One decision at a time or the whole path at once?
When the way information is provided affect prostate cancer decision making

Teresa Gavaruzzi[1], Brian Zikmund-Fisher[2,3,4], Peter Ubel[2,3,4], Angela Fagerlin[2,3,4]

[1]Department of Developmental Psychology and Socialization, DPSS, University of Padova, Italy; [2]VA Ann Arbor Healthcare System, Ann Arbor, MI; [3]Division of General Internal Medicine, University of Michigan, Ann Arbor, MI; [4]Center for Behavioral and Decision Sciences in Medicine, Ann Arbor, MI

Introduction

An essential prerequisite of patient decision making is that the patient is fully informed. Especially important for preference-sensitive medical decisions, i.e. those affected by patients' preferences and values, as the decision to have PSA test for prostate cancer early detection (e.g.,Gattellari & Ward, 2003).

In order for the patients to be informed when making decisions, not only the content of the information provided is important but also its presentation format. For example statistical information can be presented verbally by qualitative quantifiers, by numerical estimates or in different graphical formats (e.g., Hawley, Zikmund-Fisher, Ubel, Jancovic, Lucas, & Fagerlin, 2008; Yamagishi, 1997).

The decision to have PSA test can be viewed as the first of a series of possible decisions, the following being biopsy and treatment decisions. Knowing whether the way information about these potential subsequent decisions are presented affect patients' decisions has relevant practical implications for clinical practice, other than being of theoretical interest.

Objective: To compare two presentation methods to provide information about prostate cancer screening: sequential vs. all at once. The sequential method presents information about each decision and participants express their opinion about each decision one at a time, whereas in the all at once method participants express their opinion about all of the decisions at once, after having read all the information.

Abstract

We examined the effect of two information presentation methods (e.g., information described PSA testing, biopsy, treatments) on people's willingness to undergo prostate cancer testing: sequential vs. presented all at once. Participants rated their willingness to undertake each option either right after reading each piece of information (sequential) or after reading all information. Study 1 examined a simplified version of the decision for a generic cancer. Study 2 investigated exactly prostate cancer, with a broader and more specific sample, providing detailed and longer information, similarly to a patient decision aid. Results highlighted differences in prostate cancer decision making depending on whether the decision is presented as a single decision or as a series of decisions, particularly concerning biopsy and treatment decisions.

Study 1: Simplified version of PSA testing decision

Method. Web-survey of 336 participants (n = 218 females; age 25-71, M = 38.06, SD = 11.24, Mdn = 35). Between subject design. Independent variable: **sequential** vs. **all at once** presentation method (see Fig. 1). Short information about a generic cancer with the same incidence as prostate cancer, and with the same treatments available. Dependent variables: willingness to undergo the blood test and choice between active treatment and watchful waiting on a 6-point scale.

Information presented sequentially	*Information presented all at once*
Info 1 – Brief information about a generic cancer and blood test	**Info 1** – Brief information about a generic cancer and blood test
Choice 1 – Blood test "Would you have the blood test?" (1=definitely not, 6=definitely yes)	**Info 2** – Brief information about treatment
Info 2 – Brief information about treatment	**Choice 1** – Blood test "Would you have the blood test?" (1=definitely not, 6=definitely yes)
Choice 2 – Treatment "Would you have watchful waiting or active treatments (surgery or radiation)?" (1=definitely watchful waiting, 6=definitely active treatments)	**Choice 2** – Treatment "Would you have watchful waiting or active treatments (surgery or radiation)?" (1=definitely watchful waiting, 6=definitely active treatments)
Choice 1* – Biopsy (instead of blood test) "Would you have the biopsy?" (1=definitely not, 6=definitely yes)	**Choice 1*** – Biopsy (instead of blood test) "Would you have the biopsy?" (1=definitely not, 6=definitely yes)

Figure 1. Outline of the design, highlighting the succession of information and choices in the two conditions in Study 1.

Results

Results are summarized in Table 1. Willingness to have **blood test** was higher in the sequential condition than all at once condition. When dichotomized by the midpoint of the scale, 77% of participants in the sequential condition would have the test, whereas 66% in the all at once condition would, χ^2 (1,336) = 4.878, p =.027.

Willingness to have **active treatment** was lower in the sequential condition than in the all at once condition. When dichotomized in choices, watchful waiting would be preferred by 73% and 57% of participants respectively, χ^2 (1,336) = 10.165, p =.001.

Table 1. Willingness to undergo blood test, active treatment, and biopsy, depending on the method of presentation of information: sequential *vs*. all at once.

	Sequential (n = 165)	All at once (n = 171)	t (334)	p
Blood test	4.52 (1.49)	4.07 (1.78)	2.520	.012
Watchful waiting – Active treatments	2.65 (1.67)	3.29 (1.87)	-3.333	.001
Biopsy	4.07 (1.67)	3.66 (1.88)	2.093	.037

Willingness to have **biopsy** (if it was the initial test instead of the blood test) was also higher in the sequential condition than all at once condition. Moreover it lowered in both conditions relative to the willingness to undergo the blood test (sequential: t (164) = 3.782, p < .001; all at once: t (170) = 3.458, p = .001).

