Factors Affecting Eating Quality in Northern Irish Beef

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Meat Quality

- **Beef is judged and valued on eating quality**
  - Tenderness is a major factor with consumers
  - Flavour also important
- **Consistency of eating quality is crucial**
  - Maintain and expand markets
- **Scientific basis behind eating quality**
  - Many effects well known
  - Interaction of effects studied

Meat Quality Effects Across the Supply Chain

Pre-slaughter

- Stress
- Maturity
- Growth
- Fatness
- Genetics
- Marbling

Post-slaughter

- pH Temperature
- Aging
- Carcase Hanging
- Chilling
- Cooking

N.Ireland Beef Production

- **Cattle types**
  - Young bulls, Dairy Breed
- **Production**
  - Small farms, Grass Fed
- **Pre-slaughter**
  - Short lairage and transport times
- **Consumer**
  - Likes beef well done

Eating Quality
Key areas investigated

1. Effect of Doneness, Cooking Method and Cut
2. Effect of Hanging Method and Ageing
3. Pre-slaughter Stress and Gender
4. Effect of Electrical Stimulation
5. Effect of Breed
6. Interactions of Eating Quality Factors

Materials and Methods

- **192 experimental animals**
- **36,000 beef samples tasted**
- **Assessed by 6,000 consumers**
- **2 Cooking Methods**
- **Muscles taken from 5 major carcase primals**
  - Striploin, Rump, Knuckle, Silverside, Topside

Consumer Testing Program

Tenderness-40%

Juiciness-10%

Flavour-20%

Overall liking-30%

CMQ4

Meat Quality Score

Pre-Slaughter Stress and Sex Type

- **Effect of pre-slaughter stress on the eating quality of bulls and steers**
  - Lairage duration
  - Belly Clipping
  - Mixing
  - Fasting
- **To compare the eating quality of bulls and steers**
- **To investigate the occurrence of high pH (Dark Cutting Beef)**

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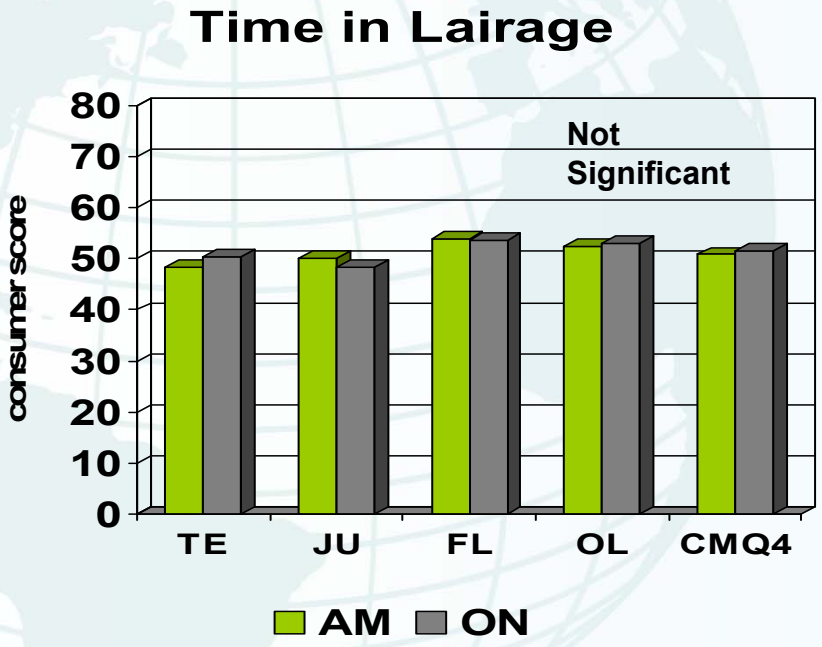
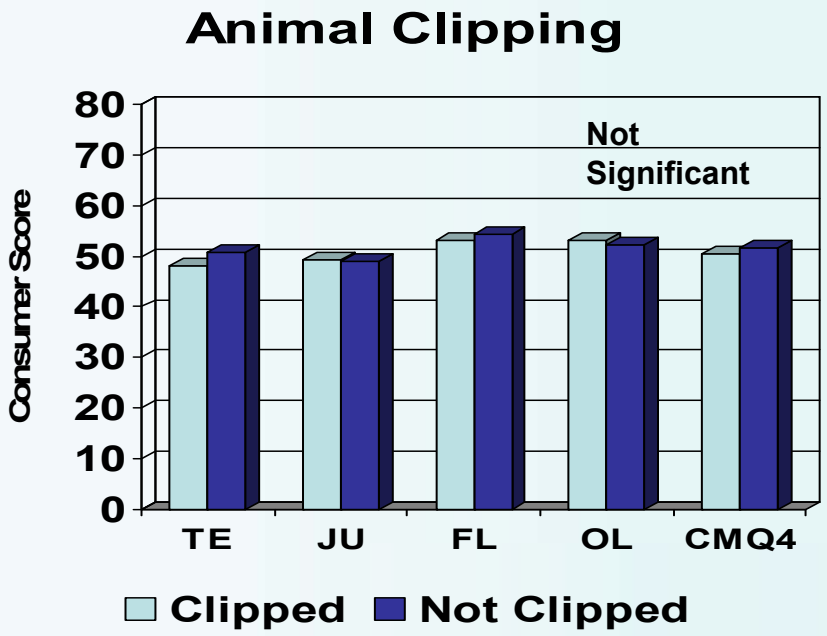
Effect of Lairage Time on the pHu of Bulls and Steers

