Consumers' preferences for 'organic plus' pasta in Italy: Is social desirability bias an issue in choice experiments?

Luisa Menapace[a], Roberta Raffaelli[b], Laura Viganò[c]

[a] *Governance in International Agribusiness Group, Technische Universität München, Germany*

[b] *Department of Economics and Management University of Trento, Italy*

[c] *CRA-INEA, Roma*

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Background and motivation (I)

A new trend towards the so called 'organic-plus', "with many consumers expecting an extensive orientation towards sustainability" (Schleenbecker and Hamm, 2013)

The literature on consumers' preference for organic-plus attributes is still limited (Stolz and Stolze, 2010; Zander and Hamm, 2010).

Only two studies on preference for pasta with sustainability attributes (Lüth, Enneking, Spiller, 2005 and Cavallo et al. 2013) but organic certification is one of the attributes.

Most organic-plus attributes are of quasi-public nature

➡ prone to social desirable responding

Background and motivation (II)

Tendency to provide socially desirable answers in surveys and stated preference studies

Social desirability bias (SDB):

a biased measure of respondents' preferences and WTPs

Approaches against SDB:

❖ Removing SDB ex-post

- scales measuring individual propensity to SDR (Steenkamp et al. 2010)

❖ Preventing SDR ex-ante:

- indirect questioning (Fisher, 1993)
- bogus pipeline techniques (Jones and Sigall, 1971)
- randomized response methodologies (De Jong et al., 2010)
- monetary incentives to increase saliency (Lusk and Norwood, 2009)

Background and motivation (III)

Indirect questioning or inferred questioning (IQ) is the state of the art in dealing with SDB in CE

With IQ individuals are asked to predict the behavior of others (Lusk e Norwood, 2009)

Key assumption: answers to IQ are based on own preferences and valuations, which are adjusted for perceived differences between the person and the others

Different IQ formats used in the literature:

- predict the choice of "most people" (Alpert, 1971)
- predict the choice of an "average person" (Fisher, 1993)
- predict the distribution of choices of others (Lusk and Norwood, 2009)

IQ can be associated to monetary incentives (Lusk and Norwood, 2009) or not (Yadav et al. 2013).

Objectives

- Investigate consumers' preferences for organic pasta contrasting direct versus indirect questions
  - Do monetary incentive increase the efficacy of indirect questioning?

Attribute selection

1. Literature review on organic and 'beyond-organic' consumption looking for attributes in three dimensions of sustainability (environmental, economic and social)
2. Focus group

All the attributes (concerning farming and processing) are already displayed in some labels of pasta on the shelves

Table 1. Attributes and levels

Attribute	VAR	Level
100% Italian durum wheat	OR	Yes/No
Produced from ancient durum cultivars	BD	Yes/No
Guarantee of fair price to producers	QU	Yes/No
With employment of disadvantaged people	SV	Yes/No
With renewable energy	EN	Yes/No
Slow drying	TR	Yes/No
Price (Euros per 500 gr package of penne rigate)	PR	1.19, 1.69, 2.19, 2.69, 3.19, 3.69

The study design (I)

- A pilot study (80 interviews) to estimate priors
- D-efficient block design: 24 choice situations, 4 blocks, 6 choice situations per respondent
- 3 alternatives per choice situation (2 unlabeled + “no-buy” option)
- Each respondent is presented with the 6 choice situations **twice**:

➢ Direct question (DQ):
  - ➢ choose which alternative you prefer

➢ Indirect question (IQ):
  - ➢ predict the percentage of customers choosing the three alternatives

- Within-subject design with randomization of the order of presentation

An example of choice card (DQ)

Scheda 1

TIPO A Confezione di penne da 500 gr	TIPO B Confezione di penne da 500 gr
	Con energia rinnovabile
	Da grani antichi
	Grano 100% italiano
	Con essicazione lenta
	Con l'impiego di soggetti svantaggiati (disabili, carcerati)
	Con garanzia di un prezzo equo all' agricoltore
2.6 Euro	2.95 Euro

Se in questo negozio fossero disponibili solo il tipo A e B,
cosa sceglierebbe Lei, in base alle sue preferenze personali?

Sceglierei il tipo A

Sceglierei il tipo B

Sceglierei di non acquistare la pasta in questo negozio

An example of choice card (IQ)

Scheda 7

TIPO A Confezione di penne da 500 gr	TIPO B Confezione di penne da 500 gr
Con energia rinnovabile	
	Da grani antichi
Grano 100% italiano	
Con essicazione lenta	
	Con l'impiego di soggetti svantaggiati (disabili, carcerati)
Con garanzia di un prezzo equo all' agricoltore	
1.2 Euro	1.9 Euro

Se in questo negozio fossero disponibili solo il tipo A e B, cosa prevede sceglierebbero gli altri clienti intervistati?

