre stage: Relevant theories about satisfaction formation are sidelined, and potential direct antecedents of satisfaction which may mediate the medium's influence are largely ignored in studies focusing on communication mode influences in negotiation.

Another limitation about the formation of negotiator satisfaction pertains to the fact that nearly all experimental studies are set in a one-to-one mode. Today's business reality, in contrast, often sees teams of negotiators bargaining over a transaction

or a continuing relationship as witnessed, e.g., in the relationship marketing and industrial sales literature (for an overview see [Jones et al. 2005](#)). Teams are increasingly used when the negotiation subject is particularly complex, when financial stakes are high or when the opposition is considered difficult to deal with ([Bright and Parkin 1998](#)).

The present study thus aims at specifying the influence of the communication medium on negotiator satisfaction. Specifically, it compares traditional FTF with asynchronous, TBEM negotiations. It analyses how the communication medium affects satisfaction antecedents as well as the processes of satisfaction formation and thus adds to the negotiation literature on both satisfaction formation and communication media. FTF and TBEM negotiations were chosen because these communication media arguably represent the two most important modes for negotiation as witnessed in the growing body of literature on TBEM negotiations and the pervasiveness of email negotiations in practice (e.g. [Griessmair and Koeszegi 2009](#); [Hill et al. 2009](#); [Loewenstein et al. 2005](#); [Rockmann and Northcraft 2008](#); [Gattiker et al. 2007](#)). TBEM negotiations via the Internet today are an integral part of business reality ([Citera et al. 2005](#); [Naquin and Paulson 2003](#)).

The main contribution of this paper is hence to extend previous knowledge on satisfaction formation in FTF negotiation by developing and testing a theoretical model that features the core indirect, mediated influences of the communication medium on satisfaction formation in negotiation. In a more exploratory vein, it also replicates and extends recent empirical evidence reporting an interaction effect between the medium and some variables of the negotiation process on negotiation outcomes. To enhance experimental realism, it employs a context-rich, high-stakes negotiation between simulated sales and purchasing teams. This procedure was chosen to increase participants' involvement compared to traditional laboratory studies.

The remainder of the paper is structured as follows. In Sect. 2, a synopsis of the theoretical and empirical knowledge on satisfaction formation in FTF negotiation is offered. It is followed by a discussion of communication media in negotiations. Both streams of research are then integrated to formulate testable hypotheses on medium influences on negotiator satisfaction formation. Sect. 3 describes the gaming simulation used for data collection, participants, procedures and measures. Results and analytical procedures are presented in Sect. 4, while Sect. 5 includes a summary, the discussion of unexpected findings, as well as limitations and future research.

2 Theory and Hypotheses

2.1 Negotiator Satisfaction as a Consequence of Expectations, Economic Outcomes and Negotiation Interaction

The term 'negotiator satisfaction' and related expressions have not always been used in a consistent manner and thus demand a short terminological and conceptual discussion. While [Wang et al. \(2010\)](#) define it as a broad concept and measure it as the negotiators' assessment of a negotiation support system, most authors referring to negotiator satisfaction (e.g. [Corfman and Lehmann 1993](#); [Galinsky et al. 2002](#); [Gillespie et al. 2000](#);

Graham 1985; Kwon and Weingart 2004; Naquin 2003; Novemsky and Schweitzer 2004) conceive and measure it as the negotiator's affective evaluation of the negotiation outcome. Other authors have used different terms for the same concept, e.g. "feelings of success" (Thompson 1995) or "subjective value about the instrumental outcome" (Curhan et al. 2006). Some conceptualizations of negotiator satisfaction additionally refer to the bargaining process both in definition and measurement (Graham 1985; Maxwell et al. 1999; Vetschera et al. 2006). Naquin (2003) explicitly notes the temporal aspect of negotiator satisfaction as an immediate perceptual response to a negotiation, distinct from a more long-term satisfaction that flows from the implementation of an agreement.

For the purpose of this study, negotiator satisfaction is thus defined as the affective response of a negotiating party to the negotiation outcome and the bargaining process immediately after conclusion of the negotiation.

According to the expectancy-disconfirmation (ED) paradigm, first applied by Oliver et al. (1994) in a negotiation context, negotiator satisfaction results from a cognitive comparison of individual negotiator profit against a comparison standard. Higher economic outcomes boost satisfaction (Purdy et al. 2000), while a higher standard of comparison reduces satisfaction because it can be less easily fulfilled or exceeded. Oliver et al. (1994) use the negotiator's individual profit expectations or aspirations as an intrapersonal comparison standard.

Yet, aspirations serve a double function in this process: On the one hand, they act as a comparison standard and thus have a direct negative effect on negotiator satisfaction. On the other hand, they serve as a cognitive reference point towards which negotiators aim and thereby help increase individual profit (Huber and Neale 1986). In turn, they indirectly have a positive influence on negotiator satisfaction through higher individual profit.¹

Besides the intrapersonal comparison processes covered by the ED paradigm, interpersonal, i.e. social, comparison processes may also play a fundamental role for understanding socio-emotional responses to a negotiation. The opponent's satisfaction may act as such an interpersonal comparison standard (Thompson et al. 1995): Higher opponent satisfaction lowers the focal negotiator's judgements of success, assuming the negotiators hold a fixed-pie perception, which reflects social comparison theory (Festinger 1954). Because they cannot establish an objective evaluation of gain from the negotiation, negotiators use social cues, including their opponent's satisfaction, as standards of comparison. If the negotiating partner appears happy, negotiators can infer that they should have taken more from the negotiation and experience dissatisfaction. Negotiators may also evaluate their outcomes against those of their peers. In both cases, feelings of (dis)satisfaction result from counterfactual thinking by negotiators (Galinsky et al. 2002). To attain their subjective evaluation, they use a hypothetical outcome as a social comparison standard. If their social comparison reveals a lower comparison standard (i.e., other satisfaction or other economic outcome), downward counterfactual thinking produces a positive emotional response and increases satis-

¹ In model terms, individual profit acts as a suppressor in a model of partial mediation: Aspirations have a direct negative influence on satisfaction and an indirect positive influence through individual profit (Shrout and Bolger 2002).

faction (Medvec and Savitsky 1997). Upward counterfactual thinking, in the case of high comparison standards, produces the opposite effect.

Similar evaluation processes apply to the negotiation process. Galinsky et al. (2002) demonstrate that negotiator satisfaction with the same economic outcome varies according to the offer pattern. Those who have their first offer accepted by a partner feel less satisfied than those whose offers are not accepted immediately. Similar findings are reported by Kwon and Weingart (2004) in their study on concession timing. Naquin (2003) finds that more issues available in a negotiation produce more upward counterfactual thinking and reduce negotiator satisfaction.

Beyond these rather rare incidents (immediate acceptance of first offer, immediate concession), content analytical studies (e.g. Weingart et al. 1990; Olekalns et al. 1996; Weingart et al. 1993) have shown that the same negotiator behaviours reappear frequently. They are often conceptualized as elements of the communication process. Some negotiator behaviours, such as single versus multiple issue offers (Weingart et al. 1990), positional or priority information exchange (Olekalns et al. 1996; Weingart et al. 1993), willingness to compromise (Olekalns and Smith 2000), or process management (Olekalns and Smith 2003), are instrumental for reaching agreement, whereas other behaviours are prone to primarily elucidate affective, emotional reactions and influence socio-emotional evaluations of negotiations. Contentious behaviour, such as threats, warnings, and commitments (Fry et al. 1983), negative reactions and put-downs (Gillespie et al. 2000) decrease negotiator satisfaction, while positive relational messages should have a positive influence (Koeszegi et al. 2006). The associations between negotiation process variables and negotiator satisfaction reflect the comparative process captured in the ED paradigm. Negotiators expect the negotiation to be a problem-solving and distributional task (Thompson 2005). However, overly contentious behaviour or greater than anticipated negative reactions deviate from expectations of a balanced negotiation process and thus decrease negotiator satisfaction. More positive relational messages instead signal concern or even liking for the other party (Drachman et al. 1978) and prompt a more positive affective evaluation of the negotiation encounter. In time unrestricted negotiations, Purdy et al. (2000) also find evidence that too long a negotiation decreases negotiator satisfaction.

