

thought that the prospect was very likely; but individuals who did not think that the use of “possible” was a facework strategy did not perceive the prospect as especially likely. Building on this result, we can expect that patients may attach greater confidence to causal inferences that involve bad news, as compared to causal inferences that involve good news. Compare indeed (2), which involves good news, with (3), which involves bad news:

- (2) a. If your pain decreases, you will change therapy
b. It is possible that your pain will decrease
- (3) a. If your pain increases, you will change therapy
b. It is possible that your pain will increase

What will be a patient’s confidence in the predictive inference that she will change therapy? In situation (2), we should expect the standard phenomenon of verbal uncertainty propagation [12,13], concluding that she will “possibly” change therapy. In contrast, in situation (3), previous research suggests that the patient may construe the phrase “possible” as a facework marker rather than a genuine uncertainty marker; and accordingly conclude that she is “probably” or even “certainly” going to change therapy.

This prediction will be tested in two studies, once with a convenience sample of students (Study 1), and once with a more specific sample of pregnant women (Study 2). Study 2 will also investigate diagnostic inferences, in addition to predictive inferences¹ [14]. Indeed, facework might also influence diagnostic causal inferences, albeit in a slightly different fashion. Compare in that regard (4), which involves good news, and (5), which involves bad news:

- (4) a. If your pain decreases, you will change therapy
b. It is possible that you will change therapy
- (5) a. If your pain increases, you will change therapy
b. It is possible that you will change therapy

Facework considerations are irrelevant for (4), and we should thus expect standard propagation of verbal uncertainty: Pain will “possibly” decrease. In contrast, facework considerations are relevant to (5), although they involve indirectness rather than hedging. That is, although changing therapy is not in itself bad news, and thus does not call for gentle hedging, a medical professional asserting both (5-a) and (5-b) might be perceived as beating around the bush, so to say; that is, as indirectly (and tactfully) pointing to the upsetting prospect of increased pain. Previous research repeatedly showed that when an assertion has an indirect, threatening interpretation, individuals are likely to consider that the threatening meaning was indeed the one intended by the speaker; and that the speaker used indirectness as a facework strategy [15–18]. Accordingly, a patient may conclude from (5-a-b) that her pain will “probably” or even “certainly” increase. This prediction will be tested in Study2.

2. Study 1

2.1. Method

Study 1 involved a convenience sample of 50 students (19 males, mean age 25, $SD = 7.8$) at the University of Toulouse, who

¹ Whereas *predictive* inferences go from cause to effect, *diagnostic* inferences go from effect to cause (note that the term “diagnostic” here generally denotes an inference from an effect to its cause, and not specifically the medical process of identifying a disease from its signs and symptoms). In predictive reasoning, the likelihood of an effect is inferred from the known likelihood of its cause (as in examples 2, and 3). In contrast, in diagnostic reasoning, the likelihood of a cause is inferred from the known likelihood of its effect (as in examples 4, and 5).

were individually recruited on campus by a research assistant who was blind to the purpose of the experiment. Each participant read three versions of two medical scenarios, each of which featured a causal rule and a remark made by a doctor. The three versions of each scenario were the good news version, the bad news version, and the filler, neutral version.

The six scenarios were presented in a random order for half participants, and in the opposite order for the other half. See [Appendix A](#) for instructions and experimental materials.

To illustrate the materials, we show below the good news version of the pain scenario:

“While talking to his doctor during a visit, Christian is informed that if his pain increases, he will change therapy. His doctor remarks that it is possible that his pain increases.”

Participants were asked to rate their degree of confidence in the (predictive) causal conclusion of the scenario, here: Christian will change therapy. They rated this confidence on a 5-point scale, where 1 was labelled certainly false, 2 was labelled improbable, 3 was labelled possible, 4 was labelled probable, and 5 was labelled certainly true. The experiment was conducted in French.

2.2. Results

[Table 1](#) reports means, and standard deviations in the two experimental conditions of Study 1.

