

Italian consumers' preferences for Pasta and consumption trends: tradition or innovation?

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Figures

Fig. 1 – Frequency pf Pasta consumption

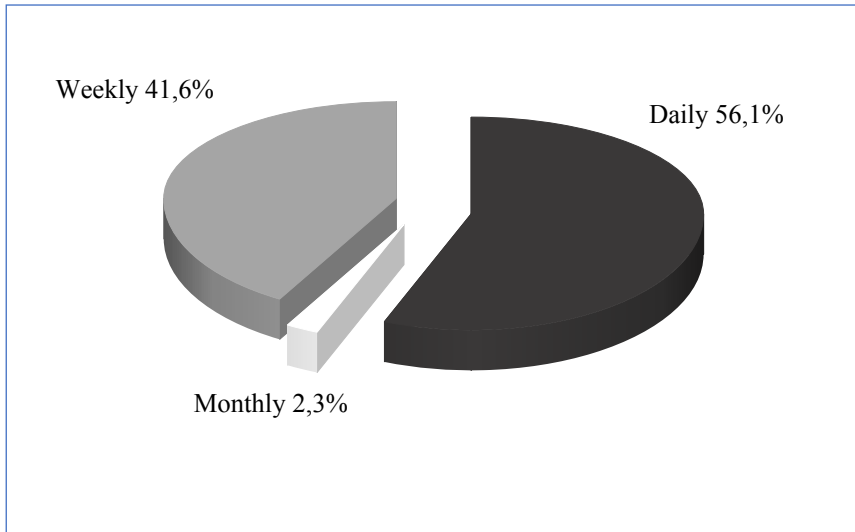
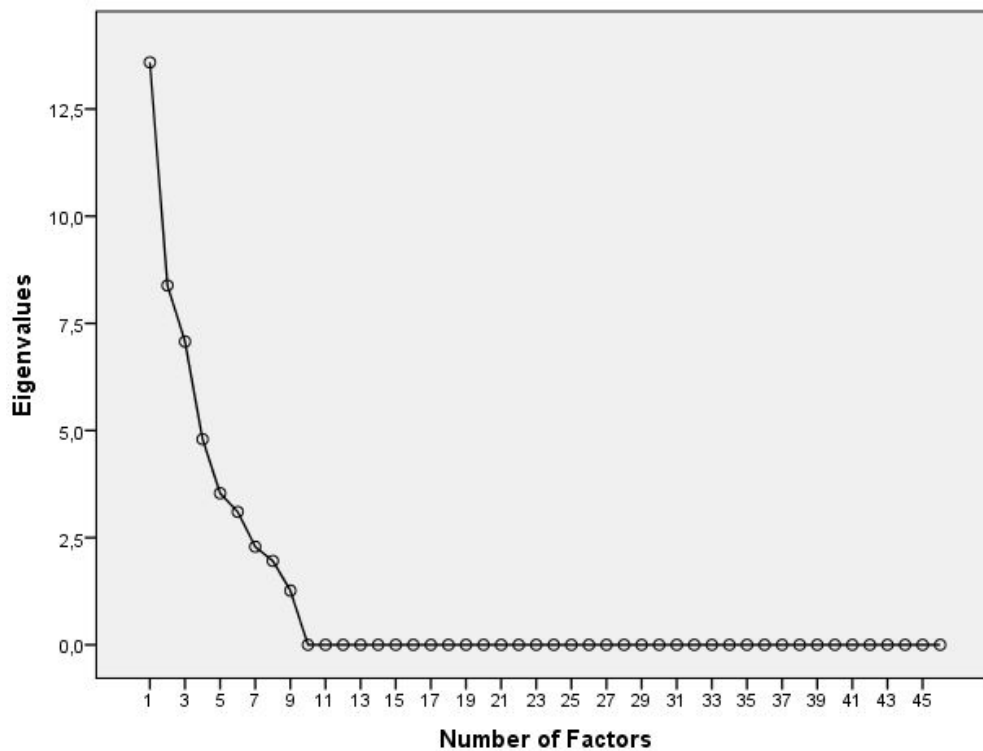


Fig.2 - Scree Plot



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2
3 **Tables**
4

5 **Table 1 – Profile of the sample (n=2.400)**
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Variable	%
Gender	100
Male	41.4
Female	58.6
Age	100
15 - 19	1.0
20 - 29	21.6
30 - 39	16.1
40 - 49	25.1
50 - 59	28.8
60 - 69	6.5
> 70	0.9
Occupation	100
Employee	35.9
Manager	25.8
Entrepreneur/Freelance professional	10.1
Student	18.5
Retired	8.5
Other (e.g. unemployed, homemaker)	1.3

37 **Table 2 – Periodicity of pasta consumption by range of age (questionnaire n. 1, n. 2 and n. 3)**
38

Range of age	Daily %	Monthly %	Weekly %	Total %
15 - 19	75.0	0.0	25.0	100.0
20 - 29	74.4	2.1	23.5	100.0
30 - 39	48.6	4.9	46.5	100.0
40 - 49	51.8	1.3	46.9	100.0
50 - 59	51.8	2.0	46.2	100.0
60 - 69	48.3	1.7	50.0	100.0
> 70	60.0	0.0	40.0	100.0

Table 3 – Periodicity of consumption by different number of family members (questionnaire n. 1)

How many people do you live with?	Daily %	Monthly %	Weekly %	Total %
Alone	35.0	4.0	61.0	100
1 Person	37.1	5.1	57.7	100
2 Person	57.9	2.3	39.8	100
3 Person	69.2	0.4	30.3	100
4 Person	65.9	0.8	33.3	100
> 4 Person	76.5	0.0	23.5	100
Total	56.1	2.3	41.6	100

Table 4 – Places of consumption of pasta by different number of family members (questionnaire n. 1)

