Analyzing dialogue moves in chronic care communication – Dialogical intentions and customization of recommendations for the assessment of medical deliberation

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Abstract

Dialogue moves are a pragmatic instrument that captures the most important categories of "dialogical intentions." This paper adapts this tool to the conversational setting of chronic care communication, characterized by the general goal of making reasoned decisions concerning patients' conditions, shared by the latter. Seven mutually exclusive and comprehensive categories were identified, whose reliability was tested on an Italian corpus of provider-patient encounters in diabetes care. The application of this method was illustrated through explorative analyses identifying possible correlations between the dialogical structure of medical interviews and one of the indicators of personalized decision-making, namely the specificity of the recommendations given by the provider ("customization"). The statistical analyses show a significant correlation between the exchange of personal information and very specific and customized recommendations for change. It suggests how the creation of common ground, exceeding the boundaries of the paternalistic or patient-centered models, can lead to highly effective communication.

1. Introduction

The investigation of the relationship between argumentation and doctor-patient communication is of crucial importance for improving healthcare providers' communication skills (Rubinelli and Zanini 2012; Labrie and Schulz 2014; Bigi 2016). In particular, the field of study of "participatory decision making" involves directly a combination of the activities and models developed in argumentation theory – decision making and practical arguments – and the practical concerns of medical communication, namely defining and improving the process of making decisions shared by the patients.

This field of study poses a challenge for argumentation theory that can lead to new directions and applications of the approaches proposed in this discipline. The literature in argumentation studies has focused primarily on the product of argumentation, i.e. on the analysis of the types and structure of arguments used in

medical consultations (Schulz and Meuffels 2012; Al Qassas et al. 2015; Bigi and Labrie 2016). This type of research is aimed at detecting the most effective arguments or reconstructing the arguments most frequently used and the premises thereof. However, the process dimension of argumentation theory, the dialogical and pragmatic one, has been little explored thus far, especially in relation to medical communication. The development of argumentation within a dialogue and its intertwining with other types of communicative goals (Walton 1989a; Walton 1992; Macagno and Bigi 2017; Macagno and Walton 2017; Macagno and Bigi 2018) can offer some important methodological insights on how healthcare providers interact communicatively with patients, and more specifically on the complex issue of medical "participatory decision making" in chronic care.

Participatory decision making is defined as the propensity to involve patients in treatment decisions, and it is commonly characterized by the following factors: 1) the patients' possibility of choosing between different medical care options, also based on their preferences; 2) the discussion of pros and cons of each choice; and 3) taking patient's preferences into account (Heisler et al. 2002). It is rather undisputed today that the practice of shared or participatory decision-making can have beneficial effects on the general outcome of medical consultations, especially those that are aimed at achieving a behavior change from patients (Charles et al. 1997; Elwyn et al. 2000; Emmons and Rollnick 2001; Entwistle et al. 2004; Taylor 2009; Epstein and Street 2011; Politi and Street 2011; Elwyn et al. 2012; Street et al. 2012). On the contrary, the imposition of treatments without incorporating patients' personal goals "undermines motivation and engagement in treatment and sabotages attempts to improve glycemic control" (Wolpert and Anderson 2001, 996).

The integration of different types of information (evidence, clinical knowledge, patient's values, opinions, preferences, and personal knowledge) into a decision-making process can be addressed by adopting the dialogical models developed in communication and argumentation theory, which are already applied to other fields such as education, AI, or law (Reed et al. 2007; Konstantinidou and Macagno 2013; Rapanta et al. 2013; Walton et al. 2014). The goal is to focus on the processes underlying the *shared* dimension of decision making in chronic care[1], namely the creation of a common ground (Kecskes and Zhang 2009; Allan 2013) between physician and patient based on which a tailored, customized decision can be made (Stevenson et al. 2000; Heisler et al. 2003; Street et al. 2012).

The specific purpose of this paper is to develop an approach that combines theoretical and methodological tools of argumentation theory to analyze written (transcribed) medical consultations. The objective is to show its possible applications to medical communication by addressing one issue related to research concerning decision making in clinical encounters, i.e. the assessment of one indicator of the achievement of a participatory decision-making process. The issue is especially relevant in relation to the design of decision aids and to the improvement of patient engagement and motivation, crucial in the management of chronic conditions.

To reach this goal, in section 2 we refer to the literature on decision making in medical consultations to describe in particular the issue of its assessment. We adopt the approach described in (Elwyn and Miron-Shatz 2010), which distinguishes clearly between the dialogical process of deliberation and the final decision (determination). Based on this work, we also point out the relevance of coming to customized

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[1] Our study concerns decisions making in diabetes care, in which making shared decisions is considered as part of the therapeutic process.

recommendations as a criterion to decide on the 'quality' of the deliberative process. We then address this topic from the point of view of argumentation theory, discussing the concept of dialogue types as a first step towards the identification of tools that may contribute to assessing deliberation in dialogue. We outline first a description of the phases of deliberation, then a more in-depth analysis using the new concept of 'dialogue move,' further specified in relation to the specific institutional context of analysis. This methodological proposal is applied and developed further in section 4, where we describe consultations in terms of the customization of the recommendations reached at the end of deliberation sequences and verify the possible correlation between the percentages of different types of dialogue moves and the degree of customization of recommendations. We conclude with a discussion of our findings and possible development of this line of research.

2. Contextual background: Deliberation in clinical encounters

The existing literature on deliberation in medical encounters has been produced mainly within the disciplinary domain of health communication and usually uses the term 'decision-making' (among the vast literature on the subject, one recent interesting paper is Kaldjian 2017). One of the problematic topics pointed out by these studies is the assessment of decision-making.

As pointed out in Elwyn and Miron-Shatz (Elwyn and Miron-Shatz 2010), the assessment of decision-making based on the quality of outcomes can be a very misleading operation, as outcomes at the individual level can be influenced by a number of different factors and cannot be directly correlated only with the quality of communication processes occurring during the medical consultation. Moreover, it is not clear yet which communicative features of the medical encounter impact on the clinical outcomes and how (Street 2013). In other words, it is likely that communication has an indirect impact on outcomes, but then which are the moderators to be considered? For example, self-efficacy has been shown to impact on treatment adherence, and it includes understanding of the problem and confidence in one's own self-care abilities (Heisler et al. 2002), so the question would be, how to increase self-efficacy. However, this kind of research has not been conducted systematically, making assessment difficult, (Durand et al. 2012) and more rigorous approaches have been called for, which should better integrate theory, context and measurement (Street et al. 2009).

Two crucial elements in shared decision-making have been identified as relevant: knowledge and preferences. Knowledge, or information, sharing is considered to be one pre-requisite of effective decision-making, as no decision can be made if there is no knowledge of the problem or of possible solutions. However, there is also evidence to show that information alone cannot support patient motivation and healthy decision-making through time, when long-term adherence to treatment and healthy lifestyle is needed (Epstein and Gramling 2012). Moreover, knowledge needs to be combined with the interlocutors' preferences, a rather vague notion in itself, which includes values, beliefs and attitudes (Elwyn and Miron-Shatz 2010). Moreover, preferences are unstable through time and they have been shown to be also co-constructed during the interaction (Brennan and Strombom 1998; Street and Haidet 2011; Epstein and Gramling 2012; Street et al. 2012).