Il _____ % dei clienti sceglierebbe il tipo A

Il _____ % dei clienti sceglierebbe il tipo B

Il _____ % dei clienti sceglierebbe nessuno dei due tipi

Treatments and hypotheses (I)

To test whether monetary incentive increase the efficacy of indirect questioning:

(i) no incentive (control treatment CT)

(ii) incentive to provide accurate estimates of others' purchase intentions (incentivized treatment IT)

Economic incentive:

Store coupons of the value of 30 Euros assigned at the end of the study to 30% of respondents

Store coupons assignment:

- CT: randomly to the 30% of respondents
- IC: to the 30% of respondents with highest scores for accurate estimates of others' purchase intentions

Treatments and hypotheses (II)

Treatments	CT	IT
Direct questioning (Dq)	Choice self (WTP_{Dq}^{CT})	Choice self (WTP_{Dq}^{IT})
Indirect question (Iq)	Predict others' choices (shares) (WTP_{Iq}^{CT})	Predict others' choices (shares) (WTP_{Iq}^{IT})
Monetary incentive	None	Linked to others' choice predictions

H1) $WTP_{Dq}^{CT} > WTP_{Iq}^{CT}$ and $WTP_{Dq}^{IT} > WTP_{Iq}^{IT}$

H2) $WTP_{Iq}^{IT} \neq WTP_{Iq}^{CT}$

The survey administration

- Intercept survey in a organic store chain in 3 large cities in Italy (Rom, Milan, Palermo)
- Data collected through CASI
- Eligibility to participate:
  - i) being habitual consumer of organic produce and
  - ii) buying organic durum wheat pasta at least in some occasions
- Respondents randomly assigned to the treatments
- 400 completed questionnaires:
  - 201 for control treatment (CT)
  - 199 for incentivized treatment (IT)

The results

Analysis of socioeconomic characteristics:

- the two samples coming from the same population

Respondents' perception about the private/public nature of the attributes

Table 3. Perceived private and public nature of attributes

Attribute	Var		CT	IT
With renewable energy	EN	Av. Score	4.015	4.005
		SD	1.116	1.126
Produced from ancient durum cultivars	BD	Av. Score	2.552	2.633
		SD	1.367	1.264
100% Italian durum wheat	OR	Av. Score	3.159	3.045
		SD	1.416	1.379
Slow drying	TR	Av. Score	1.990	1.925
		SD	1.225	1.239
With employment of disadvantaged people	SV	Av. Score	4.184	4.312
		SD	1.127	1.032
Guarantee of fair price to producers	QU	Av. Score	3.652	3.975
		SD	1.330	1.269
Number of respondents		400	201	199

Estimation strategy (I)

MNL and RPL with all the non-monetary attributes normally distributed and price held fixed (Nlogit 5.0)

LLR test for parameters equality between DQ and IQ: rejected

➡ DQ estimated separately from IQ

Estimations on DQ:

LLR test for parameters equality across CT and IT: rejected

➡ CT and IT estimated separately

LLR test for parameters equality across order of presentation: rejected for CT but not for IT

➡ split samples in DQ presented before and after IQ

RPL models provide better goodness of fit ➡ WTPs on RPL

Krinsky and Robb (1986) parametric bootstrapping with 1,000 draws and Poe et al. (2005) complete combinatorial approach

Results: WTPs from DQ before and after IQ (CT)

Table 5. WTPs from direct questions and treatments – RPL Model

Treatments	CT $(WTP_{Dq}^{CT})^A$		CT $(WTP_{Dq}^{CT})^B$		$(WTP_{Dq}^{CT})^A > (WTP_{Dq}^{CT})^B$ p-values
EN	0.455	**	0.353	**	0.344
	[0.049	1.013]	[0.089	0.651]	
BD	0.906	***	0.881	***	0.444
	[0.521	1.642]	[0.557	1.246]	
OR	1.513	**	1.193	***	0.204
	[0.931	2.502]	[0.843	1.627]	
TR	0.322	***	0.273	***	0.392
	[0.034	0.733]	[0.079	0.512]	
SV	0.790	***	0.310	**	**0.031**
	[0.410	1.459]	[0.062	0.633]	
QU	0.980	***	0.384	**	**0.016**
	[0.529	1.811]	[0.114	0.711]	