Both in the good news and in the bad news version, the modal response was, as per previous research, to simply propagate verbal uncertainty alongside the causal inference, and to select the “possible” response (46% of responses overall). As expected, though, a within-subject ANOVA on mean responses detected that the average degree of confidence was greater for bad news versions of the scenarios ($M = 3.6$, $SD = .8$) than for good news version ($M = 3.2$, $SD = .8$), $F(1,49) = 12.7$, $p = .001$, $\eta_p^2 = .21$.

3. Study 2

Study 2 provides a replication of Study 1, and extends our investigation to diagnostic inferences. In order to rule out possible demand effects due to the use of a within-subject design in Study 1, Study 2 uses a full between-subject design. Furthermore, where Study 1 involved a convenience sample of students, Study 2 involves a sample that is ecologically more interesting, that is, a sample of pregnant women. For obvious reasons, pregnant women are highly motivated to grasp as much health-related information as possible from physician–patient communication. They thus constitute an ideal population to investigate subtle communication effects as that of facework.

3.1. Method

Study 2 involved 532 pregnant women, users of an Italian web site dedicated to pregnancy and babies. An e-mail notification advertising the opportunity to take part in a research on risk communication was sent to 50,000 registered users of an Italian web site specialized in pregnancy and babies, www.gravidanzaonline.it. Our questionnaire was addressed to pregnant women

Table 1
Means, and standard deviations in Study 1.

	Mean	SD
Good news	3.2	.8
Bad news	3.6	.8

Table 2
Means, and SD in Study 2.

		Mean	SD
Prediction	Good news	3.4	.7
	Bad news	3.6	.7
Diagnosis	Good news	3.4	.6
	Bad news	3.6	.6

only. Pregnant women tend to register to informative websites during the early months of their pregnancy, and they frequently keep their registrations later on, also after the child's birth. It is then not possible to calculate the exact response rate in our on-line research given that the number of registered users that were pregnant at the moment of the study is unknown. Participants (mean age 33, $SD = 4.9$) volunteered to take the questionnaire on-line for free.

Participants were randomly assigned to one group of a 2×2 between-subject design, manipulating the valence of the scenario (good news vs. bad news) and the inference direction (prediction vs. diagnosis). Participants read the same medical scenarios used in Study 1, and used the same response scale (see Appendix B). The two scenarios were introduced in random order for each participant.

3.2. Results

Table 2 reports means, and standard deviations of the four experimental conditions of Study 2. The valence of the news, as well as the direction of the inference, were entered as predictors in an ANOVA predicting confidence ratings. The only statistically significant effect was that of the valence of the news, $F(1,528) = 14.9$, $p < .001$, $\eta_p^2 = 0.03$. The effect of direction of the inference and the interaction effect between the two factors resulted to be not statistically significant, respectively $F(1,528) = 0.14$, $p = .7$, $\eta_p^2 = 0.000$, and $F(1,528) = 0.01$, $p = .9$, $\eta_p^2 = 0.000$. Ratings were on average higher in the bad news condition ($M = 3.6$, $SD = .7$) than in the good news condition ($M = 3.4$, $SD = .6$), for predictive as well as for diagnostic inferences.²

4. Discussion and conclusion

4.1. Discussion

Health care professionals frequently need to communicate bad news to patients, or to ask them to consider unpleasant prospects. Because healthcare communication is frequently characterized by uncertainty, these bad news or prospects can be qualified by various uncertainty terms. This research adopted a sociolinguistic approach to the inferences that patient may derive from this communicated uncertainty, and built on previous findings to suggest that facework considerations may lead patients to feel greater confidence in the conclusions they derive when the news are bad, as compared to the conclusions they derive when the news are good.

² Thirty-six participants indicated that they were not Italian. The same analysis were conducted on a reduced sample of 496 pregnant women, omitting not Italian participants. Results showed no differences compared to the total sample. A 2×2 ANOVA showed a significant main effect of the valence of the news, $F(1,492) = 11.6$, $p = .001$, $\eta_p^2 = 0.02$, no significant main effect of the inference direction, $F(1,492) = 0.28$, $p = .6$, $\eta_p^2 = 0.001$, and no significant interaction between the two factors, $F(1,492) = .00$, $p = .9$, $\eta_p^2 < 0.001$.