Figure 1 subsumes the antecedents to negotiator satisfaction. They either pertain to certain consequences of the negotiation (upper part of Fig. 1) or are related to the negotiation process (lower part of Fig. 1). The subsequent discussion of media effects on satisfaction formation will concentrate on the core antecedents.

2.2 Theoretical Contributions on Media Influences in Negotiation

Research on TBEM negotiations and their peculiarities in comparison to FTF negotiations has been soaring during the last decade, covering a wide range of topics (e.g. Gattiker et al. 2007; Griessmair and Koeszegi 2009; Loewenstein et al. 2005). Many of those studies drew on media-richness theory (Daft and Lengel 1984, 1986) and the task-media fit hypothesis (McGrath and Hollingshead 1993) as a theoretical backdrop, but empirical evidence for the predictions of these theories has been far from unanimous.

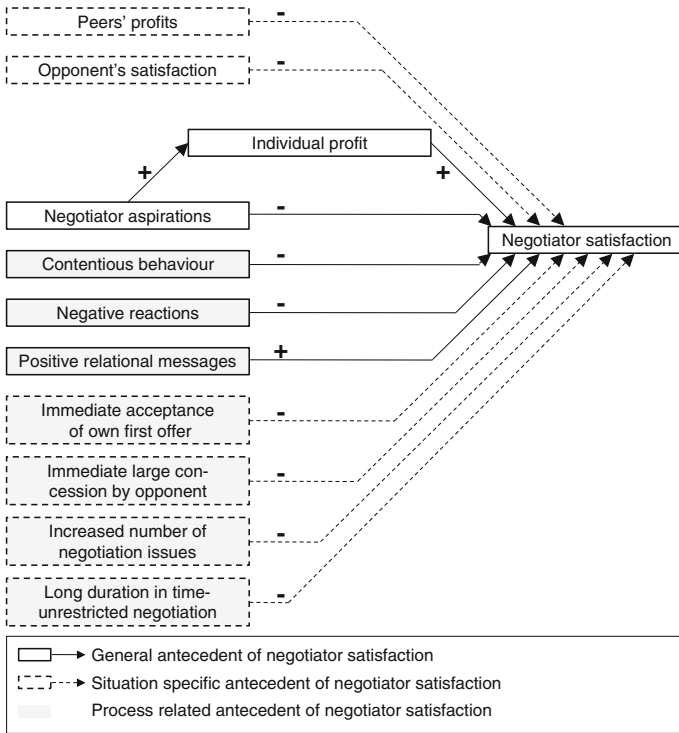


Fig. 1 General and situation specific antecedents of negotiator satisfaction

Hence, this paper shortly reviews a set of alternative theories and chooses the most appropriate one to develop hypotheses about medium influences on negotiator satisfaction: Media synchronicity theory (Dennis et al. 2008), media naturalness theory (Kock 2005) and grounding in communication (Clark and Brennan's 1991). Both media naturalness theory and media synchronicity theory are built around one central construct which is described by the characteristics of the medium. With regard to the latter neither of these theories explicitly refers to grounding in communication although they display a high degree of resemblance to this earlier theory. Moreover, Dennis et al. (2008) postulated primordial purpose of communication—conveyance of information and convergence on shared understanding—is very similar to what Clark and Brennan's (1991) call *grounding*, i.e. a state in which interlocutors mutually believe that the partner has understood what the contributor has meant. In contrast to the newer theories with their central construct (media synchronicity, media naturalness) as the main explanatory variable, Clark and Brennan's (1991) directly use the media characteristics (together with the communication task purpose, which both Kock (2005) and Dennis et al. (2008) also consider) to make predictions of how well a medium helps or hinders effective communication. Table 1 compares the media characteristics included in each theory.

As can be seen, Clark and Brennan's (1991) account of media characteristics is the most precise enumeration and is thus deemed an appropriate theoretical basis for

Table 1 Media characteristics in different media theories

Grounding in communication (Clark and Brennan's 1991): constraints on grounding (p. 143)	Media naturalness theory (Kock 2005): key communication elements (p. 121)	Media synchronicity theory (Dennis et al. 2008): media capabilities (p. 583)
Co-presence: A and B share the same physical environment	Co-location: enables individuals to share the same environment, see and hear each other	Symbol sets: number of ways in which a medium allows information to be encoded for communication, i.e. the multiplicity of cues and language variety
Visibility: A and B are visible to each other	Ability to convey and observe facial expressions Ability to convey and observe body language	
Audibility: A and B communicate by speaking	Ability to convey and listen to speech	
Co-temporality: B receives at roughly the same time as A produces	Synchronicity: extent to which individuals in communication can quickly exchange communicative stimuli	Transmission velocity: the speed at which a medium can deliver a message to intended recipients
Simultaneity: A and B can send and receive at once and simultaneously		
Sequentiality: A's and B's turns cannot get out of sequence		
Reviewability: B can review A's messages		Reprocessability: extent to which the medium enables a message to be reexamined or processed again during decoding
Revisability: A can revise messages for B		Rehearsability: extent to which the media enables the sender to rehearse or fine tune a message during encoding, before sending Parallelism: number of simultaneous transmissions that can effectively take place

explaining communication medium influences on negotiation in general (Pesendorfer and Koeszegi's 2006) and negotiator satisfaction in particular. With regard to FTF and TBEM negotiations (1) co-presence, (2) visibility, (3) audibility, (4) co-temporality, (5) simultaneity, and (6) sequentiality are properties of the FTF mode, while (7) revisability and (8) reviewability are inherent to the asynchronous TBEM mode.

Co-presence means that FTF negotiators share the same physical environment (Clark and Brennan's 1991) which can shape the atmosphere of the negotiation. It also means that negotiators need to come to the same spot to negotiate.

FTF negotiation demands mutual *visibility* of the negotiators. When negotiators see what the other party is doing or looking at, non-verbal, visual cues are transmitted.

Visibility in the form of visual access has been the subject of negotiation studies by Carnevale and Isen (1986), Carnevale et al. (1981), Fry (1985), Lewis and Fry (1977) as well as Swaab and Swaab (2009). These authors argue and empirically support that visual access fuels attempts to dominate the opponent. Higher levels of competitive behaviour ensue, especially under conditions of high accountability (Carnevale et al. 1981), low positive affect (Carnevale and Isen 1986), varying negotiator Machiavellianism (Fry 1985), and among men (Swaab and Swaab 2009).

Audibility signifies that FTF negotiators can hear each other and communicate by speaking. With audibility given, language is enriched by para-verbal cues, such as timing and intonation of the spoken word (Clark and Brennan's 1991).

FTF communication is also *co-temporal*: The receiver of a message hears the message roughly at the same time as the sender produces it (Clark and Brennan's 1991).

Simultaneity means that the receiver of a message can react at the same time as the sender, e.g. when he smiles at her or when he interrupts her. In that case, FTF negotiators are sending and receiving at the same time (Clark and Brennan's 1991). Simultaneity has been studied by Pesendorfer and Koeszegi's (2006) in their comparison of synchronous and asynchronous TBEM negotiations. The authors argue that simultaneity induces a need for immediate reactions in negotiators and thus facilitates spontaneous and unreflective emotional behaviour, such as negative reactions. Simultaneity also leaves less time to consider alternatives and to analyse the actual situation so that negotiators are inclined to use more competitive and offensive behaviour. Without simultaneity, emerging emotions can be better reflected; negotiators can cool down and consider the consequences of emotional behaviours.

