Journal of Experimental Psychology: Applied
2012, Vol. 18, No. 1, 38–51

1076-898X/11/$12.00 DOI: 10.1037/a0026018

Doc, What Would You Do If You Were Me? On Self–Other Discrepancies in Medical Decision Making

Rocio Garcia-Retamero
University of Granada and Center for Adaptive Behavior and Cognition, Max Planck Institute for Human Development, Berlin, Germany

Mirta Galesic
Center for Adaptive Behavior and Cognition, Max Planck Institute for Human Development, Berlin, Germany

Doctors often make decisions for their patients and predict their patients' preferences and decisions to customize advice to their particular situation. We investigated how doctors make decisions about medical treatments for their patients and themselves and how they predict their patients' decisions. We also studied whether these decisions and predictions coincide with the decisions that the patients make for themselves. We document 3 important findings. First, doctors made more conservative decisions for their patients than for themselves (i.e., they more often selected a safer medical treatment). Second, doctors did so even if they accurately predicted that their patients would want a riskier treatment than the one they selected. Doctors, therefore, showed substantial self–other discrepancies in medical decision making and did not make decisions that accurately reflected their patients' preferences. Finally, patients were not aware of these discrepancies and thought that the decisions their doctors made for themselves would be similar to the decisions they made for their patients. We explain these results in light of 2 current theories of self–other discrepancies in judgment and decision making: the risk-as-feelings hypothesis and the cognitive hypothesis. Our results have important implications for research on expert decision making and for medical practice, and shed some light on the process underlying self–other discrepancies in decision making.

Keywords: medical decision making, self–other discrepancies, defensive medicine, expert decision making

Shared decision making is a beautiful ideal (Gigerenzer, 2010). Very often, however, doctors make decisions for their patients (Barry, 1999; Hanson, 2008). Even when patients are willing to be involved in decision making about their health, doctors must accurately predict their patients' risk preferences and decisions to customize advice to their particular situation (Garcia-Retamero & Galesic, in press; McNutt, 2004). This research examines how doctors make decisions for their patients and themselves and how they predict their patients' decisions. This research also documents whether these decisions and predictions coincide with the decisions that patients make for themselves.

Although a wide range of research has been conducted on how people make decisions for themselves (e.g., Garcia-Retamero, Hoffrage, & Dieckmann, 2007; Garcia-Retamero, Takezawa, & Gigerenzer, 2009; Gigerenzer, Todd, & the ABC Research Group, 1999; Kahneman, 2003), there is a dearth of empirical and even less theoretical work on how people make decisions for others and predict others' decisions. Furthermore, the findings of the few studies that did examine this issue are contradictory.

Research on various topics such as lottery games, perceptions of waiting time, and romantic relationships showed that people often predict others to be more risk seeking than they are themselves (Hsee & Weber, 1997; Krishnamurthy & Kumar, 2002; Siegrist, Cvetkovich, & Gutscher, 2002). People also make more risk-seeking decisions for others than for themselves and are more likely to give advice to others encouraging taking risks they themselves are not willing to take (Beisswanger, Stone, Hupp, & Allgaier, 2003; Stone & Allgaier, 2008; Wray & Stone, 2005). These self–other discrepancies persist no matter whether decisions lead to positive or negative outcomes, and even if a monetary risk incentive is offered for accurate decisions (Hsee & Weber, 1997). Furthermore, self–other discrepancies are larger when people do not have an affective or personal relationship with the others for whom they make decisions (Hsee & Weber, 1997).

Yet other authors using similar methods (e.g., Cvetkovich, 1972; Stone, Yates, & Caruthers, 2002; Teger & Kogan, 1975) found few or no self–other discrepancies and concluded that findings from risk research on individual decision making generalize to decision making for other people. Some authors (e.g., Borresen, 1987; Levinger & Schneider, 1969; McCauley, Kogan, & Teger, 1971; Raymark, 2000; Wallach & Wing, 1968) even

This article was published Online First October 31, 2011.

Rocio Garcia-Retamero, Department of Experimental Psychology, University of Granada, Spain, and Center for Adaptive Behavior and Cognition, Max Planck Institute for Human Development, Berlin, Germany; Mirta Galesic, Center for Adaptive Behavior and Cognition, Max Planck Institute for Human Development.

This study is part of the projects, "How to Improve Understanding of Risks about Health (PSI2008-02019)," and "Helping Doctors and Their Patients Make Decisions about Health (PSI2011-22954)" funded by the Ministerio de Ciencia e Innovación (Spain).

Correspondence concerning this article should be addressed to Rocio Garcia-Retamero, PhD, Facultad de Psicología, Universidad de Granada, Campus Universitario de Cartuja s/n, 18071 Granada, Spain. E-mail: rretamer@ugr.es

showed that people are often more conservative when deciding for others than for themselves and believe themselves to be more risk taking than others. Further research that explains these contradictory results is needed.

Our first aim with the present research was to contribute to the understanding of self–other discrepancies by focusing on medical decisions. As several authors have suggested (e.g., Galesic & Garcia-Retamero, 2010; Garcia-Retamero & Galesic, 2009; Gigerenzer, Gaissmaier, Kurz-Milcke, Schwartz, & Woloshin, 2007), the relationship between doctors and their patients is very special: Doctors advise patients about decisions that are often personal, with high-impact consequences, and about which patients have little or no knowledge (Chaitin et al., 2003; Garcia-Retamero, Galesic, & Gigerenzer, 2010). Although patients often want to receive more information about their health (Beaver & Booth, 2007; Gaston & Mitchell, 2005), few wish to actively participate in medical decision making (Galesic & Garcia-Retamero, 2011b). In fact, most patients trust their doctor (Calnan & Rowe, 2006; Hall, Dugan, Zheng, & Mishra, 2001; Kao, Green, Davis, Koplan, & Cleary, 1998; Mechanic & Meyer, 2000) and prefer that he or she makes medical decisions for them (Beaver & Booth, 2007; Caress, Luker, Woodcock, & Beaver, 2002; Degner & Sloan, 1992; Strull, Lo, & Charles, 1984). Moreover, doctors are experienced decision makers. Consequently, they may be less prone to biased thinking than the average person (Carpenter, 2002; Menikoff & Richards, 2006). Besides, it is possible that self–other discrepancies only occur when the decisions do not have particularly serious consequences (see Beisswanger et al., 2003; Stone & Allgaier, 2008), which is not often the case in medical decision making. Therefore, we predict small self–other discrepancies in doctors' decisions for patients.

Second, most previous studies on self–other discrepancies focused on either how people *make decisions for others* (e.g., Beisswanger et al., 2003; Stone & Allgaier, 2008; Stone et al., 2002; Wray & Stone, 2005) or how people *predict others' decisions* (e.g., Hsee & Weber, 1997; Krishnamurthy & Kumar, 2002; Levinger & Schneider, 1969; McCauley et al., 1971; Siegrist et al., 2002; Wallach & Wing, 1968). Yet decisions for others and predictions of others' decisions were not compared systematically (see Stone & Allgaier, 2008, Experiment 3 for the only exception to the best of our knowledge). This comparison is especially important in medical decision making as doctors are not expected to make riskier decisions for their patients than for themselves (discrepancies in decisions) for ethical and legal reasons, but they could still predict that their patients are more risk-seeking decision makers than they are themselves (discrepancies in predictions). If this is the case, self–other discrepancies will be larger in predictions than in decisions. We investigated this prediction experimentally.

Third, several researchers (e.g., Hare, Pratt, & Nelson, 1992; Ouslander, Tymchuk, & Rahbar, 1989; Seckler, Meier, Mulvihill, & Paris, 1991; Suhl, Simons, Reedy, & Garrick, 1994; Uhlmann & Pearlman, 1991; Uhlmann, Pearlman, & Cain, 1988; Zweibel & Cassel, 1989) analyzed the decisions that doctors make for their patients by asking doctors and patients about their preferences for or against a series of specific medical interventions that might be considered if the patients were to lose their decision-making capacity. The results of these studies indicate that doctors are rarely able to accurately predict patients' treatment wishes. We contribute to this body of research by investigating in a single study both whether doctors have difficulties predicting their patients' decisions accurately and whether they make different decisions for patients than these patients make for themselves. Our prediction is that doctors' decisions for patients and predictions of patients' decisions will not coincide with patients' decisions for themselves.

Fourth, to the best of our knowledge there has been no research on whether patients are aware of self–other discrepancies in medical decision making—if there are any. Seckler et al. (1991) showed that patients think that their doctor will represent their wishes about medical interventions much more accurately than he or she does. We predict that patients will also expect their doctor to make similar decisions for himself/herself and for them.

Last but not least, we are not aware of any research that investigates theoretical explanations of self–other discrepancies in medical decision making—again, assuming that there are any. These discrepancies may emerge due to differences in *cognitive processes* (e.g., the amount and/or type of information used to make decisions; Beisswanger et al., 2003; Kray, 2000; Kray & Gonzalez, 1999) or *emotions* (e.g., differences in feelings about risks; Hsee & Weber, 1997; Krishnamurthy & Kumar, 2002; Siegrist et al., 2002). In the following section, we describe a study designed to delineate the predictions of these theoretical explanations.

The Present Research

We conducted a study involving a sample of doctors and their patients. The study involved two types of judgments manipulated between groups (see Figure 1). In the *decision group*, doctors made decisions for themselves, for the *last* patient they attended, and for the *next* patient they were going to attend. Note that doctors were familiar with the last patient (i.e., they knew who this patient was), whereas the next patient was unknown and therefore abstract (i.e., they did not know which of their patients would be next). Patients in the decision group made decisions for themselves and predicted the decisions that their doctor would make for them. In the *prediction group*, doctors made decisions for themselves and predicted the decisions that their *last* patient would make for himself/herself and that their *next* patient would make for himself/herself. Patients in this group made decisions for themselves and predicted the decisions that their doctor would make for himself/herself. Thus, the two group conditions involved three within-subject types of judgments for doctors (with themselves and their last and next patient as targets of the judgments), and two within-subject types of judgments for patients (with themselves and their doctor as targets of the judgments).

