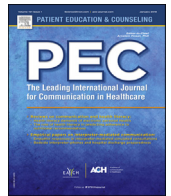




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# How does physicians' decisional conflict influence their ability to address treatment outcomes in a decision-making encounter with an advanced-stage cancer simulated patient? A descriptive study

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### ABSTRACT

**Objectives:** This descriptive study assesses how physicians' decisional conflict influences their ability to address treatment outcomes (TOs) in a decision-making encounter with an advanced-stage cancer simulated patient (SP).

**Methods:** Physicians (N = 138) performed a decision-making encounter with the SP trained to ask for TOs information. The physicians' decisional conflict regarding patients' cancer treatments in general was assessed with the General Decisional Conflict Scale (Gen-DCS). The physicians' decisional conflict regarding the SP's cancer treatments was assessed with the Specific Decisional Conflict Scale (Spe-DCS). Physicians' ability to address TOs during the encounter was assessed with an interaction analysis system: the Multi-Dimensional Analysis of Patient Outcome Predictions (MD.POP). Weekly time spent with cancer patients was assessed with a questionnaire.

**Results:** Physicians' Spe-DCS ( $\beta = -.21$ ;  $p = .014$ ) and weekly time spent with cancer patients ( $\beta = .22$ ;  $p = .008$ ) predicted the number of TOs addressed during the encounter. Spe-DCS scores predicted nearly all MD.POP dimensions ( $r = -.18$ ;  $p = .040$  to  $r = -.30$  to  $p < .001$ ) whereas Gen-DCS scores predicted nearly none MD.POP dimensions.

**Conclusion:** Physicians' specific decisional conflict interferes with their ability to address TOs in a decision-making encounter with an advanced-stage cancer SP.

**Practice implications:** Physicians should be trained to address TOs according to patient preferences, despite their own decisional conflict.

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### 1. Introduction

As cancer treatments become increasingly personalized and are based on multidisciplinary approaches [1,2], decision-making in oncology involves greater uncertainty about outcomes [3,4]. Due to this greater uncertainty, decisional conflict arises frequently in physicians during encounters with cancer patients [5–7] and especially with advanced-stage cancer patients [8,9]. Especially in decision-making encounters with advanced stage cancer patients, physicians may experience high level of uncertainty regarding treatment outcomes as scientific evidence about the best treatment

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to choose is limited [10,11]. This uncertainty may lead physicians to perceive a higher decisional conflict (e.g., treatment pursuit, limitation or withholding of specific treatments; transition from curative to palliative care) [8,9].

Decisional conflict has been defined as a state of uncertainty about which course of action to take when choice among competing options involves risk, loss, regret or challenge to life values [12]. Factors contributing to this uncertainty have been identified as: inadequate knowledge of the benefits and risks associated with all options, unclear values regarding the importance of the benefits and risks of the available options, inadequate support, uncertainty about outcomes and perception that an ineffective decision has been made [13]. Initially, decisional conflict in patients [14] as well as in physicians [15] has been studied at the level of the individual. However, LeBlanc et al. suggested that personal uncertainty of patients and physicians is influenced by their respective factors and by the factor of the other member of the dyad [16]. This mutual influence inspired the development of an adapted physicians' decisional conflict scale by integrating their personal factors and patients' factors [17]. The current study used this adapted scale to assess the physicians' decisional conflict. The physicians' General Decisional Conflict Scale (Gen-DCS) investigates their decisional conflict about patients' cancer treatments in general (unrelated to a given patient). The physicians' Specific Decisional Conflict Scale (Spe-DCS) investigates their decisional conflict about a patient's cancer treatments in particular (related to a given patient). It is therefore important to make the distinction between physicians' Gen-DCS and Spe-DCS to assess their respective impact on physicians' ability to address treatment outcomes.

Most cancer patients expect to be informed about treatment outcomes (TOs), especially in the advanced stages of their disease [18–21]. They also expect to be informed about TOs uncertainties [22–24] (e.g., treatments side-effects, life-expectancy, expected quality of life). Physicians need to be able to address TOs in their decision-making encounters [25–28]. Studies suggest that physicians' exercising effective communication skills about TOs can promote patients' understanding of expected health outcomes [29], improve quality of care [30], and support maintenance of physicians' well-being, thereby preserving their work satisfaction [31]. Physician characteristics that can influence their ability to address TOs need to be identified to inform the development of strategies aimed at improving the quality of the decision-making process.