Periodicity and number of family members	At home %	Out of home %	Both %	No-response %	Total %
Daily	77.5	1.2	20.5	0.8	100
Alone	48.6	0	48.6	2.8	7.0
1 Person	72.3	3.1	24.6	0.0	13.1
2 Person	77.6	0.8	21.6	0.0	25.2
3 Person	80.9	1.9	16	1.2	32.6
4 Person	83.7	0.0	16.3	0.0	16.6
> 4 Person	92.3	0.0	7.7	0.0	5.2
Monthly	75.0	10.0	15.0	0.0	100
Alone	75.0	0.0	25.0	0.0	20.0
1 Person	66.7	22.2	11.1	0.0	45.0
2 Person	100	0.0	0.0	0.0	25.0
3 Person	0.0	0.0	100	0.0	5.0
4 Person	100	0.0	0.0	0.0	5.0
Weekly	71.5	4.1	24.1	0.3	100
Alone	57.4	13.1	29.5	0.0	16.5
1 Person	74.2	4.0	21.8	0.0	27.7
2 Person	73.2	1.2	24.4	1.2	23.3
3 Person	70.4	0.0	29.6	0.0	19.2
4 Person	82.9	2.5	14.6	0.0	11.1
> 4 Person	75.0	12.5	12.5	0.0	2.2
Total	74.9	2.6	21.9	0.6	100

Table 5 –Extra-domestic places of consumption (questionnaire n. 1)

Extra-domestic consumption places	Periodicity of consumption		
	Daily %	Monthly %	Weekly %
Other (other during the way home-workplace)	9.0	0.0	6.3
Bars	6.1	0.0	6.3
Lunchroom	9.0	11.5	3.2
Lunchroom/ Bars/Self Service/other	1.3	0.0	0.6
Restaurant	49.9	57.7	63.2
Restaurant/ Bars / Self Service/ Lunchroom / Other	6.1	11.5	3.2
Restaurant/Bars	4.5	0.0	5.0
Restaurant/ Lunchroom	5.3	3.9	5.3
Self Service	2.3	3.9	0.6
No-response	6.5	11.5	6.3
Total	100	100	100

Table 6 – Other types of pasta consumed than dry durum wheat pasta* (questionnaire n. 2)

Types of pasta	Periodicity of consumption					
	Daily		Weekly		Monthly	
	<i>absolute frequency</i>	<i>%</i>	<i>absolute frequency</i>	<i>%</i>	<i>absolute frequency</i>	<i>%</i>
Whole-meal pasta	156	13.6	145	16.7	10	23.8
Fresh pasta	361	31.6	242	27.9	9	21.4
Organic pasta	74	6.5	66	7.6	6	14.3
Stuffed pasta	179	15.7	129	14.9	7	16.7
Egg pasta	300	26.2	216	24.9	7	16.7
<i>Innovative products</i>						
Frozen pasta cooked ready for eating	15	1.3	11	1.3	0	0.0
Pasta cooked. ready to eat: only to be heated	4	0.3	8	0.9	0	0.0
Pasta with added vitamins	1	0.1	0	0.0	0	0.0
Kamut-wheat pasta	28	2.4	36	4.1	3	7.1
None	25	2.2	15	1.7	0	0.0
Total	1143	100	868	100	42	100

* Multiple choice answer. the total is not 800

Table 7 – Knowledge of the country of production of durum wheat used to make the Italian pasta purchased (questionnaire n. 1, n. 2 and n. 3)

Periodicity of consumption	Do you know what is the wheat's origin country?		Total %
	No %	Yes %	
Daily	63.2	36.8	100
Monthly	53.8	46.2	100
Weekly	63.2	36.8	100
Total	62.2	37.1	100

Table 8 – If the provenance of the wheat used for the Italian pasta is declared known: where does it come from? – Provenance by periodicity of consumption (questionnaire n. 1, n. 2 and n. 3)

Periodicity of consumption	Domestic and foreign countries (a mix of wheat) %	Only foreign countries %	Only local (regional) territory %	Only national production %	Only national and local (regional) production %	Total %
Daily	22.8	0.5	8.8	37.8	30.1	100
Monthly	25.0	0.0	25.0	16.7	33.3	100
Weekly	15.6	0.0	6.6	38.5	39.3	100
Total	19.5	0.3	8.6	37.0	34.6	100

Table 9 – In your personal opinion, is the origin of the wheat a qualitative indicator for pasta? (questionnaire n. 3)

Periodicity of Consumption	No %	I don't know %	Yes %	Total %
Daily	9.6	16	74.4	100
Monthly	26.9	15.4	57.7	100
Weekly	9.4	17.9	72.6	100
Total	10.1	16.7	73.2	100

Table 10 – Preference for pasta produced with durum wheat of foreign countries (questionnaire n. 1 and n. 3)

Origin of wheat	Periodicity of consumption			Total %
	Daily %	Monthly %	Weekly %	
Cultivated both in Italy and in other countries	4.9	7.7	4.4	4.8
Cultivated only in Italy	46.2	46.2	49.1	47.3
Cultivated only in the South of Italy	40.7	30.8	34.6	38.1
I don't have any preferences	8.2	15.4	11.9	9.8
Total	100	100	100	100

Table 11 – Importance of information on the label and importance of information about the healthiness of Pasta consumed (questionnaire n. 1, n.2 and n. 3)

Importance of label information by Periodicity of consumption	Importance of information about the healthiness of the pasta consumed			Total %
	No %	I don't know %	Yes %	
<i>Daily</i>	2.0	3.9	94.1	100
No	0.4	0.0	2.2	2.7
I don't know	0.2	0.8	1.8	2.9
Yes	1.4	3.1	90.0	94.5
<i>Monthly</i>	11.5	3.8	80.8	100
No	0.0	0.0	15.4	15.4
I don't know	0.0	3.8	0.0	3.8
Yes	11.5	0.0	65.4	80.8
<i>Weekly</i>	3.8	4.4	91.8	100
No	0.6	0.0	1.3	1.9
I don't know	0.6	0.9	1.6	3.1
Yes	2.5	3.5	89.0	94.0
Total	3.0	4.1	91.6	100