Summarizing the first five properties of the FTF mode it becomes clear that they account for higher media efficiency, i.e. the amount of information transmitted per unit of time between the communicating parties (Pesendorfer and Koeszegi's 2006). Especially when time for negotiation is at a premium, media efficiency may influence negotiation in that negotiators feel an extra urge to stick to the facts of potential negotiation solutions. This can be reflected in more thorough planning and preparation (Kock 2005), less "cheap talk" and less haggling over minor issues when the medium is less efficient.

Sequentiality of the FTF mode means that a communication sequence by one negotiator is directly followed by a sequence of the other party (Clark and Brennan's 1991). In the asynchronous TBEM mode, communication might be interrupted by any number of messages and information to and from instances outside the focal negotiation.

Revisability as a property of the TBEM mode helps negotiators to ponder on their words more carefully: Before sending the message to the negotiation partner it can be revised in private (Clark and Brennan's 1991). Negotiators have more time to think and rework their exact wording in a negotiation (Kelly and Keaten 2007) and thus fall less prey to say something in the heat of the moment which they might later regret.

Reviewability as the second feature of TBEM communication may also have repercussions in negotiation. Reviewable communication content can be re-read again and again and thus develop a greater influence and meaning in a negotiation while communication acts in speech just fade away (Clark and Brennan's 1991).

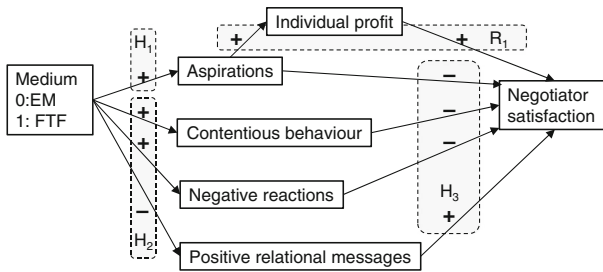


Fig. 2 Mediated influence of communication medium on negotiator satisfaction

2.3 How the Medium Impacts the Formation of Negotiator Satisfaction: Hypotheses

With the identification of the (general) antecedents of negotiator satisfaction and the discussion of media properties derived from grounding in communication (Clark and Brennan's 1991) hypotheses about media influences on the formation of negotiator satisfaction can be derived. Figure 2 illustrates the theoretical model.

Potential direct media effects on satisfaction antecedents are discussed first. To the best of the author's knowledge, no prior comparative studies of TBEM and FTF negotiations consider negotiator aspirations. Drolet and Morris (2000) stress the need to determine how aspirations may differ depending on the medium, and two lines of thought shed some light on potential differences between FTF and TBEM communications.

First, the medium available to negotiating parties may influence negotiation preparation and planning which influences aspirations. Imagine a negotiator A who has an important negotiation ahead. In the TBEM case, the negotiation partner B is on a different continent, whereas in the FTF case, B is located within driving distance. In both cases, the time for negotiation is limited, and the negotiation outcome has great importance for A. The TBEM situation appears trickier to A, because less information can be transmitted in the short time interval due to lower media efficiency of the TBEM mode. That is, the absence of co-presence, visibility, audibility and co-temporality in the TBEM mode increase the possibilities for mutual misunderstanding. In time-limited TBEM negotiations, there is little time to clarify misunderstandings or engage in fruitful improvisation. Therefore, more careful negotiation preparation and planning by A is likely in this somewhat restricted setting. Empirical evidence for better planning in email compared to FTF environments has been reported by Kock (2005) in group problem-solving tasks. Planning for negotiation involves clarifying own interests and alternatives and anticipating the opponent's position and general context (Raiffa 1982). Moreover, A might ponder different offers and anticipate different negotiation patterns. Negotiators often overestimate potential outcomes for themselves, but more careful planning should induce more realistic, and thus lower, aspirations.

Second, a short discussion of negotiator confidence extends this argument about negotiation planning. In this case, confidence refers to accurate judgements of abilities to perform a task. Many studies investigate people's tendency to overestimate their abilities to judge an unknown figure or perform a certain task better than the

average (for an overview, see [Larrick et al. 2007](#)), which represent an overconfidence bias ([Fischhoff et al. 1977](#)) and the better-than-average effect ([Larrick et al. 2007](#)), respectively. These misconceptions may be related. According to [Bazerman \(2002\)](#), people exhibit less overconfidence when they respond to a more familiar question but display greater overconfidence when their knowledge of a task decreases. Applying this reasoning to negotiators in the FTF and TBEM modes, less overconfidence should emerge in TBEM negotiations, because these negotiators likely are better prepared for and more familiar with the negotiation encounter, which should give them a more realistic appraisal of their own abilities. Even if they generally believe they are better-than-average negotiators, the TBEM environment limits negotiation room. Therefore,

Hypothesis 1 The TBEM mode leads negotiators to develop lower aspirations compared to the FTF mode.

Regarding individual gain as the second antecedent of negotiator satisfaction, media properties do not lend themselves easily to make a prediction. Comparative studies of FTF and TBEM negotiations have shown higher economic outcomes in either communication medium without clarifying possibly distinguishing boundary conditions ([Citera et al. 2005](#); [Croson 1999](#); [Naquin and Paulson 2003](#); [Purdy et al. 2000](#); [Sheffield 1995](#)). Thus, no hypothesis on eventual medium effects on individual profit is devised. For a complete theoretical model, relationships between aspirations, individual profit and negotiator satisfaction ([Oliver et al. 1994](#); [Patton and Balakrishnan 2010](#)) are formulated as

Replication 1 Aspirations positively influence individual profit which in turn positively affects negotiator satisfaction.

Turning to satisfaction antecedents out of the negotiation process, indications about media effects can be deduced from the properties of FTF and TBEM negotiations. Visibility and simultaneity in the FTF mode seem to be of particular importance. Visual access facilitates staring and produces more attempts to dominate the negotiation partner. Negotiators more easily try to beat the opponent, and subsequently use more contentious, distributive behaviour ([Swaab and Swaab 2009](#)). Because of the simultaneity of the FTF mode such rather hostile behaviours are more easily reciprocated spontaneously and emotionally, e.g. in the shape of negative reactions or contentious behaviour. In FTF negotiations where teams of two or more face each other, this effect might even be exacerbated by the salience of the in-group and out-group ([Brodt and Thompson 2001](#)): If an argument by one member of team A is brushed off by a member of the opposing team B, the probability that another member of team A will defend his/her teammate and engage in more contention toward team B instead of trying to reflect what has been said and react in a calmer way toward the opponent is higher than in one-on-one negotiations ([Zerres and Hüffmeier 2011](#)).

On the contrary, negotiators in the TBEM mode have more time to reflect on their spontaneous, emotional urges. They can more easily calm down ([Pesendorfer and Koeszegi's 2006](#)) and are able to revise a message before sending it off. In the TBEM mode, the effect of teams may work in the opposing direction as in FTF

negotiation: Because the opposing team is not visible, the in-group/out-group distinction is not as salient and thus perceived competition is lower (Polzer 1996). A more factual approach within each team may override the urge to defend a teammate.

The present argumentation is in contrast to authors who according to Pesendorfer and Koeszegi's (2006) hold a pessimistic view on computer mediated communication technology, such as Friedman and Currall (2003). The latter suggest that email—the most prominent form of TBEM communication—aggravates conflict in dispute situations compared to FTF while they acknowledge that “*communication styles are less spontaneous and more task-oriented and depersonalized when using electronic communications*” (p. 1337). Empirically, higher task orientation in email negotiations compared to the FTF mode has been found by Morris et al. (2002). Since the present study focuses on a class of negotiations that is about deal-making and not dispute resolution (Lewicki et al. 2010), this pessimistic view seems less appropriate than the arguments brought forth above.

