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## **Preferences of US and EU Undergraduates for Cloning**

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# Preferences of US and EU Undergraduates for Cloning

## Background

### What is cloning?

- A clone is an exact genetic copy of a donor animal. Clones are similar to identical twins born at different times.
- Cloning has been used in plant reproduction for centuries but its use in animals is relatively new. The first mammal to be cloned was “Dolly,” a female sheep born in 1996 at the Roslin Institute in Scotland. The cell used to produce her was taken from the donor sheep’s mammary gland – a fact which, allegedly, had something to do with her name.

### Why clone food animals?

- Cloning produces an exact copy of the donor and thus, unlike genetic modification, cannot result in any improvement. However, by providing an opportunity for more widespread dissemination of high quality genotypes, the use of cloning can accelerate improvements in the average quality and productivity of food animals. This may result in more efficient food production (with related environmental benefits), more consistency in quality, and lower prices for consumers.

## Recent developments

- In January 2008, both the United States Food & Drug Administration (FDA) and the European Food Safety Authority (EFSA) determined that meat and dairy products from cloned animals and their offspring were no different from products derived from conventionally bred animals, and thus were safe for human consumption.
- FDA, January 8, 2008: “Healthy clones that meet current requirements...pose no additional food consumption risk.”
- EFSA, January 11, 2008: “No indication of difference in terms of food safety from those conventionally bred.”

### Prior work with U.S. consumers

Prior to the FDA 2008 assessment the consensus finding from a limited number of studies was that about one-third of consumers would purchase clone products, one-third would not, and one-third were unsure. Since the FDA assessment the most comprehensive work on the issue is a study by Lusk (2008) involving over 6000 U.S. consumers. Lusk found that:

- respondents were more aware of cloning compared to other food related technologies
- similar to earlier work, roughly one-third of respondents would, would not, or were unsure if they might purchase clone products
- there was no difference between acceptance of meat or milk from cloned animals, and that respondents made no distinction between products derived from clones or from the offspring of clones
- males and individuals with more education were more accepting of cloning

### Objectives

- Compare acceptance of cloning technology across groups of US and EU undergraduates
- Investigate respondent characteristics associated with the likelihood of consuming “cloned products.”

## Data Collection

We designed a short questionnaire to collect data using the web-based **SurveyMonkey** tool. In addition to demographics, respondents were asked about frequency of meat consumption (1=never, 5=almost daily), knowledge about new food technologies (1=none, 4=a lot), and level of attention to meat labels (1=none, 5=a lot). Other questions elicited level of concern on a 5-point scale from “not concerned” to “very concerned” about nine different food characteristics (packaging, price, pathogens, use of hormones, etc).

The question of primary interest was: “***How likely are you to buy and consume meat from cloned animals?***” with the response indicated on a 5-point scale from 1=not at all likely to 5=very likely. This question was **repeated**, once after informing respondents about the FDA/EFSA opinions on the safety of clone products, and again for a scenario in which the price of the clone product was 10 percent lower than the conventional product.

The survey was pilot-tested using a graduate class and a convenience sample recruited via **Facebook**. The pilot test gathered responses and comments from 54 individuals and resulted in only minor modifications in survey wording and design.

The survey was sent via e-mail to undergraduate students: a) in three classes at Kansas State University - in Agricultural Economics, English, and Sociology, b) in the 3<sup>rd</sup> and 4<sup>th</sup> years of the Agribusiness and Food & Nutrition programs at University College Dublin, Ireland, and c) in the 3<sup>rd</sup> and 4<sup>th</sup> year at the Ecole Supérieure d'Agriculture at Purpan, in Toulouse, France. While the sample is restricted to undergraduates, we believe the comparison across locations provides interesting findings.

## Data

A total of 421 students responded. Summary information is presented in Table 1. Respondents were equally split between males and females. Because all respondents are undergraduates we do not report information on income and education in which there was little or no variability. Given the nature of their program, most French respondents are from a farming background. Levels of meat consumption frequency are similar in all three groups.

Table 1 – Selected Sample Statistics

	<u>USA</u>	<u>France</u>	<u>Ireland</u>
Total Observations	141	162	118
Female	46.8%	56.2%	50.0%
Farming background	50.3%	96.3%	52.5%
Know a “fair amount” or a “great deal” about Cloning	39.0%	46.9%	60.2%
Consume meat 3+ days a week	95.0%	84.6%	91.5%

## Likelihood of consuming cloned meat

Table 2 shows the average sample likelihood of consuming cloned meat, with the Kansas sample subdivided according to the class from which the respondent was sampled. In general, students in Ireland and France indicate a lower likelihood of purchasing the clone product. At K-State, students in the AgEcon class are significantly more likely to consume the cloned product compared to those in the English and Sociology classes.