Discussion

The decision on whether to have a blood test to detect cancer resulted to be affected by the method of presentation of information. Indeed, on one hand participants receiving information sequentially were more likely to want to be tested for cancer, on the other hand they were more likely to prefer watchful waiting over active treatments compared to participants receiving information all at once.

These results suggest caution in the way in which patients are provided with information about prostate cancer screening. However, the generalizability of these results is limited by the following **limitations**: study on a generic cancer; simplified information provided; blood test described as diagnostic; young participants, comprising also females. Limitations are addressed in Study 2.

Study 2: Enriched and realistic PSA testing decision

Method. Web-survey of 1541 male participants in the age group for whom PSA test is suggested (age 40-71, *M* = 54.51, *SD* = 8.27, *Mdn* = 55). Between subject design. Independent variable: **sequential** vs**. all at once presentation** method (see Fig. 2).

Information presented sequentially	*Information presented all at once*
Info 1 – Extensive information about a prostate cancer and PSA test	**Info 1** – Extensive information about a prostate cancer and PSA test
Choice 1 – PSA test "Would you get a PSA test?" (1=definitely not, 6=definitely yes)	**Info 2** – Extensive information about biopsy
Info 2 – Extensive information about biopsy	**Info 3** – Extensive information about treatment
Choice 2 – Biopsy "Would you want to get a biopsy?" (1=definitely not, 6=definitely yes)	**Choice 1** – PSA test "Would you get a PSA test?" (1=definitely not, 6=definitely yes)
Info 3 – Extensive information about treatment	**Choice 2** – Biopsy "Would you want to get a biopsy?" (1=definitely not, 6=definitely yes)
Choice 3 – Treatment "Which treatment would you choose?" (1=watchful waiting, 2=active treatments, 3=not sure)	**Choice 3** – Treatment "Which treatment would you choose?" (1=watchful waiting, 2=active treatments, 3=not sure)

Figure 2. Outline of the design, highlighting the succession of information and choices in the two conditions in Study 2.

Results

Results are summarized in Table 2. Willingness to have **PSA test** did not differ significantly between the two conditions.

Willingness to have **biopsy** resulted higher in the sequential condition than in the all at once condition.

Watchful waiting was indicated as the preferred **treatment** more frequently in the sequential condition than in the all at once condition, in which participants were more unsure about treatment, while active treatments were equally preferred in the two groups.

Table 2. Willingness to undergo blood test, active treatment, and biopsy, depending on the method of presentation of the information: sequential *vs*. all at once.

	Sequential (n = 736)	All at once (n = 798)	Test	p
PSA test	4.98 (1.35)	5.07 (1.28)	t = -1.250	.211
Biopsy	5.06 (1.24)	4.89 (1.35)	t = 2.584	.010
% Watchful waiting	34.0%	28.9%	χ^2= 5.475	.065
% Active treatments	27.0%	27.1%		
% Not sure	39.0%	44.0%		

Discussion

Results of study 2 confirmed the effect of the method of presentation of information on willingness to undergo biopsy, but not on willingness to undergo the blood test in the first place. Moreover, the stronger preference for watchful waiting found in Study 1 in the sequential condition was replicated, however, allowing participants to state their being not sure about treatment decision showed that there was no difference between the conditions in preference for active treatments. The fact that the information provided was longer and more detailed, and most importantly the fact that information referred specifically to prostate cancer instead of a generic cancer could be possible explanation for the difference between the two studies results.

In general, the results suggest that presenting information sequentially or all at once can affect the decisions. While the decision about undergoing PSA test does not seem to be affected, the biopsy decision and the treatment decisions seem to differ depending on the presentation method. Since prostate cancer screening is a preference-sensitive medical decision (e.g.,Gattellari & Ward, 2003; Watson, Hewitson, Brett, Bukach, Evans, Edwards, Elwyn, Cargill, & Austoker, 2006), if these results were confirmed with patients, clinicians should be advised of the potential biasing effect of the way in which they provide relevant information to patients.

References:

Gattellari, M, Ward, JE (2003). Does evidence-based information about screening for prostate cancer enhance consumer decision-making? A randomised controlled trial. *Journal of Medical Screening,10,* 27–39.

Hawley, ST, Zikmund-Fisher, B, Ubel, P, Jancovic, A, Lucas, T, Fagerlin, A (2008). The impact of the format of graphical presentation on health-related knowledge and treatment choices. *Patient Education and Counseling, 73,* 448-55.

Watson, E, Hewitson, P, Brett, J, Bukach, C, Evans, R, Edwards, A, Elwyn, G, Cargill, A, Austoker, J (2006). Informed decision making and prostate specific antigen (PSA) testing for prostate cancer: A randomised controlled trial exploring the impact of a brief patient decision aid on men's knowledge, attitudes and intention to be tested. *Patient Education and Counseling, 63*, 367-379.

Yamagishi, K (1997). When a 12.86% mortality is more dangerous than 24.14%: Implications for risk communication. *Applied Cognitive Psychology, 11*, 495–506.

Contact information:
teresa.gavaruzzi@unipd.it