Table 12 - Total variance explained by Factors (questionnaire n. 1, n.2 and n. 3)

Factors extracted	Initial eigenvalues			Coefficients of Rotated factors		
	Total	% of variance	Cumulative % of variance	Total	% of variance	Cumulative % of variance
1	13.589	29.540	29.540	11.048	24.017	24.017
2	8.385	18.228	47.768	7.706	16.753	40.770
3	7.075	15.381	63.150	7.009	15.237	56.007
4	4.796	10.427	73.577	6.015	13.077	69.084
5	3.537	7.689	81.266	4.415	9.597	78.681
6	3.104	6.747	88.013	3.233	7.029	85.710
7	2.289	4.977	92.990	2.630	5.718	91.428
8	1.958	4.256	97.246	2.574	5.596	97.024
9	1.267	2.754	100.000	1.369	2.976	100.000

Table 13 - Rotated factors matrix (questionnaire n. 1, n.2 and n. 3)

Factors/Preferences	Variables	Factors loadings								
		1	2	3	4	5	6	7	8	9*
<i>1 - Italian tradition and environment sustainability</i>	1 pasta produced with grains cultivated in Italy	.980	.118	.003	.020	-.058	.060	.047	-.124	.031
	2 recyclable packaging	.977	.002	-.155	-.115	-.080	.008	.006	-.018	-.028
	3 origin of durum wheat	.975	-.025	-.016	-.160	-.082	-.080	-.082	.013	-.049
	4 pasta with a Brand linked to an Italian territory with traditions of grain cultivation	.970	.050	.185	-.013	.011	.078	-.082	-.098	-.016
	5 production process with low environmental impact	.950	-.201	.139	-.078	.108	-.035	-.066	.103	-.063
	6 pasta produced with grains cultivated in Southern Italy	.929	.044	.016	.104	.010	.178	.138	-.255	.089
	7 healthy product certifications (absence of toxic substances)	.873	-.230	.399	.062	.061	-.032	.019	.027	-.129
	8 not sticky during cooking	.674	.428	.269	.145	.144	-.447	.018	.105	.193
	9 information on production process	.635	-.578	.164	-.043	.405	.157	-.211	-.003	.032
	10 ethical certifications (no Mafia. Fair trade. GMO free. etc.)	.615	-.246	.332	-.287	.308	.332	.174	.230	-.283
	11 pasta with famous Brand	.596	.446	-.433	-.208	-.304	-.137	.062	.133	.288
	12 not sticky in the plait	.596	.534	.363	.100	.008	-.379	.011	.207	.178
<i>2 - Typical product attributes of Italian Pasta</i>	13 because it is a cheap product	.033	.905	.004	.203	-.005	-.211	-.191	-.183	-.153
	14 with starch	.034	.872	.159	.009	-.290	.122	.225	-.051	-.246
	15 intense yellow color	-.259	.870	.256	-.199	.016	-.087	.231	.040	.089
	16 limpid cooking water	-.125	.793	-.094	-.300	.008	.126	-.444	.208	.027
	17 pasta bronze drawn	.438	.764	.260	-.184	.170	.014	-.196	-.170	.162
	18 pasta produced with grains cultivated in Apulia and in Sicily	-.253	.658	-.342	.208	.084	.266	.023	.485	.172
	19 pasta with flour	-.115	.610	.248	-.004	-.110	.430	.477	-.315	.171
	20 long pasta (like "spaghetti")	.354	.589	.496	-.382	.207	-.155	-.175	.194	-.002
<i>3 - Quality during cooking process</i>	21 fast cooking process	.025	-.095	.884	-.076	-.204	-.386	.104	-.038	-.008
	22 pasta with high content of gluten	-.274	-.272	-.839	.140	-.028	.007	.178	.299	-.072
	23 light yellow color	.221	.344	.748	-.266	-.106	.147	-.152	.226	-.310
	24 withholds seasonings	.345	.418	.742	.040	-.116	-.196	.065	.301	.085
	25 pasta that is firm to the bite	.462	.257	.540	.400	.002	-.204	.045	.367	.300
<i>4 - Nutrition and health</i>	26 because of its content of carbohydrates	-.147	-.301	.070	.911	.157	-.068	.146	.027	-.045
	27 pasta produced with grains cultivated in other Countries (not in Italy)	.077	-.036	.247	-.813	.245	.239	.385	.037	-.068
	28 quality certifications	-.116	.112	-.386	.773	.275	-.216	.047	-.072	.313
	29 pasta with high content of proteins	-.104	-.204	-.054	.765	.342	.029	.313	.379	.026
	30 pasta with beta-glucans added	-.141	.085	-.284	.725	-.042	.488	.115	-.211	.264
	31 pasta with high content of mycotoxins	.393	.481	.087	.640	-.136	.376	-.031	-.044	-.185
	32 pasta with high content of fibers	.048	.558	-.493	.574	-.231	.210	-.034	.100	-.076
<i>5 - External appearance</i>	33 pasta without brown spots	-.030	-.070	.033	.053	.990	.017	.102	-.012	-.019
	34 pasta without white spots	-.148	-.202	.019	.088	.864	.023	.084	-.346	.238
	35 pasta without black spots	.347	-.048	-.055	.087	.862	-.211	.001	.253	-.123
<i>6 - not meaningful</i>	36 turbid cooking water	.156	.015	-.209	-.166	-.161	.933	.002	-.086	-.025
<i>7 - not meaningful</i>	37 short pasta (like "Maccheroni")	-.072	-.134	-.448	.404	.247	-.147	.726	-.010	.054
	38 pasta with vitamins/minerals/etc. added	.332	-.015	.551	-.275	.276	.277	.564	.110	-.166
<i>8 - not meaningful</i>	39 pasta at a price not higher than 1 euro/Kg	-.482	.056	.026	-.023	-.353	-.215	-.102	.763	-.003
	40 pasta with "organized distributors" Brand	-.353	.440	-.521	-.069	-.030	-.327	-.078	.529	-.110

Extraction method: Principal Components Analysis. Rotation method: *Quartimax*. Rotation converged in 9 iterations.*coefficients are not interpretable (only coefficients $\geq |0.45|$ are interpretable)

Italian consumers' preferences for Pasta and consumption trends: tradition or innovation?