Participants in the study received several scenarios describing a risky and a safe medical treatment and indicated which treatment they or their doctor/patients would choose. Afterward, participants described the factors they thought influenced their decisions or their doctor's/patients' decisions. We compared doctors' decisions for their patients and their predictions of their patients' decisions with doctors' and patients' decisions for themselves and tested two theoretical explanations of self–other discrepancies in medical decision making.

Self–other discrepancies might be due to cognitive processes such as differences in the information that doctors and patients consider when they make decisions for themselves or, in the

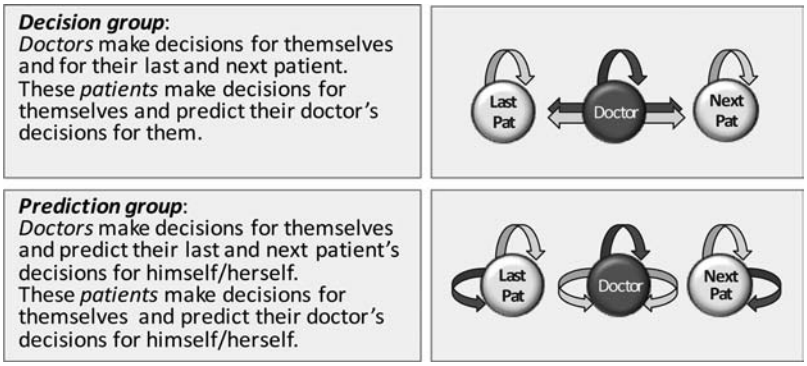

Figure 1. Groups in the study. Dark circles and arrows represent doctors and their judgments, respectively. Light circles and arrows represent patients and their judgments, respectively. Arrows always point to the target of the judgment. Doctors'/patients' decisions for themselves and predictions of their patients'/doctors' decisions for themselves are represented as curved arrows. Doctors' decisions for their patients and patients' predictions of their doctor's decisions for them are represented as straight arrows. Pat = patient.

doctors' case, when they make decisions for their patients or predict their patients' decisions. Evidence supporting the *cognitive hypothesis* has been documented in research investigating how people make *decisions for others*. For example, recent research by Kray and Gonzalez (1999; see also Kray, 2000) showed that people consider more information when deciding for themselves than for others. More precisely, they take into account multiple sources of information when making decisions for themselves, but they focus on only some aspects of the problem when deciding for others. Besides considering more information, people may also consider a different type of information when deciding for themselves and for others. For instance, Beisswanger et al. (2003; see also Vorauer & Ratner, 1996) showed that people are more likely to focus on negative outcomes and ignore positive outcomes when making decisions for themselves than when deciding for others. These authors therefore concluded that self–other discrepancies emerge because of the *type* rather than the *amount* of information considered when making decisions for others. This hypothesis implicitly assumes that people make decisions by consciously weighing the potential positive consequences against the negative consequences using a procedure akin to a cost-benefit analysis.

In our study, the cognitive hypothesis predicts that doctors will consider more benefits and fewer drawbacks of the medical treatments when they make decisions for their patients than when they or their patients make the same decisions for themselves. As a consequence, doctors will make different decisions for their patients than they (i.e., the doctors) make for themselves or than these patients make for themselves. The cognitive hypothesis further predicts that doctors will consider similar sources of information when deciding for their last and next patient. They will then make similar decisions for these patients.

Alternatively, self–other discrepancies in medical decision making might be determined by people's emotions and feelings about risk. The central argument of the *risk-as-feelings* hypothesis (Hsee & Weber, 1997; Loewenstein, Weber, Hsee, & Welch, 2001; Slovic, Finucane, Peters, & McGregor, 2004) is that people make their decisions, in part, based on their hedonic response to the various decision options, and that departures from risk neutrality depend on the extent to which they like or dread the risky option(s). The more pronounced the affective response is, the greater should be the departure from risk neutrality.

In line with this hypothesis, Hsee and Weber (1997) suggested that people predict decisions of others partly on the basis of their own feelings about the decision options, but they have difficulty in fully empathizing with others and, therefore, may believe that others have feelings that are less strong than their own. Consequently, people expect others to be more risk neutral than they are themselves. That is, their predictions of others' decisions regress from risk aversion (seeking) when the information is framed as gains (losses) toward risk neutrality (see also Faro & Rottenstreich, 2006).

Evidence consistent with this stream of literature was obtained in research investigating how people *predict others' decisions*. For instance, Siegrist et al. (2002; see also Hsee & Weber, 1997) showed that people's predictions of others' decisions are correlated with the decisions they make for themselves. This result can be interpreted as suggesting that people make decisions for others partly on the basis of their own feelings about risk. With results that are also consistent with this theory, Hsee and Weber (1997) showed that self–other discrepancies are larger when the target of the prediction is abstract (i.e., when the other is unknown) than when the target is familiar. If the target is familiar, people empathize with the target, perceive the target to have feelings similar to their own, and consequently predict the target will make the same decisions as they themselves would make. In contrast, if the target is abstract, people are emotionally more distant from the target, have greater difficulty imagining how the target feels about risk and, consequently, resort more to risk neutrality to make their predictions.

In our study, the risk-as-feelings hypothesis predicts that doctors' predictions of their patients' decisions will be only minimally correlated with the decisions that doctors make for themselves. In addition, self–other discrepancies might be large—and therefore correlations should be lower—when doctors predict their next rather than their last patient's decisions as doctors know the identity of the last patient but not that of the next one.

To the best of our knowledge, the cognitive hypothesis does not forecast how people predict others' decisions but rather focuses on

how they make decisions for others. Similarly, the risk-as-feelings hypothesis does not make predictions about how people make decisions for others but rather focuses on how they predict others' decisions. For the sake of simplicity, we assume that the two theories make similar predictions about doctors' decisions for their patients and doctors' predictions of their patients' decisions.

In summary, in our study we investigated five research questions. First, do doctors make different decisions for themselves and their patients? Second, do doctors' predictions of patients' decisions differ from the decisions that doctors make for themselves, and are self–other discrepancies in predictions larger than those in decisions? Third, do doctors predict patients' decisions accurately, and are the decisions they make for their patients similar to those that patients make for themselves? Fourth, are patients aware of self–other discrepancies? And finally, assuming that there are self–other discrepancies in medical decision making, why do these discrepancies arise in the first place? Do they emerge because of differences in cognitive processes (i.e., amount and/or type of information that doctors use to make the decisions) or are these differences determined by doctors' emotions and feelings about risk? Answers to these questions are provided in the study we describe next.

Method

Participants

The study was conducted in December 2009 and January 2010. Respondents were 40 doctors (average age of 49 years, range 40–63 years; 45% males) and 80 patients (average age of 55 years, range 18–82 years; 38% males). All doctors had a university degree and had worked as general practitioners for an average of 14.4 years ($SD = 6.63$). The majority of the patients (65%) had at most a secondary school education (i.e., up to age 15), or less than high school (23%), and 12% had a university degree. Fifteen percent of the patients had a chronic condition (such as diabetes or allergies). All participants were recruited by the first author from four hospitals in the cities of Granada and Jaén (Spain). To be eligible for recruitment, doctors had to be general practitioners for at least 1 year, and patients had to have known their doctor for at least 1 year before the study and had to have visited the doctor at least twice during the year before the study (on average, patients knew their doctor for 6.4 years and made 3.2 visits to their doctor during the year before the study).

Doctors were assigned randomly to one of two equally sized groups ($n = 20$) and received €40 for participating in the study. The last and next patient whom doctors attended participated in the study and received €20. Male and female doctors and patients were evenly distributed in the groups. All participants provided written and/or verbal consent to participate in the study.

Materials and Procedure

All participants completed a two-part paper-and-pencil questionnaire. In the first part, participants received a set of seven scenarios for each target of the judgments (i.e., themselves and their last and next patient for doctors, and themselves and their doctor for patients). Each set of scenarios started with an introductory statement. The order of the sets of scenarios was counterbalanced. Each scenario described a risky and a safe treatment (see Table 1 for a summary), and participants indicated which treatment they or their doctor/patient would choose. The risky treatment could lead to immediate recovery with a chance of 50%, or to a long period of illness (i.e., 7 months) with a chance of 50%. The safe treatment, in contrast, always led to certain recovery after a shorter time period that varied from scenario to scenario (from 1 to 7 weeks; see Hsee & Weber, 1997, for a similar procedure).[1] In every set, the seven scenarios were presented in the following order: 4, 5, 3, 6, 2, 7, 1. Half of the participants received the information about the risky treatment first and the rest received the information about the safe treatment first.

When participants made decisions for themselves, they received the following information (version for scenario 4 in Table 1).

"Think about *yourself* for a moment. Imagine that *you* have come down with a new disease. *You* have mild body aches and fatigue. The disease can also have serious symptoms such as severe headache, high fever, strong abdominal pain, and nausea, and it could even have sudden death as an outcome. You recently learned that there are two treatments for *your* disease. In the following, we present a series of scenarios describing the outcomes of the treatments. ***Your task is to tell us which treatment you would choose for yourself in each scenario***.

Treatment A: The chance that *you* will suffer the serious symptoms of the disease for 7 months after taking the treatment is 50%, but there is also a 50% chance that *you* will be cured after taking the treatment.

