

# The Context of Available Options Affects Health Care Decisions: A Generalization Study

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**Background.** When a given option is presented along with 2 alternatives, similar to each other, health care professionals choose it more often than when it is presented with just one of the alternatives. This inconsistent decision pattern may depend on the conflict generated from choosing between 2 highly similar options. **Objective.** To generalize the effect by using realistic scenarios that involve 2 alternatives displaying various degrees of similarity. **Methods.** One hundred fifty-five psychiatrists, 149 gynecologists, and 89 nurse managers had to indicate the treatment they would recommend in clinical scenarios containing either 3 options or just 2 of them. The similarity between the 2 alternatives varied across scenarios, ranging from a very high (psychiatric scenario) to an only moderately high (nursing management scenario) to a limited level (gynecological

scenario). **Results.** Professionals chose the focal option more often when both alternatives were available. The paradoxical effect occurred for all scenarios—namely, when the alternatives were medication variants (psychiatric scenario), when most of the features they shared produced their effect at a different extent in the 2 cases (nursing management scenario), and some of their consequences were at variance (gynecological problem). **Conclusions.** The context of available options affects professionals' choices when the alternatives are similar but also when they present diverging features. Professionals need to be aware of such a source of practice variability and are encouraged to consider each option per se before they compare the available options. **Keywords:** clinical decision making; context effect; similarity (*Med Decis Making* 2012;32:815–819)

The regularity principle of rational decision making states that if an agent prefers A among

options A, B, and C (e.g., a patient prefers to consult doctor A among 3 physicians working in town) and is informed that option C is not available anymore (e.g., doctor C left the town), he or she should continue to prefer A (e.g., doctor A). In other words, the patient's preferences should be independent from the absence or presence of an option that he or she would not pursue. Despite the soundness of this principle, individuals, including health care professionals, sometimes violate it.<sup>1–9</sup> In particular, Redelmeier and Shafir<sup>7</sup> asked a group of physicians to consider a patient who was treated with anti-inflammatory medications without success. In one

Received 2 August 2011 from LPC UMR CNRS 7290, Aix-Marseille University, Marseille, France (FD, MG, VG); University IUAV of Venice, Italy (VG); Jean Moulin Lyon 3 University, IFROSS, France (CP, FD); Department of Medical Information, Medical Center of Villefranche, France (J-FB); and University of Turin, Italy, and Ludwig Maximilian University, Munich, Germany (VC). The research was supported by grants from the Italian Ministry of Scientific Research (PRIN grant 20083NAH2L\_001) and by the Alexander von Humboldt Foundation to Vincenzo Crupi and from Swiss Global-Fondazione Ca' Foscari to Vittorio Girotto. The funding agreement ensured the authors' independence in designing the study, interpreting the data, and writing and publishing the report. The authors thank Don Redelmeier and 2 anonymous reviewers for their comments on a previous version of the paper, as well as 2 groups of nurse managers enrolled in continuing nursing education at Lyon III University (France) for their support in our study. They also thank a group of 33 nurse managers for their help in the construction of the material and another group of 38 nurse managers for their assistance in collecting data. Revision accepted for publication 28 January 2012.

DOI: 10.1177/0272989X12445285

Supplementary material for this article is available on the *Medical Decision Making* Web site at <http://mdm.sagepub.com/supplemental>.

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condition, physicians could either refer the patient to a specialist or prescribe 1 of 2 novel medications. In another condition, one of these medications was not available. Paradoxically, physicians choose referral more often when both medications are available, possibly because of the conflict resulting from choosing between 2 highly similar treatments.<sup>7-10</sup> Notice that such a regularity violation occurs in a situation wherein no option is patently worse than another.

