



How to Define Trust in Medical Consultation? A New Perspective With the Game Theory Approach

* Silvia Riva

Department of Health Sciences, University of Milan, Milan, Italy

* Corresponding author

Alessandro Antonietti

Department of Psychology, Catholic University of Sacred Heart, Milan Italy

Gabriella Pravettoni

Applied Research Unit for Cognitive and Psychological Science, Istituto Europeo di Oncologia (IEO)

ABSTRACT

This study aims to describe trust in medical consultation by using the game theory approach as a frame of reference. In the field of health, game theory seems to give interesting inputs in describing how trust is maintained and reinforced. A qualitative interview was conducted in Northern Italy at the University Hospital of Milan. Explorative results indicate that, in accordance with behavioural game theory approach, trust is associated with the frequency of interactions, continuity, and positive expectations. These findings highlight the potential value of game theory approach to explain trust and to design services, which in Italy and elsewhere are increasingly focused on enhancing access, often impersonal and no-continuative, rather than maintaining trust relationships based on continuity and frequency.

KEYWORDS : medical decision making, game theory, health care, trust, medical consultation

INTRODUCTION

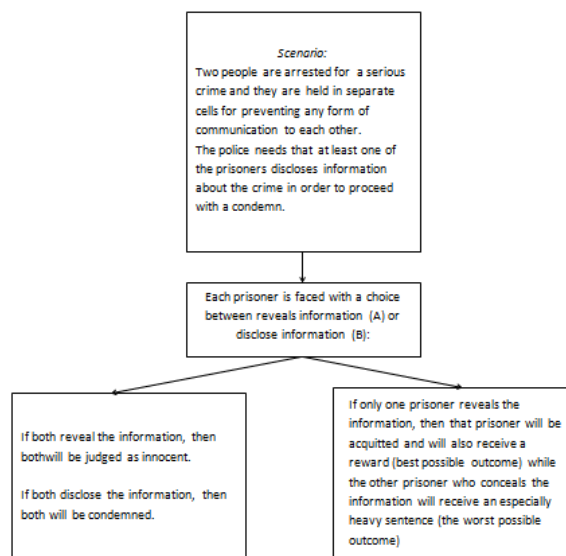
Medical consultation can be conceived as a two-way social interaction. As well described by Tarrant et al. (2004, p.461), *"in a typical consultation the doctor elicits information from the patient, then offers a diagnosis or opinion and may also discuss and offer treatment: the patient can choose what information to reveal and how to present it, can ask questions that influence the doctor's perception of the problem, can make explicit requests and, above all, can choose how to respond to the advice offered or the treatment prescribed"*. The result of this interaction between patient and doctor is influenced by the activities and decisions of both individuals (Riva et al., 2013; Riva et al., 2014). A theoretical framework for explaining this interaction is offered by game theory approach.

Game theory is a formal theoretical framework for analyzing strategic interactions between two or more individuals who, in the terminology of game theory, are called players (Colman, 1995). Game theory was formulated by mathematicians in the 1920s, and its primary purpose was to analyze how subjects will behave in specific interactions and what results will therefore obtain. Today, game theory approach represents an innovative perspective to describing the characteristics of trust and cooperation in several contexts that encompass mathematics and economics (*traditional game theory studies*) and it finds interesting applications in new field as medicine, psychology and social sciences (*behavioural game theory studies*) (Cassata et al., 2012, Riva et al., 2011).

Game theory in medical consultation

One of the main rule in game theory is that individuals "think about what others are likely to do, and do so with some degree of thought" (Elwyn, 2004, p.415). While there are different types of games used to explore this rule, all have a structure that involves an interaction leading to a reward or a loss between players. For example, a famous strategic game, the Prisoner's Dilemma game, is a standard game of a two-person interaction involving cooperation or competition, or trust and betrayal as described in Figure 1.

Fig 1. The Dilemma's Prisoner game



With reasonable interpretation of the game in health context, the structure of a medical consultation in primary care can be conceived as the Prisoner's Dilemma game. In any consultation it is possible for the doctor either to act in the patient's best interests (A) or (whether through error, misjudgement, lack of skills, or conflicting goals) to take a course of action that is not in the best interests of the patient (B), leading to poor quality care. The patient, in any medical consultation, has to decide whether to consider the doctor's advice or the prescribed treatment (A), or not (B).