Treatment B: The chance that *you* will suffer the serious symptoms of the disease for 4 weeks after taking the treatment is 100%, but after that *you* will be completely cured.

Which treatment would you choose? Please select one option.
[ ] Treatment A [ ] Treatment B.

The text in italics was adapted to the target of the judgment in each condition. Statements in bold were replaced by the corresponding option according to Table 2.

After each set of scenarios, participants described the factors they thought influenced their decisions or their doctor's/patients' decisions (depending on whether the participants made decisions for themselves or for their doctor/patients, or predicted their decisions). Half of the participants listed factors in favor of the risky treatment and against the safe treatment first, while the other half listed factors in favor of the safe treatment and against the risky treatment first. Participants also reported how much they thought

[1] These values were selected on the basis of a pilot study. Eighty-eight students from the University of Granada participated in the pilot (32% male; average age of 21.5 years). All participants received the description of the risky and the safe treatment in the seven scenarios. In each scenario, half of the participants evaluated which treatment was riskier, while the other half chose one of the treatments for themselves. Ninety-three percent of the participants evaluated the risky treatment as riskier than the safe treatment. The rest suggested that both treatments were equally risky. Participants' average risk preference was 2.87, which implies that they were risk averse when they made decisions for themselves. These results are consistent with research showing that people are largely risk averse when making decisions about their own health (Doiron, Jones, & Savage, 2008; Elbasha, 2005; Rosen, Tsai, & Downs, 2003).

Table 1
Treatment Options in the Seven Scenarios

Scenario	Treatment options	
	Safe treatment	Risky treatment
1	7 weeks	7 months or immediate cure
2	6 weeks	7 months or immediate cure
3	5 weeks	7 months or immediate cure
4	4 weeks	7 months or immediate cure
5	3 weeks	7 months or immediate cure
6	2 weeks	7 months or immediate cure
7	1 week	7 months or immediate cure

Note. Amount of time that the symptoms would persist before being cured, after taking the safe and risky treatment in the seven scenarios.

about their responses to the questions in each set of scenarios, and to what extent it was important for them to make good judgments, using 10-point scales ranging from 1 (*not much*) to 10 (*very much*).

In the second part of the questionnaire, participants provided their demographic details including age, sex, and education level. Doctors reported how long they had been working as general practitioners; patients reported whether they had a chronic condition (and if yes, which one). Finally, patients reported how often they had visited their doctor in the year before the study and for how many years they had known their doctor. There were no time constraints, but the questionnaire took approximately 25 min to complete. After completing the questionnaire, participants answered other questions about shared decision making and trust and solved some problems involving probabilities. These results will be reported elsewhere.

Data Analyses

Calculation of the risk preference index. Following Hsee and Weber (1997), a risk preference (RP) index was calculated from doctors' and patients' responses to the questions in the seven scenarios. The index was computed for each type of judgment and target in each group condition. For each participant, the seven scenarios in Table 1 were reordered according to the amount of time the symptoms would persist under the safe treatment (i.e., from Scenario 1 to 7). The RP index was based on the point in the sequence at which the participant moved from choosing the risky treatment to choosing the safe one (see Hsee & Weber, 1997; Krishnamurthy & Kumar, 2002; and Siegrist et al., 2002, for a similar procedure). For a participant who chose the risky treatment in Scenario 1 through Scenario *i*-1 and the safe treatment in Scenario *i* through Scenario 7, the RP index is defined as *i* ($i = 2, 3, \ldots 7$). Note that we would not observe a shift when the participant either never or always chose the risky treatment. In such cases, the RP index takes the value of 1 or 8, reflecting extreme risk aversion or risk seeking, respectively. Thus, the RP index ranges from 1 to 8, with larger values indicating greater risk preference. For participants lacking consistency in their responses for a target (i.e., 3%), the RP index is defined as a missing value for that target (e.g., a participant chose the safe treatment for herself when symptoms could persist for 5 weeks after this treatment, whereas she chose the risky treatment when symptoms could persist for 1 week after the safe treatment).

Coding of factors influencing risk preferences. The two sets of factors that participants thought influenced their decisions or their doctor's/patients' decisions were coded into thematic categories by two independent coders. The first set included factors influencing decisions in favor of the risky treatment and against the safe treatment; the second set included factors influencing decisions in favor of the safe treatment and against the risky treatment.

Prior to the categorization, the coders had each read through both response sets and agreed upon the thematic categories that were apparent and involved benefits and drawbacks of the risky and safe treatments (see Beisswanger et al., 2003, for a similar procedure). For the sake of simplicity and brevity, in the following, we only report benefits and drawbacks of the *risky* treatment, because these factors coincided with those affecting decisions in

Table 2
Experimental Instructions in the Two Group Conditions as a Function of the Type of Judgment and Target of Judgment

Group	Instructions
Decision group	(1) *Doctors and patients made decisions for themselves*: • Your task is to tell us which treatment you would choose for yourself in each scenario. • Which treatment would you choose? (2) *Doctors made decisions for their patients (next-patient version)*: • Your task is to tell us which treatment you would choose for your next patient in each scenario. • Which treatment would you choose? (3) *Patients predicted their doctor's decisions for them*: • Your task is to tell us which treatment your doctor would choose for you in each scenario. • Which treatment would your doctor choose?
Prediction group	(1) *Doctors and patients made decisions for themselves*: • Your task is to tell us which treatment you would choose for yourself in each scenario. • Which treatment would you choose? (2) *Doctors predicted their patients' decisions (next-patient version)*: • Your task is to tell us which treatment your next patient would choose for himself/herself in each scenario. • Which treatment would your next patient choose? (3) *Patients predicted their doctor's decisions for himself/herself*: • Your task is to tell us which treatment your doctor would choose for himself/herself in each scenario. • Which treatment would your doctor choose?

favor of and against the safe treatment in 84% of the cases (i.e., a benefit of the risky treatment is often considered a drawback of the safe treatment).

Intercoder agreement was high (i.e., 95.5% for drawbacks and 93.1% for benefits). The few disagreements were adjudicated by a third coder. In accordance with past research (Moore & Gullone, 1996), it was decided that any category with less than 5% of responses would be coded as "other." In the Results section, we first report the overall number of benefits and drawbacks and the thematic categories to which they were assigned. Following Beyth-Marom, Austin, Fischhoff, Palmgren, and Jacobs (1993), benefits and drawbacks were further coded in terms of whether they referred to personal effects or involved effects on others.

Results

Self–Other Discrepancies in Decisions and Predictions

To assess (1) whether doctors made different decisions for their patients and for themselves, and (2) whether doctors' predictions of their patients' decisions differed from the decisions that doctors made for themselves (research questions 1 and 2, respectively), we computed the difference between doctors' risk preferences for their patients and for themselves in decisions and predictions. Differences were computed for each doctor and his or her last and next patient separately. Figure 2 shows the percentage of doctors whose risk preferences in decisions for their patients or predictions of their patients' decisions were equal to or lower or higher than their risk preferences in decisions for themselves.

We predicted that self–other discrepancies involving doctors would not be very pronounced. In contrast to our prediction, many doctors showed large self–other discrepancies both in decisions and in predictions. In particular, most doctors were more risk averse when they made decisions for their last (75%) and next (70%) patient than for themselves. In contrast, only a few made less risk-averse decisions for their last and next patient (15% and 20%) than for themselves or made similar decisions (10% and 10%). Consistent with these results, in decisions, doctors' risk preferences for their last and next patient were lower than for themselves, mean difference = −1.25, $t(38) = -4.19$, $p = .0002$, $d = 1.33$, and mean difference = −1.10, $t(38) = -4.22$, $p = .0002$, $d = 1.34$ for doctors' last and next patient, respectively. In fact, many doctors made exactly the same (50%) or very similar decisions (discrepancies of ±1, 35%) for their last and for their next patient.

At the same time, many doctors (60%) predicted their *next* patient to be significantly more risk seeking than they were themselves. In contrast, only a few predicted their next patient to be less (15%) or equally (25%) risk seeking. Moreover, many doctors predicted that their *last* patient would make the same (50%) decisions as those that the doctors made for themselves. Fewer doctors, however, predicted that their last patient would make more (40%) or less (10%) risk-seeking decisions than those that the doctors made for themselves. Consistent with these results, in predictions, doctors' risk preferences for their next patient but not those for their last patient were higher than for themselves, mean difference = 1.75, $t(38) = 3.60$, $p = .001$, $d = 1.14$, and mean difference = .50, $t(38) = 1.95$, $p = .10$, $d = .51$ for the doctors' next and last patient, respectively.