The primary objective of the current study was to assess how physicians' decisional conflict (general and specific) influences their ability to address TOs in a decision-making encounter with an advanced-stage cancer simulated patient (SP) trained to ask for TOs information. We hypothesized that both high physicians' Gen-DCS and Spe-DCS levels may be indicative of discomfort

regarding TOs uncertainty that may impede their ability to address these TOs during a decision-making encounter. We predicted that the Spe-DCS which investigates the physicians' decisional conflict about a patient's cancer treatments specifically (proximal measure) may be more indicative of physician discomfort than the Gen-DCS which investigates the physicians' decisional conflict about patients' cancer treatments in general (distal measure). Consequently, we hypothesized that the former may influence more a physician's ability to address TOs than the latter. A secondary objective of this study was to explore the potential impact of the Gen-DCS and Spe-DCS on the ways physicians address TOs. This objective was thus to explore how physicians discuss all the outcomes dimensions with the SP (Object, Framing, Value, Domain, Probability, and Form dimensions). Moreover, weekly time that physicians spent with cancer patients has been assessed. We predicted that higher weekly time spent with cancer patients would be associated with a higher oncological practice and with a greater knowledge of TOs which may lead physicians to be more comfortable to address TO.

The manner in which a physician addresses TOs may vary according to each patient's preferences, expectations, disease status, and communication behaviors. Consequently, the use of standardized simulated patient encounters has been recommended to reduce these variabilities [32–34].

## 2. Methods

### 2.1. Subjects

The inclusion criteria were being a physician, being a fluent French speaker, and being willing to participate in the research program. The cohort included oncologists, other related specialists, and residents with at least 1 year of experience working with cancer patients. Our local ethics committee approved the study protocol and all of the participants provided written informed consent. A total of 138 specialist physicians were recruited for this study from 26 hospitals in France and Belgium at group meetings, individual meetings, and by phone.

### 2.2. Study design and assessment procedure

Physicians were asked to complete a simulated four-task process that lasted approximately 21 days. The process integrated the following four successive steps of an oncological treatment decision-making process (Fig. 1) [23]. These steps have been designed to be as close as possible to the oncology practice of physicians and were standardized to expose each participant to the same information regarding the SP's clinical situation, her concerns and preferences, and treatment recommendations, prior to the decision-making encounter.

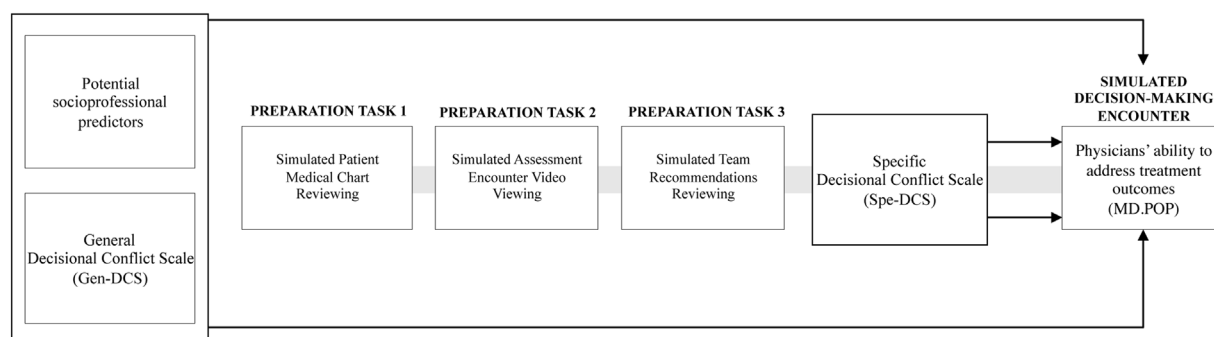


Fig. 1. Potential predictors of physicians' ability to address treatment outcomes in a decision making encounter.

The simulated case and corresponding team recommendations were developed by the medical oncology unit and psycho-oncology clinic personnel at our cancer center (Jules Bordet Institute, Belgium). For consistency with real-life cancer patient encounters and to engender uncertainty about medico-psycho-social components, the simulated scenario involves an uncertain medical context with no clear best treatment alternative. The SP modeled a 68-year-old woman with a second recurrence (pulmonary metastasis) of colorectal cancer that had been treated previously with surgery and chemotherapy.