Keywords

Consumer perception; Branding; Pricing; Sensory attributes; Food culture

Abstract

The aim of this study is to know Italian consumers' preferences for Pasta and consumption habits. Food culture and concerns about food security and product innovation were investigated. A sample of 800 Italian consumers from northern, central and southern Italy was interviewed. Consumer' profile, motivations and purchasing behavior were described. Relationships between observed variables and the latent constructs that explain the preferences were highlighted by Factor Analysis. Although Pasta is an Italian traditional food, there is asymmetric information between consumers and producers. The study revealed that consumers believe Italian Pasta is always made with Italian grains, and therefore it is original, healthy and safe, although that's not always the case. Intrinsic and extrinsic high quality, which derives from growing and production technologies, is required. Consumers are not very interested in time-saving or functional products, but someone, line with new consumption trends, expressed preferences for whole-meal Pasta or produced with local grains. All these results can be useful to the Italian Authorities dealing with health, and also to companies, in order to reflect on the importance of correct information about the healthiness of the Italian Pasta of high quality.

Introduction

The Mediterranean diet is able to provide healthy and tasty food through a model of sustainable development (Iannetta & Padovani, 2015). One of its main products is durum wheat, which is mainly used for the production of bread and Pasta (Altamore et al., 2017). Sicily, for its topographical and soil characteristics and for its agricultural tradition, is a particularly suitable area for the cultivation of this cereal, contributing significantly to the production of durum wheat within the European Union (Altamore et al., 2016). Food is now a component of a health life. Origin of products and environmentally friendly production techniques are going to be considered by consumers more and more related to human health (Ingrassia et al., 2017a). Therefore, the demand for quality food has become a new opportunity for those producers that use sustainable and precision cultural practices. In fact, on one hand they provide goods and services to consumers, on the other hand consumers satisfy other needs, related to contents that go beyond the food itself, but strictly correlated with it, namely *territoriality*, *environmental sustainability*, *respect for ethical principles*, *health protection* (Distaso, 2007; Altamore et al., 2017 Columba, 2015). In this broad scenario widely observed by researchers product attributes are a valuable segmentation basis (Van Der Zanden et al., 2014; Verain et al., 2016) because they determine consumers' food choice and information required (Bacarella et al., 2015) concerns (Bellows et al., 2010). Moreover, since importance of food attributes indicates people's motives underlying their food choices (Grunert, 1995) and these consumers motives might differ across food categories, some authors studied the differences of importance perceived regarding food attributes, across food categories, related to themes like animal welfare (for meat or eggs) (Bernués et al., 2003), or use of pesticides (organic products) and what implications these attributes may have to human health, in compare to conventional variants (Andersen and Lund, 2014). Findings of these studies gained insights into consumers' perceptions of healthiness of certain products and sustainability of some agriculture practices, and their relation to the importance of different attributes by food product category (e.g. meat, dairy, fish, vegetables) (Verain et al., 2016).

Obviously, food attributes, varying by category, include sustainability attributes (e.g. sustainability, environmental friendliness, waste, origin), healthiness attributes, and, certainly, price and sensory attributes (e.g. taste, visual appearance), that are those that mostly drive preferences (Ingrassia et al., 2017b). Dried Pasta is a staple food in the daily meals of Italians, because of their culinary tradition and culture; it is also considered a "harmless" product, often defined "good" and "healthy" by consumers who relate it to key concepts of the Italian consumption traditions and values such as 'family' and 'home' (Altamore et al., 2018). Italy is the first country in the world for the industrial production of Pasta (3.36 million tons of Pasta produced), and also first in the ranking of exports with 1.9 million tons exported (IPO, 2016). Nevertheless, in recent years: per capita consumption of Pasta in Italy decreased from 26.0 kg in 2011 to 23.5 kg in 2016 (Altamore et al., 2018). Despite of this reduction in consumption, Pasta does not compete with alternative products, and it is widely consumed daily by Italians. Pasta is a "usual/familiar" product, as it is at the same time traditional food, usual food and daily food (Vanhonacker et al., 2010); and since a high consumption of a food product implies a high degree of familiarity by those people that largely consume it, this results in a lower acceptance in possible modifications of sensory characteristics of this product (Hersleth et al., 2011). In this case, Pasta might be a product for which Italians know exactly what attributes and sensory characteristics it must have to be "typical", "traditional" and "good"; contrarily, other consumers (not Italians) might not know them or not be interested about them. There are few economic studies about consumption and preferences of Italians for Pasta (Altamore et al., 2018; Contò et al., 2016); nevertheless, consumer preferences of Italians with regard to Pasta and consumption behavior were not thoroughly investigated. This study which is part of an extensive research activity carried out within the framework of a national operational program has the aim to observe and analyze consumer preferences for Pasta and consumption trends in Italy, and discover the main factors that synthesize the actual Italians' food culture with regard to common Pasta, and the issues of health and product innovation.

Material and Methods

The survey was carried out using a sample of 2.400 consumers. For the survey three different questionnaires were prepared and diffused online with the use of web tools (e.g. social networks and email). The first questionnaire (questionnaire n. 1) was titled "Pasta e Consumo" (literally "Pasta and the Consumption") with the aim to investigate Italians' consumption characteristics, behaviors, habits and preferences (e.g. frequency of consumption, place of consumption, types of pasta consumed, etc.) with regard to Pasta.

The second one (questionnaire n. 2), titled "Pasta e Futuro" (literally "Pasta and the Future"), deals with themes related to product innovations and what types of innovations have already been applied to Pasta, or could be applicable, and acceptable/of interest, to Italian consumers.