However, co-presence, visibility and audibility in FTF negotiations also have another repercussion on the negotiation situation: They allow negotiators to transmit more than verbal communication, such as atmospheric, visual and para-verbal cues. These cues can non-verbally transmit a negotiator's positive attitude towards the relationships between the negotiating parties, e.g. smiling, approving of the other party with para-verbal utterances (“mmhm”), or a friendly intonation. A constructive negotiation relationship, needed for problem-solving, can thus be created without any explicit verbal message toward the negotiation opponent. The TBEM mode is devoid of these possibilities. So despite the possibility to transmit emotional connotation by script only (Griessmair and Koeszegi 2009), TBEM negotiators have to rely on more explicit exchanges of mutual appreciation in the form of positive relational messages (Friedman and Currall 2003), to create and foster a constructive negotiation relationship. Morris et al. (2002) found this type of behaviour and conclude: “*Email negotiators resort to explicit statements to convey messages that might be conveyed by expressions or actions in a FTF encounter*” (p. 92).

The following hypothesis sums up the previous reasoning:

Hypothesis 2 The TBEM mode leads negotiators to engage in (a) less contentious behaviour, (b) less negative reactions and (c) more positive relational messages compared to the FTF mode.

Hypotheses 1 and 2 pertain to medium influences on negotiator satisfaction antecedents. In order for the medium to have an indirect effect on negotiator satisfaction these antecedents should mediate the relationship between medium and negotiator satisfaction. Hence,

Hypothesis 3 Aspirations, contentious behaviour, negative reactions and positive relational messages mediate the relationship between medium and negotiator satisfaction.

3 Methods

3.1 Gaming Simulation

The tests of the preceding hypotheses relied on data gathered in an experimental gaming simulation. In the simulation, set in an industrial sales context, the negotiation involves a window manufacturer (buyer firm) and a supplier (seller firm) of galvanization products needed to produce windows. The window manufacturer sells its unique products as a monopolist to the downstream market, represented by a price response function known to both parties. In the negotiation, both parties must agree on the annual quantity and price of the galvanization solution (issue 1), equipment, services, and delivery terms (issues 2–5). Table 2 contains the pay-off matrix of the task. Negotiation issues 3–5 provide differential value for the two parties and thus represent their different priorities, resources, and capabilities; issue 2 is purely distributive. Figure 3 illustrates the subcontract space of these cost issues.

Table 2 Pay-off matrix of the negotiation task

	Profit (EUR)	
	Supplier (seller)	Manufacturer (buyer)
<i>Issue 1: sales price and quantity of galvanization solution</i>		
Both issues are continuous and can be freely combined in negotiation. However, negotiated quantity between supplier and manufacturer determines manufacturer's window price setting on its downstream market and hence influences its profit from the total deal. Downstream window market prices are determined by inserting the negotiated quantity into a price response function. For illustration purposes a few different price–quantity combinations are given		
Negotiated price EUR 85—quantity 125.000	775,000	3,905,295
Negotiated price EUR 85—quantity 150.000	1,150,000	3,759,547
Negotiated price EUR 85—quantity 175.000	1,525,000	3,270,864
Negotiated price EUR 90—quantity 125.000	1,400,000	3,280,295
Negotiated price EUR 90—quantity 150.000	1,900,000	3,009,547
Negotiated price EUR 90—quantity 175.000	2,400,000	2,395,864
Negotiated price EUR 95—quantity 125.000	2,025,000	2,655,295
Negotiated price EUR 95—quantity 150.000	2,650,000	2,259,547
Negotiated price EUR 95—quantity 175.000	3,275,000	1,520,864
Negotiated price EUR 100—quantity 125.000	2,650,000	2,030,295
Negotiated price EUR 100—quantity 150.000	3,400,000	1,509,547
Negotiated price EUR 100—quantity 175.000	4,150,000	645,864
<i>Issue 2: cost sharing for anodizing plant (total cost: EUR 500,000)</i>		
Cost could be shared continually, discrete values given for illustration purposes		
Total cost with supplier, manufacturer pays nothing	−500,000	0
Cost is shared equally between supplier and manufacturer	−250,000	−250,000
Total cost with manufacturer, supplier pays nothing	0	−500,000

Table 2 continued

	Profit (EUR)	
	Supplier (seller)	Manufacturer (buyer)
<i>Issue 3: complimentary scope of delivery of anodizing plant</i>		
Plant only, no additional services	0	-400,000
Plant including ISO 9001 quality certification (service 1), no other services	-45,000	-225,000
Plant including environmental approval process with local authorities (service 2), no other services	-20,000	-310,000
Plant including lease chemicals for operations (service 3), no other services	-35,000	-265,000
Plant including services 1 and 2	-65,000	-135,000
Plant including services 1 and 3	-80,000	-90,000
Plant including services 2 and 3	-55,000	-175,000
Plant including all services	-100,000	0
<i>Issue 4: complimentary staff training by supplier</i>		
No complimentary staff training	0	-250,000
Complimentary staff training for shift foremen only	-40,000	-100,000
Complimentary staff training for all workers in plant	-100,000	0
<i>Issue 5: monthly delivery frequency of galvanization solution</i>		
Costs for no. of deliveries is linear between available options: 1 to 12 deliveries		
1 delivery per month	-29,167	-50,000
2 deliveries per month	-58,333	-45,455
...
11 deliveries per month	-320,833	-4,545
12 deliveries per month	-350,000	0

Both parties have viable best alternatives to a negotiated agreement (BATNA): The supplier has another possible deal looming, worth EUR 1 million, and the manufacturer can buy galvanization solution and new equipment from two other companies and earn a profit of EUR 924,600 if the focal negotiation does not lead to an agreement. Furthermore, both parties can achieve win-win solutions by logrolling across negotiation issues 3–5 and skimming the downstream window market to a lesser or greater extent, depending on the quantity sold to the downstream market. The optimal quantity for the supply chain is 154,213 units of galvanization solution for the same number of windows (Voeth and Herbst 2006). The price of the galvanization solution and issue 2 can be used to distribute the profit available to the parties. The illustration in Fig. 4 demonstrates the full contract space and possible moves in the negotiation. The complexity of the negotiation task was attenuated by a spreadsheet contract calculator which participants could use to compare different possibilities for agreement.

Using a gaming simulation compared to standard negotiation games fosters participants' motivation and involvement (Noy et al. 2006) and generally displays a higher degree of experimental realism. With regard to the simulation used for this study, a supplementary survey ("an assessment of two different negotiation simulations")

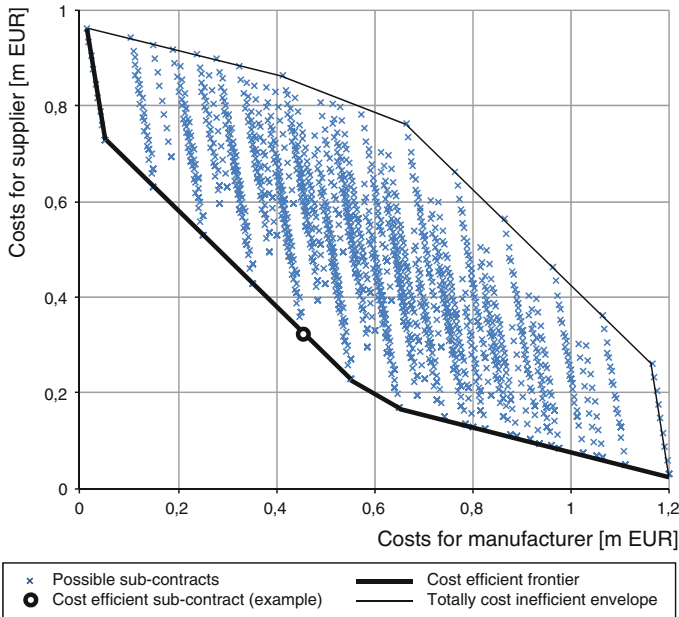


Fig. 3 Subcontract space of all cost issues in the negotiation task

among experienced negotiation practitioners from the sales realm (i.e., the background in which the simulation is set) clearly supports this notion. The 53 knowledgeable respondents (average professional experience: 14.1 years, average time of professional activities spent negotiating: 32%) compared the present simulation with a standard negotiation game (Van Boven and Thompson 2003) and assessed both with regard to the realism of different features, the simulations' ability to stimulate various behaviors that occur in practice, and their overall ability to generate meaningful practical implications. According to the results in Table 3 the current gaming simulation outperforms the standard game on all tested elements of realism; and even on an absolute level it is judged as close to reality and well able to stimulate behaviours that occur in negotiation practice. The experienced practitioners also indicated they would trust insights gained from using the present simulation. In a field for comments, the richness of the scenario (27 mentions), sufficient complexity (11) and the type and amount of issues (9) were mentioned as the most realistic aspects.