For preparation task #1, the physicians were given a medical, psychological, and social information summary document for the SP. For preparation task #2, they were asked to watch a 28-min video of a collaborative assessment encounter between SP and a simulated oncologist that was intended to expose them to a standardized encounter in which the SP was allowed to express her medical, psychological, and social concerns explicitly, as well as to state her desire to participate in the decision-making process. The aim of asking physicians watch an encounter between a simulated oncologist and the SP was to allow every participating physician to have the same level of knowledge regarding the SP's expectations and wishes regarding treatment options (preparation task #2). As studies reported that only learner-centered, skills-focused and practice-oriented communication skills training program may change physicians' communication [35], we assume that this video watching didn't biased the way in which physicians subsequently conducted their SP encounter. For preparation task #3, the physicians reviewed the conclusions of a simulated multidisciplinary team meeting that recommended two treatment options: (1) surgical excision of the lung metastasis followed by chemotherapy (irinotecan) plus targeted therapy (cetuximab); versus (2) chemotherapy plus targeted therapy without surgery. To avoid bias of participating to a multidisciplinary meeting which may differ from the actual multidisciplinary meeting of each participating physician, only the conclusions of the simulated multidisciplinary team meeting was provided to physicians. Finally, for the performance assessment task (task #4), physicians conducted a decision-making encounter with the SP, which was audiotaped and transcribed. The physicians were asked to complete questionnaires before and after each task. The SP's satisfaction with the physicians'

communication was measured with a questionnaire after the decision-making encounter.

### 2.3. The decision-making encounter

The decision-making encounters occurred in each physician's workplace. The physicians were asked to maintain their professional identity, to take all the time they felt was appropriate for the encounter, and to make a treatment decision with the SP during the encounter.

The SP role was played by an actress experienced in SP encounters. She was trained to follow a standardized script and to exhibit consistent behaviors across all of the encounters. Regular feedback sessions were organized to help her maintain reproducibility. During the encounter, the actress was instructed to ask physicians for information about available treatment options and their outcomes (risks and benefits) to induce physicians to address TOs. She was instructed to refuse treatment recommendations after listening to the information provided and to choose supportive care or treatments that would have only a moderate impact on her quality of life (e.g., stereotactic radiotherapy for lung metastases) as her final selection.

### 2.4. Multi-Dimensional analysis of Patient Outcome Predictions (MD.POP)

To measure how physicians address TOs during the decision-making encounter with the SP, we used the Multi-Dimensional analysis of Patient Outcome Predictions (MD.POP), a validated interaction analysis system for examining how physicians discuss precisely and exclusively a patient's future outcomes during medical encounters [36]. The MD.POP enables verbal expressions that address patient outcomes during medical encounters to be identified, coded, and scored manually. It is composed of six dimensions: Object, Framing, Value, Domain, Probability, and Form. The definition of these MD.POP dimensions and their categories are provided in Table 1 with examples.

A reliability analysis was performed for 20 of the decision-making encounters that were coded by two trained raters who achieved excellent reliability ( $k = 0.83$ ; agreement  $\geq 96\%$ ) [36]. The

**Table 1**  
Multi-Dimensional analysis of Patient Outcome Predictions (MD.POP): Definitions.

DEFINITIONS	
<b>Patient Outcome Prediction (POP)</b>	<b>Speech segment within a sentence expressed during a medical encounter addressing the patient's future clinical situation and restricted to one outcome, one domain, one probability and one form of prediction</b>
<b>POP Object</b>	<b>The positive or negative value of the words referring to the POP</b>
Positive	One or more words referring to a positive patient outcome
Negative	One or more words referring to a negative patient outcome
Positive and Negative	One or more words that can be interpreted either as a positive or as a negative patient outcome
<b>POP Framing</b>	<b>The positive or negative framing of the POP</b>
Positive	POP is framed by a positive sentence
Negative	POP is framed by a negative sentence
Positive and Negative	POP is framed simultaneously by a negative and a positive sentence for the same outcome
<b>POP Value</b>	<b>The combined value of the POP Object and the POP Framing</b>
Positive	A positive object and a positive framing /OR/ a negative object and a negative framing
Negative	A positive object and a negative framing /OR/ a negative object and a positive framing
Positive and Negative	A positive and a negative object AND /OR a positive and a negative framing
<b>POP Domain</b>	<b>The medical, psychological or social outcome to which a POP is referring</b>
Medical	POP with a medical outcome
Psychological	POP with a psychological outcome
Social	POP with a social outcome
<b>POP Probability</b>	<b>The probability of the outcome</b>
Certain	Outcome with a certain probability
Uncertain	Outcome with an uncertain probability
Unknown	Outcome with an unknown probability
<b>POP Form</b>	<b>The way an outcome probability is expressed in terms of numbers or words</b>
Numerical	The outcome probability is expressed in numbers
Non-Numerical	The outcome probability is expressed in words