We further predicted that self–other discrepancies would be larger in doctors' predictions of their patients' decisions than in their decisions for their patients. In contrast, these discrepancies were smaller in predictions than in decisions for the last patient but were similar in those for the next patient. In line with these results, the absolute difference between doctors' risk preferences in decisions for their *last* patient and for themselves significantly differs from that in predictions, absolute mean difference = 1.55 versus .80, $t(38) = 2.50$, $p = .017$, $d = .79$. The absolute difference between doctors' risk preferences in decisions for their *next* patient

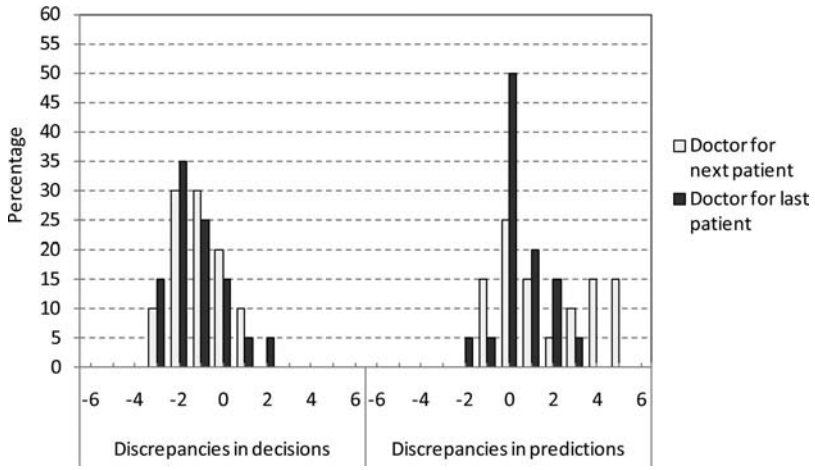

Figure 2. Percentage of doctors whose risk preferences in decisions for their patients or predictions of their patients' decisions were equal to (0) or lower (<0) or higher (>0) than *their own* risk preferences in decisions for themselves by type of patient. Note: A discrepancy of zero indicates that doctors' risk preferences for their patients and for themselves were the same. Positive (negative) discrepancies indicate that doctors were more (less) risk seeking in decisions for their patients or predictions of their patients' decisions than in decisions for themselves.

and for themselves does not significantly differ from that in predictions, absolute mean difference = 1.30 versus 2.05, $t(38) = -1.60$, $p = .12$, $d = .51$.

Correspondence of Doctors' Decisions for Patients and Predictions of Patients' Decisions With Patients' Decisions for Themselves

To assess whether doctors made decisions for their patients similar to those that these patients made for themselves and predicted their patients' decisions accurately (research question 3), we computed the difference between doctors' risk preferences for their patients and the patients' risk preferences for themselves in decisions and predictions. Differences were computed for each doctor and his or her last and next patient separately. Figure 3 shows the percentage of doctors whose risk preferences in decisions for their patients or predictions of their patients' decisions were equal to or lower or higher than the patients' risk preferences in decisions for themselves.

We predicted that doctors' decisions for patients and predictions of patients' decisions would not coincide with patients' decisions for themselves. In line with our predictions, most doctors made less risky decisions for their last (63%) and next (79%) patient than these patients made for themselves. Only a few doctors made equal or more risky decisions for their last (21% and 16%) and next (0% and 21%) patient than these patients made for themselves. Consistent with these results, in decisions, doctors' risk preferences for their last and next patient were lower than these patients' risk preferences for themselves, mean difference = −1.47, $t(37) = -2.73$, $p = .01$, $d = .87$, and mean difference = −1.26, $t(38) = -2.83$, $p = .007$, $d = .89$ for doctors' last and next patient, respectively.

Similarly, most doctors (70%) predicted that their next patient would make riskier decisions than this patient actually made. Only a few expected that their next patient would make the same decisions (25%) as this patient actually made or less risky decisions (5%) than this patient actually made. In contrast with our hypotheses, however, many doctors accurately predicted their last patient's decisions (50%), and only a few expected that their last patient would make riskier (25%) or less risky (25%) decisions than this patient actually made. Consistent with these results, in predictions, doctors' risk preferences for their next patient but not those for their last patient were higher than these patients' risk preferences for themselves, mean difference = 1.55, $t(38) = 3.87$, $p = .0004$, $d = 1.22$, and mean difference = –.25, $t(38) = -.93$, $p = .36$, $d = .29$ for the doctors' next and last patient, respectively.

Awareness of Self–Other Discrepancies

To assess whether patients were aware of self–other discrepancies in medical decision making (research question 4), we compared patients' predictions of their doctor's decisions for himself/herself (i.e., for the doctor; prediction group) and patients' predictions of their doctors' decisions for them (i.e., for the patients; decision group; see Figure 1).

We predicted that patients might not be aware of self–other discrepancies in decision making. With results consistent with this prediction, the analyses showed that both last and next patients predicted that their doctor would make the same decisions for himself/herself and for them, risk preference = 2.89 versus 3.57, $t(36) = .94$, $p = .35$, $d = .30$ for last patients, and risk preference = 3.68 versus 3.33, $t(35) = -.40$, $p = .69$, $d = .13$ for next patients.

Theoretical Explanations of Self–Other Discrepancies in Medical Decision Making

Some of the results we reported are not consistent with our predictions. In particular, we predicted that self–other discrepancies involving doctors would not be very pronounced and that

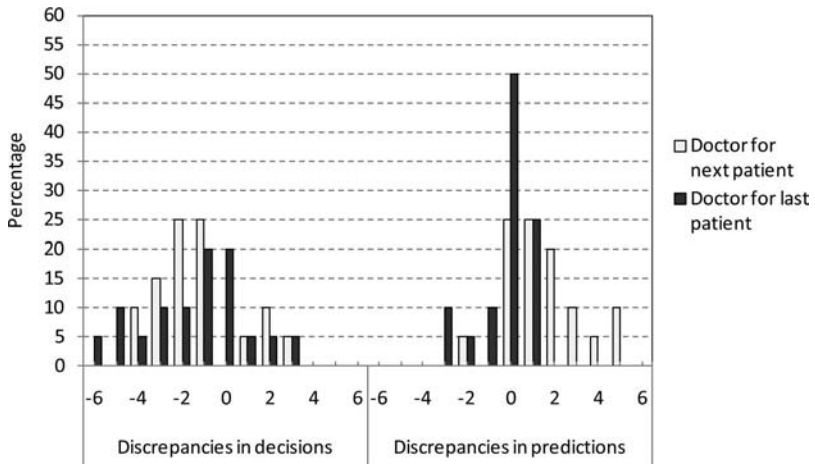

Figure 3. Percentage of doctors whose risk preferences in decisions for their patients or predictions of their patients' decisions were equal to (0) or lower (<0) or higher (>0) than *their patients'* risk preferences in decisions for themselves by type of patient. Note: A discrepancy of zero indicates that doctors' risk preferences for their patients and patients' risk preferences for themselves were the same. Positive (negative) discrepancies indicate that doctors were more (less) risk seeking when making decisions for their patients or predicting their patients' decisions than patients were in decisions for themselves.

these discrepancies would be larger in doctors' predictions of their patients' decisions than in their decisions for the patients. However, we documented large self–other discrepancies both in predictions and in decisions. Even more, these discrepancies were smaller in predictions than in decisions for the doctors' last patient but were similar in those for the next patient. That is, doctors often made more conservative decisions for their patients than for themselves but predicted their patients–especially the next patient—would be more risk seeking than themselves. Also, in contrast to our expectations, doctors accurately predicted the decisions of their last patient. In line with our predictions, however, doctors did not accurately predict the decisions of their next patients and made different (i.e., more conservative) decisions for their last and next patients than these patients actually made for themselves. Finally, patients were not aware of self–other discrepancies in medical decision making, which is also consistent with our predictions.

To investigate why doctors showed self–other discrepancies in their judgments (research question 5), and to shed light on our unexpected findings, we conducted further analyses. In particular, we first analyzed the number and type of *factors* influencing doctors' and patients' responses to test whether these factors can explain their risk preferences–as the cognitive hypothesis predicts. Second, we analyzed *correlations* between doctors' risk preferences for their patients and for themselves to test whether doctors' decisions for their patients and predictions of their patients' decisions are related to the decisions they made for themselves. As we mentioned above, the risk-as-feelings hypothesis predicts that this might not be the case–especially for the doctors' next patient. Finally, we investigated whether our results are due to differences in participants' demographics or in their involvement and motivation when they made their decisions and predictions (see Levin, Schnittjer, & Thee, 1988).

Overall doctors suggested more factors (benefits and drawbacks combined) when they made decisions for their patients than for themselves, number of factors = 1.53 versus 1.20, $t(19) = 3.85$, $p = .001$, $d = .68$. There was a similar trend in doctors' predictions of their patients' decisions, number of factors = 1.20 versus 1.05, $t(19) = 1.88$, $p = .076$, $d = .09$. Doctors also suggested more drawbacks, $t(19) = 7.34$, $p = .0001$, $d = .99$, and fewer benefits, $t(19) = -2.13$, $p = .046$, $d = .72$, of the risky treatment when they made decisions for their patients than when they made the same decisions for themselves (see Figure 4). Doctors, however, suggested a similar number of drawbacks, $t(19) = -.69$, $p = .49$, $d = .19$, and benefits, $t(19) = -.27$, $p = .79$, $d = .07$, in decisions for their last and next patient. The findings that most doctors made more risk-averse decisions for their patients than for themselves and that they made similar decisions for their last and next patient (see Figure 2) are consistent with the analyses of the type of factors influencing doctors' decisions (see Figure 4) and with the cognitive hypothesis: Doctors might make decisions for their patients based on the potential drawbacks and benefits of the decisions. Figure 4 further shows that patients considered fewer drawbacks, $t(19) = -4.36$, $p = .003$, $d = .99$, and more benefits, $t(19) = 2.37$, $p = .028$, $d = .64$, of the risky treatment when they made decisions for themselves than their doctors did when they made decisions for these patients. This result is also in line with the cognitive hypothesis as patients often made more risky decisions for themselves than their doctors did for them (see Figure 3).

In contrast with the cognitive hypothesis, doctors considered a similar number of drawbacks, $t(19) = 1.07$, $p = .30$, $d = .22$, and benefits, $t(19) = 1.32$, $p = .20$, $d = .43$, of the risky treatment when they predicted their patients' decisions and made decisions for themselves (see Figure 4). Doctors also suggested a similar number of drawbacks, $t(19) = 1.19$, $p = .25$, $d = .28$, and benefits, $t(19) = .001$, $p = .99$, $d = .001$, in their predictions of their last and next patient's decisions. As we mentioned above (see Figure 2), doctors predicted that their last—but not their next—patient would make similar decisions to those the doctors made for themselves. In addition, patients making decisions for themselves and doctors predicting these patients' decisions considered a similar number of benefits, $t(19) = -1.32$, $p = .20$, $d = .38$, and drawbacks, $t(19) = -.001$, $p = .99$, $d = .001$ (see Figure 4). This result is also in contrast with the cognitive hypothesis as doctors accurately predicted their last—but not their next—patient's decisions (see Figure 3).