Based on these starting points, Elwyn and Miron-Shatz (Elwyn and Miron-Shatz 2010) propose to distinguish between the process of *deliberation* and *determination*: the former is the process of getting to a decision, while the latter

indicates the making of a decision. According to the authors, it is the deliberation process that should be described and assessed, while the decision itself can be evaluated based on different, clinical, criteria. Elwyn and Miron-Shatz (Elwyn and Miron-Shatz 2010) argue that the prerequisites for an effective deliberation process are: 1) accepting that a relevant problem exists; 2) being aware of the relevant options and 3) of the fact that they need to be understood and considered.

Implicit in this approach is the suggestion of a fundamental criterion for the assessment of deliberation in consultations, the *customization of recommendations*. Elwyn and Miron-Shatz argue that prior to constructing preferences, interlocutors should gain information about the options and their probable outcomes, imagine different future scenarios and possible affective reactions to them, which would provide insights into the possible consequences of choices. This process would allow integrating and co-constructing preferences in a more effective way during the deliberation process. However, in order for patients to be able to imagine possible future scenarios and possible reactions to them, the options described by clinicians should be maximally tailored to the actual life conditions of patients. In other words, the customization of recommendations is a *necessary* condition for patients' imagining counterfactuals and thus forming preferences and making decisions regarding the existing options (Locke and Latham 2002; Baca-Motes et al. 2013).

This criterion can be directly assessed considering the dialogical process. To this purpose, we turn to the field of argumentation theory and initially propose to consider dialogue types as candidate methodological tools for an initial minimal assessment of the structure of deliberation.

3. Dialogue types and dialogue moves

In this section we reconsider dialogue types, a concept well known to scholars in the field of argumentation theory, as tools for the analysis of the structure of deliberation in medical consultations, with the aim of contributing to the debate concerning the possibilities to assess deliberation used to achieve shared decision making.

3.1 Deliberation sequences in clinical encounters
The goal of analyzing the dialogical structure of deliberations in medical consultations faces the problem of analyzing dialogical intentions, in other words of capturing the use of language in a specific context to pursue a communicative goal. The notion of speech act (Searle 1969) has been commonly used to refer to the possible acts performed when producing an utterance. However, this approach can be hardly used for describing the structure of an interaction. Speech acts are focused only on speakers' intentions (Streeck 1980) and the cognitive dimension of an utterance, which Searle refers to as the "direction of fit," namely the relationship between the proposition and the world of the utterance (Searle and Vanderveken 1985, 92–95). This view says very little about the effects that an utterance can have on the conversation, or the intentions expressed by non-serious utterances (Kissine 2012, 177). For this reason, it can be useful to focus on the conversational goals of the "moves" of dialogues, namely the sequences pursuing a determinate and identifiable communicative purpose (Macagno and Bigi 2017).

In dialogues, the goal of a move can be generally conceived in terms of "what the speaker intended the hearer to do with what he said," namely its "point," whose reconstruction depends on its significance to the interlocutors in the specific context in which it is made (Schank et al. 1982, 267). However, Schank and colleagues

identify points with the categories of the generic interlocutors' sets of plans and goals, without providing reasons and criteria for distinguishing one from another, or for limiting them. The risk is the virtual infinity of the possible points that can be pursued through an utterance, and the further possible multiplication thereof by narrowing them to the information provided (Sanders 1987, 54). Since the number of acts that can be performed through speech, or "pragmemes" (Hymes 1964; Mey 2001; Mey 2016), is virtually indeterminate, the challenge is to provide a classification criterion based on a limited number of categories aimed at capturing a specific pragmatic dimension. In the case of dialogues, the classification needs to take into account the interactional dimension (Ervin-Tripp 1964), characterized by a joint communicative goal (Grice 1975, 45; Geis 1995, 10; 32) and individual purposes. The starting point is constituted by the categories of joint (social) actions performed, proposed, and pursued by the interlocutors, namely the "socially binding relations" created when the speaker produces a speech act (Mey 2001; Seuren 2009; Kecskes 2010), which correspond to the interlocutors' higher-order intentions (or conversational demands) (Mann 1988; Dascal 1992).

Argumentation theory can provide a typology of classification of dialogical goals. From an argumentative perspective, the "points" can be addressed by taking into account the most common and generic goal-oriented types of dialogical interactions (Dunin-Keplicz & Verbrugge 2001; McBurney & Parsons 2009). Dialogues have been classified in abstract types according to the joint and individual goals of the interlocutors, namely the types of obligations and relations that moves in a dialogue can create (Walton 1989b; Walton 1990; Walton and Krabbe 1995; Walton 1998; Macagno 2008). Dialogue types can be thought of as a system for classifying speaker's decisions to "define his or her socially binding position with regard to the proposition expressed" (Seuren 2009). These decisions can be also regarded as proposals to engage in a specific joint activity (such as exchanging information or making a joint decision) (Ruhi 2007; Haugh and Jaszczolt 2012, 101; Kádár and Haugh 2013, 221–223).

The joint purposes of a dialogue, namely the interlocutors' generic "we-intentions" of pursuing a joint activity (Searle 2002, 92–94), were classified by Walton in seven "types of dialogue," namely persuasion, negotiation, inquiry, discovery, deliberation, information seeking, and eristic (Walton 1989b; Walton 1990; Walton and Krabbe 1995; Walton 1998; Macagno 2008; Walton 2010). This typology represents the most common and generic goal-oriented types of dialogical interactions (Dunin-Keplicz and Verbrugge 2001; McBurney and Parsons 2009). These types of dialogue can provide some general criteria for developing a possible classification of the dialogue moves according to the dialogical inputs (initial situation) and output conditions (the proposed goal of the dialogue and the speaker's goals). In particular, the distinction between the types of initial situation (conflict; problem; lack of knowledge) and the common (proposed) goals (reaching a stable agreement; making a decision; reaching an accommodation between the interlocutors) (Walton and Krabbe 1995, 81–82) can be considered as theoretical categories for describing different types of actions proposed by the individual moves (Macagno and Bigi 2017, 155).

Based in particular on the description of the deliberation dialogue as proposed in (Walton et al. 2014), we conducted an exploratory search in a corpus of transcripts of medical consultations in a chronic care setting to verify how much we would be

able to say about the structure of deliberation[2]. As predictable, using the model of the deliberation dialogue as a heuristic tool allows a description of deliberation sequences in terms of presence or absence of the "blocks" that compose the dialogue (opening, argumentation, closing). A similar experiment has been described in (Lamiani et al. 2017), eliciting results that allow to assess the completeness of deliberations, but do not allow a deeper analysis of the moves that contribute to the construction of the blocks, thus preventing us from understanding why some sequences are not "well formed."