remaining encounter transcripts were rated separately by four trained psychologists who had undergone a 20 h intensive training from the two trained raters to code and rate the encounters with the MD.POP, as recommended [36]. These four additional raters were psychologists. Each coded transcript was then proofread by one of the first two trained raters.

To ensure the validity of MD.POP based analysis of TOs, the SP's satisfaction with the physicians' communication was assessed after the encounter on a 100-mm Visual Analog Scale (VAS) that ranged from "very unsatisfied" to "very satisfied".

## 2.5. Potential socioprofessional predictors

At baseline (before the preparation task #1 "the SP's medical chart reviewing"), physicians completed a self-reported questionnaire that collected information about their age, gender, and oncological practice (i.e., weekly time spent with cancer patients). Physicians were also asked whether or not they had taken part in psychological skills training programs within the last year.

## 2.6. Potential psychological predictors: General Decisional Conflict Scale (Gen-DCS) and Specific Decisional Conflict Scale (Spe-DCS)

The Gen-DCS, completed at baseline (before the preparation task #1: "the SP's medical chart reviewing"), assesses physicians' decisional conflict about patients' cancer treatments in general. It was used as adapted by Légaré et al. [38] by combining items from the original validated DCS [14] and from the validated Provider Decision Process Assessment Instrument which assesses the physicians' decisional conflict [15], a French version of the Decisional Conflict Scale. All items were only modified to indicate the reference to cancer patients [31]. The Gen-DCS is a 24-item questionnaire [39] that includes six subscales that assess physicians' perception of (1) their personal uncertainty, (2) patient's and (3) physician's inadequate knowledge of the benefits and risks associated with all options, (4) unclear patient values regarding the importance of the risks and benefits of the options, (5) inadequate patient support for decision making, and (6) their perception that a poor or ineffective decision has been made. Each item was scored on a 5-point Likert scale (1 = strongly agree; 5 = strongly disagree). The scores range from 0 (no decisional conflict) to 100 (high decisional conflict).

The Spe-DCS, completed before the decision-making encounter (before the performance task 4#), assesses physicians' decisional conflict about the SP's cancer treatment specifically. The Spe-DCS is a 9-item questionnaire adapted from two subscales of the 24-item questionnaire Gen-DCS. The 9-items were adapted to relate with the specific situation of the SP. The Spe-DCS assesses physicians'

perception of (1) their personal uncertainty regarding all the treatment options related to the SP and (2) their inadequate knowledge of the benefits and risks, associated with every treatment option related to the SP. The others subscales of the Gen-DCS were not considered to be adapted for the Spe-DCS, because they were not related to the simulated scenario. The simulated scenario was developed to generate an uncertain medical context with no clear best treatment alternative. Moreover, the SP was trained to ask for information about TOs. The items were scored in the same way than the Gen-DCS items. It should be noticed that the Spe-DCS total score is weakly to moderately correlated with the total score of the Gen-DCS and with the total score of the two selected subscales of the Gen-DCS ( $r = .30$ ;  $p < .001$  and  $r = .33$ ;  $p < .001$  respectively). Moreover, the total score of the two selected subscales of the Gen-DCS are highly correlated with the Gen-DCS total score ( $r = .82$ ;  $p < .001$ ).

The Gen- and Spe-DCS showed good internal reliability (Cronbach's  $\alpha$  scores of 0.76 and 0.84, respectively).

## 2.7. Statistical analyses

Analyses were performed in SPSS version 25.0 for PC (SPSS Inc., Chicago, IL). Parametric and univariate analyses were used to evaluate predictors of the number of TOs. All tests were two-tailed and alpha was set at 0.05. Backward linear regression models were used to determine which correlated variables associated independently with the number of TOs. Independent variables were included in the model if they had a  $p$  value  $\leq 0.10$ .

## 3. Results

### 3.1. Descriptive analysis

Descriptive analyses of physicians' socioprofessional characteristics and decisional conflicts are shown in Table 2.