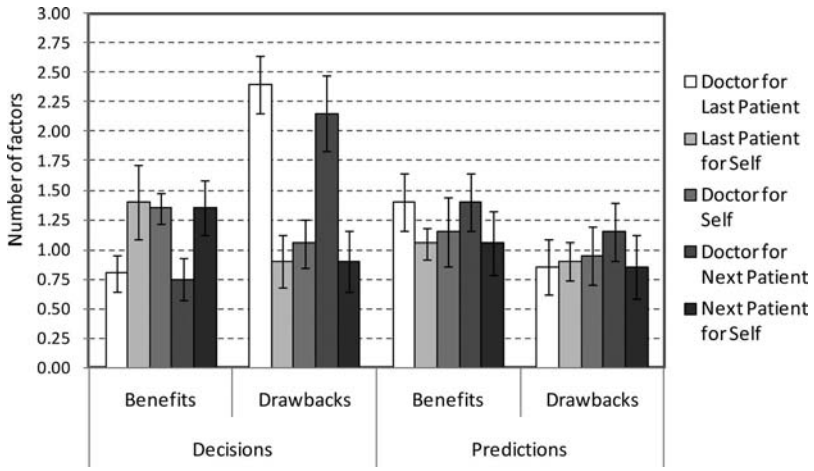

Figure 4. Average number of benefits and drawbacks influencing doctors' and patients' risk preferences as a function of type of judgment and target of judgment. Error bars indicate one standard error.

Table 3 shows the thematic categories encompassing the drawbacks and benefits of the risky treatment mentioned when doctors and patients made decisions for themselves and when doctors made decisions for their patients and predicted their patients' decisions. There were from three to five meaningful thematic categories in each condition. These categories (excluding the "other" category) captured over 83% and 94% of the benefits and drawbacks, respectively. The main cited drawback of the risky treatment was "possible legal consequences" of the decisions (38%; e.g., being sued by the patient or the patient's family) when doctors made decisions for their patients. When doctors predicted patients' decisions, the most cited drawback was the "likelihood of experiencing more pain" (40%). Finally, the most cited drawback when doctors and patients made decisions for themselves was "likelihood of experiencing pain for a longer period" (35% and 42%, respectively). At the same time, "likelihood of experiencing less pain" represented the most cited benefit of the risky treatment when doctors made decisions for their patients and when they predicted their patients' decisions (39% and 32%, respectively). In contrast, when patients made decisions for themselves the most commonly cited benefit was that "the treatment might be more effective" (38%). Finally, the most commonly cited benefit of the risky treatment when doctors made decisions for themselves was "chance of recovering faster" (34%).

As Table 4 shows, when doctors and patients made decisions for themselves, the majority of drawbacks and benefits of the risky treatment referred to personal effects, while all drawbacks and benefits involved effects on others when doctors predicted their patients' decisions. In contrast, when doctors made decisions for their patients, the majority of the drawbacks referred to personal effects, while most of the benefits referred to effects on others.

In a second step in our data analyses, we computed (1) the correlation between doctors' risk preferences for their patients and for themselves and (2) the correlation between doctors' risk preferences for their patients and these patients' own risk preferences. As Table 5 shows, doctors' predictions of their last patient's decisions were highly correlated with the decisions that doctors made for themselves. In contrast, doctors' predictions of their next patient's decisions and, especially, doctors' decisions for their last and next patient were not related to the decisions that doctors made for themselves. The finding that most doctors predicted that their last—but not their next—patient would make similar decisions to those the doctors made for themselves (see Figure 2) is consistent with the correlation analyses (see Table 5) and with the risk-as-feelings hypothesis: Doctors might have based their predictions of their last—but not that of their next—patient's decisions on their own risk preferences as they knew the identity of the last patient but not that of the next one. In contrast, doctors' decisions for patients were not in line with the risk-as-feelings hypothesis, as neither decision for their last patient nor those for their next patient were related to those that doctors made for themselves. We found a similar pattern of results in correlations between doctors' risk preferences for their patients and these patients' own risk preferences. In the General Discussion, we spell out the theoretical implications of these results.

Finally, we investigated whether our results persisted after controlling for participants' demographics and involvement and motivation when they made their decisions and predictions. The

Table 3
Thematic Categories of Benefits and Drawbacks of the Risky Treatment Mentioned by Doctors and Their Patients

Benefits			Drawbacks		
%	*f*	Thematic category	%	*f*	Thematic category
		Doctors' decisions for patients (f = 31)			*Doctors' decisions for patients (f = 91)*
39	12	Likelihood of experiencing less pain	38	35	Possible legal consequences of the decision
26	8	Chance of recovering faster	24	22	Having problems at work
10	3	The treatment might be more effective	19	17	Likelihood of experiencing more pain
26	8	Other	10	9	Uncertainty about the symptoms
			9	8	Other
		Doctors' predictions of patients' decisions (f = 56)			*Doctors' predictions of patients' decisions (f = 40)*
32	18	Likelihood of experiencing less pain	40	16	Likelihood of experiencing more pain
30	17	Chance of recovering faster	30	12	Likelihood of experiencing pain for a longer period
13	7	Fewer problems in patient's daily life	18	7	Uncertainty about the symptoms
7	4	The treatment might be more effective	13	5	Other
18	10	Other			
		Patients' decisions for themselves (f = 97)			*Patients' decisions for themselves (f = 71)*
38	37	The treatment might be more effective	42	30	Likelihood of experiencing pain for a longer period
24	23	Chance of recovering faster	23	16	Likelihood of experiencing more pain
18	17	Likelihood of experiencing less pain	23	16	Chance of experiencing more side effects if the symptoms persist
6	6	Less painful for family	7	5	More painful for family
14	14	Other	6	4	Other
		Doctors' decisions for themselves (f = 50)			*Doctors' decisions for themselves (f = 40)*
34	17	Chance of recovering faster	35	14	Likelihood of experiencing pain for a longer period
24	12	Likelihood of needing the treatment for a shorter period	33	13	Likelihood of experiencing more pain
14	7	Likelihood of experiencing less pain	15	6	Uncertainty about the symptoms
12	6	The treatment might be more effective	18	7	Other
16	8	Other			

Note. Relative (%) and absolute (*f*) frequency of all thematic categories concerning benefits and drawbacks for different types of judgment.

Table 4
Benefits and Drawbacks of The Risky Treatment Considered by Doctors and Patients as a Function of Whether They Referred to Personal Effects or Involved Effects on Others

	Benefits		Drawbacks	
Condition	Personal effects (%)	Effects on others (%)	Personal effects (%)	Effects on others (%)
Doctors' decisions for patients	19	81	67	33
Doctors' predictions of patients' decisions	0	100	0	100
Patients' decisions for themselves	87	13	90	10
Doctors' decisions for themselves	92	8	75	25

inclusion of participants' sex, age, and level of education in the analyses either as independent variables or as covariates did not systematically influence our findings. Whether patients had a chronic disease and the length of doctor–patient relationship did not systematically influence our results, either. The only exception is a significant positive relationship between years of experience as a doctor and accuracy in predicting their last patient's decisions. Finally, the results are not due to differences in participants' involvement and motivation when making their decisions and predictions (Levin et al., 1988), as doctors and patients reported similar consideration when answering the questions ($M = 7.90$, $SEM = .45$, and $M = 7.80$, $SEM = .23$, for doctors and patients, respectively) and coincided in the extent to which it was important for them to provide correct answers to these questions ($M = 7.90$, $SEM = .25$, and $M = 7.60$, $SEM = .28$, for doctors and patients, respectively) when they made decisions for themselves and when their patient/doctor was the target of the decisions/predictions.

General Discussion

We investigated how doctors make decisions for their patients and for themselves and how they predict their patients' decisions. We also investigated whether these decisions and predictions coincided with the decisions that patients made for themselves. Our study documented three important findings. First, many doctors made more conservative decisions about medical treatments for their patients than for themselves (i.e., they frequently selected a safer medical treatment). This result is robust as doctors often made similar decisions for patients they knew personally (i.e., the last patient they attended) and for patients whose identity they did not know (i.e., the next patient they were going to attend). At the same time, these patients often made riskier decisions about medical treatments for themselves than their doctors did for them. Doctors, therefore, showed substantial self–other discrepancies in medical decision making and did not make decisions that reflected their patients' preferences. Second, many doctors predicted their *last* patient would make decisions about medical treatments similar to those that these doctors made for themselves. These predictions were accurate, as the patients' decisions in fact often coincided with their doctor's predictions. In contrast, many doctors expected their *next* patient to make riskier decisions for himself/herself than doctors made for themselves. In fact, many doctors were not accurate in predicting their next patient's decisions and overestimated this patient's willingness to choose the risky treatment. Doctors, therefore, only showed substantial self–other discrepancies in predictions of patients whose identity they did not know. Third, neither the last nor next patients were aware of these self–other discrepancies and frequently thought that their doctor would make similar decisions for himself/herself and for them. Clear theoretical and practical implications can be drawn from our findings.

Implications of the Results for Research on Self–Other Discrepancies in Decision Making

Although some authors might wish otherwise (e.g., Carpenter, 2002; Menikoff & Richards, 2006), our results suggest that doctors show a systematic bias when they make decisions for their patients and predict their patients' decisions. Our findings provide some insight about the process underlying this bias.