The third (questionnaire n. 3) was titled "Pasta e Salute" ("Pasta and Health") and it was prepared to investigate the issues relating to food safety, healthiness of foods and of Pasta in particular, origin of the wheat used for the production of Italian pasta, toxicity of some imported grains (e.g. presence of mycotoxins, etc..) and information displayed on the label.

For each questionnaire, a sample of 800 respondents was observed. It was used the *stratified* sampling method. The samples were drawn by simple *random sampling* method proportionally to the number of residents in the main regions of the three Italian territorial zones (Population divided in three strata) identified by the ISTAT (Istituto Nazionale di Statistica), that are Northern, Central and Southern Italy. The samples selected were balanced basing on gender, age and occupation. From the first sample obtained $n = 3.285$ cases, there were excluded the cases with errors or empty answers and subsequently

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3 the sample was structured following the established rules for balancing and proportion (with random
4 exclusion of cases from the bigger clusters), so that the final sample used for the study resulted $n = 2.400$.
5 The three questionnaires were divided in two parts. The first part contained detailed questions on socio-
6 demographic characteristics of respondents and family components. This part was structured with filter
7 questions, alternative questions, closed and multiple choice questions, as well as preference lists and
8 open questions. The second part had score questions: respondents were asked to assign a score using a
9 10-pt preference scale, from 1 (minimum) to 10 (maximum), according to the personal/subjective
10 preference of the listed characteristics/attributes (i.e. qualitative variables selected for this study) of Pasta,
11 following the sentence: "When I choose Pasta it is important/I prefer". Considering the three thematic
12 questionnaires, there were analyzed a total of 40 qualitative variables.
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16 Sample characteristics were analyzed using descriptive statistics. Subsequently, a framework of
17 preferences was highlighted by applying the Factor Analysis (FA) to the scores given by
18 respondents/consumers to the qualitative variables. The aim of factor analysis is to describe variables in
19 terms of a smaller number of underlying dimensions (Gaskin, & Happell, 2014); in fact, a common use
20 of FA is the development of construction measures, which are not directly observable in real life.
21 Therefore, in this study, the FA was used to discover a smaller number of factors underlying a large
22 number of observed variables, namely the preferences that drive the consumer in choosing Pasta (Gaur
23 and Gaur, 2006, Samoggia and Castellini, 2018).
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26 The rationale behind the method is the attempt to reduce the complexity of the data by reducing the
27 number of variables (Landau and Everitt, 2004) to be considered. With factor analysis, only the shared
28 variance among items is analyzed (Boehm-Kaufman, & Bandalos, 2010). If the first derived variables,
29 namely the main Factors, represent together a large portion of the total variance of the observed variables,
30 they can be used to provide a simpler synthesis of the data, and to simplify subsequent analysis (Landau
31 and Everitt, 2004). In this case they may 'explain' the preferences of the Italian consumer of Pasta. The
32 strong assumption that lies at the base of the FA consists in the idea that the observed variables can be
33 considered as indicators of more general concepts, not observed, that can be explained by the Factors
34 (De Lillo, 2007). Therefore, the factors are hypothetical dimensions which are estimated from the
35 observed variables.
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38 For this study, the *Exploratory Factor Analysis* (EFA) was applied because it is able to better reveal the
39 underlying dimensions of all the variables considered, since there is no pre-determined expectation as to
40 which and how many factors will be extracted and, even if expectations are thinkable, these do not
41 influence the analysis in any way (Thompson, 2004; Taherdoost et al., 2014; Chironi et al., 2017,
42 Samoggi and Castellini, 2018).
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45 It was not necessary to standardize the data beforehand, because the variables have the same units of
46 measurement (scores from 1 to 10), so we are imposing the same contribution of the original variables.
47 In order to measure the goodness of the collected data the Kaiser-Meyer-Olkin Test (KMO) was applied.
48 There are several ways to extract factors, according to the literature (Gaur and Gaur 2006), for this study
49 the Principal Components Analysis method was considered the most adequate, as no method of extraction
50 of factors produces factors that explain a greater proportion of variance than what happens for the
51 components, in fact it maximizes the variance explained (Gorsuch 1983). As it is well known, the greater
52 the number of factors extracted, the less the ability to summarize information in a limited number of
53 sizes; the researcher chooses the appropriate number of factors for each survey. One of the most common
54 strategies for deciding on the number of factors is the rule of "eigenvalues greater than 1" (with the
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Guttman-Kaiser criterion). Both eigenvalues greater than 1 and Scree test (using the Scree Plot) were taken into account to identify the number of underlying factors after extraction (Marques De Sá, 2003). The FA provides factor weights for each combination of extracted factors and observed variables, which are similar to the correlation coefficients between factors and variables. In factor analysis, not rotated factor weights are extremely difficult to interpret, regardless of extraction methods. The rotation of factors helps to arrive at a simple model of factorial weights, maximizing the high correlations and minimizing the low ones. The rotation, in fact, has no effect on the goodness of the model, neither the communality nor the percentage of variance explained change. Rotation is not always possible, the orthogonal rotation must be used under the hypothesis that the underlying factors are not correlated with each other, and in this case this hypothesis is acceptable, because there is no theoretical reason to assume, in the beginning, that the factors can be correlated. In this study the *Quartimax* orthogonal rotation technique was used in order to obtain a simplified structure of more immediate interpretation when there is the likelihood that a variable has equal scores on all the factors (Gorsuch, 1983; Jackson, 2014). With this rotation the differences between the factors in which the variables that influence one factor do not influence another are highlighted. The statistical software used for processing was SPSS v. 21.

Results

Sample characteristics, behaviors and attitudes

The survey was conducted involving the adult population, over 15 years old, and the respondents are segmented in balanced ranges of age, as shown in Table 1, i.e. 28.8% in the 50-59 range of age, 25.1% in the 40-49 range of age and 21.6% in the 20-29 range of age. The Pasta is consumed almost daily (4 or more times a week) by the 56.1% of the sample, highlighting familiarity with this food or its essential presence in the daily meal (Fig. 1). Weekly consumption (2 - 3 times a week) is however preferred by the 41.6% of respondents. Only the 2.3% of respondents consumes Pasta on a monthly basis (4-5 times per month).