3.2 Dialogue moves
The theory of types of dialogue, indeed, is a normative model that describes the rules for abstract dialectical systems or "dialogue games," which can be implemented in AI or in multi-agent communication systems (Walton and Krabbe 1995, 67). Real dialogical contexts are characterized by a mixture of different dialogues (as Walton and Krabbe acknowledge considering the "admixtures" between different dialogues, which include mixed dialogues, embeddings, and "flavors," see Walton and Krabbe 1995, 70; 82), and constantly shift from one type of dialogue to another (van Eemeren 2010). For example, persuasion and information seeking are involved in all the real contexts of dialogue that can fall under the general category of "negotiation" or "deliberation." Other types of dialogues are too specific for describing general categories of joint dialogical intentions. For example, "eristic" dialogues represent only verbal disputes aimed at reaching a provisional accommodation; "information seeking" dialogues refer to a specific question-answer dialogical pattern.

The abstract types of dialogue games need to be modified in order to be translated into categories of joint dialogical intentions. "Information seeking" is described according to an initial situation in which one party lacks the information that is known by the other, and the goal of the former is to request information from the other (Walton and Krabbe 1995, 75). However, in real dialogues the situation of lack of knowledge is not stable, as new information can modify the epistemic status and the type of information needed by the participants. For this reason, a dialogue move can be considered more generally as aimed at "information sharing," namely providing, requesting, offering information. Similarly, "deliberation" refers to the whole process of making a joint decision, which includes several other types of moves (Walton et al. 2014). When describing the individual moves, it is necessary to focus only on the aspects that are characterized by the joint communicative goal of reaching a group decision on how to act (distinguishing this move from the others). For this reason, the more specific category of "proposal" can be introduced, which includes the acts of making and accepting a proposal and making compromises. Finally, the category of "eristic" dialogue (Walton and Krabbe 1995, 76) also needs to be adapted to the goal of "reaching an accommodation between the interlocutors." An accommodation refers to the development of a personal relationship between speaker and hearer, which can be sought for reasons that include not only personal conflicts (a damaged existing relation), but also lack of adequate personal knowledge. For this reason, this dialogue move can be better described as aimed at *building the relationship* between the interlocutors, which is a common dialogical dimension analyzed in social sciences (Roter and Larson 2002; Clayton et al. 2011; LaNoue and

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[2] The analysis was performed on a corpus of 60 video-recordings of doctor-patient encounters. The corpus was collected between 2012-2014 at a public diabetes outpatient clinic in northern Italy (all staff and patients provided informed consent and the data collection was approved by the Ethical Committee of the health care facility) (Bigi 2014).

Roter 2018). The most generic types of dialogue moves are represented in Table 1 below:

TYPE	INITIAL SITUATION	MAIN GOAL	PARTICIPANTS' AIMS	SIDE BENEFITS
1. Persuasion	Doubts concerning a viewpoint or conflicting points of view.	Resolving a difference of opinion or a doubt by means of arguments.	Persuading the other(s).	• Develop and reveal positions. • Strengthen the acceptability of a viewpoint. • Learn more about the issue.
2. Negotiation	Conflict of interests & need for cooperation.	Making a deal.	Getting the best out of it for oneself.	• Reach an agreement. • Reveal positions. • Add to profit.
3. Inquiry	General ignorance on an issue.	Increasing knowledge and reaching an agreement.	Finding a "proof" or destroy one.	• Add to knowledge. • Gain experience.
4. Discovery	Need to find an explanation of facts	Choose best hypothesis for testing	Find and defend a suitable hypothesis	• Add to knowledge. • Gain experience. • Learn more about the issue.
5. Proposal	Need for action.	Reaching a group decision on how to proceed.	Influencing the outcome through collaboration and compromise.	• Develop and reveal positions. • Express preferences.
6. Information-sharing	Lack of information.	Finding information.	Gaining, passing on, showing, or hiding personal knowledge.	• Learn facts.
7. Rapport building	Undefined or uncertain roles and personal relationship.	Reaching a (provisional) accommodation in a relationship.	Defining one's own commitments towards the interlocutor.	• Reach an agreement. • Develop and reveal dialogical and institutional roles. • Develop personal relations relevant to the dialogue. • Vent emotions.

Table 1: Types of dialogue and dialogical goals

These generic dialogical goals can be recognized based on the type of activity that the interlocutors engage in (Levinson 1992; Levinson 2012) and a range of other factors providing the evidence necessary for interpreting the intended acts (Sanders 1987, 71). As pointed out by Levinson, such factors include "format (linguistic shape), content (e.g. mentioning of conditions on another action), position in a sequence, the nature of the prior sequence, by detecting the underlying project from the current and preceding turns, and by tracking epistemic authority and other aspects of context" (Levinson 2012, 127), which provide a "grammar of motives."

This typology is only partial, tentative, and extremely generic, but it can provide the starting point for classifying dialogical moves and show how the intentions can be represented and distinguished in a dialogue. Dialogue moves can be directly related to the constructs representing the overall dialogical activity, both as abstract and normative dialogue games (types of dialogue) or as conventionalized communicative practices, empirically conceptualized as activity types (van Eemeren 2010, 144). The

analysis of the individual moves and their relationship with the overall dialogical goal can explain how a move can contribute to or define it (for example, based on its absolute or relative frequency), and why and how it is relevant or irrelevant (Macagno 2018).

Dialogue moves are the result of an activity of interpretation in which the speech actions performed by the interlocutors are retrieved considering the evidence from the co-text and the context (Levinson 2012). To this purpose, a crucial dimension of the approach we propose in the following section consists in adapting the dialogue moves to the specific communicative practice defined by the institutional purpose of the interaction, the institutional constraints, and interlocutors' common and individual goals, and their dialogical and institutional roles (van Eemeren and Houtlosser 2005; van Eemeren 2011).

3.2.1 Describing dialogue moves in clinical encounters' deliberation sequences

From a communicative point of view, medical encounters in chronic care are dialogues with the goal of making a reasoned and grounded decision about one or more aspects of the patient's health condition. A reasonable decision needs to be characterized by being useful for the better management of the disease (otherwise it would be useless), achievable by the patient (otherwise it would be useless), and (ideally, at least) acceptable or rather based on patient's preferences (Chewning et al. 2012) (otherwise it would be an imposition, and it would be more difficult to achieve, see Brennan & Strombom, 1998). For this reason, the fundamental communicative purposes in deliberation are: to acquire and provide information, to discuss the reasons why a certain behavior is acceptable or not, to co-construct preferences in view of a decision (Charles et al. 1997; Street et al. 2012). These communicative goals characterizing chronic care encounters correspond to three relevant types of dialogical moves, which we called: a) information-sharing; b) proposal; and c) persuasion. These moves need to be further specified considering some elements relevant for the interaction.

