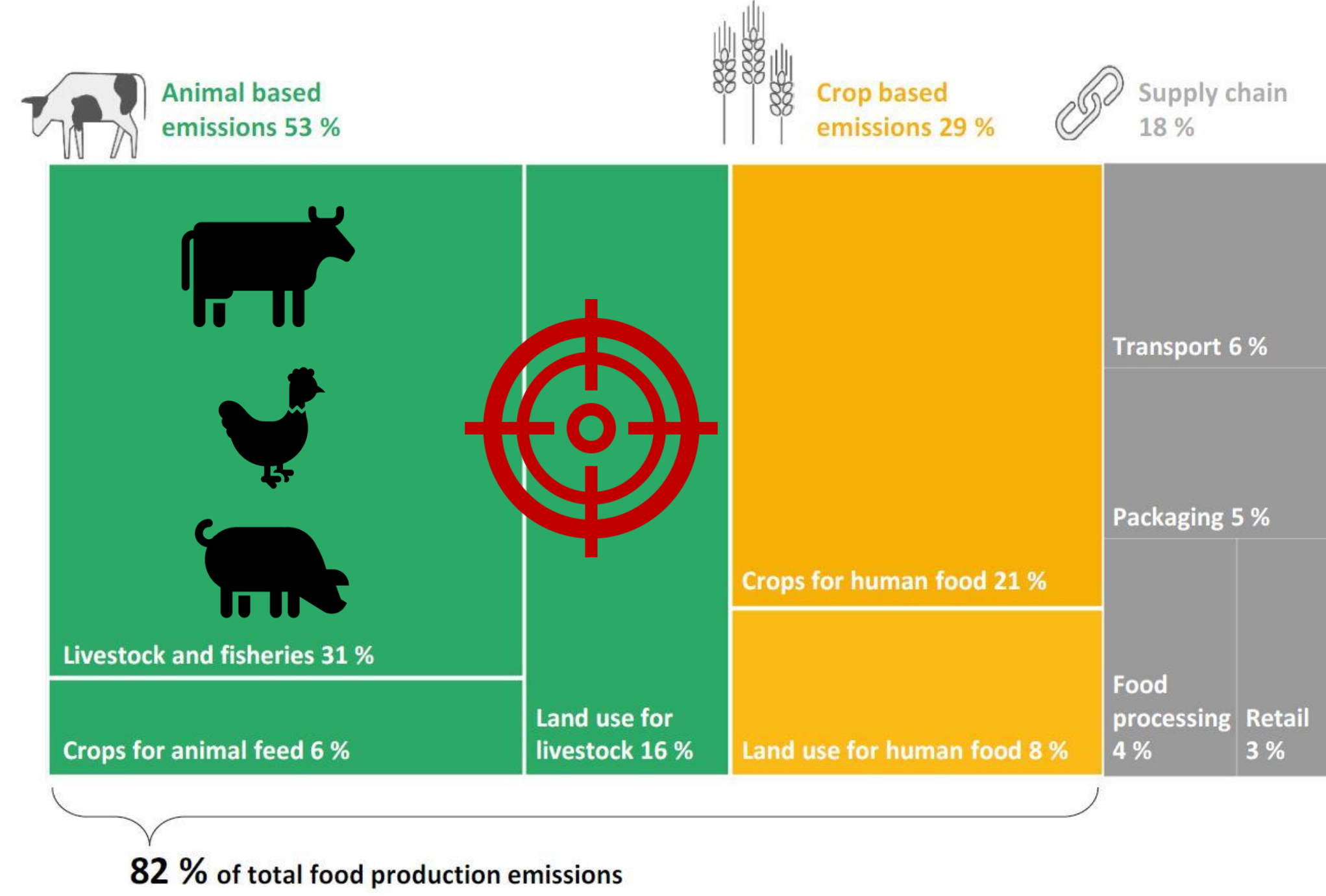


Introduction

- Food production is responsible for **26 % OF GLOBAL GREENHOUSE GAS EMISSIONS**.



- In May 2017, the European Commission adopted Regulation 2017/893, authorises the use **OF INSECT PROTEINS TO FEED AQUACULTURE ANIMALS**.

- Recently, Commission Regulation (EU) 2021/1372[1] also authorized the use of Processed Animal Proteins derived from insects (insect PAPs) in **POULTRY AND PIG**.

- INSECT-FED ANIMAL PRODUCTS** offer several notable benefits:

- ✓ Efficient converters of feed
- ✓ Fewer resources (land, water and feed)
- ✓ Contribute to sustainable & circular economy
- ✓ Offer unique nutritional advantages

- Sogari et al. [2] provided a comprehensive analysis of consumer acceptance regarding the use of insects as feed in six European countries (Germany, France, Poland, Belgium, Italy and the UK) and one worldwide. They concluded that between **53% AND 76% EXPRESSED THEIR WILLINGNESS TO CONSUME (WTC)** animal products fed with insects.