Descriptive analyses of the coded and scored MD.POP dimensions for encounters between 138 physicians and the SP are shown in Table 3. There was great diversity among the physicians with respect to the number of TOs expressed during the encounter. Substantial diversity was observed across the different MD.POP dimensions and coding categories as reflected by the large standard deviations. This reflects differing physicians' communication styles of addressing TOs.

The most common Patient Outcome Predictions (POP) have a "positive and negative" object, and value, "positive" framing, a medical content, and a non-numerical form. Certain and uncertain probabilities are expressed with similar frequencies. Throughout

**Table 2**  
Physicians' socioprofessional characteristics and decisional conflicts before conducting the decision-making encounter with the advanced-stage cancer simulated patient (SP): Descriptive analysis (n = 138).

	n (%)	Mean $\pm$ SD	Min–Max
<b>Socioprofessional characteristics</b>			
Age		45 $\pm$ 10	26–72
Gender			
Male	76 (55)		
Female	62 (45)		
Oncological practice			
Number of years		16 $\pm$ 10	1–41
Time spent with cancer patients (number of hours/week)		32 $\pm$ 17	1–65
Psychological skills training <sup>a</sup>			
Yes	27 (20)		
No	111 (80)		
<b>Decisional conflicts</b>			
General Decisional Conflict regarding patients' cancer treatments (Gen-DCS)		42 $\pm$ 10	13–71
Specific Decisional Conflict regarding the SP's cancer treatments (Spe-DCS)		46 $\pm$ 15	11–100

Abbreviation: SD, standard deviation.

<sup>a</sup> Physicians taking part in workshops addressing stress management skills and/or communication skills with cancer patients in the last year.



**Table 3**

Physicians' communication in the decision-making encounter with the advanced-stage cancer simulated patient (SP): Descriptive analysis (n = 138).

	n		%	
	Mean $\pm$ SD	Min–Max	Mean $\pm$ SD	Min–Max
<b>Number of physicians' words</b>	2257 $\pm$ 892	733–4957		
<b>Encounter length (in minutes)</b>	29 $\pm$ 8	15–57		
<b>Number of treatment outcomes (TOs) addressed by the physicians</b>	119 $\pm$ 46	31–375		
<b>Number of treatment outcomes (TOs) addressed by the physicians per minute</b>	4 $\pm$ 2	1–12		
<b>Patient Outcomes Predictions (POP) coding analysis<sup>a</sup></b>				
<b>Object<sup>b</sup></b>				
Positive	19 $\pm$ 10	3–67	16 $\pm$ 6	3–39
Negative	28 $\pm$ 14	2–90	24 $\pm$ 7	5–44
Positive and negative	72 $\pm$ 28	20–18	60 $\pm$ 8	42–84
<b>Framing<sup>c</sup></b>				
Positive	95 $\pm$ 37	21–288	80 $\pm$ 6	65–93
Negative	23 $\pm$ 11	4–87	20 $\pm$ 6	7–34
Positive and negative	0 $\pm$ 1	0–3	0 $\pm$ 1	0–4
<b>Value<sup>d</sup></b>				
Positive	22 $\pm$ 12	3–94	18 $\pm$ 5	3–38
Negative	26 $\pm$ 12	4–63	22 $\pm$ 6	8–39
Positive and negative	72 $\pm$ 28	20–218	61 $\pm$ 8	42–85
<b>Domain<sup>e</sup></b>				
Medical	113 $\pm$ 44	30–349	95 $\pm$ 4	76–100
Psychological	3 $\pm$ 3	0–20	3 $\pm$ 3	0–11
Social	3 $\pm$ 4	0–20	2 $\pm$ 3	0–18
<b>Probability<sup>f</sup></b>				
Certain	68 $\pm$ 34	16–263	56 $\pm$ 12	27–85
Uncertain	48 $\pm$ 21	12–115	42 $\pm$ 12	15–71
Unknown	3 $\pm$ 2	0–11	2 $\pm$ 2	0–10
<b>Form<sup>g</sup></b>				
Numerical	7 $\pm$ 6	0–37	6 $\pm$ 4	0–18
Non-Numerical	112 $\pm$ 42	30–338	94 $\pm$ 4	82–100

Abbreviation: SD, standard deviation.