Information-sharing moves are originated by an actual or presumed need for information. The lacking information that can be sought for or provided by either the patient or the healthcare provider can be classified according to its relationship with the overall goal of the interaction. A first distinction is between information potentially related to patient care (essential), and information accessory (contributing) to patient care, namely concerning the administrative aspects of the management of a disease. For example, requesting or providing clinical data, information about a disease or a treatment, or information concerning patient's eating habits can be regarded as a means to the main goal of the interaction (making a reasonable decision based on patient's preferences). In contrast, information about how to make an appointment for a medical interview, how to withdraw drugs or medical material, or how to use an instrument concern the consequences of a decision already made. The category of the patient-care related information can be further specified according to its content, which can be divided in two sub-categories depending on its function for the goal of the dialogue. A first category is personal information, which includes information about what a patient eats, how he behaves, or his habits (needed for making a decision based on patient's habits and preferences and addressing his or her problems). A second category is clinical information, namely medical evidence such as the results of medical assessments or controls (for example, the levels of glycated hemoglobin, the dosage of insulin, etc.) (needed for assessing the patient's condition and choosing a possible treatment).

Deliberation starts from an open problem, practical in nature, and the goal is to decide how to act by reaching an agreement thereon. Proposal moves are characterized by plans, and the interlocutors propose and balance the pros and cons of a possible course of action, assessing its possible consequences based on their values and preferences. Like in the case of information sharing, in chronic care interviews proposals can concern either "essential" (patient care) or accessory (administrative) plans. For example, the doctor can propose to increase the dose of insulin, reduce the amount of pasta that the patient usually eats during the day, or increase the time he or she devotes to exercising. These three types of proposal are directly related to the main goal of the dialogue. In contrast, a healthcare provider can suggest the patient reserving the next appointment immediately, using a certain instrument, or making some tests. This type of proposals is accessory, as it concerns the consequences or the requirements of a decision. Both in case of information sharing and proposal, the category of "accessory" moves simply indicates their indirect relationship with the main goal of the interview. The classification of only *administrative* information-sharing or proposal moves under these categories does not exclude other types of accessory moves in other conversational practices. Rather, the only moves that in this type of activity were found to be accessory and at the same time relevant to the goal of the interview were the ones concerning the administrative dimension of diabetes care.

Finally, persuasion moves consist in trying to provide the reasons for accepting a specific viewpoint, which can be a proposal for action or a statement that is not shared or presumably sharable by the interlocutor. The interlocutors aim at modifying the interlocutor's actual or potential disagreement or doubt by providing arguments. Such arguments are intended to modify the other party's assessment of the controversial viewpoint. For this reason, they need to take into account the presumed or known system of preferences of the interlocutor.

The classification of the moves is represented in the following Figure 1:
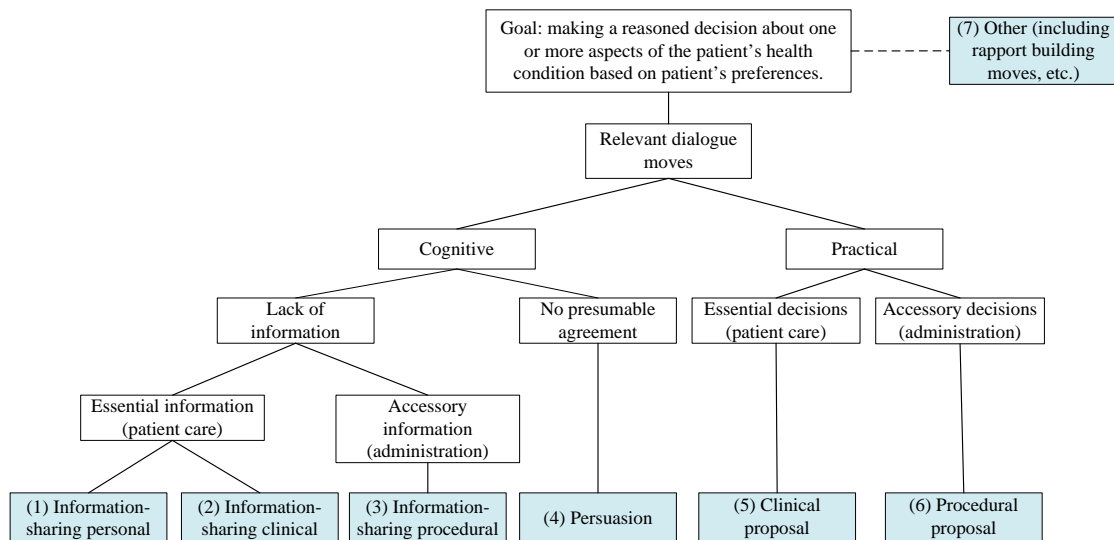
Figure 1: Classification of dialogue moves in diabetes care interviews

The outcome of these distinctions is a list of six types of dialogue moves plus a "rest" category, coded as "other," which includes turn-taking dialogical sequences not directly relevant to the overarching purpose of the interview. The types of dialogue

moves are represented in the coding scheme of Table 2. The examples in Table 2 are taken from the same corpus on which we performed the analysis (described below)[3].

Category (Code)	Description of category	Example
Information sharing personal (1)	Dialogue move aimed at retrieving and providing personal information on the patient, including: • lifestyle; • physical conditions (no medical evidence); • psychological conditions; • social behavior; • preferences; • eating habits; • daily routine.	D: *I would like to know, while I am writing the test results, if anything has happened, if anything has changed from October to this date, and how you feel.* P: *I always feel a bit tired, but except for the last four months, in which I have been hospitalized three times because I was sweating, sweating, sweating, and I passed out.* D: *So, you had collapses. Did they give you a report, a diagnosis?* P: Yes, but I don't have the documents with me. D: Do you know whether they were related to hypoglycemias or hyperglycemias? P: *No, it was due to stress.* They made all the analyses and tests available, they have not found anything particular.
Information sharing clinical (2)	Dialogue move aimed at retrieving and providing clinical information and data on the patient's health condition, including: • levels of the relevant health indicators; • results of medical tests or assessments; • results of measurements during the visit; • data concerning self-monitoring taken from measurements; • dosages; • clinical indicators; • details of a disease, body function, organ, substance.	D: *of course so then I see that your fasting glucose level is acceptable also the one after meals is good so eh:: the therapy you are following this is a confirmation of the validity of the therapy your glycated hemoglobin has slightly worsened but this is very probably due to these events that you [reported]* P: [I brought] this because in this case here eh::= (talks pointing to a spot in the diary he has opened for the doctor to see) D: later we'll look at all these we'll look at them later so we can look at the details D: *ok let's see microalbuminuria also has improved from the last one (.) and then the hepatic functionality which is the liver's functionality is also good (lowers the tone of voice, as if talking to herself) twenty twenty-two (…) eh twenty-four (raising the tone of voice) very well eh::creatine kinase also twenty-four total cholesterol one-hundred-sixty-seven good forty-eight of hdl and (.) triglycerides (.) not exactly eh::the appropriate value*
Information sharing procedural (3)	Dialogue move aimed at sharing information on bureaucratic steps needed for managing administratively the disease, including:	P: *I do not know whether I need to request more strips, as the treatment plan is expired.* D: *The treatment plan? When did it expire?* P: *It should expire now.*

