

Politeness and Conditional Reasoning: Interpersonal Cues to the Indirect Suppression of Deductive Inferences

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A successful theory of conditional reasoning requires an account of how reasoners recognize the pragmatic function a conditional statement is meant to perform. Situations in which it is ambiguous whether a conditional statement was meant to add information or to correct a mistake are discussed in this article. This ambiguity has direct consequences on the way reasoners update their beliefs and derive conclusions. In an analysis of ambiguity from the perspective of politeness theory, the authors suggest that any contextual factor that increases the face threat of a correction will encourage reasoners to construe the ambiguous conditional as a correction. This construal will impact their beliefs about the piece of information that is ambiguously corrected, and their beliefs will affect the deductive conclusions they are willing to draw. This nested mediation structure was observed in 2 experiments. The first experiment manipulated the threat level of a correction through the portrayed personality of the person being corrected; the second experiment manipulated the affective distance between the corrector and the corrected.

Keywords: deduction, reasoning, pragmatics, politeness, ambiguity

Conditional reasoning (the cognitive manipulation of “If p , then q ” statements) is considered the cornerstone of hypothetical thinking (Evans & Over, 2004). Although there is currently no dominant theory of the processes underlying conditional reasoning, scholars agree that this theory requires a pragmatic component (i.e., an account of how the content and context of a conditional affect interpretation and inference).

Much pragmatic research was devoted to the most basic conditional inference, modus ponens (MP): If p , then q ; p is true; therefore, q is true (e.g., If Alan works hard, then he will pass the exam; Alan works hard; therefore, he will pass the exam). MP is the prototypical deductive inference; its validity is hardly questionable, and the derivation of MP seems so automatic that Sperber (2001) once qualified it as a cognitive reflex. However, a whole line of research investigates the way MP can be pragmatically suppressed (i.e., which contents or contexts make reasoners doubt the conclusion of an MP argument, often by weakening their confidence in the rule “If p , then q ”). These experiments often present reasoners with three-premise problems, such as

- 1a. If p_1 , then q_1 ;
- 1b. If p_2 , then q_1 ;
- 1c. p_1 ,

where “if p_2 , then q_1 ” is expected to affect their belief in the “if p_1 , then q_1 ” rule and, subsequently, their acceptance of conclusion q_1 from 1a through 1c. MP is unaffected when 1b conveys an alternative (q_1 may sometimes happen in the absence of p_1) but is affected when 1b conveys either a disabler (p_1 may sometimes fail to make q_1 happen) or a correction (it may be incorrect to assume a dependency between p_1 and q_1); concrete examples are introduced in the next section. We argue that 1b can be ambiguous and can be construed as conveying either an alternative or a correction. In this situation, reasoners must resort to pragmatic, interpersonal cues to disambiguate the statement, update their beliefs accordingly, and draw a conclusion. These situations are our focus in this article.

We briefly review the classic results on the suppression of MP and come to a question: When “If p_2 , then q_1 ” is ambiguous, how do reasoners solve the ambiguity and draw a conclusion? We suggest that politeness theory (Brown & Levinson, 1978/1987) provides a useful framework with which to address this question. In a nutshell, politeness theory suggests that ambiguity is often a face-saving strategy; that individuals accordingly solve ambiguity by selecting the most face-threatening interpretation of an ambiguous statement (Clark & Schunk, 1980; Holtgraves, 1998, 1999); and that any contextual factor that makes a given interpretation more face threatening increases the probability that this interpretation will be adopted (Demeure, Bonnefon, & Raufaste, 2008; Holtgraves, 1994; Holtgraves & Yang, 1990, 1992).

We then investigate two factors that should make a correction more face threatening. These factors would encourage reasoners to interpret the ambiguous statement “If p_2 , then q_1 ” as a correction and thus would decrease the subjective probability of the major premise “If p_1 , then q_1 ” and the endorsement of MP. In Study 1, we manipulated the personality of the individual to whom the ambiguous statement was addressed by portraying that individual as more or less willing to accept criticism. In Study 2, we manipu-

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lated the affective distance between the person who issued the ambiguous statement and the person to whom it was addressed by mentioning that the latter either liked or disliked the former.