4.2. Conclusion

In Study 1, students were presented with good news and bad news scenarios, and asked to make causal inferences from a prospect qualified as “possible”, for example:

- (6) a. If the pain decreases, the patient will change therapy
b. It is possible that the pain decreases
c. Will the patient change therapy?
- (7) a. If the pain increases, the patient will change therapy
b. It is possible that the pain increases
c. Will the patient change therapy?

Results showed that participants felt greater confidence in conclusion (7-c) than in conclusion (6-c), and were more likely to qualify it as probable, or even certainly true. This result was replicated in Study 2 among a sample of pregnant women, and extended to diagnostic causal inferences.

4.3. Practical implications

These findings have implications for health care professionals who are routinely led to communicate good and bad prospects to patients, and who need to qualify the certainty of these prospects. Previous research has amply emphasized the need for quality physician–patient communication [19–20], especially when this communication involves uncertain prospects, which can be a cause of anxiety for patients [21]. For this reason, health care professionals should be particularly alert about how patients interpret and reason from uncertain information. Previous research [11] showed that uncertainty terms such as “possible”, when applied to bad news, can be interpreted as a way for the doctor to sugar-coat the pill, rather than to express genuine uncertainty. The present research showed that this interpretation can propagate to inferences made by the patients about their situation, and lead them to overestimate the probability of various conclusions they derive from the information communicated by the professional. This tendency can result in sub-optimal communication between physicians and patients, due to a discrepancy between the conclusions they reach and the information that is communicated.

Although the patient-centered approach resulted in a more egalitarian relationship between doctors and patients, the balance between their relative contributions is still precarious, because of their different roles, language, expectations and perspectives [22]. The present research provides a novel illustration of the challenges of optimal health communication, and suggests that health professionals should take account of patient's sociolinguistic expectations involved in conversational dynamics. They should be aware in particular that when the news are bad, any hedging term such as “possible” can be misunderstood by patients as a mere facework marker, rather than as a genuine uncertainty marker; and that this misinterpretation can lead them to inferences that are not shared by the professional. The prescriptive message for health professionals here is to try to eschew any form of vagueness which could be read by patients as either hedging or indirectness, mainly when health professionals communicate bad news, and to routinely check for patient's understanding in order to avoid a mismatch between their communication and patient's inferences.

Acknowledgement

This research was supported by grant ANR-07-JCJC-0065-01.

Appendix A. Instructions and material, Study 1

1. General instructions

We are going to show you six short stories where a doctor announces something to a patient. After each story, we suggest a conclusion which could be drawn from the doctor's remark. Your task is to judge to which extent this conclusion seems certain to you. This is not a test, there are no correct or incorrect answers. We are interested in your personal judgment. Thank you for your collaboration.

2. Experimental material

The words between square brackets were used for the bad news versions and the filler version, respectively.

Scenario 1: While talking to his doctor during a visit, Christian is informed that if pain decreases [increases/the orthopedic has some advice], he will change therapy. The doctor remarks that: 'It is possible that the pain decreases [increases/the orthopedic has some advice].' Conclusion: Christian will change therapy.

Scenario 2: While talking to his doctor during a visit, Bruno is informed that if the disease is mild [severe/the specialist is in], he will get an appointment in two days. The doctor remarks that: 'It is possible that the disease is mild [severe/the specialist is in].' Conclusion: Bruno will get an appointment in two days.

Appendix B. Instructions and material, Study 2

1. Experimental material

The words between square brackets were used for the bad news version.

Prediction, Scenario 1: While talking to his doctor during a visit, Christian is informed that if pain decreases [increases], he will change therapy. The doctor remarks that: 'It is possible that the pain decreases [increases].' Conclusion: Christian will change therapy.

Prediction, Scenario 2: While talking to his doctor during a visit, Bruno is informed that if the disease is mild [severe], he will get an appointment in two days. The doctor remarks that: 'It is possible that the disease is mild [severe].' Conclusion: Bruno will get an appointment in two days.