Respondents in all groups indicated a higher likelihood of consuming cloned product after being informed of the FDA/EFSA opinions (**Likely 2**). However, the increase in average likelihood is much smaller for the French sample (+0.17) compared to the Irish (=0.37) or US (+0.57) samples. The 10% price reduction on which the **Likely 3** response is predicated also shows a marginal increase compared to **Likely 2**, with the largest increase again coming from US students.

Table 2 – Likelihood of Consuming Cloned Meat. (1 = 'not at all likely' to 5 = 'very likely')

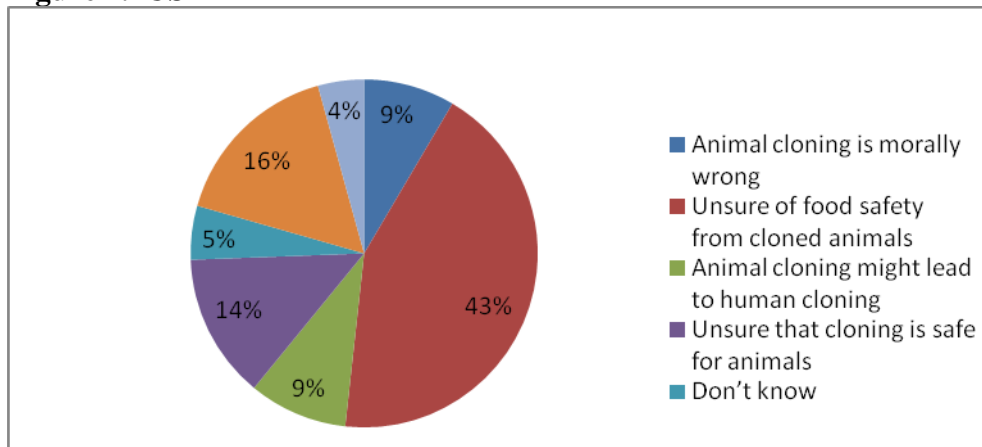
	<u>AgEcon</u>	<u>Sociology</u>	<u>English</u>	<u>USA</u>	<u>France</u>	<u>Ireland</u>
Total Observations	61	34	46	141	162	118
<b>Likely 1</b>	3.28	2.09	2.20	2.64	1.93	1.92
<b>Likely 2</b>	3.77	2.59	2.93	3.21	2.10	2.29
<b>Likely 3</b>	3.82	2.82	3.17	3.37	2.20	2.30

## Reasons for discomfort with cloned product

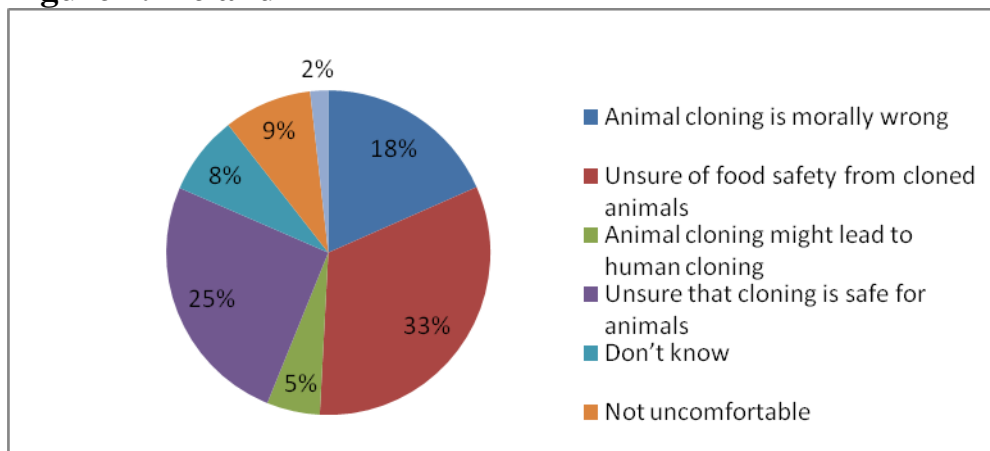
Respondents were asked to identify why, if that were the case, they would be uncomfortable eating meat from cloned animals. They were allowed to choose one of the following responses: *Animal cloning is morally wrong*; *Unsure of food safety from cloned animals*; *Animal cloning might lead to human cloning*; *Unsure that cloning is safe for animals*; *Don't know*; *Not uncomfortable*; *Don't care*. Figures 1 to 3 illustrate the distribution of responses for the three samples.

The most interesting contrast is between the US and French samples with respect to the proportions indicating that animal cloning is morally wrong – 9% vs 39%, and those who are unsure about the safety of clone products – 43% vs 22%.