One open question is whether the effect may occur with options displaying various degrees of similarity. To answer this question, however, one should use scenarios that provide explicit criteria to evaluate the degree of similarity between the options. Thus, we constructed scenarios that display the expected benefits and detriments of each option. We asked health care experts to indicate the treatment they would recommend in scenarios containing either 3 options or just 2 of them. Each scenario described realistically the case of a patient and specified the consequences of each option. Across scenarios, we varied the similarity between options B and C. Specifically, in study 1, B and C were highly similar. In study 2, they still shared many features but differed from each other in the extent of effect of most of their shared features. In study 3, some of their shared features had opposite consequences on the patient's health. If the paradoxical choice pattern documented by Redelmeier and Shafir<sup>7</sup> is robust, then experts will exhibit it regardless of the degree of similarity between options B and C.

## METHODS

Thirty-three nurse managers enrolled in continuing nursing education at Lyon III University (France) worked on the construction of scenarios in their specialized health care domain (i.e., psychiatry, gynecology, elderly care). In all studies, the scenarios provided a biographical sketch of a patient and his or her specific problem, followed by possible courses of action and the positive v. negative features of each of them. There were 2 versions of each scenario that differed only by the options submitted. In one version, the scenario presented 2 treatment options. In the other one, it presented a further treatment option.

In each study, the nurse managers who constructed the scenarios established the criteria to define the positive v. negative features of each

treatment option. The options were such that A differed from B or C along each dimension, and both B and C had some negative value along at least one dimension. In each scenario, the global difference between A and B or C was greater than the global difference between B and C. In all studies, the treatment cost was not a relevant dimension to distinguish the various options. In all studies, the scenarios were described in an uncontrived format. The texts describing the clinical case ranged between 268 and 508 words. The texts describing the options ranged between 132 and 439 words.

Another group of 38 nurse managers solicited a total of 412 professionals who worked in the public and private sectors of the French health system and came from virtually all areas of France. They received a scenario concerning their own specialty, in either the 2-option or the 3-option version. In each version, the description of the options was followed by the request to choose one of the courses of action. Each version was randomly assigned to participants of a group. Ninety-five percent of the solicited participants replied. This high response rate might have been achieved because nurse managers solicited participants through their professional network.

To determine the degree of similarity between the various options presented in each scenario, we constructed a relative similarity index. Two independent judges coded the nurse managers' analysis of the features characterizing the options (e.g., the consequences of a given treatment) into numerical values ranging from  $-1$  to  $+1$  to each option. A  $-1$  value indicated a very negative feature, a  $-1/2$  value indicated a mildly negative feature, a  $0$  value indicated a feature that was not relevant to a given option, a  $+1/2$  value indicated a mildly positive feature, and a  $+1$  value indicated a very positive feature. The judges' agreement rate was 95%. Disagreements were solved via discussion. The values associated with each option for each dimension are reported in the online appendix. On the basis of this numerical coding, we calculated the distance between 2 options ( $d$ ), which is the sum of the absolute differences of their value for each feature. Then, we considered the relative contrast ( $rc$ ) between B and C by dividing their distance by their mean distance to A. Without considering the degenerate case in which the 3 options share the same features,  $rc$  is between 0 and 2. When just B and C share the same positive and negative features,  $rc$  equals 0. When their difference is smaller than their mean difference with A,  $rc$  is smaller than 1. When it is greater,  $rc$  is between 1 and 2. Notice that an augmentation of the

**Table 1** Values Assigned to Each Option's Dimensions in the 3 Scenarios

Dimension	Option		
	A	B	C
Psychiatric scenario			
Administration	-1/2	1/2	1/2
Invasiveness	-1/2	1/2	1/2
Patient's compliance	1/2	-1/2	-1/2
Intervention frequency	1/2	-1/2	-1/2
Preparation	0	-1/2	-1/2
Nursing management scenario			
Administration	-1/2	1/2	1
Patient's autonomy	1/2	-1/2	0
Service quality	1/2	-1/2	-1/2
Patient's self-esteem	1/2	-1/2	-1
Patient's privacy	-1/2	-1/2	-1
Gynecological scenario			
Patient's compliance	-1/2	1/2	1/2
Weight control	0	-1/2	1
Menstruation control	1/2	1	-1/2
Effectiveness	1/2	-1	-1/2
Comfort	1/2	-1	-1/2

Note: The dimensions are listed from those wherein B and C options receive a positive value to those wherein B or C options receive a negative value.

dissimilarity of A compared with B and C diminishes the relative contrast between B and C.