It is interesting to observe that most young people, up to 29 years (74%), consume Pasta almost daily (Table 2), following respondents in the range of age of forty years old and fifty (51.8%), respondents in the group of thirty (48.6%), and finally, 48.3% for the respondents in the range of age of sixty. In contrast, about 47% of respondents in the last three age ranges consumes Pasta on a weekly basis.

The consumption of Pasta on a daily base is linked to the number of members of the family: the larger the family, the higher is the frequency of respondents that declare a daily consumption of Pasta. On the contrary, in larger families there is a reduction of consumption on weekly basis (Table 3). The explanation for this phenomenon is undoubtedly linked to the low cost of the product in relation to its high capacity to satisfy energetically the individuals; in families with three or more components it is therefore cheaper to introduce Pasta daily in order to meet the dietary needs, contrarily, in families with fewer components (1 or 2), it is economically viable to replace it with other products. The results showed, in particular, that among singles, those who eat Pasta daily are equally divided between those who eat it mainly at home or alternatively at home or outside.

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3 People eating Pasta on a weekly basis prefer to consume it at home (57.4%) and 29.5% of this segment
4 declares to consume it indifferently both outside and at home; only 13.1% of respondents eat
5 predominantly away from home. Eating Pasta at home is therefore a prevalent habit for those who
6 consume it daily, weekly and monthly.
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9 According to respondents, Pasta is preferably consumed at lunch, more rarely consumed alternatively at
10 lunch or dinner (Table 4). As for consumption outside home, the interviewees declared they prefer to eat
11 Pasta at restaurant, but the different percentage of preference depends on whether this consumption is on
12 a weekly (63.2%) or a daily (49.9%) basis. More particularly, the consumer eat Pasta daily also declared
13 to eat frequently it in places such as canteens or bars (Table 5).
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17 Another important result for the market of Pasta in Italy is that respondents declared to alternate the
18 consumption of dry Pasta with other types of Pasta, like 'fresh Pasta', 'egg Pasta', 'stuffed Pasta',
19 'Whole-meal pasta' and 'Organic Pasta' (Table 6). Additionally, the interest of consumers for the whole
20 wheat Pasta is, particularly concentrated in the segment of those ones who do not eat Pasta on a daily
21 basis, and at the same time, there is little interest for functional Pasta with added elements (e.g. vitamins,
22 minerals, etc.) or for innovative types Pasta (Table 6).
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26 With regard to the awareness of the Italian consumers of Pasta respect to the production process, the
27 origin of the raw material (durum wheat), and quality of the wheat. The 62.2% of respondents declared
28 they did not know any information about the origin of the raw material of the Italian Pasta (Table 7).
29 Nevertheless, at the same time, 77.8% of respondents that affirmed to be aware of the Country of origin
30 of durum wheat and to consume Pasta on a weekly basis, said that wheat used for Italian Pasta is produced
31 in Italy (Table 8), this percentage drops to 67.9% for those who consume Pasta daily (Table 8). Only
32 19.5% of those who claim to know the origin of the wheat believes that the Pasta is made with a mix of
33 domestic and foreign grains, which is the actual Italian situation.
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37 Moreover, as for the Brand preference, from a list of all the Italian national and local marks, consumers
38 indicated to buy mainly strong and notorious national brands and only occasionally Pasta with local
39 brands. All the interviewees were asked to express an opinion on the origin of the wheat and then to
40 declare if, in their belief, the origin of the wheat could be an indicator of quality for Pasta. Regardless of
41 the frequency of consumption (daily, weekly or monthly), about 75% of the sample gave an affirmative
42 answer (Table 9); 47.3% of the entire sample stated that they would prefer to consume Pasta made with
43 Italian wheat; only 38.1% would prefer wheat to be produced in the regions of Southern Italy (Table 10).
44 For the 9.8% of respondents, the origin of wheat is not important.
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48 These results highlight a situation of information asymmetry between producers and consumers, in fact,
49 consumers appear to believe that the origin of the durum wheat in Italy is an important indicator of quality
50 for Pasta, and, at the same time, consumers are confident that Italian Pasta is made with Italian wheat;
51 moreover, at the time of purchase they prefer Pasta of strong national brands. Nevertheless, is well known
52 that the strong national brands generally use a mix of durum wheat, from domestic and foreign producers,
53 (for many reasons related both to quantities and to technological characteristics of Pasta required by the
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market), and only local brands with production plants of small dimensions use exclusively local and Italian durum wheat to produce Pasta, that therefore possesses higher levels of nutritional quality.

The Italian consumer of pasta is sensitive with respect to the information the label may convey in relation to the characteristics of Pasta; in fact, despite Pasta is a very simple product and assumed well known by consumers, the label “as a tool to get more information about the Pasta” is considered very important for about 90% of respondents which say to consume Pasta at least weekly; moreover, they declared to be interested in having more information about the healthiness of the Pasta they eat (Table 11).

Factors explain preferences

The factorization process extracted nine factors but as it is possible to observe in Tables 12 and 13 the last four factors are not highly significant because they are composed by one or two variables with interpretable coefficients (only coefficients $\geq |0.45|$ are interpretable). Figure 1 shows the *Scree Plot* indicating the nine factors extracted by the analysis. Table 12 shows the total variance explained by the extracted factors and the cumulative variance. The table shows that the first factor has a total initial eigenvalue of 13.589, and a total variance of 29.540%; the second factor has a total initial eigenvalue of 8.385, which is equivalent to a further 18.228% of the total variance, and so on. Only five factors explain 81.3% of the total variance in the data (Test KMO measure, 0.891, significant differences were found using the Bartlett's test of Sphericity for the data matrix). Table 13 shows the rotated matrix of coefficients (after *Quartimax* rotation) and only the coefficients that assume a value higher than $|0.45|$ are interpretable; in this case it is possible to consider the optimal result. The table shows the main variables for each solution (or factor) extracted.