The Prisoner's Dilemma game postulates that must exist is a conflict between self-interest and the advantages achieved through mutual cooperation. However, it may be that some types of medical consultation are more precisely described by coordination games (Elwyn, 2004) where both the doctor and patient profit most from joint collaboration, such as the assurance game or the centipede game (Tarrant et al., 2008).

More specifically, coordination games have a particular structure that

can be well adapted in health contexts. Within this structure, coordination game argument that consecutive interactions, continuity of exchanges, and positive expectations, are important contributing factors for the success of the game. In health context, these elements, as innovative research have shown, are important contributing factors for the success of the relationship between patient and doctor because they promote trust (Riva et al, 2014; Baldi et al., 2013; Riva, 2012). Trust is promoted when people interact with each other repeatedly (*consecutivity*), and particularly when individuals are aware of their partners' cooperativeness on past occasions -either from personal experience or reputation- (*continuity*), and anticipate positive interactions for the future (*expectations*) (Tarrant et al., 2012).

Given the innovation of these preliminary research, there is evident potential for application of game theory concepts and principles to help theorize the definition of trust in health settings. This brief short report describes a qualitative analysis aimed to test whether trust in medical consultation can be conceptualized in the frame of game theory.

METHOD

Our analysis was based on in depth-structured interview with 15 subjects conducted in Northern Italy (University Hospital of Milan, General Medicine department) as part of a larger study into the meaning of "personal self care". Questions chosen for this purpose included the analysis of different aspects related with trust and game theory approach (See Appendix). Participants signed an informed consent to declare their participation to this interview and a privacy form for data confidentiality.

The analysts (SR) and an independent researcher of the Department of Health Sciences (Milan) individually read all of the transcripts and developed an initial list of codes (Miles & Huberman, 1994). The independent coding was subsequently jointly reviewed by two external readers (AA and GP author of the paper). Transcripts were then reread to confirm the list of codes and create subheadings (Miles & Huberman, 1994). The constant comparative method approach was employed to ensure that the analysts defined and applied the codes in a consistent manner across all transcripts.

Analysis was facilitated by the use of the T-LAB software package (www.tlab.com). Fifteen interviews were subject to this detailed analysis, and this sample size was sufficient to reach theoretical saturation.

RESULTS

Participants

Of the 15 participants included in the analysis; 2 were younger than 25 years, 7 were aged between 21 and 40 years, 6 were aged between 41 and 60 years. There were 8 men and 12 women. All participants identified themselves as white and have a high education (diploma or degree). Nine participants had chronic health conditions. For this study, we selected a purposive sample. Purposive sampling ensured that the interviews selected came from a heterogeneous group of patients with diverse experiences of illness and of general practice, allowing the phenomenon of trust to be explored in a broad context

Four elements were recurrently reported by participants as being essential to create and maintain trust in medical consultation: (1) consecutive interactions, (2) time, (3) expectations about treatment and care, (4) verbal and non-verbal signals. All these element appear in line with game theory approach. These domains overlap, but each emphasizes distinct goals that must be fulfilled to create and maintain trust.

(1) consecutive interactions

Participants recurrently reported that, in case of illness, being adequately in contact with their doctor was absolutely essential to create and maintain a trust relationship.

Trust is reinforced when doctor appeared close to the patients and involved into the clinical situation. For participants, strong evidence of trustworthiness was provided when a doctor seemed intrinsically motivated to care for patients. Trust was maintained and reinforced if participants perceived that the care they received was appropriate and effective.

"My doctor was very active when I was this viral infection..he gave me not only a good treatment but he also phoned me at home during the week end because he wanted to know how I felt" (interview 7).

"Generally, my doctor spends his time to explain me the problems, he phones me at home if necessary (interview 2)

"...my doctor he seems more business like rather than patients come first"(interview 10).