As we mentioned above, the *cognitive hypothesis* suggests that self–other discrepancies are due to the amount and/or type of information considered in the decisions and predictions of decisions. Doctors' decisions for their patients are consistent with this hypothesis and can be interpreted as suggesting that they might have used a procedure similar to a cost-benefit analysis to combine

Table 5
Correlations Between Doctors' Risk Preferences for their Patients and for Themselves and Between Doctors' Risk Preferences for their Patients and these Patients' Risk Preferences for Themselves as a Function of Type of Judgment

	Decisions		Predictions	
Risk preferences for self	Doctors' risk preferences for last patient	Doctors' risk preferences for next patient	Doctors' risk preferences for last patient	Doctors' risk preferences for next patient
Doctors' risk preferences for themselves	.14	.03	.61*	.29
Patients' risk preferences for themselves	–.02	–.18	.54*	.28

*Differs from zero; $p < .05$.

drawbacks and benefits of the medical treatments when making decisions for their patients. Doctors might have selected the risky treatment if the number of benefits of this treatment was larger and the safe treatment if the number of drawbacks seemed more compelling.

In contrast, the *risk-as-feelings hypothesis* assumes that doctors' decisions for their patients and predictions of their patients' decisions do not involve a conscious trade-off between benefits and drawbacks of the treatments. Rather, this theory assumes that doctors' decisions for patients and predictions of patients' decisions are partly based on doctors' own risk preferences and feelings about risk and partly on risk neutrality (which reflects a lack of particular feelings). Doctors' predictions of their patients' decisions were in line with this hypothesis and can be interpreted as suggesting that they might have projected their own feelings about risk onto their last but not their next patient when they made these predictions.

In summary, our results suggest that doctors' predictions and decisions are based on different underlying processes. While doctors may predict patients' decisions based on their own risk preferences and feelings about risk, they make decisions for their patients based on additional information concerning potential costs and benefits of medical treatments. This conclusion is further supported by the finding that doctors considered the same amount and type of information when they predicted their last and next patient's decisions (see Figure 4). The finding that doctors' decisions for patients were not similar (i.e., related) to those that doctors made for themselves supports our conclusion, as well (see Table 5; see Wray & Stone, 2005, for similar results).

Implications of the Results for Expert Decision Making

Doctors often make decisions for their patients. Due to time constraints, however, they might not often try to predict their patients' risk preferences and treatment wishes in their medical practice (Barry, 1999; Frosch & Kaplan, 1999; Hanson, 2008). It is, therefore, most likely that doctors' decisions for patients—rather than their predictions—are a result of their previous experience and expertise. This conclusion is supported by self–other discrepancies in expert and novice decision makers in several domains, including health.

In clear contrast to our results, for instance, the findings of several authors (e.g., Beisswanger et al., 2003; Kray, 2000; Kray & Gonzalez, 1999; Stone & Allgaier, 2008) showed that undergraduates with no formal training in decision making in various domains such as job selection and personal relationships often made riskier—rather than less risky—decisions for others than for themselves. They also used more—rather than less—information, including potential negative outcomes, to make decisions for themselves than for others. Also, in contrast to our participants, novices made similar decisions for themselves and for others when the decisions could have serious, life-changing consequences (Beisswanger et al., 2003), and more often recommended risky decisions (e.g., a risky medical treatment for cancer) to people they knew personally than to someone in the general population (Levin et al., 1988). Doctors in our study, in contrast, made similar decisions for patients they knew personally and for patients whose identity they did not know. Our findings, therefore, suggest that conclusions about self–other discrepancies in decision making in research using convenient samples of undergraduates with no formal expertise in the domain of decision making cannot be generalized to expert decision makers (see Garcia-Retamero & Dhami, 2009a, 2009b, for a similar finding).

Are our conclusions applicable to experts in other domains or are these conclusions restricted to medical decision making? Consistent with our findings, Roszkowsky and Snelbecker's (1990) results showed that professional investors also made less risky investment decisions for their (hypothetical) clients than for themselves. Interestingly, the authors suggested that this result was due to investors being trained to avoid "playing with their clients' money" when they make decisions for them. In contrast, our results show that doctors were not concerned with the effects of their decisions on their patients but with the consequences that these decisions could have for themselves. Our results are also consistent with research by Dhami and Ayton (2001), who showed that magistrates based their bail decisions on previous decisions (made by, e.g., police or previous bench) rather than on characteristics of defendants and their offenses, thus effectively passing the responsibility for their decisions on to others. Magistrates may therefore also be concerned with the consequences that their decisions have for themselves. Whether experts in other domains (e.g., politicians and manufacturers) also make riskier decisions for themselves than for others, and why, is an interesting topic that deserves further investigation.

Implications of the Results for Medical Practice

Many doctors in our study feared being sued by patients and regarded their patients as potential plaintiffs. The interesting questions are then whether we as patients can blindly trust our doctors, and to what extent the legal and financial environment in which our health system operates affects decisions in health experts.

Prominent recent examples such as the case of Dr. Daniel Merenstein in the United States (Merenstein, 2004) have triggered an intensive debate in scientific journals and the media (Atkins, Siegel, & Slutsky, 2005; Bishop, Federman, & Keyhani, 2010; Hurwitz, 2004; Hyman & Silver, 2006; King & Moulton, 2006) and suggest that *defensive medicine* (i.e., a deviation from sound medical practice that is indicated primarily by a threat of liability; Studdert et al., 2005) is common (Salem & Forster, 2009). Defensive medicine has spread to many areas of specialty and to many countries (Catino & Celotti, 2009; Chen, 2007; Hiyama et al., 2006; Kessler, Summerton, & Graham, 2006; Naumann, 1998; Steurer et al., 2009). This trend has recently been noticed and brought to public attention (Brilla, Evers, Deutschlander, & Wartenberg, 2006; Brown, 2007; Hiyama et al., 2006; Toker, Shvarts, Perry, Doron, & Reuveni, 2004). The practice has serious consequences, such as overmedication and overdiagnosis, that provide little or no benefit to patients and sometimes even cause them harm (Gigerenzer, 2007; Studdert et al., 2005). It favors certain behaviors, such as avoidance of risky interventions and patients at high risk of certain health outcomes, who may also be at high risk of filing lawsuits (Salem & Forster, 2009; Summerton, 2000). Defensive medicine also leads to a tremendous increase in health care costs (estimated at tens of billions of dollars annually in the United States alone; Anderson, 1999; Sloan & Shadle, 2009), and to a

noticeable decrease in the quality of health care (Studdert et al., 2005).

To the best of our knowledge, our research is the first to show that doctors select more conservative treatments for their patients than for themselves. Most notably, our doctors did so even when they accurately predicted that their patients would select riskier treatments. Doctors, therefore, make decisions for their patients on the basis of the legal consequences that their decisions could bring them (see Table 3). Our study is also the first to show that doctors in Spain—like doctors in other countries—are not immune to practicing defensive medicine. Finally, our research also sheds some light on the process underlying self–other discrepancies in decision making. In fact, our study is the first that pits the predictions of the cognitive and risk-as-feelings hypotheses against each other.

At the same time, our work has some limitations and leaves some questions open for further investigation. First, the cognitive hypothesis assumes that self–other discrepancies in decision making are due to the amount and/or the type of information considered to make the decisions. It is also possible that doctors in our study came up with a list of drawbacks and benefits to justify their decisions after making them (i.e., a posteriori). If so, information processing might be the consequence rather than the cause of self–other discrepancies in medical decision making. We do not think that this is the case in our study because participants were carefully instructed to report the factors affecting their decisions/predictions *before* they made these decisions/predictions. However, further research could investigate the causal relationship between information processing and decision making involving doctors and their patients. Second, we followed the procedure of previous work testing the risk-as-feelings hypothesis and did not include a measure of affect to evaluate this hypothesis (see Hsee & Weber, 1997; Krishnamurthy & Kumar, 2002; Siegrist et al., 2002, for a similar method). Future work could also investigate whether doctors' feelings mediate their predictions of their patients' decisions.

Third, there might be several alternative theoretical approaches that could also explain our results. For instance, self–other discrepancies in medical decision making might be due to social norms and values (Stone & Allgaier, 2008). In particular, if risk aversion is valued in medical decisions, it would then be inappropriate for doctors to make risk-seeking decisions for their patients but they might still predict that their patients are more risk-seeking than themselves. Future research could investigate this prediction. Fourth, although our conclusions are robust, they are based on doctors' self-reports. Further investigation can provide additional evidence supporting self–other discrepancies in medical decision making using different (e.g., observational) methods. Finally, research can also test whether these discrepancies depend on doctors' and patients' numerical skills (Garcia-Retamero & Galesic, 2010a, 2011), and whether they can be countered or eliminated by using decision aids (Galesic & Garcia-Retamero, 2011a; Garcia-Retamero & Cokely, 2011; Garcia-Retamero & Dhami, 2001; Garcia-Retamero & Galesic, 2010b). We do not know of any research that addresses these questions.

Legal reforms that free physicians from fear of doing the best for their patients are necessary (Kessler et al., 2006; Salem & Forster, 2009). Meanwhile, our research suggests that there might be ways to reduce the consequences of defensive medicine: Patients could ask their doctors what they would do if they were in the patient's situation. In line with our findings, doctors would recommend what is best for the patient rather than follow self-protecting procedures. Alerting patients to the fact that their doctors are more cautious in how they handle their patients' health than their own health would also yield important benefits. In particular, it might help patients take on more responsibility and actively participate in decision making about their own health. The beauty of this approach is that it would encourage patients and physicians to engage in shared decision making, a practice that has been considered ideal.