## STUDY 1

In study 1, the scenario dealt with a psychiatric case (see the appendix). It described a psychotic patient whose last prescription was a treatment by Haldol injection. His new psychiatrist considered the possibility to continue with Haldol injection (option A) or to opt for another administration regimen. In the 2-option version, the alternative was Haldol pills (option B). In the 3-option one, Haldol drops (option C) were added. Options B and C presented a very high degree of similarity ( $rc = 0$ ). Unlike option A, they shared the positive feature of being a self-administered treatment, as well as the negative features of implying frequent interventions and increasing the risks of neglect or voluntary discontinuation (see Table 1). In sum, options B and C were very similar to each other, as in Redelmeier and Shafir's study.<sup>7</sup> Accordingly, we expected to replicate their finding.

The participants were 155 psychiatrists (median professional experience: 18 years; range, 4 months

to 40 years), 57 of whom were women. Seventy-eight psychiatrists received the 3-treatment version and 77 the 2-treatment one.

## Results

In the 3-option condition, psychiatrists chose option A more often than those in the 2-option condition (63% v. 48%,  $z = 1.83$ , 1-tailed  $P = 0.02$ ). Twenty-two percent of the psychiatrists chose option C in the 3-treatment version. We divided the entire group of psychiatrists into 2 subgroups according to their level of professional experience (i.e., above v. below the median years of professional experience). We did not obtain a significant difference between the patterns of choice produced by the 2 subgroups. In sum, we replicated Redelmeier and Shafir's effect<sup>7</sup> by using a clinical scenario wherein options B and C were very similar.

## STUDY 2

In study 2, the scenario (see the appendix) concerned a nursing management case. It described a resident in an elderly institution who suffered from rising urinary incontinence. The nurse manager of the institution considered the possibility of providing systematic toileting assistance (option A) or opting for an alternative course of action. In the 2-option version, the alternative was incontinence pads (option B). In the 3-option one, a potty chair (option C) was added. Options B and C presented a moderately high degree of similarity ( $rc = .44$ ). They shared 1 positive (i.e., they both reduced the cost of personnel assistance) and 3 negative features (i.e., they both reduced patients' self-esteem and privacy, as well as the service quality), only one of which was also shared by option A (i.e., they all threatened patients' privacy). Unlike study 1, however, in this scenario, options B and C differ from each other because 3 of the 4 features they shared produced their effects to a different extent in the 2 cases: Both B and C reduced patients' self-esteem and privacy, but C reduced them to a larger extent than B; both B and C reduced the cost of personnel assistance, but C reduced it to a larger extent than B (see Table 1). Could a regularity violation effect occur in this case, despite the lower degree of similarity between options B and C?

The participants were 89 nurse managers (median professional experience: 5 years; range, 3 months to 36 years), 67 of whom were women. Forty-two

participants received the 3-treatment version and 47 the 2-treatment one.

## Results

In the 3-option condition, nurse managers chose option A more often than in the 2-option condition (93% v. 74%,  $z = 2.21$ , 1-tailed  $P < 0.01$ ). Five percent of the respondents chose option C in the 3-treatment version. No significant difference emerged as a function of the participants' level of professional experience (i.e., nurse managers above v. below the median years of professional experience). In sum, we documented a regularity violation effect by using a clinical scenario wherein most of the features shared by B and C produced their effects to a different extent in the 2 cases.