"One time I was uncertain about the use of cortisone but my doctors ensured me, he explained me the risks and the benefits of using this drug and during our different encounters. At the end, I received a very good advantage and I solved my problem"(interview 9)

These findings seem to be consistent with the game theory approach that trust can develop over recurring and consecutive interactions, in which people have the possibility to update their thinking about each others' trustworthiness.

(2) Time

Time is a fundamental variable to enrich trust between patient and doctor. Time permits to build a solid trustfully relationship because trust, built over time tended to be robust. In the logic of game theory, time can therefore represents "continuity".

The lack of time spent with patients during medical encounters is frequently cited as a barrier to providing effective healthcare.

"A lot of them don't explain things—they don't have the time or they don't take the time. (Interview 12)

"It just doesn't feel like there's ever room in the system anymore for real dialogue. In other words, that's what gets in the way...Time... Time sadly"(Interview 5)

"A lot of them don't explain things—they don't have the time or they don't take the time. (Interview 12)

"It just doesn't feel like there's ever room in the system anymore for real dialogue. In other words, that's what gets in the way...Time... Time sadly"(Interview 5)

Effective Healthcare.

Participants also felt that lack of time limits the extent to which physicians can help their patients process information.

A lot of them don't explain things—they don't have the time or they don't take the time. (Interview 12)

"It just doesn't feel like there's ever room in the system anymore for real dialogue. In other words, that's what gets in the way...Time... Time sadly"(Interview 5)

"We (patients) bring things in from the Internet, and then time is taken up wading through a lot of stuff, which may not even be of importance. So...when there is a little bit of time it is confused by all of the outside information that patients have." (Interview 11)

These findings seem to be consistent with the game theory perspective that there is little inherent in a too short interaction to provide a foundation for secure trust. In this context, people can draw only on whatever general information is available to the likely trustworthiness of the person with whom they are interacting, such as social role and status. Trust in brief encounters is weak and restricted in scope.

(3) Expectations about treatment and care

Not only consecutive interactions are important in promoting trust, but expectations about future also played an important role to maintain and reinforce trust.

Participants repeatedly highlighted to have solid and positive expectations about their treatment and their prognosis and these expectations enriched trust.

Several participants pointed out that they trust their doctors because they expected the availability and the presence of their doctor in case of need.

"He did not fall short my expectations... I am very confident, I trust him" (Interview 6)

"When LES was diagnosed to my wife, the doctor explained me the disease with simple words because this disease is really complicated and with different effects. When my wife feels bad, I generally phone to my doctor first because know he is available".(interview 4)

These findings seem to be in line with the game theory approach that trust can reinforced thanks to positive expectations

(4) Verbal and non verbal signals

The behaviours and attitudes described by physicians provide a repertoire of facilitators (composed by verbal and nonverbal elements) from which either person may draw to increase the likelihood that a trustful interaction will occur. These signals occur throughout interactions in medical consultations—for example, in acts of deep inquiry to understand patients' problems carefully; listening and response; when either person takes, cedes, or shares control or facilitates the other person's ability to do so; when physicians adjust the information to give patients a clear.

"I perceive his honesty and sense of realism for his calm and clearness". (interview 5)

"My doctor looks me in the eye and he tells me what to do and which treatment to follow".(interview 7)

"You don't want to go see a doctor that says this is what you have to have done, who doesn't look you in your eyes". (interview 19)

"I do not have the chance to look his face when I go to him..the visit is too short". (interview 1)

These data fit with the game theory perspective, especially with the theoretical background in which game theory is inserted, which recognize that players act to each other also in relation with particular cues or signals of communication. Particularly, behavioral game theory states that verbal and non-verbal signals are frequently observed in social interactions between humans, and may be used as a signal of the intention to cooperate.

DISCUSSION

The objective of this study was to investigate how the game theory perspective could be an useful theory to describe trust in medical consultation within the patient-doctor relationship. The results have shown that trust, in line with the assumptions of behavioural game theory approach, is built up and maintained thanks to consolidated interactions of consecutiveness, time-continuity, and positive expectations. The study also has highlighted the impact of verbal and non-verbal signals in this relationship which act as facilitators to elicit a sense of trust between physician and patient.