	• scheduling medical tests; • purchasing medical material; • describing the structure of patient management • describing the use of medical instruments.	D: *We can issue a new one only when it is expired, not before then. However, it is not needed for all the months.* Ok, I will have it issued then.
Persuasion (4)	Dialogue move aimed at persuading the interlocutor, leading him or her to accept a specific behavior or viewpoint related to his or her condition, including: • pointing out the positive or important aspect of a clinical proposal; • rebutting or discussing a clinical proposal; • bringing arguments pro or against the assessment of a relevant habit or behavior; • supporting the acceptability of relevant information.	D: eh just think about that. I must tell you obviously and I imagine that you already know this that *there is a strong ehm link between the endocrine system and the limbic system* that is the one that manages our emotions and obviously I understand also that talking can help but up to a [certain point] P: [yes up to a certain point] D: but once again *I would like you mmm to be aware that any change in your psycho-emotional condition surely will interfere with your glucose level and so with your diabetes control.* so can we control our eating habits? yes because it is simpler than controlling our emotions. can we control the therapy? yes no doubt. *but let us try to remember that we are also made of a psycho-emotional part that has a strong impact on our life. (..) I don't mean to say that it is easy because one thing is to talk about it another is doing but I would like you to be aware of this; obviously unfortunately ehm there are are conditions that cannot easily be tackled ehm differently from a psycho-emotional point of view like your situation at home but eh surely this explains us also the alterations we have seen and it also explains us the stress.* stress is a big word [but there is everything in there eh.]
Clinical proposal (5)	Dialogue move aimed at expressing a recommendation or making a proposal concerning: • a treatment; • a modification of the patient's lifestyle; • a modification of the patient's diet. It refers also to acceptance, the discussion, or the refusal of a proposal.	D: having always the same therapy what is it that changes? what changes is what you have been eating P: yes exactly [well done hehehe eh:::] D: [yes ok yes how much] counts what we eat P: I don't know but maybe I see something tempting I eat it and then I realize right away from this number D: [exactly] *so then at this point what should you do?* P: *I shouldn't eat it* D: *no one should you should at this point not sit down but try to [do a little of activity] physical activity.* I know that in the evening one [would sit]
Procedural proposal (6)	Dialogue move aimed at making a proposal concerning administrative or	*Setting dates* D: *I will schedule the next visit in October, so you can return to Milan* P: *Ok, or November, if it is possible*

	procedural steps or issues, including: • scheduling an encounter; • following a procedure; • purchasing some material; • obtaining exemptions; • choosing a doctor; • choosing a healthcare institute; It refers also to acceptance, the discussion, or the refusal of a proposal.	D: *Let's go for October. I cannot leave you 9 months without any control. Do you want a visit in November?* P: *I wanted to go to the South in October. If it is at the beginning of October it is ok.* D: *Mid-October?* P: *Ok.*
Other dialogical moves (7)	This category includes all types of dialogical interactions that do not fall in the relevant moves, namely: • Rapport-building exchanges; • Instructions on how use an instrument; • Provision of materials/documents; • Information not falling in categories 1, 2, or 3; • Proposals not falling in categories 5 and 6; • Arguments not related to supporting a relevant proposal or relevant information.	*Rapport building* D: Please have a seat. Good morning. P: Good morning. I had promised something last time, do you remember? D: Please sit here. No I do not remember P: Dried mushrooms, do you remember? D: Yes, you are right! *Providing documents* D: This is the report I was talking about. Here you are. D: This is the request for the exams in October

Table 2: Categories of the coding scheme

The sub-categories of dialogue moves presented in Table 2 were identified to describe the strategies used by healthcare providers in a specific setting (diabetes care) to make decisions, and capture some of the elements that are considered in the literature as relevant for assessing the *dialogical* quality of medical decision-making, which are the following (Ratliff et al. 1999; Elwyn and Miron-Shatz 2010):

- Existence of alternatives;
- Information about the alternatives;
- Construction of patient's preferences;
- Compatibility of the recommendations with patient's values;
- "Practicability" of the recommendations.

To this purpose, we first tested the reliability of the categories for the analysis, which were then used for analyzing medical consultations and capturing the patterns of communication.

3.2.2 Reliability of the categories for the analysis
Out of our corpus of 60 transcripts[4] we selected 40 consultations, which were chosen according to the following criteria:

1) the clinical condition of the patients, who all had to modify their self-management (they had to make a decision concerning their habits);
2) the topics discussed during the encounters, which all included at least one phase of decision-making;
3) the physician/patient ratio: equal number of visits for each of the diabetes specialists working at the clinic.

The transcribed interviews were first divided in dialogue units (Asterhan and Schwarz 2009). Each dialogue unit corresponds to a dialogical move, namely a speech act or complex speech act aimed at a single dialogical purpose (Mayweg-Paus et al. 2016; Macagno and Bigi 2017). Dialogue moves were further divided in "on-" and "off-task" units, where the off-task units indicate the moves that are not relevant to any dialogical purpose (for example, talking to a third person; attending the phone; comments unheard by the interlocutor, etc.). The on-task units were then coded according to the dialogue type categories, illustrated in Table 2. On average, the relevant dialogical units were 399.4 (Krippendorff's α = .95), of which on average 381.4 were on-task (Krippendorff's α = .96) and 17.6 off-task (Krippendorff's α = .70).

The testing of the interrater reliability followed a two-step procedure. A preliminary coding (step 1) was conducted by one of the authors (who contributed to designing the categories) and an independent researcher, trained based on an extended version of annotation guidelines provided in Table 2, which included examples of all the subtypes of each category indicated in the second column. The coders achieved the annotation once, without any restriction on time, and they had to rely on their own judgment, without considering any additional information. The preliminary coding was conducted on roughly 30% of the interviews. The reliability was computed using Krippendorff's α, a measure of reliability allowing for gradient disagreements between annotators (Artstein and Poesio 2008; Artstein and Poesio 2009; Cavicchio and Poesio 2009). The interrater agreement calculated on all the categories was good (Krippendorff's α = .75).

A more extensive testing (step 2) was then conducted by the other author and an independent research assistant on 100% of the selected transcribed interviews. While the second author also contributed to the design of the categories, the research assistant was trained using the same materials described above. The procedure followed for the coding was the same as in step 1. The interrater agreement calculated on all the categories was strong (90.3% of agreement; Krippendorff's α= 0.884) (Krippendorff 2004; Hayes and Krippendorff 2007). In order to account for the annotator's bias, a possible problem arising when only 2 annotators code the sample (Artstein and Poesio 2008, 561; Artstein and Poesio 2009), the difference between Cohen's k and Scott's π was calculated considering all the 7 categories. The

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[4] See footnote 2 for a description of the corpus.

difference founds was 0, indicating that the individual coders' preferences are similar to random noise. The specific interrater agreement was then calculated for the distinct categories. The results are represented in the following Table 3:

	IS Pers. (1)	IS Clin. (2)	IS Proc. (3)	Persuas. (4)	PR Clin. (5)	PR Proc. (6)	Other (7)
Agreement	91.5%	87.9%	82.7%	68.6%	83.6%	82.5%	82.5%

Table 3: Agreement (individual moves)

The dialogue moves can be considered as independent, as they capture autonomous elements of discourse. Even though a move belonging to a specific category leads the interlocutor to preferentially continue the discourse pursuing the same communicative sub-goal (such as exchanging clinical information), nothing prevents him from using different moves in order to better pursue the goal of the medical encounter (such as seeing personal information or persuading the patient that a certain result is not good).