## STUDY 3

In study 3, the scenario dealt with a gynecological case (see the appendix). It described a woman who used an oral contraceptive. Her gynecologist considered the possibility of continuing with an oral contraceptive (option A) or switching to a new treatment. In the 2-option version, the alternative was a hormonal intrauterine device (IUD) (option B). In the 3-option one, a copper IUD (option C) was added. Options B and C presented a limited degree of similarity ( $rc = .80$ ). Options B and C shared 1 positive feature (i.e., they do not imply compliance and the associated risk of neglecting) and 2 negative features not shared by A (i.e., they both imply the risk of extrauterine pregnancy and reduce the patients' comfort). Options B and C, however, did not share 2 other features: Hormonal but not copper IUD regulated the abundant and painful menstruations of the patient, and copper but not hormonal IUD avoided the risk of weight gain (see Table 1). Could a regularity violation effect occur in this case, despite the fact that options B and C had opposite consequences on the health of the patient?

The participants were 149 gynecologists (median professional experience: 20 years; range, 6 months to 40 years), 73 of whom were women. Seventy-one participants faced the 3-treatment version and 78 the 2-treatment one.

## Results

In the 3-option condition, gynecologists chose option A more often than in the 2-option condition

(41% v. 24%,  $z = 2.12$ , 1-tailed  $P < 0.01$ ). Thirty-nine percent of the respondents chose option C in the 3-treatment version. No significant difference emerged as a function of participants' level of professional experience (i.e., gynecologists above v. below the median years of professional experience). In sum, we documented a regularity violation effect by using a clinical scenario wherein options B and C had diverging features.

## DISCUSSION

The present results confirm and extend the previous finding that the context of available options may affect health care experts' choice. Contrary to the normative principle of regularity, our participants chose a particular option (e.g., treatment A) when it was presented with 2 other options (e.g., treatments B and C) more often than when it was presented with just 1 of the 2 (e.g., treatment B). We obtained this paradoxical decision pattern by using clinical decision-making scenarios that, unlike previously used scenarios, described the expected benefits and detriments of each option. Besides being closer to real clinical settings, wherein the consequences of medications and treatments are usually described in formularies, such scenarios allowed us to explore the boundary conditions of the effect. The precise description of the positive and negative features of each option allowed us to construct clinical scenarios that explicitly indicated the similarities and differences between options B and C and to compute an index of similarity between them. The results showed that the choice of a treatment may violate the regularity principle when options B and C are highly similar (psychiatric problem) but also when they differ from each other, because most of the features they shared produced their effect to a different extent in the 2 cases (nursing management problem), or even when they have opposite consequences on the health of the patient (gynecological problem).

In our studies, the relative contrast between options B and C ranged from 0 (psychiatric problem) to .80 (gynecological problem). Thus, in all problems, the difference between B and C was always smaller than the difference between each of them and A. Now, suppose that we used a problem wherein the relative contrast between B and C were greater than 1. In such a case, at least 1 of the 2 options would have been closer to A than to the other one. Accordingly, it would have been paradoxical to predict

a regularity violation effect. Future research will clarify the possible common mechanism underlying the regularity violations reported in our studies and in the previous ones. Moreover, future research will better support the claim of a novel generalization of the effect by systematically manipulating similarity within the same experiment and avoiding scenarios that differ in aspects other than degree of similarity between alternatives. Nevertheless, our results indicate that regularity violations do not uniquely occur when individuals have to choose between 2 highly similar options.

All our respondents were health care experts, that is, senior physicians (psychiatrists and gynecologists) and nurse managers who play a pivotal role in resources management and patient care<sup>11</sup> while not having been involved in related inquiries in the past. The finding that the context of available alternatives may affect their decisions is a cause for concern, given the increasingly high number of treatment options available, the ongoing pressure to use generic drugs,<sup>12</sup> the resulting problem of generic v. brand-name counterpart bioequivalence,<sup>13</sup> and the growing spread of biosimilar medications.<sup>14</sup> More generally, as the set of feasible treatment varies in time and across settings, context dependence may foster practice variability with no clinical motivation. Unfortunately, it is not easy to reduce such a bias.<sup>8</sup> Informing professionals of its existence seems therefore particularly advisable.<sup>15</sup> In relevant circumstances, they might be able to avoid it by not engaging in a comparison of available alternatives until a careful assessment has been made of each feasible option per se. If coupled with awareness of the risk of bias, this procedure could reduce the impact of the decision context and favor consistent choices.

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