3.2 Procedure and Data Collection

Participants in the simulation were 223 graduate business students at four German universities. The average age of the participants was 24.97 years. All had been given an introductory lecture to negotiation strategy, but none had completed a full-scale course on negotiation since this is not normally taught in German universities. The simulation was part of two courses on inter-firm coordination and earned participants course credit. Grading subjects on their negotiation performance and involving them in a very realistic setting ensured high involvement and serious preparation.

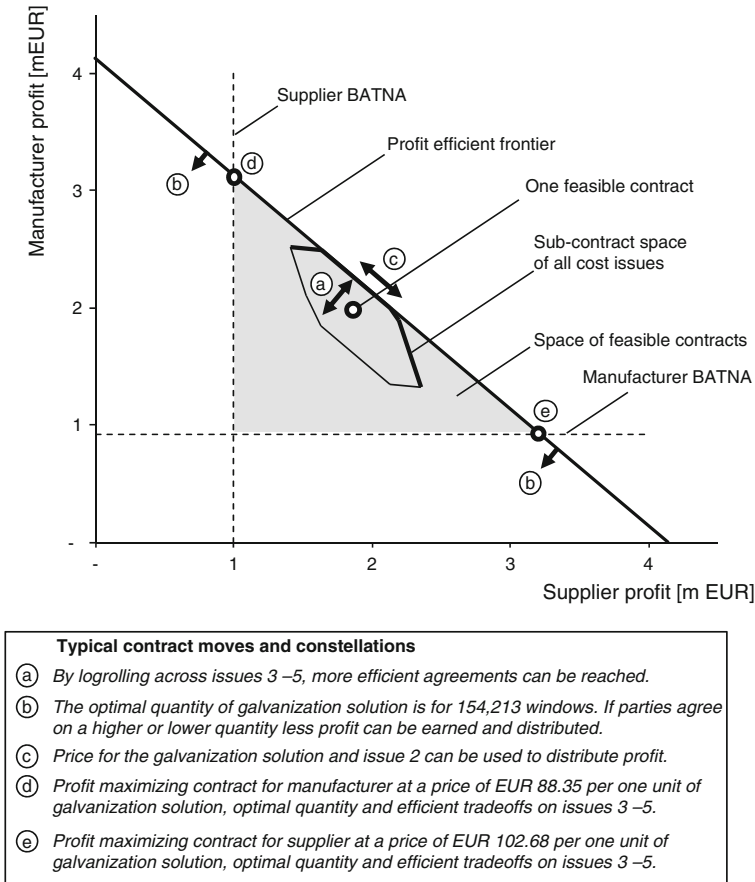


Fig. 4 Contract space of the negotiation task

As a requirement in an interactive course across the universities, participants formed 104 teams of two (90 teams) or three members (14 teams).² In the TBEM condition, 24 teams were male, 11 were female and 37 were mixed sex while in the FTF mode there were 19 male, 4 female and 9 mixed sex teams. Participants were allowed to form a team according to their suggestion. As each TBEM team negotiated with a team from another university, participants did not know each other before the negotiation. In the FTF mode, teams might have known the members from the opposing team by sight, but due to the anonymity and large size of the course in which the experiment was held this fact was not deemed problematic. All in all, 36 dyads negotiated in the TBEM condition and 16 negotiated face-to-face.

² Teams of three emerged since participant numbers in one university were higher than in the other universities combined. In order to have each team in the TBEM condition negotiate with a team from another university some teams of three had to be formed.

Table 3 External validation of the simulation

Items	Standard Game		Study simulation		T [^]
	M	SD	M	SD	
How do you rate this simulation in terms of ...					
<i>Scale: 1 (very unrealistic) to 7 (very realistic)</i>					
1. ... the amount of information available for negotiation? ^a	3.42	1.63	5.79	.84	-9.09
2. ... the complexity of the negotiation task? ^a	3.57	1.62	6.00	.90	-9.89
3. ... the need to make preparations for negotiation?	4.25	1.71	6.21	1.10	-7.86
4. ... the realism of the given negotiation issues and their respective options?	3.57	1.68	5.75	1.02	-9.38
5. ... its general realism?	3.55	1.72	5.77	.89	-8.88
How do you rate this simulation in terms of its ability to ...					
<i>Scale: 1 (not at all suitable) to 7 (very suitable)</i>					
6. ... stimulate behaviours you know from reality (your professional practice)? ^{b,c}	3.98	1.89	5.85	.82	-7.08
7. ... ensure engaged participation by the subjects? ^d	3.91	1.90	5.58	1.25	-5.08
8. ... make subjects take the task seriously? ^d	3.79	1.80	5.74	1.02	-6.57
9. ... make subjects fill the role that was described in the simulation materials? ^e	4.02	1.78	5.85	1.22	-5.77
10. ... create the pressure to seal a deal, which you know from reality?	3.91	1.89	5.58	1.06	-5.92
11. All in all, how close does this simulation approximate professional reality?	3.60	1.75	5.64	.90	-7.89
<i>Scale: 1 (not at all close to reality) to 7 (very close to reality)</i>					
12. On the basis of your professional experience, would you trust research results about the negotiation behaviour and strategies gained with the help of this simulation?	3.38	1.75	5.66	.92	-8.96
<i>Scale: 1 (not at all) to 7 (definitely)</i>					

[^] All differences are significant at $p < .0001$

The content of the items was obtained from the following references: ^a Hyder et al. (2000), ^b Croson (2005),

^c Shiu et al. (2009), ^d Goodwin (2002), ^e Sandole (2003)

After receiving their extensive role information and instructions for the upcoming negotiations, participants had approximately 1 week to work through the information and prepare for their negotiation. Because the simulation took place during normal class time, with other assignments and duties in parallel, the demands on participants realistically matched those of managers in reality. To start negotiation, each team was assigned an exact time slot over the period of a week.

In the TBEM mode, teams physically met anywhere they wanted and logged on to an internet chat, programmed for this exercise. At the beginning of their time slot they had to indicate a target profit before they could meet the opposing team in the chat. The chat was asynchronous insofar as each typed statement needed to be confirmed by clicking on a “send” button. It could only be read by the receiving team once it had refreshed the chat screen. The chat is thus comparable to email and Pesendorfer and Koeszegi's (2006) asynchronous EM communication mode. Negotiation time was up to 2 h. To finalize the negotiation (after agreement or disagreement and resorting to

BATNAs) the seller team had to proceed to and fill out a pre-programmed contract sheet which the buying team subsequently had to confirm. Hereafter, both teams were re-directed to a post-negotiation questionnaire which they had to answer as a team, i.e. one team filled in one questionnaire. The negotiation interaction was captured as a log file.

In the FTF condition, teams appeared at a pre-specified room at university at their time slot. Each team indicated its target profit on a paper questionnaire and was then seated at a table so that the two teams faced each other across the table. Each team had a computer with the contract calculator at its disposal. Negotiation time was up to 1 h, owing to the higher media efficiency in FTF negotiations (e.g., [Croson 1999](#)). Negotiation interaction was audio taped and negotiation was concluded by filling in a paper contract sheet. Directly after the negotiation the teams were seated at different tables in a certain distance and each filled out one paper post-negotiation questionnaire.

3.3 Measures

Each team indicated one target profit that represented their negotiator aspirations. Individual negotiator profit was the monetary profit earned from the agreed on contract; in the case of non-agreement, the individual negotiator profit equals the BATNA value. Negotiator satisfaction was measured by the scale introduced by [Graham \(1985\)](#). Teams responded to the following items: “How satisfied were you with (a) the agreement in case an agreement was reached? (b) the agreement relative to your pre-game expectations? (c) your individual profit level? (d) your performance during the negotiation?”, on a seven-point scale anchored by “totally dissatisfied” and “totally satisfied.”