By reading the factor coefficients resulting from the application of the analysis, the five main factors can be defined as follows.

Factor 1, “Italian tradition and Environment sustainability”; this factor reveals an underlying preference for the basic Italian values of traditional-natural-unaltered Pasta of National origin, which are linked to environmental concerns and ethical-health certifications. The brand of Italian Pasta also appears to be closely connected with local territory and grain cultivation traditions. Other values underlying this factor are those related to the typical sensory attributes of the Pasta product, that stimulate high visual appeal.

Factor 2, “Typical product attributes of Italian Pasta”; it reflects the typical idea that Italians have of Pasta and What that they search at the time of purchase, these are values closely linked to the intrinsic and extrinsic attributes of good quality Italian Pasta.

Factor 3, “Quality during cooking process” shows preferences for food attributes that are related to practical activities during preparation; the preference reflects a value of *familiarity* with the product that give to the consumer the confidence of being preparing the *typical Italian Pasta*.

Factor 4, “Nutrition and health”, reveals the preference for Pasta attributes that are related with its healthy and nutraceutical function; this preference focus on the Pasta nutritional capacity to provide useful nutrients for the human nutrition.

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3 *Factor 5*, “External appearance”, displays elements related to the preference for a Pasta without external
4 defects; this preference is extremely related to attributes of visual quality because it highlights the
5 importance of homogeneity in the external texture of Pasta as value of quality.
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10 **Discussion**

12 *Consumption behaviors and trends*

14 This work confirms that Pasta is a fundamental food for the Italian consumer. Despite in recent years the
15 per capita consumption of Pasta in Italy decreased from 26.0 kg in 2011 to 23.5 kg in 2016 (Altamore et
16 al., 2018), more than a half of the population continues to consume it daily without substantial differences
17 between the different age, unlike the elderly (over 60 years). The reduction in consumption per capita is
18 linked both to the reduction in the single portion, and to its replacement with other foods such as
19 vegetables, fish and rice. However, its constant consumption indicates that Pasta is considered a food
20 without drawbacks for the human diet, easy to digest and a high energy source.
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24 Pasta is also popular and appreciated because Italians like it, moreover it is easy to cook, versatile and
25 cheap (Fig. 1). Another interesting aspect to be highlighted is that Pasta is consumed more in those
26 families with a higher number of members; in fact, the larger the family nucleus, the more the Pasta is
27 consumed preferably at home. This choice combines and satisfies in a meal both nutritional and taste
28 needs with the family's financial budget control.
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32 Due to its peculiarities, Pasta is consumed mainly at lunch or alternatively at lunch and dinner, when at
33 home there is most part of the family members, this confirms that Pasta is a usual, familiar and traditional
34 food of the Italians' diet (Cavallo et al., 2013). “You can't give up Pasta even when you don't go home
35 for lunch”, it appears so, in fact respondents declared that they often look for a place where they can
36 consume Pasta which is in the proximity of their working place, even if they try to differentiate the places
37 of consumption. This preference is mainly for consumers that eat Pasta daily and not very evident among
38 those who eat Pasta less frequently.
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42 The survey confirmed that Pasta is a traditional food and that Italian consumers are therefore reluctant to
43 change their buying and consumption habits. It should be noted, in fact, that dried Pasta is occasionally
44 replaced with fresh Pasta or other typical regional products (egg Pasta or stuffed Pasta). Respondents
45 also showed interest in whole wheat Pasta, in line with the growth trend of this product in recent years.
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48 The consumer's attitude when referring to product innovations is different. Contrary to what has been
49 observed for many traditional products, for which possible innovations are accepted by consumers
50 (Vanhonacker et al., 2013), the Italian consumer does not show the same attitude towards Pasta. The
51 interviewees showed little or no interest in innovative products such as frozen Pasta cooked and ready
52 for consumption, Pasta cooked and ready for consumption only to be heated and Pasta with added
53 vitamins.
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3 In accordance with Contò et al. (2016) the consumer seems to choose the Pasta on the basis of credence
4 attributes (origin of the wheat, brand, price, etc.). Despite this, the study showed a strong asymmetry in
5 information between the consumer and producers, since 62.2% of the sample says they do not know
6 which is the origin of wheat the Pasta is made with. The same asymmetry is also evident for those who
7 claim to know the origin of wheat only because they believe that the Pasta is always produced with
8 national or even local wheat. In reality, the Pasta purchased by the interviewees is mainly of national
9 brands (Fig. 2), which are known to use largely also imported durum wheat. This shows that Italian
10 consumers infer the origin of the durum wheat from the country of origin of the brand, in this case an
11 Italian brand always means for consumers “Italian wheat”.
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15 The origin of the raw material is considered, in general, an important indicator of the quality of the Pasta,
16 so much that the interviewees would prefer it to be produced with only Italian grains or, secondarily,
17 with grains produced exclusively in Southern Italy. In agreement with Ingrassia et al. (2017), almost the
18 entire sample considers that the labeling of the Pasta is important in order to be able to make an informed
19 choice about the product and, above all, that it is an appropriate means of being informed about the
20 product's characteristics. In particular, more than 90% of the sample wants information on the
21 wholesomeness of the Pasta or how it is produced, the origin of the raw material and the absence of
22 elements potentially harmful to human health.
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27 *Consumption preferences and food culture of Pasta*