Diagnosis, Scenario 1: While talking to his doctor during a visit, Christian is informed that if pain decreases [increases], he will change

therapy. The doctor remarks that: 'It is possible that you will change therapy.' Conclusion: The pain decreases [increases].

Diagnosis, Scenario 2: While talking to his doctor during a visit, Bruno is informed that if the disease is mild [severe], he will get an appointment in two days. The doctor remarks that: Doctor's remark: 'It is possible that you will get an appointment in two days'. Conclusion: The disease is mild [severe].

References

- [1] Blackhall LJ, Murphy ST, Frank G, Michel V, Azen S. Ethnicity and attitudes toward patient autonomy. *J Amer Med Assoc* 1999;274:820–4.
- [2] Haddad A, Vernarec E. Ethics in action. *Regist Nurse* 2001;64:25–6.
- [3] Leino-Kilpi H, Välimäki M, Arndt M, et al. Patient's autonomy, privacy and informed consent. Washington: IOS Press; 2000.
- [4] Staten PA. How to cover all the bases on informed consent. *Nurs Manage* 1999;30:14.
- [5] Lassen L. Connection between the quality of consultation and health patient compliance in general practice. *Fam Pract* 1991;8:154–60.
- [6] Stewart M. Effective physician–patient communication and health outcomes: a review. *Canadian Med Assoc J* 1995;152:1423–33.
- [7] Ghosh AK. Understanding medical uncertainty: a primer for physicians. *JAPI* 2004;52:739–42.
- [8] Brown P, Levinson SC. Politeness: some universals in language usage. Cambridge: Cambridge University Press; 1987 (Original work published 1978).
- [9] Goffman E. Interaction ritual: essays on face-to-face behaviour. Garden City, NY: Anchor Books; 1967.
- [10] Bonnefon JF, Feeney A, Villejoubert G. When some is actually all: scalar inferences in face-threatening contexts. *Cognition* 2009;112:249–58.
- [11] Bonnefon JF, Villejoubert G. Tactful or doubtful? Expectations of politeness explain the severity bias in the interpretation of probability phrases. *Psychol Sci* 2006;17:747–51.
- [12] George C. The endorsement of the premises: assumption based or belief-based reasoning. *Br J Psychol* 1995;86:93–111.
- [13] George C. Reasoning from uncertain premises. *Think Reason* 1997;3:161–240.
- [14] Fernbach PM, Darlow A, Slovic SA. Neglect of alternative causes in predictive but not diagnostic reasoning. *Psychol Sci* 2010;21:329–36.
- [15] Demeure V, Bonnefon JF, Raufaste E. Utilitarian relevance and face management in the interpretation of ambiguous question/request statements. *Mem Cognit* 2008;36:873–81.
- [16] Demeure V, Bonnefon JF, Raufaste E. Politeness and conditional reasoning: interpersonal cues to the indirect suppression of deductive inferences. *J Exp Psychol Learn Mem Cogn* 2009;35:260–6.
- [17] Holtgraves T. Interpreting indirect replies. *Cognit Psychol* 1998;37:1–27.
- [18] Holtgraves T. Comprehending indirect replies: when and how are their conveyed meaning activated? *J Mem Lang* 1999;519–40.
- [19] Ong LM, Haes JC, Hoos AM, Lammes FB. Doctor–patient communication: a review of the literature. *Soc Sci Med* 1995;40:903–18.
- [20] Rao JK, Anderson LA, Inui TS, Frankel RM. Communication interventions make a difference in conversations between physicians and patients: a systematic review of the evidence. *Med Care* 2007;45:340–9.
- [21] Johnson CG, Levenkron JC, Suchman AL, Manchester R. Does physician uncertainty affect patient satisfaction? *J Gen Intern Med* 1988;3:144–9.
- [22] VamDulmen AM. Different perspectives of doctor and patient in communication. *Int Congr Ser* 2002;1241:243–8.