The Suppression of Modus Ponens

In the standard suppression paradigm, an additional conditional, such as 2b below, is introduced alongside an MP argument, such as 2a and 2c:

- 2a. If she has an essay to write, she will study late in the library;
- 2b. If the library stays open, she will study late in the library;
- 2c. She has an essay to write.

In this classic example (Byrne, 1989), the additional information provided in 2b suggests the existence of a disabler to the major conditional, 2a: Reasoners know that when the library does not stay open late, her having an essay to write is a moot consideration. In fact, 2b reminds them of this fact and suggests that this very library might not be open late in the present case (Bonnefon & Hilton, 2002; Politzer, 2005). This additional premise lowers the certainty of 2a, and the acceptance of MP conclusion “She will study late in the library” drops dramatically (for replications and extensions, see, e.g., Bonnefon & Hilton, 2002, 2004; Oaksford & Chater, 2003; Politzer & Bonnefon, 2006; Politzer & Bourmeau, 2002; Stevenson & Over, 1995).

Conversely, suggesting the existence of an alternative does not impact MP. When we borrow another example from Byrne (1989), the confidence in the conclusion “she will study late in the library” does not decrease if 2b is replaced by 3:

- 3. If she has some textbooks to read, she will study late in the library.

Having textbooks to read is usually construed as another, independent reason for studying late in the library. Thus, 3 does not lower the certainty of 2a and does not suppress MP. Note, though, that 3 could also be read as conveying a correction: It could be meant as “She will study late in the library if she has textbooks to read, but not if she has an essay to write.” In that case, we should expect confidence in 2a to decrease and MP to be suppressed. This potential ambiguity between alternatives and corrections was pointed out by a few authors (Stenning & van Lambalgen, 2005, 2008; Stevenson & Over, 2001) and is empirically supported by the results of Stevenson and Over (2001) on problems such as

- 4a. If Bill has typhoid, he will make a good recovery;
- 4b. If Bill has malaria, he will make a good recovery;
- 4c. Bill has typhoid.

As noted by Stevenson and Over (2001), the literal, direct reading of 4b is to consider malaria as an alternative from which Bill will make a good recovery. However, 4b also has a nonliteral, indirect reading, that of a correction: “If Bill has malaria, then he will make a good recovery, but not if he has typhoid.”

If 4b is interpreted literally, as an alternative, MP should not be suppressed. But if 4b is interpreted indirectly, as a correction, confidence in 4a should decrease and MP should be suppressed. Stevenson and Over (2001) found that MP was suppressed when 4a and 4b were asserted by a student and professor of medicine, respectively. They argued that the greater expertise of the professor encouraged participants to interpret the ambiguous statement 4b as a correction and that this interpretation considerably reduced reasoners’ confidence in 4a.

In sum, previous research showed that MP can be directly suppressed by disabler conditionals and that MP can be indirectly suppressed by ambiguous conditionals, when they are construed as corrections rather than alternatives. Therefore, to understand the pragmatic component of conditional reasoning, we must identify the contextual cues that reasoners may use to solve the ambiguity. In the next section, we suggest that politeness theory provides a useful pragmatic framework with which to identify some of these contextual cues.

Politeness as the Motivation for Ambiguity

The reasons why people interpret ambiguous statements directly or indirectly have been extensively studied within the pragmatic framework of politeness theory (Brown & Levinson, 1978/1987). In brief, politeness theory posits that people are motivated to save their face (and that of others) in everyday interactions; that to any action is attached a face-threat level, which depends on the content and the context of the action; and that an appropriate face-saving strategy is chosen as a function of this threat level. Politeness theory, then, consists of cataloging face-threatening actions, identifying the factors that enter into the computation of their threat level, and describing the face-saving strategies that can be adopted as a function of this threat level.

Politeness theory identifies a correction as a face-threatening action, as it threatens the desire of the individual to be approved of and appreciated. Ambiguity is a common face-saving strategy in this situation: By phrasing a statement ambiguously between a correction and some other literal signification, the speaker gives the listener latitude to interpret the statement in a face-saving way. To use a classic example (Holtgraves, 1998), imagine that you ask a colleague whether you gave a good presentation and the answer is “It is hard to give a good presentation.” The ambiguity of this answer leaves you free to interpret it either literally, as a general comment, or indirectly, as a criticism of your presentation.