For the measure of negotiation behaviour, a content analytical coding scheme applied, to avoid self-report biases ([Weingart et al. 2004](#)). The scheme used semantic instead of syntactic unitizing ([Angelmar and Stern 1978](#)) to provide a more precise picture of negotiation behaviours, especially during long speaking turns. Each unit was coded once. The final coding scheme contained 14 categories, as shown in [Table 4](#).

Altogether, 6,422 communication units from the 16 FTF negotiations and 2,852 communication units from the 36 TBEM negotiations were coded by two coders; of these, 1,215 units were double unitized and coded to check for reliability, as measured by [Guetzkow's \(1950\) U](#), which equaled .005. A co-terminability index ([Angelmar and Stern 1978](#)) indicated 84 % agreement between the coders. The coding reliability for each category ([Table 4](#)), measured by Cohen's κ ([Cohen 1960](#)), reached excellent levels ([Bakeman and Gottman 1986](#)). Every disagreement on the codes was discussed and resolved between the two coders and the agreed upon code was used in subsequent analysis. In the analysis the relative frequencies of behaviour were used, in line with previous research ([Weingart et al. 2004](#)).

4 Data Analysis and Results

The data analysis pertains to individual level data only (i.e. variables on the level of each negotiating team in a dyad) and includes both buyer and seller data, similar to

Table 4 Content analytical coding scheme of negotiation behavioural categories

Category	Description	Cohen's κ
Single issue offer	Offer or acceptance of an offer referring only to one negotiation issue	.88
Package offer	Offer or acceptance of an offer referring to at least two negotiation issues. This category also contains mutually beneficial trade-offs.	.95
Demand for an offer	One party demands an offer from the other party	.90
Priority information exchange	One party asks for or provides information on the priority of particular negotiation issues or provides information on variable costs to maximize monopoly gains in the supply chain	.84
Positional information exchange	A party reveals her preferences within a negotiation issue or presents facts of the negotiation context. Arguments to support an own offer.	.88
Misrepresentations, lies	Active misrepresentation of, for example, own costs, own BATNA, or arguments in one's own favor	.55
Willingness to compromise	Announcement of a general willingness to compromise	.89
Process management	Meta-communication to manage the negotiation process: Proposal to negotiation package offers instead of single issue offers. Proposal to disclose variable costs to maximize monopoly gains for the supply chain. Proposal to use a certain scheme for distribution of resources.	.60
Contentious behaviour	Threats, warnings, commitments, and bluffs. References to a party's own BATNA. Ultimate offers. Misrepresentations and lies revealed.	.77
Negative reaction	Rejection of arguments and offers. Negative reactions like insults, ridicule, personal assaults, and accusations.	.84
Positive relational message	Messages referring to a positive relationship between the two parties	.98
Technology induced remark	Messages referring to or caused by the communication medium in use, clarifying questions	.98
Miscellaneous	Small talk, greetings, etc.	.98
Administrator	Messages by the administrator	1.0

Oliver et al. (1994). No dyadic measures are employed, and no systematic differences based on role appear in the dependent variables. In total, 104 cases—72 TBEM and 32 FTF—enter the analysis.

Negotiator behaviour for a team is the respective behaviour by the opposing party, for two main reasons. First, the socio-emotional response in terms of negotiator satisfaction should be stronger toward perceived other behaviour rather than toward own behaviour. Second, using only one party's behaviour, instead of both (e.g., Weingart et al. 1990), ensures that the buyer and the seller teams in a dyad possess different data points for the given behavioural variable.

Table 5 provides the means and standard deviations of all variables in the two conditions. Negotiator satisfaction is factor analysed, and factor scores serve as single satisfaction ratings. Differences were tested according to the procedure for nested data proposed by Kenny et al. (1998) which adjusts the t values according to the level of

Table 5 Means and standard deviations of all model variables according to experimental condition

Measure	FTF		TBEM		Adjusted	
	M	SD	M	SD	F	<i>p</i>
Aspirations	2,550,046	719,509	2,149,996	984,707	5.279	<.05
Profit	1,976,837	590,583	1,937,612	595,214	.595	n.s.
Contentious behaviour	.017	.012	.018	.024	.0802	n.s.
Negative reactions	.072	.038	.048	.031	8.169	<.01
Positive relational messages	.011	.008	.034	.022	18.837	<.01
Negotiator satisfaction	-.640	1.009	.284	.860	17.433	<.01

Aspirations and profit are in EUR. Contentious behaviour, negative reactions, and positive relational messages are measured as the relative frequency of the other party's behaviour as part of the total negotiation communication. Negotiator satisfaction is a factor score based on the four-item scale by [Graham \(1985\)](#). All F-scores are adjusted for nesting according to [Kenny et al. \(1998\)](#)

Table 6 Intra-class correlations of all dependent variables

Dependent Variable	Full data set		FTF negotiations		TBEM negotiations	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Individual profit	-.835	.000	-.949	.000	-.787	.000
Aspirations	-.190	.053	-.186	.491	-.273	.108
Contentious behaviour	.407	.000	.553	.026	.466	.004
Negative reactions	.268	.006	.743	.001	.223	.190
Positive relational messages	.655	.000	.704	.002	.572	.000
Satisfaction factor	.309	.001	.116	.527	.175	.141
Satisfaction 1	.241	.014	-.115	.672	.294	.081
Satisfaction 2	.193	.049	.283	.288	-.008	.963
Satisfaction 3	.271	.005	.063	.818	.205	.230
Satisfaction 4	.341	.000	.215	.424	.261	.124
Satisfaction as factor score	.312	.001	.114	.535	.182	.126

data interdependence within a dyad. Table 6 shows the intra-class correlations (ICCs), computed according to [Kashy and Kenny \(2000\)](#). The descriptive statistics reveal that aspirations are higher in FTF than TBEM negotiations (2,550,046 vs. 2,149,996; $p < .05$), in initial support for H1. Negotiator profit does not differ significantly in the two conditions. Furthermore, contrary to H2a, the analysis reveals no mean differences in contentious behaviour between the two conditions, though in line with H2b and H2c, more negative reactions (.072 vs. .048; $p < .01$) and less positive relational messages (.011 vs. .034; $p < .01$) appear in FTF compared with TBEM negotiations. Accordingly, negotiator satisfaction is higher in TBEM than in FTF negotiations ($p < .01$).

Table 7 exhibits the zero-order correlations across all variables in the theoretical model. The signs in the correlation matrix between the medium and satisfaction ante-

Table 7 Zero-order correlations of all measures

Measure	1	2	3	4	5	6	7
1. Medium	1						
2. Aspirations	.200*	1					
3. Profit	.031	.390**	1				
4. Contentious behaviour	-.027	.141	-.061	1			
5. Negative reactions	.317**	.229*	-.156	.358**	1		
6. Positive relational messages	-.488**	-.220*	.002	-.003	-.131	1	
7. Negotiator satisfaction	-.429**	-.304**	.207*	-.218*	-.263**	.398**	1

Medium is coded as a dummy variable, where TBEM is 0 and FTF is 1

** $p < .01$; * $p < .05$

Table 8 Results of the PLS mediation model

Exogenous variable	Endogenous variable						
	1	2	3	4	5	6	7
1. Medium		.200**		-.027	.317**	-.488**	
2. Aspirations			.390**				-.332**
3. Profit							.335**
4. Contentious behaviour							-.145*
5. Negative reactions							-.044
6. Positive relational messages							.329**
7. Negotiator satisfaction							
R ² (%)		4.0	15.2	.1	10.0	23.8	35.5

Medium is coded as a dummy variable, where TBEM is 0 and FTF is 1. Significance of path coefficients according to the bootstrapping procedure with 98 cases and 500 subsamples

** $p < .01$; * $p < .05$

cedents reflect the expected links, except for the insignificant correlation between the medium and contentious behaviour.