3.2.3 Results of the analysis
The percentages of the occurrence of the seven different dialogical moves are reported in Table 4.

	% IS Pers. (1)	% IS Clin. (2)	% IS Proc. (3)	% Persuas. (4)	% PR Clin. (5)	% PR Proc. (6)	% Other (7)
Average	17.79	28.47	17.89	4.40	9.23	11.40	10.79
Median	18.43	26.75	16.67	4.28	7.65	10.79	10.88
SD	6.37	9.45	5.68	2.28	5.61	4.35	7.64

Table 4: Percentages of the dialogical moves.

We notice that the information sharing clinical has the highest average percentage of units (28.47%), followed by the two other types of information sharing, namely procedural (17.89%) and personal (17.79%). The percentage of the persuasion dialogue moves is the lowest (4.4%). The Other types of dialogical moves represent the 10.79% of the total.
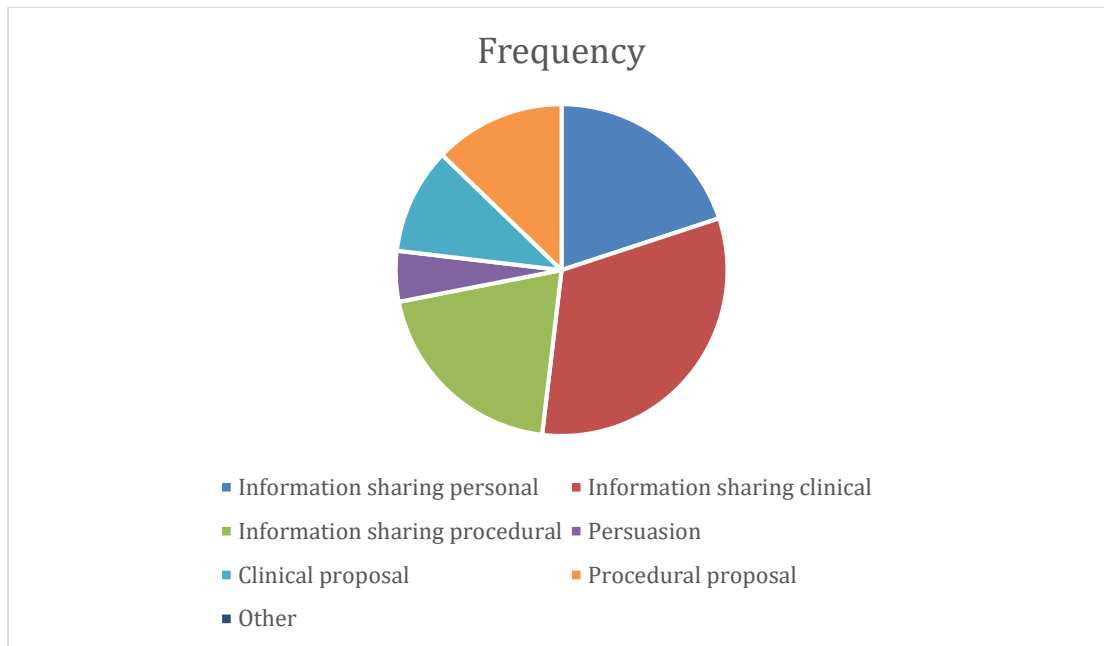
Figure 2: Distribution of dialogue moves

As mentioned in section 2 and based on the literature of personalized decision making, one important criterion for the assessment of medical deliberation is the personalization (customization) of the advice or set of recommendations constituting the conclusion (and fundamental goal) of the dialogue. Indeed, the more tailored on the specific needs and situation of patients, the more recommendations are likely to be realistic and viable options. So, as a development of the previous analysis, we decided to explore possible correlations between the kind of dialogue moves we found in the transcripts and the degree of customization of the recommendations provided by clinicians.

4. Describing customization of recommendations in clinical encounters

The notion of "customization" captures an important dimension of the process, namely the personification of its outcome, which can be assessed through the number and the specificity of the recommendations resulting from the deliberation phases. The combination of these two variables reflects how patients' different values and preferences are incorporated in a decision (Sacchi et al. 2015), which makes a decision "compatible with patient values" and "practical" (Ratliff et al. 1999, 187).

The number of the recommendations was determined based on the specific subject matter: two recommendations are classified as different when their specific subject matter is different. For example, a recommendation on "exercising" more and a recommendation on "exercising" every day are coded as one recommendation (the latter specifies the former). In contrast, a recommendation on "walking" every day and a recommendation on "going to the gym" are considered as distinct. The specificity of the recommendation was assessed based on two independent parameters: 1) the relationship with the patient's life conditions (decisions referring to patient's habits, such as "you should walk more during the day"); and 2) the general or specific nature of the decision (for example "you should walk more" vs. "you should walk in the park 30 minutes per day"). The criteria are summarized in Table 4.

Characteristic of suggestions	Evaluation
1. Relation to patient's life conditions	Yes/No
2. Generic/Specific.	Yes/No

Table 5: Criteria for assessment of recommendations

We considered as 'specific' a recommendation satisfying both criteria.
We analyzed the recommendations provided in the same set of consultations that were analyzed using the dialogue move categories described above. As an example, in Table 5 we provide an assessment of typical recommendations. Specific recommendations are indicated in italics and the ones related to the patient's life conditions in bold. The total number of recommendations and an overall assessment of the interview based on this criterion is indicated in the last column.

Example	Total	Generic/ Specific	Life conditions	Recommendations
To measure values at specific hours; to follow a diet; **to have meals at specific hours**; to avoid high glycated values; **specific hours at which to use insulin**; **to eat at night in specific conditions**; **not to use sweeteners**; **to eat small quantities of walnuts**; **to eat either bread or pasta**; **to drink either wine or sodas**; nephrologist consultation.	10	8	7	7 VERY CUSTOMIZED
To have specific controls; to lose weight; to follow a diet; **to avoid cookies**; **to drink coffee without sugar**; *to be careful to the quantities of fruit*; **to eat strawberries and bananas**; **to reduce pasta**; *to walk*	9	7	4	4 CUSTOMIZED
To increase insulin quantities; to control urine; to see a nutritionist; *to walk*; to check glycaemia.	5	2	0	0 NOT CUSTOMIZED

Table 6: Examples of assessment of recommendations.