<sup>a</sup> Performed with the Multi-Dimensional Analysis of Patient Outcome Predictions (MD.POP).<sup>b</sup> Positive or negative value of words referring to POP; Positive: One or more words refer to a positive patient outcome; Negative: One or more words refer to a negative patient outcome; Positive and Negative: One or more words that can be interpreted either as a positive or negative patient outcome.<sup>c</sup> Positive or negative framing of POP; Positive: POP is framed by a positive sentence; Negative: POP is framed by a negative sentence; Positive and Negative: POP is framed simultaneously by a positive and negative sentence for the same outcome.<sup>d</sup> Combined value of POP Object and POP Framing Positive Positive object and positive framing OR negative object and negative framing; Negative: Positive object and negative framing OR negative object and positive framing; Positive and Negative: Positive and negative objects AND/OR positive and negative framing.<sup>e</sup> Outcome to which POP refers; Medical: POP with a medical outcome; Psychological: POP with a psychological outcome; Social: POP with a social outcome.<sup>f</sup> Outcome probability; Certain: Outcome with a certain probability; Uncertain: Outcome with an uncertain probability; Unknown: Outcome with an unknown probability.<sup>g</sup> How outcome probability is expressed; Numerical: Outcome probability is expressed in numbers; Non-Numerical: Outcome probability is expressed in words.

the 138 encounters, physicians expressed certainty with regard to outcomes (i.e., you will experience side effects from this treatment) as often as they expressed uncertainty (i.e., you could benefit from this treatment). It is also very interesting to note that across the 138 different encounters, physicians very rarely expressed a Patient Outcome Predictions (POP) in the “unknown” probability category or in the numerical form category.

The association observed ( $r = .22$ ;  $p = .009$ ) between the number of treatment outcomes addressed by the physicians during the decision-making encounter and SP satisfaction with the physicians' communication was positive and confirmed the validity of the outcomes assessed.

### 3.2. Predictors of number of treatment outcomes

The associations between potential physician predictors and their number of TOs are reported in Table 4. Multiple regression analysis (Table 5) showed that physicians' Spe-DCS scores ( $\beta = -.21$ ;  $p = 0.014$ ) and weekly time spent with cancer patients ( $\beta = .22$ ;  $p = 0.008$ ) were predicted the number of TOs that they addressed during the decision-making encounter. The proportion of variance explained was 10.4 % (adjusted 9%). The association between Spe-DCS and number of TOs was negative whereas the association between Spe-DCS and weekly time spent was positive.

Further univariate analyses showed that physicians' Gen-DCS scores predicted nearly none MD.POP dimensions (physicians' use

of unknown probabilities) whereas physicians' Spe-DCS predicted nearly all MD.POP dimensions: 12 dimensions of the 17 (from  $r = -.18$ ;  $p = .040$  to  $r = -.30$ ;  $p < .001$ ).

The two subscales total scores from the Gen-DCS (physicians' personal uncertainty and their inadequate knowledge of the benefits and risks associated with all options) are not correlated with the number of TOs ( $r = -.08$ ;  $p = .310$ ).

## 4. Discussion and conclusion

### 4.1. Discussion

To our knowledge, this is the first study to assess how physicians' decisional conflict (general and specific) influences their ability to address TOs during a decision-making encounter with a SP. The SP asked for treatment outcomes information led the physicians to address numerous TOs, as shown by the high mean number of TOs expressed during the decision-making encounter.

We hypothesized that both high physicians' Gen-DCS and Spe-DCS levels may be indicative of discomfort regarding TOs uncertainty that may impede their ability to address these TOs during a decision-making encounter. The results of this study confirmed our hypotheses in part by showing that the Spe-DCS, but surprisingly not the Gen-DCS, was predictive of the number of TOs addressed. We observed an inverse relationship between Spe-DCS scores and the number of TOs discussed. These results suggest that

**Table 4**  
Associations between physicians' General Decisional Conflict regarding patients' cancer treatments (Gen-DCS) and Specific Decisional Conflict regarding the simulated patient's cancer treatments (Spe-DCS) with their communication in the decision-making encounter with the advanced-stage cancer simulated patient (SP): Univariate analyses (n = 138)<sup>a</sup>.