References

Anderson, R. E. (1999). Billions for defense: The pervasive nature of defensive medicine. *Archives of Internal Medicine, 159,* 2399–2402. doi:10.1001/archinte.159.20.2399

Atkins, D., Siegel, J., & Slutsky, J. (2005). Making policy when the evidence is in dispute. *Health Affairs, 24,* 102–113. doi:10.1377/hlthaff.24.1.102

Barry, M. J. (1999). Involving patients in medical decisions: How can physicians do better? *Journal of the American Medical Association, 282,* 2356–2357. doi:10.1001/jama.282.24.2356

Beaver, K., & Booth, K. (2007). Information needs and decision-making preferences: Comparing findings for gynaecological, breast and colorectal cancer. *European Journal of Oncology Nursing, 11,* 409–416. doi:10.1016/j.ejon.2007.04.004

Beisswanger, A. H., Stone, E. R., Hupp, J. M., & Allgaier, L. (2003). Risk taking in relationships: Differences in deciding for oneself versus for a friend. *Basic and Applied Social Psychology, 25,* 121–135. doi:10.1207/S15324834BASP2502_3

Beyth-Marom, R., Austin, L., Fischhoff, B., Palmgren, C., & Jacobs, M. (1993). Perceived consequences of risky behaviors. *Developmental Psychology, 29,* 549–563. doi:10.1037/0012-1649.29.3.549

Bishop, T. F., Federman, A. D., & Keyhani, S. (2010). Physicians' views on defensive medicine: A national survey. *Archives of Internal Medicine, 170,* 1081–1083. doi:10.1001/archinternmed.2010.155

Borresen, C. R. (1987). Decision making as a function of self and others. *Perceptual and Motor Skills, 64,* 1301–1302. doi:10.2466/pms.1987.64.3c.1301

Brilla, R., Evers, S., Deutschlander, A., & Wartenberg, K. E. (2006). Are neurology residents in the United States being taught defensive medicine? *Clinical Neurology & Neurosurgery, 108,* 374–377. doi:10.1016/j.clineuro.2005.05.013

Brown, H. S. (2007). Lawsuit activity, defensive medicine, and small area variation: The case of Cesarean sections revisited. *Health Economics, Policy, & Law, 2,* 285–296. doi:10.1017/S1744133107004136

Calnan, M., & Rowe, R. (2006). Researching trust relationships in health care. *Journal of Health Organization and Management, 20,* 349–358. doi:10.1108/14777260610701759

Caress, A. L., Luker, K., Woodcock, A., & Beaver, K. (2002). Qualitative exploration of treatment decision-making role preference in adult asthma patients. *Health Expectations, 5,* 223–235. doi:10.1046/j.1369-6513.2002.00181.x

Carpenter, W. T. (2002). Commentary: How the doctor can counter commercial bias in the dissemination of pharmacotherapeutic knowledge. *Journal of Nervous & Mental Disease, 190,* 593–596. doi:10.1097/00005053-200209000-00003

Catino, M., & Celotti, S. (2009). The problem of defensive medicine: Two Italian surveys. *Studies in Health Technology & Informatics, 148,* 206–221.

Chaitin, E., Stiller, R., Jacobs, S., Hershl, J., Grogen, T., & Weinberg, J. (2003). Physician-patient relationship in the intensive care unit: Erosion

of the sacred trust? *Critical Care Medicine, 31,* 367–372. doi:10.1097/01.CCM.0000066452.48589.F4

Chen, X. Y. (2007). Defensive medicine or economically motivated corruption? A Confucian reflection on physician care in China today. *Journal of Medicine & Philosophy, 32,* 635–648. doi:10.1080/03605310701681021

Cvetkovich, G. (1972). Effects of sex on decision policies used for self and decision policies used for other persons. *Psychonomic Science, 26,* 319–320.

Degner, L. F., & Sloan, J. A. (1992). Decision making during serious illness: What role do patients really want to play? *Journal of Clinical Epidemiology, 45,* 941–949. doi:10.1016/0895-4356(92)90110-9

Dhami, M. K., & Ayton, P. (2001). Bailing and jailing the fast and frugal way. *Journal of Behavioral Decision Making, 14,* 141–168. doi:10.1002/bdm.371

Doiron, D., Jones, G., & Savage, E. (2008). Healthy, wealthy and insured? The role of self-assessed health in the demand for private health insurance. *Health Economics, 17,* 317–334. doi:10.1002/hec.1267

Elbasha, E. H. (2005). Risk aversion and uncertainty in cost-effectiveness analysis: The expected-utility, moment-generating function approach. *Health Economics, 14,* 457–470. doi:10.1002/hec.915

Faro, D., & Rottenstreich, Y. (2006). Affect, empathy, and regressive mispredictions of others' preferences under risk. *Management Science, 52,* 529–541. doi:10.1287/mnsc.1050.0490

Frosch, D. L., & Kaplan, R. M. (1999). Shared decision making in clinical medicine: Past research and future directions. *American Journal of Preventive Medicine, 17,* 285–294. doi:10.1016/S0749-3797(99)00097-5

Galesic, M., & Garcia-Retamero, R. (2010). Statistical numeracy for health: A cross-cultural comparison with probabilistic national samples. *Archives of Internal Medicine, 170,* 462–468. doi:10.1001/archinternmed.2009.481

Galesic, M., & Garcia-Retamero, R. (2011a). Communicating consequences of risky behaviors: Life expectancy versus risk of disease. *Patient Education and Counseling, 82,* 30–35. doi:10.1016/j.pec.2010.02.008

Galesic, M., & Garcia-Retamero, R. (2011b). Do low numeracy people avoid shared decision making? *Health Psychology, 30,* 336–341.

Garcia-Retamero, R., & Cokely, E. T. (2011). Effective communication of risks to young adults: Using message framing and visual aids to increase condom use and STD screening. *Journal of Experimental Psychology: Applied, 17,* 270–287.

Garcia-Retamero, R., & Dhami, M. K. (2009a). Differences between experts and novices in estimations of cue predictive power in crime. *Psicothema, 21,* 376–381.

Garcia-Retamero, R., & Dhami, M. K. (2009b). Take-the-best in expert-novice decision strategies for residential burglary. *Psychonomic Bulletin and Review, 16,* 163–169. doi:10.3758/PBR.16.1.163

Garcia-Retamero, R., & Dhami, M. K. (2011). Pictures speak louder than numbers: On communicating medical risks to immigrants with limited non-native language proficiency. *Health Expectations, 14,* 46–57.

Garcia-Retamero, R., & Galesic, M. (2009). Communicating treatment risk reduction to people with low numeracy skills: A cross-cultural comparison. *American Journal of Public Health, 99,* 2196–2202. doi:10.2105/AJPH.2009.160234

Garcia-Retamero, R., & Galesic, M. (2010a). How to reduce the effect of framing on messages about health. *Journal of General Internal Medicine, 25,* 1323–1329. doi:10.1007/s11606-010-1484-9

Garcia-Retamero, R., & Galesic, M. (2010b). Who profits from visual aids: Overcoming challenges in people's understanding of risks. *Social Science & Medicine, 70,* 1019–1025. doi:10.1016/j.socscimed.2009.11.031

Garcia-Retamero, R., & Galesic, M. (in press). *Transparent communication of risks about health: Overcoming cultural differences.* New York, NY: Springer.

Garcia-Retamero, R., & Galesic, M. (2011). Using plausible group sizes to communicate information about medical risks. *Patient Education and Counseling, 84,* 245–250.

Garcia-Retamero, R., Galesic, M., & Gigerenzer, G. (2010). Do icon arrays help reduce denominator neglect? *Medical Decision Making, 30,* 672–684. doi:10.1177/0272989X10369000

Garcia-Retamero, R., Hoffrage, U., & Dieckmann, A. (2007). When one cue is not enough: Combining fast and frugal heuristics with compound cue processing. *Quarterly Journal of Experimental Psychology, 60,* 1197–1215. doi:10.1080/17470210600937528

Garcia-Retamero, R., Takezawa, M., & Gigerenzer, G. (2009). Does imitation benefit cue order learning? *Experimental Psychology, 56,* 307–320. doi:10.1027/1618-3169.56.5.307

Gaston, C. M., & Mitchell, G. (2005). Information giving and decision-making in patients with advanced cancer: A systematic review. *Social Science and Medicine, 61,* 2252–2264. doi:10.1016/j.socscimed.2005.04.015

Gigerenzer, G. (2007). *Gut feelings: The intelligence of the unconscious.* New York, NY: Viking.

Gigerenzer, G. (2010). Collective statistical illiteracy. *Archives of Internal Medicine, 170,* 468–469. doi:10.1001/archinternmed.2009.515

Gigerenzer, G., Gaissmaier, W., Kurz-Milcke, E., Schwartz, L. M., & Woloshin, S. (2007). Helping doctors and patients make sense of health statistics. *Psychological Science in the Public Interest, 8,* 53–96.

Gigerenzer, G., Todd, P. M., & the ABC Research Group. (1999). *Simple heuristics that make us smart.* New York, NY: Oxford University Press.

Hall, M. A., Dugan, E., Zheng, B., & Mishra, A. (2001). Trust in physicians and medical institutions: What is it, can it be measured, and does it matter? *Milbank Quarterly, 79,* 613–639. doi:10.1111/1468-0009.00223

Hanson, J. L. (2008). Shared decision making: Have we missed the obvious? *Archives of Internal Medicine, 168,* 1368–1370. doi:10.1001/archinte.168.13.1368

Hare, J., Pratt, C., & Nelson, C. (1992). Agreement between patients and their self-selected surrogates on difficult medical decisions. *Archives of Internal Medicine, 152,* 1049–1054. doi:10.1001/archinte.152.5.1049

Hiyama, T., Yoshihara, M., Tanaka, S., Urabe, Y., Ikegami, Y., Fukuhara, T., & Chayama, K. (2006). Defensive medicine practices among gastroenterologists in Japan. *World Journal of Gastroenterology, 12,* 7671–7675.