To test the influence of the medium on satisfaction formation partial least squares (PLS) structural equation modelling is employed. PLS can be used with a limited sample size and is not subject to distributional assumptions (Chin 1998). In the present study, only three variables are normally distributed (aspirations, profit, negative reactions), according to a Kolmogorov–Smirnov test, so a non-parametric modelling procedure is appropriate. Calculations are made using smartPLS M3.

The between-group differences in satisfaction antecedents suggest that the medium's indirect influence on satisfaction can be captured by a mediation model as illustrated in Fig. 2. The analysis of the reliability and validity of the measurement model of negotiator satisfaction establishes indicator reliability and construct validity: Item-to-total correlations of each indicator range between .78 and .90, and factor loadings fall between .81 and .94. The composite reliability of the construct is .96, average variance extracted (AVE) is .84, and Cronbach's α is .94.

Table 8 displays the estimated path coefficients of the proposed model, their levels of significance (derived through a bootstrapping procedure with $n = 500$ bootstrapping samples, for details see Henseler et al. 2009), and R² as a quality criterion for any endogenous variable. To adjust for non-independence between buyer and seller data,

an average ICC of the dependent variables was computed. The degrees of freedom for testing were adjusted according to the formula suggested by Kenny et al. (1998) and bootstrapping sample sizes reflect the degrees of freedom lost through nesting. Data interdependence does not affect the parameter estimates themselves (Turel 2010). Nesting effects on standard errors of parameter values which would bias significance tests performed on the original sample (Turel 2010), e.g. in regression analysis, are cancelled out through the bootstrap drawing with replacement procedure used in PLS, similar to Turel (2010) re-sampling suggestion.

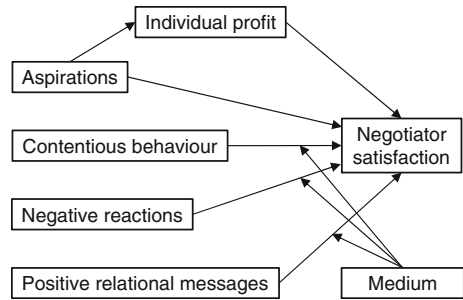
The model finds support for all expected relationships between negotiator satisfaction and its antecedents except for the link between negative reactions and negotiator satisfaction which is in the expected direction, but is not significant ($\beta = -.044$, n.s.). However, three of four hypothesized links between the medium and satisfaction antecedents receive support. H1, predicting higher aspirations in FTF negotiations can be substantiated ($\beta = .200$, $p < .01$). Furthermore, the medium dummy variable, equal to 0 for TBEM negotiations and 1 for FTF negotiations, has a positive impact on negative reactions (H2b, $\beta = .317$, $p < .01$) and a negative effect on positive relational messages (H2c, $\beta = .488$, $p < .01$). Only H2a, predicting more contentious behaviour in the FTF mode must be rejected on the basis of this model (H2a, $\beta = -.027$, n.s.). Replication 1 is also substantiated (Aspirations \rightarrow profit: $\beta = .390$, $p < .01$; profit \rightarrow negotiator satisfaction: $\beta = .335$, $p < .01$).

To demonstrate mediation of the indirect links between the medium and satisfaction, the product of the coefficients of both paths to and from the mediator must be significantly different from 0. Because those products might not be normally distributed, it is advisable to follow the procedure proposed by Shrout and Bolger (2002): Using 500 bootstrapping runs, the relevant path coefficients are multiplied (e.g., $\beta_{\text{medium} \rightarrow \text{aspirations}} \cdot \beta_{\text{aspirations} \rightarrow \text{satisfaction}}$) for every bootstrap sample and those products are ordered for every mediated link. The constructed confidence interval excludes the 2.5% at the top and bottom of the ordered products. If the sign of the product does not change within the confidence interval—that is, there are only values greater or smaller than 0—the mediation effect is tested at an α -level of 5%. This analysis substantiates mediation from the medium through aspirations and positive relational messages to satisfaction, as well as from aspirations through profit to satisfaction. According to the path coefficients, no mediation exists from medium through contention or negative reactions to satisfaction. Thus, H3 can be partly substantiated.

Beyond the indirect effects of the medium to satisfaction, direct paths from exogenous variables to dependent variables should be included in a structural model estimated with PLS, to avoid misinterpretation of mediating effects (McDonald 1996). This direct path is negative ($\beta = -.303$) and significant ($p < .01$). It increases R^2 for satisfaction from 35.5 to 41.2%. Adding other appropriate mediators (Baron and Kenny 1986), beyond the proposed model, thus might increase the strength of the explanation of negotiator satisfaction.

On a more exploratory note, it seemed worthwhile to analyse potential interaction effects between the medium and negotiation process based satisfaction antecedents on negotiator satisfaction, too. Two recent studies (Morris et al. 2002; Johnson and Cooper 2009) suggest that such effects may exist although they haven't been fully explicated theoretically yet: Those studies found that in written communication (such

Fig. 5 Potential moderating influences of communication medium on the formation of negotiator satisfaction



as TBEM) variables of the negotiation process had a stronger impact on negotiation results than in spoken communication (such as FTF). Figure 5 exhibits the moderation model.

To analyse these potential interaction effects a non-parametric procedure is employed, called PLS-MGA (multi-group analysis). It tests whether path coefficients of the same model are significantly different within two different groups (in the present case: different media) and whether the grouping variable therefore moderates the tested relationships. Henseler et al. (2009, p. 309) explain the procedure as follows:

The working principle of the novel PLS-MGA approach is as follows: First, the subsamples to be compared are exposed to separate bootstrap analyses, and the bootstrap outcomes serve as a basis for the hypothesis tests of group differences. Instead of relying on distributional assumptions, the new approach evaluates the observed distribution of the bootstrap outcomes. Given two subsamples with parameter estimates (e.g., a path coefficient), $b(1)$ and $b(2)$, the conditional probability $P(b(1) > b(2) / \beta(1) \leq \beta(2))$ has to be determined. Here, $\beta(1)$ and $\beta(2)$ represent the true population parameters of population 1 and 2. A researcher would like to be sure that P is below a specified α -level before concluding that $b(1)$ is greater than $b(2)$.

Following this approach, the partial models in Fig. 5 are computed and the resulting path coefficients between negotiator satisfaction and its antecedents are compared. They are displayed in Table 9. The associations among aspirations, profit, and satisfaction are significant in both TBEM and FTF groups and do not differ significantly. The conditional probability P of the PLS-MGA is higher than an acceptable α -level of .05 for the respective path coefficients. The same applies to the association between negative reactions and satisfaction. However, the path coefficients between the two subsamples are not significantly different. In contrast, the links between negotiator satisfaction and contentious behaviour as well as positive relational messages are found to be different. Applying PLS-MGA, a conditional probability of $P = .065$ for no group differences between TBEM and FTF for the path coefficient linking contentious behaviour and negotiator satisfaction and $P = .017$ for the path coefficient between positive relational messages and negotiator satisfaction are found. This indicates an interaction effect between medium and contentious behaviour and positive relational messages, respectively. In line with previous empirical findings, the present

Table 9 Results of the PLS-MGA to test for moderation

Exogenous variable	Endogenous variable	TBEM		FTF		PLS-MGA <i>P</i>
		β	<i>p</i>	β	<i>p</i>	
Aspirations	Satisfaction	-.384	<.01	-.262	<.1	.287
Aspirations	Profit	.37	<.01	.474	<.01	.293
Profit	Satisfaction	.307	<.01	.508	<.01	.182
Neg. reactions	Satisfaction	.076	n.s.	-.107	n.s.	.284
Cont. behaviour	Satisfaction	-.27	<.01	.175	n.s.	.065
Pos. rel. messages	Satisfaction	.289	<.01	-.18	n.s.	.017

p values for subsample models are established using bootstrapping with $n=500$ samples. In the TBEM subgroup, for each bootstrapping sample 68 cases are drawn, versus 28 cases for each bootstrapping sample in the FTF subgroup

data and analysis also suggests that the medium at least partially moderates the impact of negotiator behaviours on negotiator satisfaction.³

5 Discussion

5.1 Summary

The formation of negotiator satisfaction and related socio-emotional negotiation outcomes has long been treated with less attention in negotiation research than economic outcomes (Zerres and Hüffmeier 2011), despite their significance for future interactions and the relationship between negotiating parties. While existing studies have looked into specific antecedents to negotiator satisfaction, almost exclusively in one-to-one and FTF contexts, the present study broadens the scope in more than one respect.