(A) indicates Direct Questions presented before Inferred Questions
(B) indicates Direct Questions presented after Inferred Questions
***, ** and * for 1%, 5% and 10% significance levels of the non-price coefficients, respectively
Numbers in brackets are 95% confidence interval estimated using Krinsky-Robb (1986) parametric bootstrapping method. P-Values were determined by applying the nonparametric combinatorial method (Poe et al., 2005) to 1,000 Krinsky–Robb (1986) bootstrapped WTP estimates

Results: WTPs from DQ before and after IQ (IT)

Table 6. WTPs from direct questions and treatments – RPL Model

Treatments	IT $(WTP_{Dq}^{IT})^A$		IT $(WTP_{Dq}^{IT})^B$		$(WTP_{Dq}^{IT})^A > (WTP_{Dq}^{IT})^B$ p-values
EN	0.516	***	0.431	***	0.320
	[0.260	0.796]	[0.164	0.744]	
BD	0.486	***	0.598	***	0.728
	[0.277	0.743]	[0.345	0.978]	
OR	1.083	***	1.454	***	0.897
	[0.681	1.561]	[1.086	2.008]	
TR	0.161	**	0.335	***	0.866
	[-0.028	0.387]	[0.117	0.600]	
SV	0.290	***	0.463	**	0.834
	[0.070	0.559]	[0.212	0.861]	
QU	0.513	***	0.426	***	0.360
	[0.209	0.890]	[0.168	0.805]	

(A) indicates Direct Questions presented before Inferred Questions
(B) indicates Direct Questions presented after Inferred Questions
***, ** and * for 1%, 5% and 10% significance levels of the non-price coefficients, respectively
Numbers in brackets are 95% confidence interval estimated using Krinsky-Robb (1986) parametric bootstrapping method. P-Values were determined by applying the nonparametric combinatorial method (Poe et al., 2005) to 1,000 Krinsky–Robb (1986) bootstrapped WTP estimates

Results: WTPs from DQ asked before IQ (A)

Table 4. WTPs from direct questions and treatments – RPL Model

Treatments	CT		IT		$(WTP_{Dq}^{IT})^A < (WTP_{Dq}^{CT})^A$
	$(WTP_{Dq}^{CT})^A$		$(WTP_{Dq}^{IT})^A$		p-values
EN	0.455	**	0.516	***	0.596
	[0.049	1.013]	[0.260	0.796]	
BD	0.906	***	0.486	***	**0.040**
	[0.521	1.642]	[0.277	0.743]	
OR	1.513	**	1.083	***	0.134
	[0.931	2.502]	[0.681	1.561]	
TR	0.322	***	0.161	**	0.181
	[0.034	0.733]	[-0.028	0.387]	
SV	0.790	***	0.290	***	**0.019**
	[0.410	1.459]	[0.070	0.559]	
QU	0.980	***	0.513	***	**0.050**
	[0.529	1.811]	[0.209	0.890]	

(A) indicates Direct Questions presented before Inferred Questions

***, ** and * for 1%, 5% and 10% significance levels of the non-price coefficients, respectively

Numbers in brackets are 95% confidence interval estimated using Krinsky-Robb (1986) parametric bootstrapping method. P-Values were determined by applying the nonparametric combinatorial method (Poe et al., 2005) to 1,000 Krinsky–Robb (1986) bootstrapped WTP estimates

Estimation strategy (II)

Estimations on IQ:

LLR test for parameters equality across CT and IT:
unable to rejected

LLR test for parameters equality across order of presentation:
unable to reject

MNL and RPL models:
no evidence of preference heterogeneity ➡ WTPs on MNL

Results: WTPs from IQ

Table 7. WTPs from inferred valuation and treatments – MNL

Treatments	CT (WTP_{Iq}^{CT})		IT (WTP_{Iq}^{IT})		p-values (WTP_{Iq}^{CT}) >(WTP_{Iq}^{IT})
EN	0.356	***	0.220	**	0.210
	[0.131	0.625]	[0.016	0.466]	
BD	0.300	***	0.260	**	0.422
	[0.070	0.597]	[0.062	0.496]	
OR	0.572	***	0.570	***	0.489
	[0.329	0.882]	[0.327	0.884]	
TR	0.151		0.145		0.497
	[-0.064	0.393]	[-0.059	0.394]	
SV	0.257	**	0.244	**	0.472
	[0.027	0.494]	[0.038	0.478]	
QU	0.266	**	0.242	**	0.450
	[0.049	0.533]	[0.012	0.501]	

***, ** and * for 1%, 5% and 10% significance levels of the non-price coefficients, respectively
Numbers in brackets are 95% confidence interval estimated using Krinsky-Robb (1986) parametric bootstrapping method. P-Values were determined by applying the nonparametric combinatorial method (Poe et al., 2005) to 1,000 Krinsky–Robb (1986) bootstrapped WTP estimates