Politeness theory holds that people are aware of this strategic use of ambiguity and thus tend to consider the most face-threatening interpretation of ambiguous statements (Holtgraves, 1991, 1998, 1999). When presented with a problem such as 4, people should tend to consider 4b a (face-threatening) correction rather than an alternative. Furthermore, any contextual factor that increased the threat level of a correction should reinforce this tendency. We therefore arrived at the following, general prediction: A factor that increases the threat level of a correction encourages reasoners to interpret a premise, such as 4b, as a correction. Such interpretation decreases their confidence in the major premise (4a), and this decrease in confidence eventually suppresses the MP conclusion from Argument 4. In the rest of this article, we test this general prediction with respect to two specific

factors: the personality of the listener and the affective distance between speaker and listener.

Study 1: Personality of the Listener

Corrections require a face-saving strategy because people arguably dislike being corrected. But people, also quite clearly, vary along that dimension. Some dislike corrections to an extreme extent, and others may welcome criticism to some extent. We expect that the threat level of a correction (and, accordingly, the need for polite ambiguity) is greater in the former situation. In Study 1, we manipulated the personality of the listener (more precisely, his distaste for corrections) and measured the interpretation that reasoners make of the ambiguous conditional, their resulting confidence in the major conditional premise, and their resulting tendency to endorse the MP conclusion.

Method

Participants were 100 volunteer students at the University of Toulouse, all native French speakers (38 men, age range 18–32 years, $M = 21.7$ years, $SD = 3.1$). They were randomly assigned to one of two experimental groups (listener has a high vs. low distaste for corrections).

Participants read a cover story that stated that factory workers were engaged in a 1-day training session after a new machine had been installed. At the end of that session, workers were encouraged to say what they remembered about the machine. Then, they read two conditional statements made in succession by two workers:

- 5a. The first worker says, “If the water level is low, then the machine stops automatically.”
- 5b. Another worker says, “If the oil level is low, then the machine stops automatically.”

The personality of the first worker (more precisely, his distaste for being corrected) was manipulated through a cartoon and a written personality sketch, as shown in Figure 1.



An open-minded employee, who listens to others, cares about their opinions and ideas

A very touchy employee, who dislikes being contradicted. He likes to be in control and to impose his point of view

Figure 1. Cartoons and personality sketches used in Study 1 (translated from French). The worker on the left has low distaste for being corrected; the worker on the right has high distaste for being corrected.

Then, participants answered three questions. After they were told that the water level was low, they evaluated the conclusion “the machine stops automatically” on a 5-point scale (anchors: *I quite think the conclusion is incorrect, I rather think the conclusion is incorrect, I think the conclusion could be correct as well as incorrect, I rather think the conclusion is correct, and I quite think the conclusion is correct*).¹ Second, they judged the probability that “if the water level is low, then the machine stops automatically” on a 7-point scale (anchors from *very low* to *very high*). Third, they chose a paraphrase for the second worker’s statement, from “whether the water level is low or the oil level is low, in both cases, the machine automatically stops” (alternative) and “if the oil level is low, then, yes, the machine stops automatically, but not if the water level is low” (correction).

Results

The listener’s distaste for being corrected had the expected effect on MP endorsement, on the probability of the major conditional, and on the paraphrase chosen by the participants (see Table 1). When the listener had a high distaste for corrections, participants were more likely to choose the correction paraphrase, $F(1, 98) = 15.7, p < .001$; the probability of the major conditional was lower, $F(1, 98) = 8.4, p = .005$; and MP acceptance was lower, $\chi^2(1, N = 100) = 4.9, p < .05, d = 0.79$.

We conjectured that our manipulation would affect the interpretation of the second conditional, that the interpretation would affect the probability in the major premise, and that the probability would in turn affect the endorsement of MP. Statistically, this conjecture amounts to a nested mediation hypothesis. We tested it through a series of five regressions, summarized in Figure 2. In all regressions, high (low) distaste for correction was coded $-1 (+1)$, as was the choice of the correction (alternative) paraphrase.

Distaste for correction significantly affected endorsement of MP, $\beta = .37, t(98) = 4.0, p < .001$. Likewise, distaste for correction significantly affected the probability of the major conditional, $\beta = .28, t(98) = 2.9, p < .01$.