This is an initial and explorative study and the present findings require further investigation. It must be acknowledged that the participants included in the study represent only a small group of patients from a single Italian site. Although we conducted interviews until thematic saturation was reached, i.e., until no new themes arose, our sample was composed primarily of well-educated patients of a single town with similar experiences of a single hospital, thereby limiting the generalizability of the themes discussed in this group. Furthermore, it is important to compare our results investigating the view of patients' in longitudinal studies in order to evaluate how trust is conceived over time in relation to possible changes and critical events.

Even though this research does not claim absolute generalizations, we can describe some interesting implications in a context-bound sense that come from an active process of reflection given by the qualitative data analysis. About implications, the results of this study might be helpful both to physicians and policymakers.

For physicians, the study can lead them to identify the key factors

that support trust in medical consultation. The results of this study are in line with findings of recent literature in medical education where various authors—from disparate branch or research or without identifying a common theoretical background—have argued that continuity of care and repetitive interactions are the two fundamental predictors for patient satisfaction (Thom et al., 2002; Riva et al., 2014) adherence to treatment (Reed et al., 2009) and better psychological adjustment to the illness (Riva et al., 2014b). Moreover, this study shows the value of non-verbal signals that must be considered in the physician's competence. The behaviours and gestures described by physicians provide a repertoire of facilitators from which either person may draw to increase the likelihood that a trustful interaction will occur. As such, these findings suggest a more powerful and dynamic process based on "unspoken messages" (Street et al, 2007; Pentland, 2009) across verbal and non-verbal components. These signals occur throughout interactions in medical consultations—for example, in acts of deep inquiry to understand patients' problems carefully; in listening and responding; when either person takes, cedes, or shares control or facilitates the other person's ability to do so; or when physicians adjust the information to give patients a clear picture about their health status.

For policymakers, this study can help to understand how—and under what circumstances—trust can be reinforced or undermined over time. Some changes of the organization and delivery of health system in Italy (but also in Europe) have the potential to decrease trust strikingly, as observed by national surveys. Italy medical care is an important area for the study of trust in medical relationship because recent policy shifts have promoted global cuts in public health sector; at the same time, they have emphasized the improvement of access and choice rather than supporting long-term interpersonal relationships as the target goal. For example, patients using public health system are unlikely to be visited by the same specialists. Other problems are related with the strict appointment management system and very long waiting lists, the limited resources for the outpatient treatment for the elderly population, and the lack of support in case of emergency. In these situations, patients are increasingly likely to be consulting unfamiliar health professionals where the trust relationship is seriously undermined. The results of this study underline the importance to maintain a trustful relationship between physician and patient and encourage physicians to facilitate the access to the patients. Ways of minimizing these recent policy shifts could be, for example, the use of flexible appointment booking systems, the increment of the number of visits *per day*, the reduction of waiting lists, the presence of more health services—with the support of social and family institutions—for vulnerable populations like old people and children).

CONCLUSIONS

Game theory may have particular value in increasing our understanding of doctor-patient trust relationships. Although different empirical research and theoretical studies has found evidence that a trustful relationship between physician and patient is associated with a range of measurable positive outcomes, much of this research is pragmatic, lacking a theoretical basis through which findings can be integrated and from which new hypotheses can be developed and tested. This study has the merit to conceptualize and to describe the value of a trustful relationship within a structured theoretical background. Summarizing, we can conclude confirming that game theory approach can be applied in health contexts to developing and understanding how to build and how to maintain trust in medical consultation.

APPENDIX

Discussion Guide

The purpose of this study is to understand the relationship between patients and their doctors in medical consultations. We are interested in understanding how patients and their doctors maintain a relationship over the time and how they communicate and make decisions about an illness or a medical condition. The information gathered through this study will be used to develop strategies to help patient and doctors communicate more effectively.

I will be asking you 10 questions. They are all open-ended questions and there are no right or wrong answers. They are about your own experiences in medical care. They are not necessarily specific to any medical conditions.

To begin, I am going to ask you to think back to a time when you met

your doctor for an illness or a medical condition.