$WTP_{Iq}^{IT} \neq WTP_{Iq}^{CT}$ not confirmed

Results: Contrast between WTPs from DQ and IQ

Table 8. Comparison of WTPs obtained through direct and indirect questions and treatments

	$(WTP_{Dq}^{CT})^{A}$ (CT^{A})		(WTP_{Iq}^{CT}) (CT)		$(WTP_{Dq}^{IT})^{A}$ (IT^{A})		(WTP_{Iq}^{IT}) (IT)		p-values $CT^{A} > CT$	p-values $IT^{A} > IT$
EN	0.455	**	0.356	***	0.516	***	0.220	**	0.349	**0.048**
	[0.049	1.013]	[0.131	0.625]	[0.260	0.796]	[0.016	0.466]		
BD	0.906	***	0.300	***	0.486	***	0.260	**	**0.007**	**0.089**
	[0.521	1.642]	[0.070	0.597]	[0.277	0.743]	[0.062	0.496]		
OR	1.513	**	0.572	***	1.083	***	0.570	***	**0.002**	**0.025**
	[0.931	2.502]	[0.329	0.882]	[0.681	1.561]	[0.327	0.884]		
TR	0.322	***	0.151		0.161	**	0.145		0.176	0.472
	[0.034	0.733]	[-0.064	0.393]	[-0.028	0.387]	[-0.059	0.394]		
SV	0.790	***	0.257	**	0.290	***	0.244	**	**0.011**	0.385
	[0.410	1.459]	[0.027	0.494]	[0.070	0.559]	[0.038	0.478]		
QU	0.980	***	0.266	**	0.513	***	0.242	**	**0.003**	**0.094**
	[0.529	1.811]	[0.049	0.533]	[0.209	0.890]	[0.012	0.501]		

$WTP_{Dq}^{CT} > WTP_{Iq}^{CT}$: confirmed for all attributes except EN

$WTP_{Dq}^{IT} > WTP_{Iq}^{IT}$: confirmed for all attributes except SV

Results: Contrast between WTPs from DQ and IQ

Table 8. Comparison of WTPs obtained through direct and indirect questions and treatment

	$(WTP_{Dq}^{CT})^{A}$ (CT^{A})		(WTP_{Iq}^{CT}) (CT)		$(WTP_{Dq}^{IT})^{A}$ (IT^{A})		(WTP_{Iq}^{IT}) (IT)		p-values CT^{A} > CT	p-values IT^{A} > IT
EN	0.455	**	0.356	***	0.516	***	0.220	**	0.349	**0.048**
	[0.049	1.013]	[0.131	0.625]	[0.260	0.796]	[0.016	0.466]		
BD	0.906	***	0.300	***	0.486	***	0.260	**	**0.007**	**0.089**
	[0.521	1.642]	[0.070	0.597]	[0.277	0.743]	[0.062	0.496]		
OR	1.513	**	0.572	***	1.083	***	0.570	***	**0.002**	**0.025**
	[0.931	2.502]	[0.329	0.882]	[0.681	1.561]	[0.327	0.884]		
TR	0.322	***	0.151		0.161	**	0.145		0.176	0.472
	[0.034	0.733]	[-0.064	0.393]	[-0.028	0.387]	[-0.059	0.394]		
SV	0.790	***	0.257	**	0.290	***	0.244	**	**0.011**	0.385
	[0.410	1.459]	[0.027	0.494]	[0.070	0.559]	[0.038	0.478]		
QU	0.980	***	0.266	**	0.513	***	0.242	**	**0.003**	**0.094**
	[0.529	1.811]	[0.049	0.533]	[0.209	0.890]	[0.012	0.501]		
Aver. Ratio Dir/Indir	*2.76*				*1.88*					

***, ** and * for 1%, 5% and 10% significance levels of the non-price coefficients, respectively

The ratio between WTPs obtained from direct and indirect questions are calculated excluding TR which is n
statistically significant in the inferred valuation.

Summary and further research

- SDB is an important and challenging issue to deal with in CE on consumers' preferences for normative attributes
- IQ is an interesting instrument to deal with SDB
  - IQ lead to WTPs that are generally lower than DQ
  - IQ lead to WTPs that are statistically identical across treatments (IQ are not sensitive to incentives)
  - Incentivizing the accuracy of IQ seems to have spillover effects on DQ
  - If economic incentives are not feasible, DQ made after IQ seem to reduce SDB

Further research is needed to:

➢ compare the effects of this IQ format with other formats

Thank you for your attention!

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INEA
ISTITUTO NAZIONALE DI ECONOMIA AGRARIA

UNIVERSITÀ DEGLI STUDI DI TRENTO
Dipartimento di Economia e Management