- This study examines **SPANISH CONSUMERS' WTC**, attitudes, and opinions regarding animal products fed with insect meal, and explores the effects of sociodemographic and psychometric characteristics.

Materials and Methods

Data collection

- A sample of **SPANISH ADULTS (n = 1,260)** was recruited by a market research company using a semi-structured questionnaire.

Survey design and measures

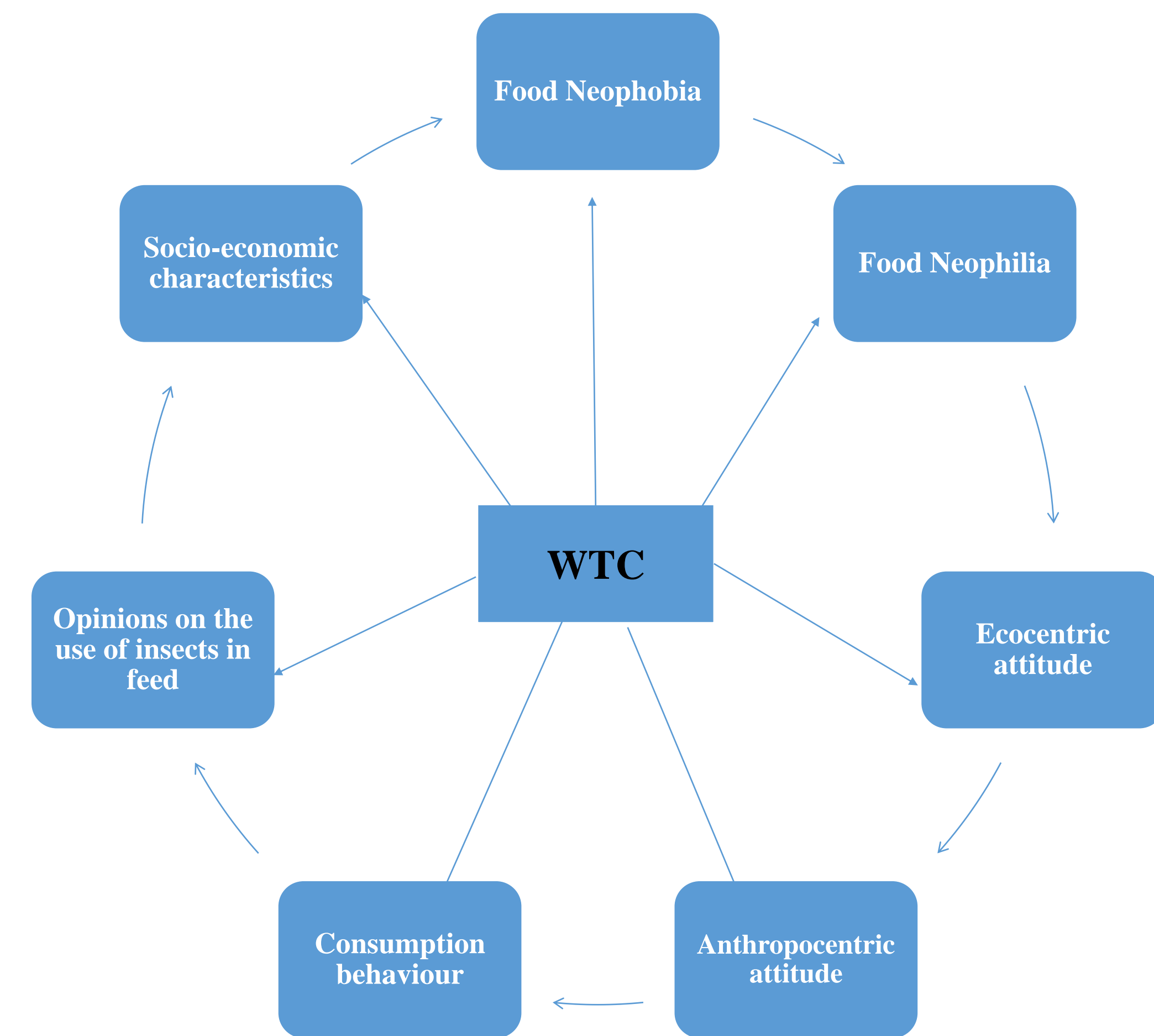


Table 1. Summary of socio-demographic characteristics and percentages of their WTC insect-fed animal products.