**Figure 1. USA**

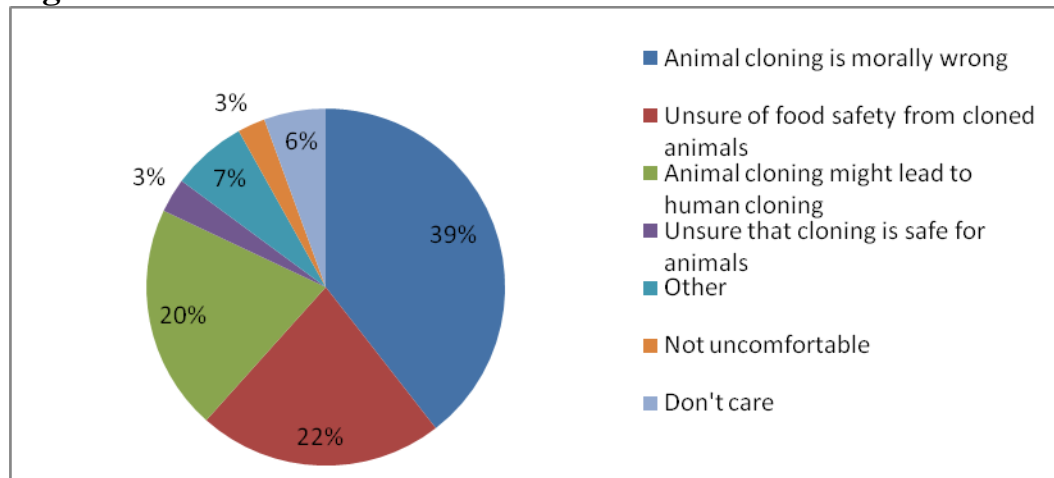


**Figure 2. Ireland**





**Figure 3. France**



## Regression analysis

We use a simple regression model to examine correlations between various demographic and attitudinal measures as well as the stated likelihood of consuming cloned beef. The dependent variable is the response to the first question eliciting likelihood of consuming cloned product (Likely 1).

The ‘Concern for Quality’ variable is the average level of concern expressed about Food Handling, Ingredients, Foodborne Pathogens, Chemicals/Pesticides, Use of hormones, and Biotechnology. The variables ‘*Morally wrong*’, ‘*Unsure about food safety*,’ ‘*Lead to human cloning*,’ and ‘*Unsafe for Animals*,’ are dummy variables identifying individuals who cited that factor as the reason they would not be comfortable consuming cloned products.

Table 3 – Regression Results

	<u>AgEcon</u>	<u>Sociology</u>	<u>English</u>	<u>France</u>	<u>Ireland</u>
<i>N</i>	<i>60</i>	<i>34</i>	<i>46</i>	<i>156</i>	<i>102</i>
Constant	2.05	5.41	2.41	1.78	4.31
Meat consumption	0.06	-0.38	0.17	0.08	0.21
Concern about Price	0.28*	0.14	0.13	0.18**	-0.03
Concern about Quality*	-0.36*	-0.26*	-0.27	-0.09	-0.34***
Attention to Labels	0.26**	-0.14	-0.16	-0.13*	-0.18*
Knowledge of FoodTech	0.34*	-0.03	0.67***	0.20**	0.03
<i>Morally wrong</i>	-2.19***	-0.18	-2.39***	-1.52***	-1.58***
<i>Unsure about food safety</i>	-1.41***	-0.39	-1.48***	-1.08***	-0.92***
<i>Lead to human cloning</i>	-1.24***	0.80	-2.15***	-1.06***	-0.88
<i>Unsafe for animals</i>	1.11	-0.23	-1.09**	-0.77**	-1.02***
Female	0.18	-1.13***	0.45	0.02	-0.03
Farm background	0.09	-0.63**	-0.45	0.56	-0.31
Adj R-Square	51.4%	68.0%	32.5%	34.6%	32.0%

\*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels.

## Key Findings

- Students in France and Ireland indicated a lower likelihood of consuming cloned products compared to students at Kansas State.
- Informing respondents about the FDA/EFSA opinions on the safety of cloned products led to a small increase in the stated likelihood of consuming cloned product.
- In all samples, a higher level of stated concern about food quality issues was correlated with a lower likelihood of consuming cloned product.
- Over forty percent of Kansas students cited concern about food safety as a reason for being uncomfortable with cloned products. In contrast, almost forty percent of French students indicated that cloning was morally wrong.
- In all but the Sociology class sample, an indication that cloning was “Morally wrong” had the strongest negative impact on the likelihood of consuming cloned product.
- The latter two findings suggest that efforts to educate consumers about the safety of cloned products may meet with some success in populations similar to the Kansas sample, but are unlikely to have an impact in populations similar to the French sample.