In the first case, the recommendations in total were ten. Eight of them were specific, in the sense that they provided specific instructions (such as to have meals at specific hours; when to use insulin; to eat at night in specific conditions), whereas two were more generic (to avoid high glycated values; to follow a diet). Moreover, seven recommendations can be considered as related to the patient's lifestyle (such as: to have meals at specific hours; when to use insulin; to eat at night in specific conditions, etc.), whereas three of them (to measure values at specific hours; to follow

a diet; to avoid high glycemic values) can be considered as independent of the specific conditions and lifestyle of the patient. The assessment is provided by taking into account the total number of customized recommendations (the higher the number, the more customized the interview) and the ratio between the total number of recommendations and the ones that are customized to patients' lifestyle. For example, in the first case, the customized recommendations are high in number (7) and represent more than half of the recommendations (75%), while in the second case their number is lower (4) and they are about half the recommendations (43%). In the last case, no customized recommendations were provided. Such assessments are only generic.

4.1. Exploring correlations between dialogue moves and customization

At this point, we explored statistically the relationship between the level of customization of the interviews (measured through the number of specific recommendations provided) and the types of dialogue involved, excluding the category of dialogical moves directly related to one of the factors affecting the assessed customization of the medical interview (the number of recommendations, directly related to clinical proposal moves). A Shapiro-Wilk test was used to test for normality and homogeneity of variance on the variable "Customization." The percentage, $p = .026 < .05 = \alpha$ was not normal, indicating that the data were not normally distributed. For this reason, we run a Spearman's rank correlation test to measure the possible correlations between the number of moves of different type and the customization of the interviews.

We found a positive correlation between the specificity of recommendation and information sharing-personal moves ($r_s = .488$, $p < .001$, r = .504 large effect size) (Figure 3), and persuasion moves ($r_s = .516$, $p < .001$, r = .451 medium effect size). The boxplots of the two moves are represented below:
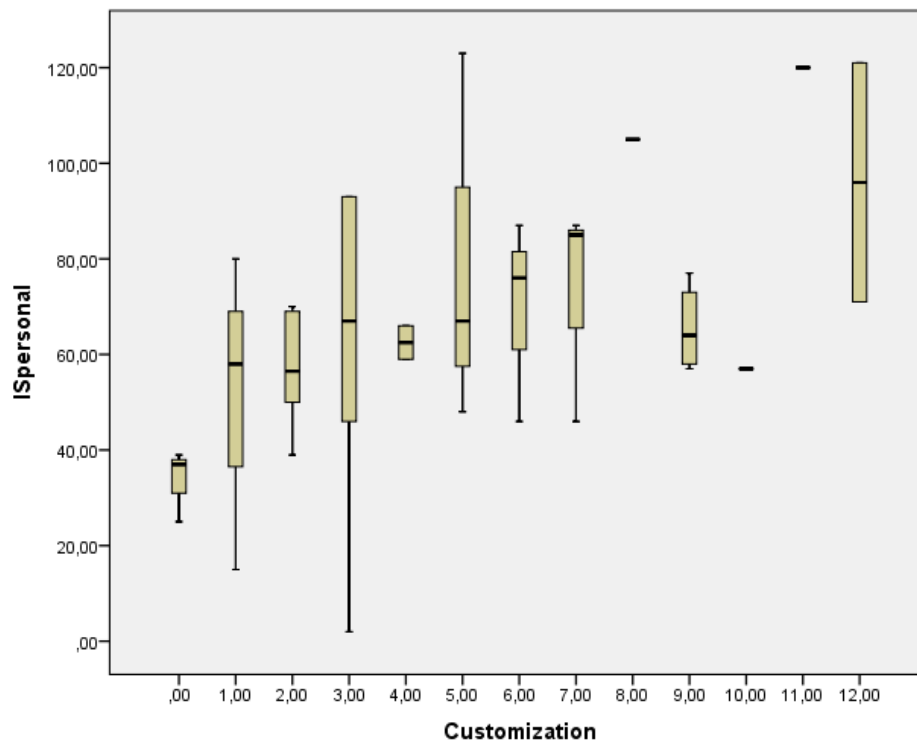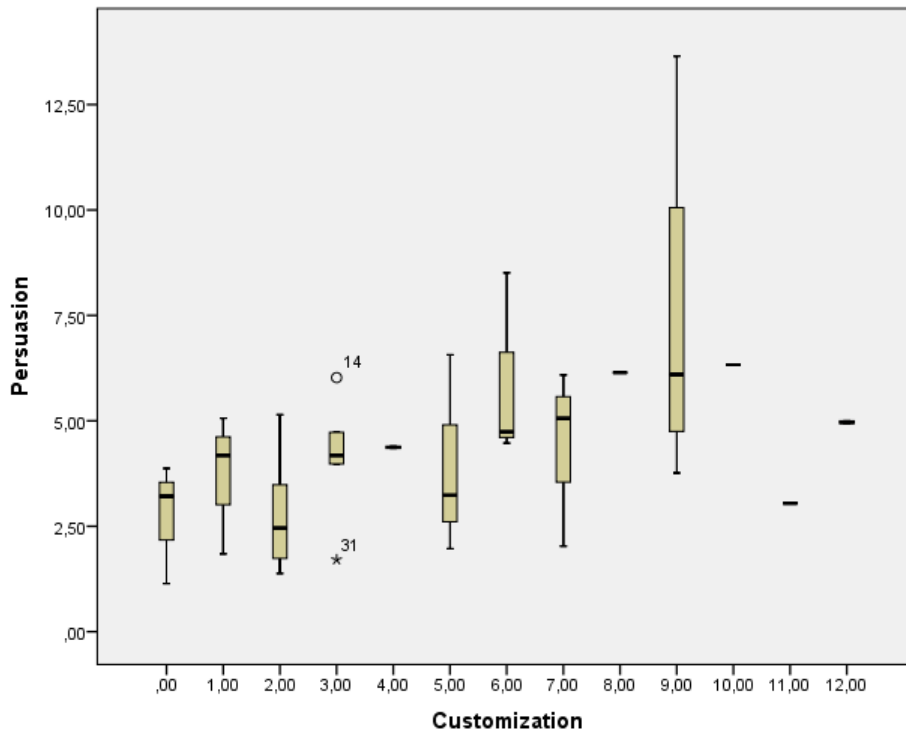

Figure 3: Correlation between IS personal and customization

Figure 4: Correlation between Persuasion and customization

In contrast, there is no relationship with information sharing-clinical moves (r_s = -.272, *ns.*), information sharing-procedural moves (r_s = .290, *ns.*), and procedural proposal (r_s = -.003, *ns.*). Considering that the categories of dialogue moves are mutually exclusive from a methodological point of view, we could (at least provisionally) assume that the relationships between dialogue moves and customization of the recommendation are direct.