	General Decisional Conflict regarding patients' cancer treatments (Gen-DCS)		Specific Decisional Conflict regarding the SP's cancer treatments (Spe-DCS)	
	r	p	r	p
<b>Number of physicians' words</b>	0.01	–	–0.05	–
<b>Encounter length (in minutes)</b>	0.02	–	0.03	–
<b>Number of treatment outcomes (TOs) addressed by the physicians</b>	0.02	–	–0.24	0.005
<b>Number of treatment outcomes (TOs) addressed by the physicians per minute</b>	–0.05	–	–0.27	0.002
<b>POP coding analysis<sup>a</sup></b>				
<b>Object<sup>b</sup></b>				
Positive	–0.12	–	–0.30	<0.001
Negative	0.04	–	–0.19	0.025
Positive and negative	0.06	–	–0.18	0.038
<b>Framing<sup>c</sup></b>				
Positive	0.04	–	–0.24	0.005
Negative	0.04	–	–0.19	0.027
Positive and negative	–0.07	–	0.00	–
<b>Value<sup>d</sup></b>				
Positive	0.06	–	–0.29	<0.001
Negative	0.00	–	–0.20	0.019
Positive and negative	0.06	–	–0.18	0.040
<b>Domain<sup>e</sup></b>				
Medical	0.01	–	–0.24	0.005
Psychological	0.12	–	–0.05	–
Social	0.02	–	–0.08	–
<b>Probability<sup>f</sup></b>				
Certain	–0.05	–	–0.29	<0.001
Uncertain	0.10	–	–0.07	–
Unknown	0.18	0.030	0.14	–
<b>Form<sup>g</sup></b>				
Numerical	0.03	–	–0.24	0.005
Non-Numerical	0.02	–	–0.22	0.009

Abbreviation: SD, standard deviation.

<sup>a</sup> Performed with the Multi-Dimensional Analysis of Patient Outcome Predictions (MD.POP).

<sup>b</sup> Positive or negative value of words referring to POP ; Positive : One or more words refer to a positive patient outcome ; Negative : One or more words refer to a negative patient outcome ; Positive and Negative : One or more words that can be interpreted either as a positive or negative patient outcome.

<sup>c</sup> Positive or negative framing of POP ; Positive : POP is framed by a positive sentence ; Negative : POP is framed by a negative sentence ; Positive and Negative ; POP is framed simultaneously by a positive and negative sentence for the same outcome.

<sup>d</sup> Combined value of POP Object and POP Framing ; Positive : Positive object and positive framing OR negative object and negative framing ; Negative : Positive object and negative framing OR negative object and positive framing ; Positive and Negative : Positive and negative objects AND/OR positive and negative framing.

<sup>e</sup> Outcome to which POP refers ; Medical : POP with a medical outcome ; Psychological : POP with a psychological outcome ; Social : POP with a social outcome.

<sup>f</sup> Outcome probability ; Certain : Outcome with a certain probability ; Uncertain : Outcome with an uncertain probability ; Unknown : Outcome with an unknown probability.

<sup>g</sup> How outcome probability is expressed ; Numerical : Outcome probability is expressed in numbers ; Non-Numerical ; Outcome probability is expressed in words.

**Table 5**  
Associations between physicians' socioprofessional characteristics and Specific Decisional Conflict regarding the simulated patient's cancer treatments (Spe-DCS) with the number of treatment outcomes addressed by the physicians in the decision-making encounter: Regression analysis (n = 138)<sup>a</sup>.

	Number of treatment outcomes addressed by the physicians		
	$\beta$	t	p
<b>Socioprofessional characteristics</b>			
Time spent with cancer patients (number of hours/week)	0.22	2.68	0.008
<b>Decisional Conflict</b>			
Specific Decisional Conflict regarding the SP's cancer treatments (Spe-DCS)	–0.21	–2.50	0.014

SE: Standard error.

<sup>a</sup> The proportion of variance explained is 10,4% (adjusted = 9%).

the Spe-DCS may be a good indicator of physician discomfort with TOs uncertainty that may reduce their addressing of TOs during the decision-making encounter. These results suggest that a proximal measure of the decisional conflict (e.g., specific decisional conflict) may be indicative of sufficient discomfort to interfere with addressing TOs in the decision-making encounter.

With respect to our secondary objective to explore the potential impact of the physicians' Gen-DCS and Spe-DCS scores on the ways they address TOs, we found that the Spe-DCS was predictive of nearly all MD.POP dimensions whereas the Gen-DCS predicted nearly none MD.POP dimensions. Moreover, higher Spe-DCS scores

were associated with less MD.POP dimensions associated with positive value and expression of certainty. These results suggest that a high level of Spe-DCS might lead physicians to be hesitant to address TOs comprehensively, or perhaps to avoid inducing unrealistic expectations or false beliefs in patients.