1. Which elements do you consider important to maintain a good relationship with your doctor?
2. Which elements your doctor has to communicate to you to understand your medical situation and the course of action?
3. Do you have any experience, positive or negative, to tell us about a medical experience with your doctor?
4. In a situation where there are choices about treatment, how your doctor take into account your past experiences and medical history?
5. How important is it for the patient and doctor to share a similar outlook, such as values about health or use of medicine? Why?
6. Does your doctor take in consideration your emotions and feelings during a medical consultation?
7. How important is it that a physician explains clearly your medical situation and/or a course of treatment? Why?
8. How much time your doctor dedicate to explain you your medical situation, in general?
9. In general, do you think there any barriers in our health care system which make it difficult for patients to maintain a good relationship with your doctor? Why?
10. What do you think could be done to improve the relationship for you in medical consultation?

REFERENCES

- Baldi, P.L., Iannello, P., Riva, S., Antonietti, A. (2013) Socially Biased Decisions Are Associated to Individual Differences in Cognitive Reflection, *Studia Psychologica*, 55, 265-271. | Cassata, A., Rudnick, M., & Freeman, C. (2012). Measuring Enactment of Innovations and the Factors that Affect Implementation and Sustainability: Moving Toward Common Language and Shared Conceptual Understanding. *The Journal of Behavioral Health Services & Research*, 39, 343-361 | Elwyn, G. (2004). The consultation game, *BMJ Quality and Safety*, 13, 415-416 | Miles, M. & Huberman, A.M. (1994) *Qualitative Data Analysis: An Expanded Sourcebook*, Thousand Oaks, CA: Sage Publications. | Pentland, A. (2010) Preface: a God's Eye View. In Pentland, A. *Honest Signals: How They Shape Our World*. MA, USA: MIT press, 1-15. | Ridd, M., Shaw, A., Lewis, G., & Salisbury, C. (2009) The patient-doctor relationship: a synthesis of the qualitative literature on patients' perspectives. *British Journal of General Practice*, 59, 268-275 | Riva, S. (2012) Bounded Rationality and medical choices. Making good decisions for own health, LAMBERT Academic Publishing, Saarbrücken, Germany, ISBN: 978-3-8484-9004-2 | Riva, S., Camerini, A.L., Allam, A., & Schulz, P. (2014) Interactive sections of an internet-based intervention increase patient empowerment: a randomized controlled study with chronic back pain patients, *Journal of Medical Internet Research*. doi:10.2196/jmir.3474 <http://dx.doi.org/10.2196/jmir.3474> | Riva, S., Monti, M., Iannello, P., & Antonietti, A. (2012). The Representation of Risk in Routine Medical Experience: What Actions for Contemporary Health Policy? *PLoS ONE*, 7(11): e48297. doi:10.1371/journal.pone.0048297 | Riva, S., Monti, M., Iannello, P., Pravettoni, G., Schulz, P. & Antonietti A. (2014). What does trust mean? the hidden dynamics in medical consultation, *PlosOne*, *PLoS ONE* 9(3): e90941. doi:10.1371/journal.pone.0090941 | Riva, S., Monti, M., & Antonietti, A. (2011). Simple heuristics in over-the-counter drug choices: a new hint for medical education and practice, *Advances in Medical Education and Practice*, 2, 59 - 70. | Street, R.L., Gordon, H., & Haidet, P. (2007) Physicians Communication and Perceptions of Patients: Is it How They Look, How They Talk, or is it Just the Doctor? *Social Science & Medicine*, 65, 586-598. | Tarrant, C., Colman, A.M., & Stokes, T. (2008). Past experience, 'shadow of the future', and patient trust: a cross-sectional survey. *British Journal of General Practice*, 58, 780-783. | Tarrant, C., Stokes, T., & Colman, A.M. (2004) Models of the medical consultation: opportunities and limitations of a game theory perspective. *BMJ Quality and Safety*, 13, 461-466. | Thom, D.H., Kravitz, R.L., Bell, R.A., Kupat, E., & Azari, R. (2002) Patient trust in the physician: relationship to patient requests. *Family Practice*, 19, 476-483. | T-Lab. Tools for Text Analysis. Available: www.tlab.it. Accessed: 11 August 2014. |