When MP endorsement was simultaneously regressed on distaste for correction and on the probability of the major conditional, the effect of probability was significant, $\beta = .49, t(98) = 5.8, p < .001$, but the contribution of distaste for correction dropped, $\beta = .23, t(98) = 2.8, p < .01$. This decrease is significant according to the Sobel test, whose value was 2.6 ($p < .01$).

Data also show that distaste for correction significantly affected the choice of a paraphrase, $\beta = .22, t(98) = 2.2, p < .05$. When the probability judgment was regressed on distaste for correction and on paraphrase, the effect of paraphrase was significant, $\beta = .47, t(98) = 5.4, p < .001$, but the contribution of distaste for correction dropped, $\beta = .18, t(98) = 2.0, p < .05$. This decrease was significant according to the Sobel test, whose value was 2.1 ($p < .05$).

¹ These instructions encourage pragmatic thinking rather than strict deductive thinking. As noted by Evans and Over (2004, Chapter 6), these pragmatic instructions are arguably more appropriate to a study of conditional reasoning in context.

Table 1
Study 1: Endorsement of Modus Ponens (MP), Probability of the Major Conditional Premise, and Frequency of Correction Paraphrase, as a Function of the Listener's Distaste for Correction

Distaste	MP	Probability	Correction, %
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Low, Group 1	3.9 (0.8)	5.1 (1.2)	34
High, Group 2	3.2 (0.9)	4.3 (1.4)	56

Note. MP was measured on a 5-point scale. Probability was measured on a 7-point scale.

Discussion

Results lend strong support to our hypotheses. When the listener was described as strongly disliking corrections, reasoners interpreted the ambiguous conditional as a correction. This interpretation made them doubt the major conditional premise, and their doubt made them reject the MP conclusion. We predicted this chain of results on the basis of our assumption that a correction had a high threat level for a listener who has a special distaste for being corrected and that, accordingly, the interpretation of the ambiguous conditional as a correction or alternative was motivated by the perceived desire of the speaker to be polite. However, as pointed out by a reviewer, this key assumption was not tested in Study 1.

Thus, to make sure this key assumption was legitimate, we randomly assigned 50 volunteer students (all native French speakers, 19 men, age range 18–27 years, $M = 21.3$ years, $SD = 2.5$) to two experimental groups, as in Study 1, and presented them with the same story as in Study 1, plus an additional piece of information: We told them that the second worker wanted to point out a mistake made by the first worker. We then emphasized that the second worker could have done so by saying, “No, if the oil level is low, then the machine stops automatically, but not if the water level is low.” We then asked participants why the second worker expressed himself the way he did. Participants rated on two separate 5-point scales whether they thought the second worker did because it would avoid offending the first worker or because it was shorter that way.

That second rating was sensibly the same whether the listener did or did not have a strong distaste for correction ($M = 2.2$, $SD = 1.3$ vs. $M = 2.4$, $SD = 1.3$), $t(48) = 0.6$, $p = .53$, $d = 0.15$. However, participants clearly assumed that politeness was the

motivation for ambiguity when the listener disliked correction ($M = 3.9$, $SD = 1.2$), more so than when the listener had no special distaste for correction ($M = 2.2$, $SD = 1.4$), $t(48) = 1.3$, $p < .001$, $d = 1.3$.

These results put the last touch on the picture we anticipated. Reasoners understand that, for the sake of politeness, people use ambiguous statements to correct listeners who have a special distaste for corrections. Therefore, in such a situation, reasoners are more likely to interpret ambiguous conditionals as corrections than alternatives. In turn, this interpretation makes them doubt the major conditional that is being corrected, which eventually makes them reject the MP conclusion on the basis of this conditional.

Study 2: Affective Distance

Politeness theory posits that the need for politeness increases with the distance between speaker and listener, although the original formulation of the theory was not clear about whether this distance was social (knowing each other) or affective (liking each other; see Spencer-Oatey, 1996, for a discussion, and Slugoski and Turnbull, 1988, for empirical data). According to our rationale, if the need for politeness increases when people do not like each other, ambiguous conditionals would be more likely to be interpreted as corrections when people do not like each other. In turn, this interpretation should affect the subjective probability of the major conditional, which should then suppress MP.