Interestingly, the weekly time that physicians have spent with cancer patients in their practice was associated with a high number of TOs during the simulated decision-making encounter. This result suggests that oncological practice leads physicians to feel that addressing TOs may facilitate the decision-making process despite the uncertainties associated with TOs.

In interpreting the results of this study, it should be recalled that a high Spe-DCS score was associated with a low number of TOs during the decision-making encounter with the SP trained to ask for TOs information. Likewise, in a previous study with the same population, we found that a high physicians' specific decisional conflict showed a strong trend to involve the SP in the decision-making process and further showed that the physicians' oncological practice (number of years) was associated with greater patient involving behaviors [37]. Notwithstanding, the levels of SP involvement in the decision-making process were poor overall.

Hence, the two studies together suggest that physicians' specific decisional conflict shapes their communication style during a decision-making encounter with the SP. A high physicians' specific decisional conflict is associated with lower TOs addressed during the decision-making encounter with the SP and is associated with greater patient involving behaviors. Conversely, a low physicians' specific decisional conflict is associated with greater TOs addressed during the decision-making encounter with the SP and is associated with lower patient involving behaviors. These results indicate that physicians tend not to be responsive to patient expectations to be informed about TOs or involved in the decision-making process. These results support Wouda's impulsive/reflexive model of physician-patient communication [40]. This model assumes that communication can be either impulsive or reflective. In the reflexive system, communication is processed by a conscious reasoning and decision process. In the impulsive system, communication is processed by associative memory and thus automatisms. This impulsive system can alternate between two orientations to stimuli, that is approach and avoidance. The results of these two studies show that physicians' decisional conflict activates the impulsive system. A high specific decisional conflict in physicians may favor the impulsive behavior to simultaneously address TOs less and involve patients in the decision-making process more. Such impulsive communication may be detrimental to the decision-making process in that it is shaped by the physician's own specific decisional conflict rather than the patient's preferences and expectations. Conversely, the reflexive system would allow physicians to simultaneously involve patients in the decision making process and address TOs to them despite their own decisional conflict. This use of reflexive system is recommended in this kind of decision-making encounter. These two studies suggest that oncological practice may moderate this communication style.

#### 4.2. Limitations

This study had a notable limitation in that it did not address variability in patients' psychological characteristics, preferences, and expectations. It is therefore of course difficult to extrapolate what could be "best" for actual patients with an advanced cancer SP. The conclusions of this study may be applicable only to encounters with advanced-stage cancer patients who ask for treatment outcomes information. Future studies should explore the impact of physicians' decisional conflict on their ability to address TOs in decision-making encounters with actual cancer patients. Moreover, it should be noticed that in real life practice setting, the decision-making process simulated in the current study is not always followed.

The Gen-DCS and the Spe-DCS scales are adapted from validated decisional conflict scale but are not yet validated. Future studies should be conducted to validate these two scales.

#### 4.3. Conclusion

The findings of this study support the hypothesis that during decision-making encounters with advanced-stage cancer patients

who ask for treatment outcomes information, a physicians' specific decisional conflict may interfere with their ability to address these outcomes and, consequently, may impair the quality of a decision-making process.

#### 4.4. Practice implications

This study identified a physician characteristic, namely specific decisional conflict that interferes with his or her ability to address TOs in decision-making encounters with patients. Physicians should be encouraged to reduce as much as possible their decisional conflict regarding a patient's medical situation despite the significant a high number of uncertainties involved in oncology in order to feel less discomfort about them. In so doing, they should seek all available information from the scientific literature, experts, and colleagues regarding TOs relevant to the patient's medical condition. They should share their specific decisional conflict with experienced supervisors. Moreover, they should clarify the patient's preferences and expectations regarding outcomes that the patient would like to be addressed. More importantly, physicians should receive communication skills training to enable them to achieve these expectations. Communication skill training program facilitators should address physicians' decisional conflict in role-play exercises, feedbacks, and discussions [41,42] aimed at helping physicians to develop a reflective communication style that balances TOs information with patient involvement in the decision-making process [40]. Future studies should assess the effectiveness of these practice implications to guide the evolution of cancer care into the future, wherein treatment decisions may involve higher levels of uncertainty and higher patients' expectations than ever before.

#### Informed consent

The authors affirm that all personal identifiers have been removed so that participating physicians are not identifiable and cannot be identified through narrative details.

#### Declaration of Competing Interest

The authors have declared that there is no conflict of interest.

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