In a thorough literature review, it identifies the most important general and situation-specific determinants of negotiator satisfaction and discusses the theoretical bases used to describe and explain the various influences. The ED paradigm emerges as the central theoretical backdrop for explicating the formation of negotiator satisfaction, while social comparison processes and counterfactual thinking also account for the effects of some more situation-specific satisfaction determinants.

The main contribution of this study lies in the consideration of the process of satisfaction formation in different negotiation media, i.e. whether parties negotiate FTF or in a TBEM mode, such as email. While extant literature on communication media in negotiation has sometimes considered satisfaction as one among other dependent variables, the present study is the first to theoretically and empirically focus on the

³ As one reviewer pointed out, sample size may have been problematic according to the rule of thumb for minimum sample size in PLS which demands ten cases for every exogenous variable influencing the endogenous variable with the highest number of determinants (Henseler et al. 2009). Therefore, an MGA in a partial model (contentious behavior, negative reactions and positive relational messages as antecedents to negotiator satisfaction) satisfying the rule of thumb for sample size was also computed. It yielded similar results to the full model and showed that both the influence of contentious behaviour and the influence of positive relational messages were moderated by the medium.

whole process of satisfaction formation in two different communication modes. Drawing on grounding in communication (Clark and Brennan's 1991) the study develops and tests hypotheses about the influence of the medium on the formation of negotiator satisfaction.

As hypothesized, the medium has been shown to affect central antecedents of negotiator satisfaction, namely aspirations, negative reactions and positive relational messages. Only the anticipated association between medium and contentious behaviour found no support in the data. Those direct antecedents then influence negotiator satisfaction. Employing PLS structural equation modelling and the non-parametric mediation testing procedure proposed by Shrout and Bolger (2002), this study shows that the medium has several mediated, indirect effects on negotiator satisfaction through aspirations, individual profit and positive relational messages. In other words, those negotiating in the TBEM mode developed lower, more realistic aspirations, achieved similar individual profit, and used more explicit relationship building communication which all together led to higher negotiator satisfaction compared to the FTF mode.

On a more exploratory note, the present empirical study also exhibits an interaction effect between the medium and negotiation process variables (contentious behaviour, positive relational messages) on negotiator satisfaction. It thereby replicates and extends empirical findings by Morris et al. (2002) and Johnson and Cooper (2009). Grounding in communication may provide some explanations for these findings: Verbal cues in FTF negotiations receive enrichment by para-verbal cues (audibility), gestures and mimicry (visibility), and the atmosphere (co-presence). In TBEM negotiations, however, parties rely solely on textual messages for both communication and their affective evaluation of the encounter. Since negotiator behaviour has been conceptualized and measured as verbal communication between negotiators, but because in FTF negotiations, participants also can communicate non-verbally, verbal communication and its emotional connotations play a greater role in TBEM than in FTF negotiations (Griessmair and Koeszegi 2009; Morris et al. 2002). Therefore, the influence of negotiator behaviours (in the sense of verbal messages between negotiators) on negotiator satisfaction is more pronounced in TBEM than FTF negotiations. This means that a positive relational message (e.g. "You are really a very constructive negotiator.") has a stronger positive impact on negotiator satisfaction when it is written and reviewable as in TBEM than when it has been said and then just faded away in FTF. Conversely, a threat as one form of contentious behaviour (e.g., "I will break off this transaction if you do not agree to this point") is also more salient in written form and thus has a stronger negative impact on negotiator satisfaction in TBEM compared to FTF negotiations (Morris et al. 2002).

Another distinguishing feature of the present study is the use of a high stakes gaming simulation experiment for data generation. Such a setting tries to model a real-world negotiation closely by providing realistic negotiation issues and valuation, excess background information and real-world incentives (participants' course grades partially depended on their negotiation results) and by compelling teams to negotiate. The present setting also granted participants more time to prepare and plan their negotiation. Since the negotiation outcomes had high importance for the participants, the TBEM characteristics might have represented a restriction that could be dealt with through more thorough planning and preparation. Although planning effort was not

controlled for in the present research, the observed aspiration levels indicate planning. Also, in the TBEM mode, 10 negotiators prepared an opening statement, including arguments and offers, well before the scheduled negotiation session and copied it into the Internet chat when their time slot opened. In the FTF mode, no such behaviour was observed. Overall, this experimental procedure was chosen to increase the external validity of the exercise and at least create some of the pressures that real world negotiators face. A validation survey among experienced negotiation professionals supported this notion.

For negotiation practice, this study has several implications. Since negotiator satisfaction has important repercussions on the implementation of an agreement and the future relationship between negotiators, higher satisfaction levels may be beneficial for all parties to a negotiation. In our setting of high-stakes, time-limited, team negotiation with the primary goal of maximising individual profit, the TBEM mode produced higher negotiator satisfaction than FTF negotiation. From a satisfaction perspective, the present results suggest that negotiators in such a situation may prefer choosing a TBEM communication medium like email compared to FTF negotiations. If they are bound to a specific medium by the circumstances, negotiators should be aware of the different mechanisms for satisfaction formation at work: Since the medium influences the level of aspirations, negotiators should evaluate whether they may conscientiously adjust their aspirations. Moreover, they should ponder their communication acts more carefully (contentious behaviour, positive relational messages) in the TBEM mode: Those behaviours affect satisfaction formation especially in that medium, while they matter less in the FTF mode.

5.2 Unexpected Findings

The present study also displayed some unexpected findings in the statistical analysis which warrant further discussion. First, the predicted influence of the medium on the level of contentious behaviour did not emerge in the statistical analysis. These predictions reflected the notion that simultaneity in the FTF mode encourages spontaneous emotional actions and thus kick off a spiral of competitive behaviours. However, the statistical analysis shows that this reasoning only holds for negative reactions, not for contentious behaviour. One possible explanation is that negative reactions truly represent a negotiator's affective response to a situation, while the tendency to engage in contentious behaviour is more of a personality dimension related to people's motivational orientation (De Dreu et al. 2000).

Second, while the proposed theoretical model of mediated indirect influences of the medium on negotiator satisfaction finds empirical support, the hypothesized model should not be considered comprehensive, as the significant direct path from medium to negotiator satisfaction in the altered mediation model suggests. Other mediators might be included to eliminate the direct path (Baron and Kenny 1986).

5.3 Limitations and Future Research

Finally, this study contains several limitations that suggest avenues for further research. The size of the FTF sample (32) is just about enough to corroborate the theoretical

hypotheses with the employed methods. Different subsample sizes between the conditions also likely affected the mediation model, such that the bigger TBEM subsample skewed some path coefficients toward the subsample properties. Notwithstanding this imbalance, the general findings still hold.

A source of variance not accounted for in the model involves the use of negotiator teams. This set-up is realistic in the simulated context of high stakes sales negotiations and thus increases external validity, but the team composition might have had an influence on negotiator satisfaction. Including intra-personal and intra-team processes (Brodth and Thompson 2001) and variables in an analysis of negotiator satisfaction would be a worthwhile undertaking, because most high-stakes negotiations involve teams of negotiators.

The present analysis accounts for most theoretical associations between media and satisfaction mediators. Further research also should test if the predicted associations hold when control variables that hypothetically cause the medium's influence (e.g., negotiator preparation/planning, confidence) also are included in the analysis.

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