	Morning		Overnight	average
Sex type				
Bull	5.57	*	5.77	5.67
	ns			ns
Steers	5.64	ns	5.56	5.60
average	5.61	ns	5.67	

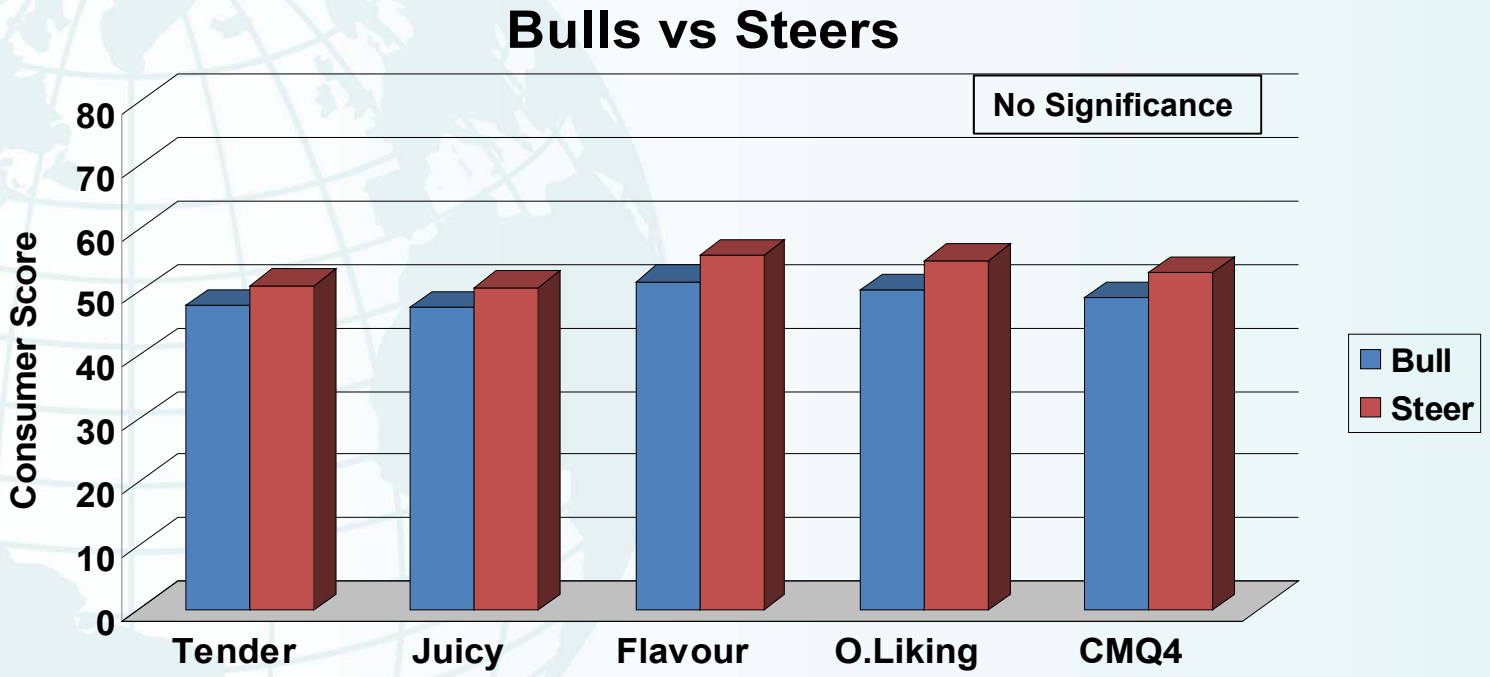
Mean pHu was significantly higher (<0.05) for bulls than steers when held in overnight lairage