Method

Participants were 100 volunteer students at the University of Toulouse (all native French speakers, 41 men, age range 18–39 years, $M = 21.7$ years, $SD = 3.1$). They were randomly assigned to one of two experimental groups (listener likes vs. hates speaker).

Participants read a cover story in which two executives (Alan and Ben) discussed which product they should use to manufacture a new Christmas candy. Participants were told that Alan either liked or hated Ben. Participants were then presented with two conditional statements:

- 6a. Alan says, “If we use Lupin marshmallow, then the candy will be mellow.”
- 6b. Ben says, “If we use Maujy marshmallow, then the candy will be mellow.”

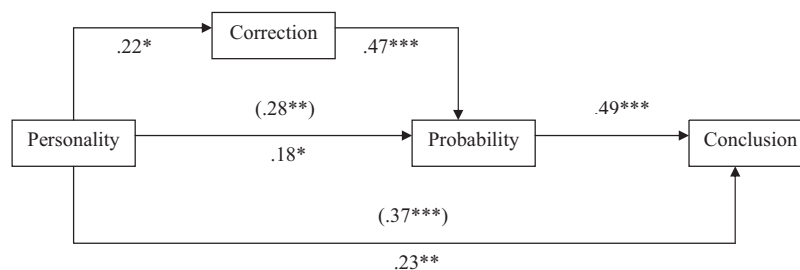


Figure 2. Study 1: Path analysis for the effect (β coefficients) of the listener's personality on the acceptance of modus ponens. $N = 100$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Participants were told to imagine that the Lupin marshmallow was used and to evaluate the conclusion “the candy will be mellow” on the same 5-point scale they had used in Study 1. Second, they judged the probability that “if we use Lupin marshmallow, then the candy will be mellow” on a 7-point scale (anchors from *very low* to *very high*). Third, they chose a paraphrase for Ben’s statement from “Whether we use the Lupin marshmallow or we use the Maujy marshmallow, in both cases, the candy will be mellow” (alternative) and “If we use Maujy marshmallow, then, yes, the candy will be mellow, but not if we use Lupin marshmallow” (correction).

Results

Affective distance had the expected effect on participants’ choice of paraphrase, on the probability of the major conditional, and on MP acceptance (see Table 2). When the listener hated the speaker, participants were more likely to choose the correction paraphrase, $\chi^2(1, N = 100) = 10.3, p = .001$; the probability of the conditional was lower, $F(1, 98) = 5.1, p < .05$; and MP acceptance was lower, $F(1, 98) = 4.9, p < .05, d = 0.44$.

We conjectured that our manipulation would affect the interpretation of the second conditional. The interpretation would affect the probability in the major premise, and the probability would in turn affect the endorsement of MP. Again, this conjecture amounts to a nested mediation hypothesis. We tested it through a series of five regressions summarized in Figure 3. In all regressions, the listener hating (liking) the speaker was coded $-1 (+1)$, as was the choice of the correction (alternative) paraphrase.

Data show that affective distance significantly affected endorsement of MP, $\beta = .22, t(98) = 2.2, p < .05$, and the probability of the major conditional, $\beta = .22, t(98) = 2.2, p < .05$.

When MP endorsement was simultaneously regressed on affective distance and on the probability of the major, the effect of probability was significant, $\beta = .78, t(98) = 12.2, p < .001$, but the contribution of affective distance dropped, $\beta = .05, t(98) = 0.7, p = .47$. This decrease was significant according to the Sobel test, whose value was 2.2 ($p < .05$). Affective distance also significantly affected the choice of a paraphrase, $\beta = .32, t(98) = 3.4, p < .001$.

When the probability judgment was regressed on affective distance and on paraphrase, the effect of paraphrase was significant, $\beta = .62, t(98) = 7.4, p < .001$, but the contribution of affective distance dropped, $\beta = .02, t(98) = 0.3, p = .78$. This

decrease was significant according to the Sobel test, whose value was 3.1 ($p < .01$).