To explore the impact of the roles (patient-provider) on the customization, we analyzed the *Information sharing personal* moves, and we found that there is a strong correlation between the patients' moves and the outcome (r_s = .458, *p* < .001 r = .490 medium effect size), while there is no correlation between the number of personal questions asked by the doctor and the outcome (r_s = .906, *ns.*). This result suggests that while no correlation has been found between the positive strategy of asking personal questions and the customization of the recommendations, a strong correlation can be found between the latter indicator and the provision of personal information by the patient. This outcome can be considered as pointing out the importance of the active role of patients in the interaction, and the importance of providers' choice to let them share personal information.

5. Discussion and Conclusions

This paper was aimed at developing the notion of dialogue types into a tool for analyzing medical communication. To this purpose, we first addressed and justified the passage from the abstract formal dialectical notion of dialogue types to the pragmatic one of dialogue moves. Then, we developed specific categories of moves that could capture the dialogical intentions pursued in the exchanges that characterize doctor-patient communication. This new instrument of dialogue analysis was applied

to our corpus of medical interviews, showing how it can be used for bringing to light a fundamental aspect of the communicative patterns of the participants in a conversation and assessing how dialogical intentions are related to one of the criteria used for evaluating personalized decision-making in medical communication – the customization of the recommendations.

The application of dialogue moves to health communication allowed addressing tentatively a crucial issue in this field, namely physicians' communication style in decision-making related to diabetes issues (Makoul et al. 1995; Braddock et al. 1999; Heisler et al. 2002). The effectiveness of doctor-patient communication has been found to affect patient health outcomes in various areas of medicine (Stewart 1995). More precisely, the creation of the common ground between patient and provider, including patient's preferences and values (Stevenson et al. 2000), is the core of patient-centered care and (more specifically) shared-decision making approaches (Arora and McHorney 2000). One of the problems is to assess how communication can be effective in shared decision-making related to chronic diseases, in order to find and build common ground regarding the management of the chronic condition (Stevenson et al. 2000) by gathering and sharing information (Cvengros 2008).

The analysis of the dialogical practice of decision-making was shown to be a promising strategy to inquire into the communication patterns that can be considered as the most appropriate for an intended effect. To this purpose, we analyzed how doctor-patient communication in diabetes interviews is composed in terms of communicative goals. The questions we addressed concerned 1) the communicative goals and sub-goals that physicians (and the patient) pursue in their practice (represented as dialogue moves); and 2) the relationship between the various goals and the customization of the recommendation expressed. By assessing the correspondence between the frequency of specific dialogical moves and the specificity of the recommendation (which can be theoretically used as a measure of the quality of the decision (Locke and Latham 2002; Baca-Motes et al. 2013)), we showed that it is possible to explain in terms of dialogical objectives the ideal communicative framework in medical interviews.

The percentages resulting from the coding of the dialogical moves show that the dialogical practice of the medical encounters involve a close interaction among information-seeking, persuasion and deliberation moves. More than 50% of the dialogue moves are aimed at retrieving and providing information, including personal, procedural, and clinical information. The deliberation process is based on such information, which is constantly updated, integrated, and negotiated. More specifically, the positive correlation between *information-seeking personal* and the number of the customized recommendations (i.e. the outcome of the deliberation process) mirrors the structure of this communicative process. This correlation sheds light onto one of the essential features of deliberation in medical encounters, namely the need to integrate and discuss patient preferences in the deliberation. The physicians that focused more on the specific lifestyle of patients, on their preferences and habits could provide more specific recommendations than the ones who preferred to focus on clinical data and information. On this perspective, the structure of the ideal dialogue consisted in a constant combination of acquisition of relevant personal information and specific decisions, which resulted in customized and highly specific recommendations. On the contrary, physicians who chose to devote more time to clinical data could provide fewer, and more generic and abstract recommendations,

with a lower involvement of the patient in the deliberation process (Rimer and Kreuter 2006).

The other significant correlation is between persuasion moves and customization of the interview. In terms of percentage, persuasion moves seem to play a minor role, as they occur less frequently (3.7%); however, we consider this a relevant result that would need further study, as persuasion has to do with providing reasons in support or against a certain behavior or interpretation, or the patient's values emerging from the interview (Smith and Pettegrew 1986, 134). If this kind of exchange happens so rarely, it may not be a good sign for the quality of the deliberation process, in which the doctor needs to make the patient understand the relevance or importance of a specific element, behavior, or parameter, and patients should have the opportunity to express their own reasons for (not) doing or thinking something (Smith and Pettegrew 1986; Rubinelli and Zanini 2012).

5.1. Limitations

This study has some limitations, which need to be taken into account before the results can be used to make generalizations.

Concerning the coding categories, the first limitation is the interrater reliability. The reliability of the coding categories was assessed by 2 coders, and despite the strong interrater agreement and the exclusion of the coders' bias hypothesis, its usability should be further tested by involving more coders. Moreover, the categories have been described based on a specific type of interaction, namely a medical interview in the area of diabetes care, and related to a specific application, measuring the personalization of the decision-making process. Other analytical goals may need the specification of other categories – such as the rapport-building moves.

Concerning the correlations illustrating the possible applications of the analytical approach we used, two limitations need to be pointed out. First, our results refer to overall percentages and do not say anything about possible patterns of realization of the different dialogical moves. In other words, we know that a different distribution and frequency of the different types of dialogical moves may impact on the personalization of the decision-making process, but we do not know which individual dialogical move can impact positively on it. We also cannot say if there is a pattern of realization of the consultations, both the highly personalized and the low-personalized ones, which could be targeted in possible interventions. To improve on this point, a further analysis on the same data is ongoing, aimed at describing the shifts between the different types of dialogical moves. This analysis should be able to reveal how the information sharing personal moves are hooked to the deliberation ones, what triggers shifts from one type of move to the other and if there are any patterns in the alternation between types of moves. Second, the results of the analysis refer to the context of diabetes care, in a specific territory, northern Italy, and involving a group of specialists who had received adequate training on doctor-patient communication at different stages in their career. These results are thus confined to a specific case study and for this reason it is too early to use them as a basis for generalizations.

5.2. Practice Implications

The dialogue-based approach to medical interviews is aimed at selecting the most effective communicative practices among physicians, abstracting them, and

representing them in terms of dialogical goals. For these reasons, this study can provide the ground for possible interventions. The frequency of specific dialogical moves can be increased by designing profiles of dialogue, namely abstract communicative models (Krabbe 1999; Walton 1999) guiding or prompting the speaker to perform determinate moves (asking personal questions, etc.). The correlation between moves and the dialogue-based assessment of the interview provides indicators for providers' self-assessment of an interview and criteria for improving it.

Notwithstanding the limitations pointed out in the previous section, the results suggest that at least in one specific context, specific dialogical structures increase the likelihood for a specific quality (or specificity) of the recommendations constituting the conclusion of deliberation. The results of the analysis presented in this contribution suggest a correlation that may be observed in other types of medical interviews (different topics) or in other contexts (dialogues occurring in other health care facilities, involving different types of physicians and patients).

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