Hsee, C. K., & Weber, E. U. (1997). A fundamental prediction error: Self–other discrepancies in risk preference. *Journal of Experimental Psychology: General, 126,* 45–53. doi:10.1037/0096-3445.126.1.45

Hurwitz, B. (2004). How does evidence based guidance influence determinations of medical negligence? *British Medical Journal, 329,* 1024–1028. doi:10.1136/bmj.329.7473.1024

Hyman, D. A., & Silver, C. (2006). Medical malpractice litigation and tort reform: It's the incentives, stupid. *Vanderbilt Law Review, 59,* 1085–1136.

Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality. *American Psychologist, 58,* 697–720. doi:10.1037/0003-066X.58.9.697

Kao, A., Green, D. C., Davis, N. A., Koplan, J. P., & Cleary, P. D. (1998). Patient's trust in their physicians: Effects of choice, continuity, and payment method. *Journal of General Internal Medicine, 13,* 681–686. doi:10.1046/j.1525-1497.1998.00204.x

Kessler, D. P., Summerton, N., & Graham, J. R. (2006). Effects of the medical liability system in Australia, the UK, and the USA. *Lancet, 368,* 240–246. doi:10.1016/S0140-6736(06)69045-4

King, J. S., & Moulton, B. W. (2006). Rethinking informed consent: The case for shared medical decision-making. *American Journal of Law & Medicine, 32,* 429–501.

Kray, L., & Gonzalez, R. (1999). Differential weighting in choice versus advice: I'll do this, you do that. *Journal of Behavioral Decision Making,*

12, 207–217. doi:10.1002/(SICI)1099-0771(199909)12:3<207::AID-BDM322>3.0.CO;2-P

Kray, L. J. (2000). Contingent weighting in self–other decision making. *Organizational Behavior and Human Decision Processes, 83,* 82–106. doi:10.1006/obhd.2000.2903

Krishnamurthy, P., & Kumar, P. (2002). Self–other discrepancies in waiting time decisions. *Organizational Behavior and Human Decision Processes, 87,* 207–226. doi:10.1006/obhd.2001.2980

Levin, I. P., Schnittjer, S. K., & Thee, S. L. (1988). Information framing effects in social and personal decisions. *Journal of Experimental Social Psychology, 24,* 520–529. doi:10.1016/0022-1031(88)90050-9

Levinger, G., & Schneider, D. J. (1969). Test of the "risk is a value" hypothesis. *Journal of Personality and Social Psychology, 11,* 165–169. doi:10.1037/h0026966

Loewenstein, G. F., Weber, E. U., Hsee, C. K., & Welch, N. (2001). Risk as feelings. *Psychological Bulletin, 127,* 267–286. doi:10.1037/0033-2909.127.2.267

McCauley, C., Kogan, N., & Teger, A. I. (1971). Order effects in answering risk dilemmas for self and others. *Journal of Personality and Social Psychology, 20,* 423–424. doi:10.1037/h0031938

McNutt, R. A. (2004). Shared medical decision making: Problems, process, progress. *Journal of the American Medical Association, 292,* 2516–2518. doi:10.1001/jama.292.20.2516

Mechanic, D., & Meyer, S. (2000). Concepts of trust among patients with serious illness. *Social Science and Medicine, 51,* 657–668. doi:10.1016/S0277-9536(00)00014-9

Menikoff, J., & Richards, E. P. (2006). *What the doctor didn't say: The hidden truth about medical research.* New York, NY: Oxford University Press.

Merenstein, D. (2004). A piece of my mind. Winners and losers. *Journal of the American Medical Association, 291,* 15–16. doi:10.1001/jama.291.1.15

Moore, S., & Gullone, E. (1996). Predicting adolescent risk behavior using a personalized cost-benefit analysis. *Journal of Youth and Adolescence, 25,* 343–359. doi:10.1007/BF01537389

Naumann, G. O. H. (1998). Ophthalmology in Germany. *Archives of Ophthalmology, 116,* 1366–1368.

Ouslander, J. G., Tymchuk, A. J., & Rahbar, B. (1989). Health care decisions among elderly long-term care residents and their potential proxies. *Archives of Internal Medicine, 149,* 1367–1372. doi:10.1001/archinte.149.6.1367

Raymark, P. H. (2000). Accepting or rejecting medical treatment: A comparison of decisions made for self versus those made for a significant other. *Journal of Applied Social Psychology, 30,* 2409–2436. doi:10.1111/j.1559-1816.2000.tb02443.x

Rosen, A. B., Tsai, J. S., & Downs, S. M. (2003). Variations in risk attitude across race, gender, and education. *Medical Decision Making, 23,* 511–517. doi:10.1177/0272989X03258431

Roszkowsky, M. J., & Snelbecker, G. E. (1990). Effects of "framing" on measures of risk tolerance: Financial planners are not immune. *The Journal of Behavioral Economics, 19,* 237–246. doi:10.1016/0090-5720(90)90029-7

Salem, O., & Forster, C. (2009). Defensive medicine in general practice: Recent trends and the impact of the Civil Liability Act 2002 (NSW). *Journal of Law & Medicine, 17,* 235–348.

Seckler, A. B., Meier, D. E., Mulvihill, M., & Paris, B. E. (1991). Substituted judgment: How accurate are proxy predictions? *Annals of Internal Medicine, 115,* 92–98.

Siegrist, M., Cvetkovich, G., & Gutscher, H. (2002). Risk preference predictions and gender stereotypes. *Organizational Behavior and Human Decision Processes, 87,* 91–102. doi:10.1006/obhd.2001.2956

Sloan, F. A., & Shadle, J. H. (2009). Is there empirical evidence for "defensive medicine"? A reassessment. *Journal of Health Economics, 28,* 481–491. doi:10.1016/j.jhealeco.2008.12.006

Slovic, P., Finucane, M. L., Peters, E., & McGregor, D. G. (2004). Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality. *Risk Analysis, 24,* 311–322. doi:10.1111/j.0272-4332.2004.00433.x

Steurer, J., Held, U., Schmidt, M., Gigerenzer, G., Tag, B., & Bachmann, L. (2009). Legal concerns trigger prostate-specific antigen testing. *Journal of Evaluation in Clinical Practice, 15,* 390–392. doi:10.1111/j.1365-2753.2008.01024.x

Stone, E. R., & Allgaier, L. (2008). A social values analysis of self-other differences in decision making involving risk. *Basic and Applied Social Psychology, 30,* 114–129. doi:10.1080/01973530802208832

Stone, E. R., Yates, A., & Caruthers, A. S. (2002). Risk taking in decision making for others versus the self. *Journal of Applied Social Psychology, 32,* 1797–1824. doi:10.1111/j.1559-1816.2002.tb00260.x

Strull, W. N., Lo, B., & Charles, G. (1984). Do patients want to participate in medical decision making? *Journal of the American Medical Association, 252,* 2990–2994. doi:10.1001/jama.252.21.2990

Studdert, D. M., Mello, M. M., Sage, W. M., DesRoches, C. M., Peugh, J., Zapert, K., & Brennan, T. A. (2005). Defensive medicine among high-risk specialist physicians in a volatile malpractice environment. *Journal of the American Medical Association, 293,* 2660–2662. doi:10.1001/jama.293.21.2609

Suhl, J., Simons, P., Reedy, T., & Garrick, T. (1994). Myth of substituted judgment: Surrogate decision making regarding life support is unreliable. *Archives of Internal Medicine, 154,* 90–96. doi:10.1001/archinte.154.1.90

Summerton, N. (2000). Trends in negative defensive medicine within general practice. *British Journal of General Practice, 50,* 565–566.

Teger, A. I., & Kogan, N. (1975). Decision-making for others under reciprocal and non-reciprocal conditions. *British Journal of Social and Clinical Psychology, 14,* 215–222. doi:10.1111/j.2044-8260.1975.tb00174.x

Toker, A., Shvarts, S., Perry, Z. H., Doron, Y., & Reuveni, H. (2004). Clinical guidelines, defensive medicine, and the physician between the two. *American Journal of Otolaryngology, 25,* 245–250. doi:10.1016/j.amjoto.2004.02.002

Uhlmann, R. F., & Pearlman, R. A. (1991). Perceived quality of life and preferences for life-sustaining treatment in older adults. *Archives of Internal Medicine, 151,* 495–497. doi:10.1001/archinte.151.3.495

Uhlmann, R. F., Pearlman, R. A., & Cain, K. C. (1988). Physicians' and spouses' predictions of elderly patients' resuscitation preferences. *Journal of Gerontology, 43,* 115–121.

Vorauer, J. D., & Ratner, R. K. (1996). Who's going to make the first move? Pluralistic ignorance as an impediment to relationship formation. *Journal of Social and Personal Relationships, 13,* 483–506. doi:10.1177/0265407596134001

Wallach, M. A., & Wing, C. W. (1968). Is risk a value? *Journal of Personality and Social Psychology, 9,* 101–106. doi:10.1037/h0025719

Wray, L. D., & Stone, E. R. (2005). The role of self-esteem and anxiety in decision making for self versus others in relationships. *Journal of Behavioral Decision Making, 18,* 125–144. doi:10.1002/bdm.490

Zweibel, N. R., & Cassel, C. K. (1989). Treatment choices at the end of life: A comparison of decisions by older patients and their physician-selected proxies. *Gerontologist, 29,* 615–621. doi:10.1093/geront/29.5.615

Received March 9, 2010
Revision received August 15, 2011
Accepted September 19, 2011 ■