Discussion

Results lend strong support to our nested mediation hypothesis. When the listener hated the speaker, reasoners interpreted the ambiguous conditional as a correction. Their interpretation made them doubt the major conditional premise, and their doubt made them reject the MP conclusion. Note that we observed a full nested mediation in Study 2, whereas mediation was partial in Study 1. We predicted this nested mediation on the basis of our assumption that a correction would have a high threat level for a listener who hated the speaker and, that, accordingly, the interpretation of the ambiguous conditional as a correction or alternative would be motivated by the perceived desire of the speaker to be polite. However, this key assumption was not tested in Study 2.

Thus, to make sure this key assumption was legitimate, we again randomly assigned 50 volunteer students (all native French speakers, 23 men, age range 18–35 years, $M = 22.2$ years, $SD = 3.8$) to two experimental groups, as in Study 2, and presented them with the same stories as in Study 2, plus an additional piece of information: We told them that Ben wanted to point out a mistake made by Alan. We then emphasized that Ben could have done so by saying “No, if we use Maujy marshmallow, then the candy will be mellow, but not if we use Lupin marshmallow.” We asked participants why Ben expressed himself the way he had. Participants rated on two separate 5-point scales whether they thought he had done so because otherwise Alan would have been offended or because it was shorter that way.

That second rating was sensibly the same whether Alan liked or hated Ben ($M = 1.9, SD = 1.3$ vs. $M = 2.2, SD = 1.1$), $t(48) = 0.7, p = .50, d = 0.2$. However, participants assumed that politeness was the motivation for ambiguity when Alan hated Ben ($M = 3.6, SD = 1.1$) and that this was more so than when Alan liked Ben ($M = 2.7, SD = 1.4$), $t(48) = 2.0, p < .01, d = 0.7$.

These results complete the picture we anticipated. Reasoners understand that, for the sake of politeness, people use ambiguous statements to correct listeners who dislike them. Therefore, in such a situation, reasoners are more likely to interpret ambiguous conditionals as corrections than as alternatives. In turn, this interpretation makes them doubt the major conditional that is being corrected, and their doubt eventually makes them reject the MP conclusion on the basis of this conditional.

General Discussion

Understanding conditional reasoning requires us to identify the cues to the pragmatic function of a conditional statement (Evans, 2005). Reasoners reach very different conclusions depending on whether they construe a given conditional as expressing a disabler, an alternative, or a correction. We claimed that conditional statements could be ambiguous, as they could be construed either as alternatives or corrections; and that the way reasoners resolved the ambiguity would have a noticeable effect on their beliefs and conclusions. We suggested that politeness theory could help us identify some cues that reasoners use to solve the ambiguity, to update their beliefs accordingly, and to draw appropriate inferences.

Table 2

Study 2: Endorsement of Modus Ponens (MP), Probability of the Major Conditional Premise, and Frequency of Correction Paraphrase, as a Function of Whether the Listener Likes or Hates the Speaker

Distance	MP	Probability	Correction, %
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Likes speaker, Group 1	3.7 (1.0)	4.5 (1.4)	30
Hates speaker, Group 2	3.2 (1.2)	3.9 (1.4)	62

Note. MP was measured on a 5-point scale. Probability was measured on a 7-point scale.

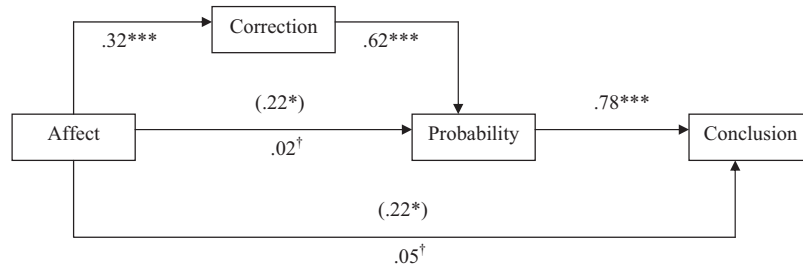


Figure 3. Study 2: Path analysis for the effect (β coefficients) of affective distance on the acceptance of modus ponens. $N = 100$. $\dagger p > .05$. $* p < .05$. $*** p < .001$.