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29 The analysis examined underlying preferences towards the attributes of Pasta and highlighted a
30 summarized construct of four principal factors that explain the variability of preferences and provide
31 elements to understand the food culture of Italians with reference to their typical food product known all
32 over the world: common Pasta.
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35 Pasta was emotionally associated to values with social and cultural meanings, because it reflects some
36 fundamental cultural and social Italian traditions, related to family, home, care, health, as it has emerged
37 in Factor 1, “Italian tradition and environment sustainability”. More particularly, with regard to health,
38 respondents identified Italian Pasta as an ecosystem service, like the result of a production process with
39 low environmental impact, a natural product without toxic substances, GMO free and thus a real quality
40 product. This is in line with other studies on food products where it was highlighted that consumers’
41 preferences reflect largely cultural values (Sortino et al., 2016), and are significantly influenced by
42 emotional stimuli and awareness, which is an important factor in determining the intention to choose
43 halal food (Bashir et al., 2019). In agreement with recent literature that studied the equation
44 “sustainability = health” and analyzed how sustainability relates to the question of healthy (Béné, et al.,
45 2019), in this study it was observed that the Italian consumer who values healthiness also values
46 sustainability and in Italy, “Pasta” symbolizes this link. In fact, consumers’ perceptions of healthiness
47 and sustainability were strictly linked to origin of durum wheat, and to the regions where traditionally it
48 is cultivated (Southern Italy, Apulia and Sicily), although descriptive statistics highlighted an asymmetric
49 information between producers and the consumer, who believes that Italian Pasta is made with Italian
50 grains and as a consequence it is safe and healthy.
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3 The low price is basically the first market characteristic of Pasta that is a common product consumed
4 daily. For this reason, probably the high preference for recyclable packaging may be related with the idea
5 of a product that is used very frequently and on a daily basis, this is in line with other studies about
6 innovations in traditional foods (Vanhonacker et al., 2010).
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9 With regard to the brands, similarly to other recent studies, consumers appear to believe that labels and
10 marks of Italian Pasta represent a typical product (Ceschi et al., 2018) linked with local territory and
11 grain cultivation “traditions”, and they see this aspect associated with authenticity, quality and health,
12 and this perception is not influenced very much by the brand and packaging (Chousou et al., 2017).
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16 According to previous studies (Verain et al., 2016), with regard to typical characteristics of Pasta,
17 innovations on sensory elements are completely avoided. In fact, Factor 2 “Typical product attributes of
18 Italian Pasta”, Factor 3 “Quality during cooking process”, and Factor 5 “External appearance”
19 highlighted that the Italian consumer think to be is ‘aware’ of what are the characteristics that the Pasta
20 must have to be “good”, this awareness means the knowledge or understanding of this product: external
21 appearance (search attribute), behavior during preparation and at consumption (experience attributes),
22 intrinsic attributes to be a healthy and beneficial (credence/search). Generally, awareness refers to the
23 human perception and intellectual response to the condition of what consumers eat, drink, and use, it
24 usually reflects the step in which consumers become familiar with a product (Bashir et al., 2019). Visual
25 appearance is very important for understanding the quality of Pasta (Altamore et al., 2018), and it
26 influences the preference of consumers towards choosing Pasta.
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32 Therefore, finally we can confirm that, in agreement with previous studies on Italian consumer
33 preferences for food (Ceschi et al., 2018; Mascarello et al., 2015), the first criteria which Italian
34 consumers use to evaluate Pasta is related to the organoleptic attributes (taste, appearance, etc.), the
35 second one is associated with the place and methods of production (certifications, organic production,
36 local production, etc.), and finally, the third factor is related to the brand and price.
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40 In addition, contrarily to what happens for other foods, for which some studies demonstrated that the
41 package plays a significant role in the purchasing phase (Ting et al., 2014), in this case, for Pasta,
42 packaging characteristics (such as text, color and material) are secondary elements compared to extrinsic
43 aspect of Pasta itself, according to Italians. Moreover, in line with other studies that demonstrated the
44 need to design more attractive packaging with respect to verbal information for consumers who have a
45 high propensity for frugal consumption (Ladeira et al., 2018), in this case, an expert consumer of Pasta
46 is not attracted very much by the packaging but is interested in information about traceability of the
47 product.
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51 The results showed that Italians, who claim to be the best Pasta experts, do not know the origin of the
52 wheat used to produce it and they do not have enough information about toxicity of foreign grains, that
53 are often used to produce Italian Pasta of Italian brands. This is undoubtedly of high interest for marketing
54 actions and communication campaigns of information and promotion about local durum wheat,
55 disadvantaging the use of foreign grains.
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3 In addition, in line with previous studies and in view of new consumption trends, health benefits appear
4 to enhance product demand when the claims are based on scientific evidence (Xiong, et al., 2018),
5 therefore local small producers, could direct supply the market with products that better meet the demand
6 for quality Pasta using secure local durum wheat. The Italian Authorities dealing with Agriculture and
7 Health and the Academia must together support local products of high quality by communication and
8 information campaigns to inform Italian and foreign consumers about components of foodstuffs they
9 consume and make them aware of their choices, also with regard to Pasta.
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15 **Conclusion**

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17 This study revealed new elements with respect to what was known about Pasta consumption in Italy. A
18 clear picture has been drawn of preferences with respect to the quality characteristics (intrinsic and
19 extrinsic) of common Pasta and Pasta that have a more niche market, such as functional, whole meal or
20 produced with local grains. More specifically, there is an asymmetry of information between consumers
21 and producers about the origin of the constituents used for the production of Italian pasta, since the origin
22 itself is considered by consumers to be an important indicator of quality. Moreover, in line with new
23 consumption trends, consumers are more likely to use whole meal pasta; on the contrary, they are not
24 very interested in time-saving or functional products. The empirical findings are particularly relevant to
25 agribusiness stakeholders who grow or market food products featuring health concepts. Health benefits
26 appear to enhance product demand when the claims are based on scientific evidence, and this may be the
27 case of the Italian Pasta produced with local durum wheat. Therefore, all these results can be interesting
28 also to the Italian Authorities dealing with health, and also to companies, in order to reflect on the
29 importance of correct information about the healthiness of the Italian pasta of high quality, and to
30 implement appropriate information campaigns aimed at consumers in order to make them more aware.
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39
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