Description	n	Sample (%)	Population (%)	Animal Products	n	Sample (%)
Age						
- 18-24	174	13.8	8.0			
- 25-44	477	37.9	29.1	WTC Pork meat		
- ≥ 45	609	48.3	43.7	- Yes sure	491	39.0
				- Uncertain	665	52.9
				- No	102	8.1
Gender				WTC Chicken meat		
- Male	620	49.2	48.9	- Yes sure	498	40.0
- Female	640	50.8	51.1	- Uncertain	666	53.5
				- No	82	6.6
Education				WTC Chicken eggs		
- Basic	85	6.7	28.0	- Yes sure	520	41.5
- Intermediate	547	43.4	23.0	- Uncertain	650	51.9
- High	628	49.8	49.0	- No	82	6.5
				WTC Fish		
Household Income				- Yes sure	468	37.4
- Never cover household expenses	21	1.7		- Uncertain	683	54.5
- Sometimes cover household expenses	774	61.5		- No	102	8.1
- Always cover household expenses	465	36.9				
Financial situation						
- Very difficult	181	14.4				
- Adequate	888	70.5				
- Good	176	14.0				

Table 2. Attitudes and personality traits.

Factors	Mean ± S.D	Interpretation
Food neophobia	4.97 ± 1.47	Moderate
Food neophilia	5.96 ± 1.57	Moderate
Ecocentric attitude	7.24 ± 1.38	High
Anthropocentric attitude	4.43 ± 1.65	Moderate
Opinions on the use of insects in animal feed	5.63 ± 1.37	Moderate

Results and Discussion

- Most Spanish consumers have expressed **CONSIDERABLE UNCERTAINTY** regarding their WTC insect-fed animal products. Specifically, **52.9%** of them expressed hesitancy about consuming **PORK** fed with insect meal, followed by **CHICKEN (53.5%)**, **CHICKEN EGGS (51.9%)**, and **FISH (54.5%)** (Table 1).

- However, a **FAVOURABLE MAJORITY** has shown WTC such products, with only a small proportion expressing their reluctance. They inferred that the WTC was expressed by approximately **37% TO 42%** of the participants, a percentage slightly less than the results reported by Sogari et al. [2].

- In terms of the attitudes and personality traits, the results in Table 2 revealed that consumers have a moderate level of **FOOD NEOPHOBIA** and **FOOD NEOPHILIA** ($\bar{x} = 4.97$ and 5.96 , respectively). They expressed a **HIGH ECOCENTRIC ATTITUDE** ($\bar{x} = 7.24$) and moderate **ANTHROPOCENTRIC ATTITUDE** ($\bar{x} = 4.43$). Meanwhile, overall mean scores for **OPINIONS ON THE USE OF INSECTS IN ANIMAL FEED** was also moderate ($\bar{x} = 5.63$).

- The non-parametric comparison analysis confirmed significant differences in WTC sustainable animal products across sociodemographic characteristics:

- **FINANCIAL SITUATION** and **GENDER** were significant, with consumers with difficult financial situations are more inclined to consume, and females more willing to consume than males.

- For the **PSYCHOMETRIC TRAITS**: significant differences in WTC were confirmed across food neophobia, food neophilia, opinions on using insects in animal feed, and ecocentric attitude.

- **FOOD NEOPHOBIA/NEOPHILIA**: Consumers demonstrating a high level of food neophobia tend to be less willing to consume, while on the other hand, consumers with a significant degree of food neophilia exhibit a high WTC.

- **ECOCENTRIC ATTITUDE**: Consumers are willing to consume these insect-fed animal products when they adopt a more ecocentric attitude

- **OPINIONS ON THE USE OF INSECTS**: Consumers who indicated a willingness to consume (positive WTC) such animals have positive opinions towards the use of insects in animal feed

- The results also confirmed a significant difference in the effects of sociodemographic variables on psychometric attributes:

- **FINANCIAL SITUATION**: Consumers in good financial situation tended to have more positive attitude towards food neophilia, anthropocentric attitudes, and opinions on the use of insects in animal feed.

- **AGE**: Middle-aged respondents (25-44 years) reported a higher mean rank levels of food neophobia and significantly differ from those of younger respondents (18-24 years). Older respondents had more positive ecocentric attitudes, and opinions on the use of insects in animal feed.

- **EDUCATION**: consumers with high education levels have more positive food neophilia, ecocentric attitudes, and opinions on the use of insects in animal feed.

- **GENDER**: females are more neophobic than males.

- This study has provided comprehensive initial insights into consumer WTC insect-fed animal products in Spain. The findings from this study will serve as a valuable resource for producers, policymakers, and governments in making informed decisions that promote more sustainable production practices.

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