From the perspective of politeness theory, ambiguity is a strategy that speakers can adopt when being direct would threaten the face of the listener. We assumed that reasoners were aware of that strategic use of ambiguity and predicted that any factor that increased the face threat of a correction would encourage reasoners to interpret the ambiguous conditional as a correction; this interpretation would in turn decrease their confidence in the first conditional, and their decreased confidence would eventually suppress MP. We observed this nested mediation structure in two studies. Study 1 manipulated the threat level of a correction by describing the listener as someone who did or did not have a special distaste for correction; Study 2 manipulated the threat level of a correction by changing the affective distance between speaker and listener. Furthermore, we could check that our manipulations of threat level appropriately encouraged participants to consider politeness as the motivation for ambiguity.

Although there has been much emphasis on pragmatic influences in the psychology of conditional reasoning, our research has very few precursors. First, most pragmatic research on conditional reasoning dealt with the semantic contents of conditionals (e.g., Byrne, 1989; De Neys, Schaeken, & d'Ydewalle, 2003; Politzer & Bonnefon, 2006). The present research was concerned, rather, with context effects. The contextual effects we observed were large (Study 1) to moderate (Study 2). This places them in the upper range of effect sizes for content effects, which went from small (De Neys et al., 2003) to moderate (Poltizer & Bonnefon, 2006) to large in the original study by Byrne (1989). The original Byrne effect had a standardized effect size of about 0.9. This is comparable with the effect size in our own Study 1.

Second, previous research on context effects rarely considered the interpersonal dimension of context but focused instead on factors such as what is at stake for the reasoner (Oberauer & Wilhelm, 2003) or the individual enunciating the conditional (Hilton, Kimmelmeier, & Bonnefon, 2005; Ohm & Thompson, 2004) or even on the mere fact that the conditional is asserted by one person to another (Bonnefon & Villejoubert, 2007). Rarely did any study consider the personality of the agents who exchanged conditionals or their relationship. Notable exceptions (Fiddick & Cummins, 2001; Kilpatrick, Manktelow, & Over, 2007) addressed the effect of status or power, but these experiments, unlike our studies, focused on deontic conditionals rather than causal conditionals.

More generally, research on the pragmatics of conditional reasoning has been quasi-exclusively based on Gricean approaches, to the detriment of the rich tradition of politeness theory.² This is

unfortunate, because politeness theory can give novel and distinct insights on the pragmatics of judgment and reasoning (Bonnefon & Villejoubert, 2006; Holtgraves, 2005). The traditional application of pragmatics to conditional reasoning has been centered on extralogical conclusions that pragmatic reasoners draw when they assume Gricean cooperativeness. As demonstrated by the present findings, new insights can be gained by considering the extralogical conclusions that pragmatic reasoners draw out of politeness concerns, which Brown and Levinson (1978/1987) considered to provide the main motivation to flout the Gricean maxims of conversation.

² We do not claim that politeness theory is a non-Gricean approach to communication; rather, we observe that Gricean approaches to conditional reasoning have never addressed politeness phenomena.

References

- Bonnefon, J. F., & Hilton, D. J. (2002). The suppression of modus ponens as a case of pragmatic preconditional reasoning. *Thinking and Reasoning*, 8, 21–40.
- Bonnefon, J. F., & Hilton, D. J. (2004). Consequential conditionals: Invited and suppressed inferences from valued outcomes. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 30, 28–37.
- Bonnefon, J. F., & Villejoubert, G. (2006). Tactful or doubtful? Expectations of politeness explain the severity bias in the interpretation of probability phrases. *Psychological Science*, 17, 747–751.
- Bonnefon, J. F., & Villejoubert, G. (2007). Modus Tollens, Modus Shmolens: Contrapositive reasoning and the pragmatics of negation. *Thinking and Reasoning*, 13, 207–222.
- Brown, P., & Levinson, S. C. (1987). *Politeness: Some universals in language usage*. Cambridge, England: Cambridge University Press. (Original work published 1978).
- Byrne, R. M. J. (1989). Suppressing valid inferences with conditionals. *Cognition*, 31, 61–83.
- Clark, H., & Schunk, D. (1980). Polite responses to polite requests. *Cognition*, 8, 111–143.
- Demeure, V., Bonnefon, J. F., & Raufaste, E. (2008). Utilitarian relevance and face-management in the interpretation of ambiguous question/request statements. *Memory & Cognition*, 36, 873–881.
- De Neys, W., Schaeken, W., & d'Ydewalle, G. (2003). Inference suppression and semantic memory retrieval: Every counterexample counts. *Memory & Cognition*, 31, 581–595.
- Evans, J. S. B. T. (2005). The social and communicative function of conditional statements. *Mind and Society*, 4, 97–113.
- Evans, J. S. B. T., & Over, D. E. (2004). *If*. Oxford, England: Oxford University Press.

- Fiddick, L., & Cummins, D. D. (2001). Reciprocity in ranked relationships: Does social structure influence social reasoning? *Journal of Bioeconomics*, 3, 149–170.
- Hilton, D. J., Kimmelmeier, M., & Bonnefon, J. F. (2005). Putting ifs to work: Goal-based relevance in conversational action planning. *Journal of Experimental Psychology: General*, 135, 388–405.
- Holtgraves, T. (1991). Interpreting questions and replies: Effects of face-threat, question form, and gender. *Social Psychology Quarterly*, 54, 15–24.
- Holtgraves, T. (1994). Communication in context: Effects of speaker status on the comprehension of indirect requests. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20, 1205–1218.
- Holtgraves, T. (1998). Interpreting indirect replies. *Cognitive Psychology*, 37, 1–27.
- Holtgraves, T. (1999). Comprehending indirect replies: When and how are their conveyed meaning activated? *Journal of Memory and Language*, 41, 519–540.
- Holtgraves, T. (2005). Social psychology, cognitive psychology, and linguistic politeness. *Journal of Politeness Research*, 1, 73–93.
- Holtgraves, T., & Yang, J. (1990). Politeness as universal: Cross-cultural perceptions of request strategies and inferences based on their use. *Journal of Personality and Social Psychology*, 59, 719–729.
- Holtgraves, T., & Yang, J. (1992). Interpersonal underpinnings of request strategies: General principles and differences due to culture and gender. *Journal of Personality and Social Psychology*, 62, 246–256.
- Kilpatrick, S. G., Manktelow, K. I., & Over, D. E. (2007). Power of source as a factor in deontic inference. *Thinking and Reasoning*, 13, 295–317.
- Oaksford, M., & Chater, N. (2003). Conditional probability and the cognitive science of conditional reasoning. *Mind and Language*, 18, 359–379.
- Oberauer, K., & Wilhelm, O. (2003). The meaning(s) of conditionals: Conditional probabilities, mental models, and personal utilities. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 29, 680–693.
- Ohm, E., & Thompson, V. (2004). Everyday reasoning with inducements and advice. *Thinking and Reasoning*, 10, 241–272.
- Politzer, G. (2005). Uncertainty and the suppression of inferences. *Thinking and Reasoning*, 11, 5–33.
- Politzer, G., & Bonnefon, J. F. (2006). Two varieties of conditionals and two kinds of defeaters help reveal two fundamental types of reasoning. *Mind and Language*, 21, 484–503.
- Politzer, G., & Bourmeau, G. (2002). Deductive reasoning from uncertain conditional. *British Journal of Psychology*, 93, 345–381.
- Slugoski, B., & Turnbull, W. (1988). Cruel to be kind and kind to be cruel: Sarcasm, banter and social relations. *Journal of Language and Social Psychology*, 7, 101–121.
- Spencer-Oatey, H. (1996). Reconsidering power and distance. *Journal of Pragmatics*, 26, 1–24.
- Sperber, D. (2001). In defense of massive modularity. In E. Dupoux (Ed.), *Language, brain and cognitive development: Essays in honor of Jacques Mehler* (pp. 47–57). Cambridge, MA: MIT Press.
- Stenning, K., & van Lambalgen, M. (2005). Semantic interpretation as computation in nonmonotonic logic: The real meaning of the suppression task. *Cognitive Science*, 29, 919–960.
- Stenning, K., & van Lambalgen, M. (2008). *Human reasoning and cognitive science*. Cambridge, MA: MIT Press.
- Stevenson, R. J., & Over, D. E. (1995). Deduction from uncertain premises. *Quarterly Journal of Experimental Psychology*, 48A, 613–643.
- Stevenson, R. J., & Over, D. E. (2001). Reasoning from uncertain premises: Effects of expertise and conversational context. *Thinking and Reasoning*, 7, 367–390.

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