Effect of Lairage Time and Clipping on the Eating Quality of Bulls and Steers



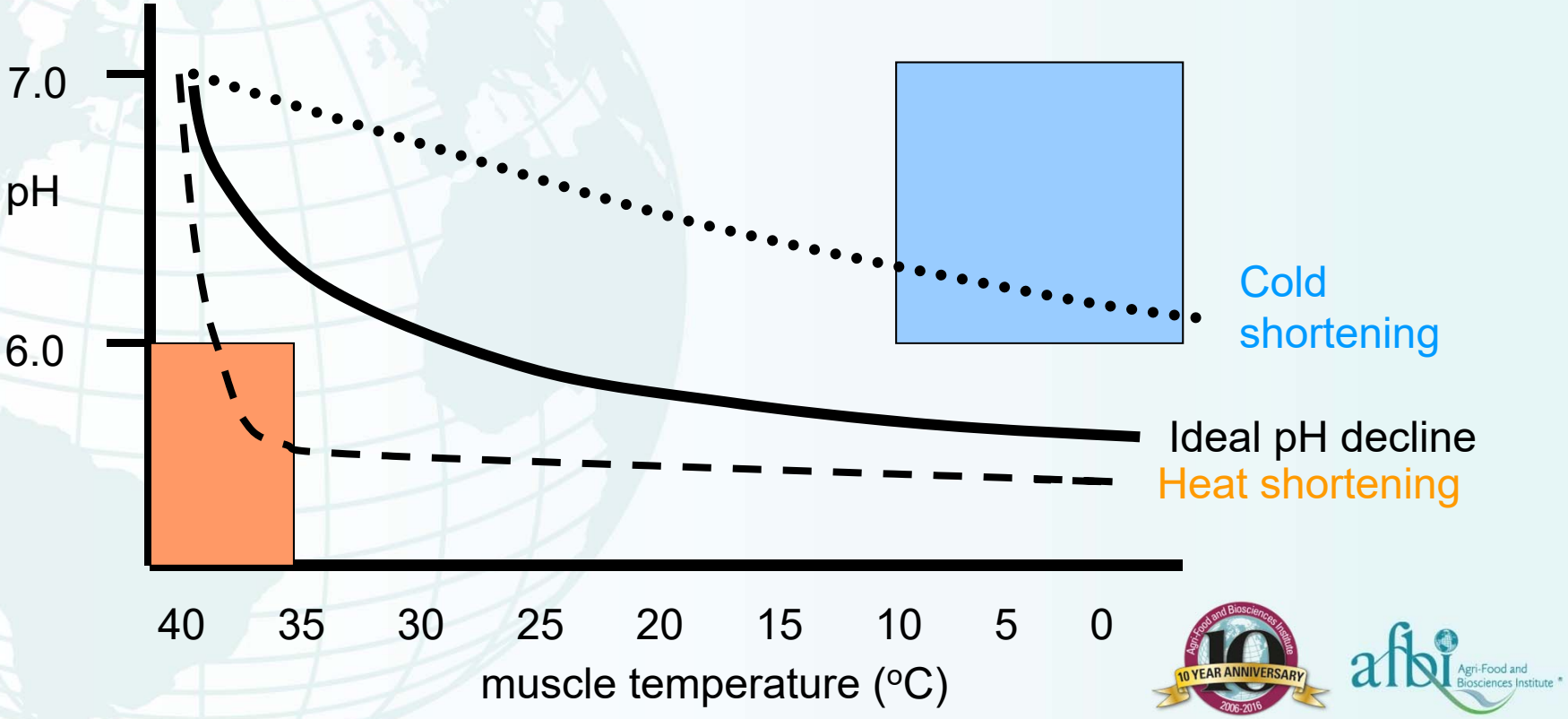


Effect of Sex Type on Eating Quality

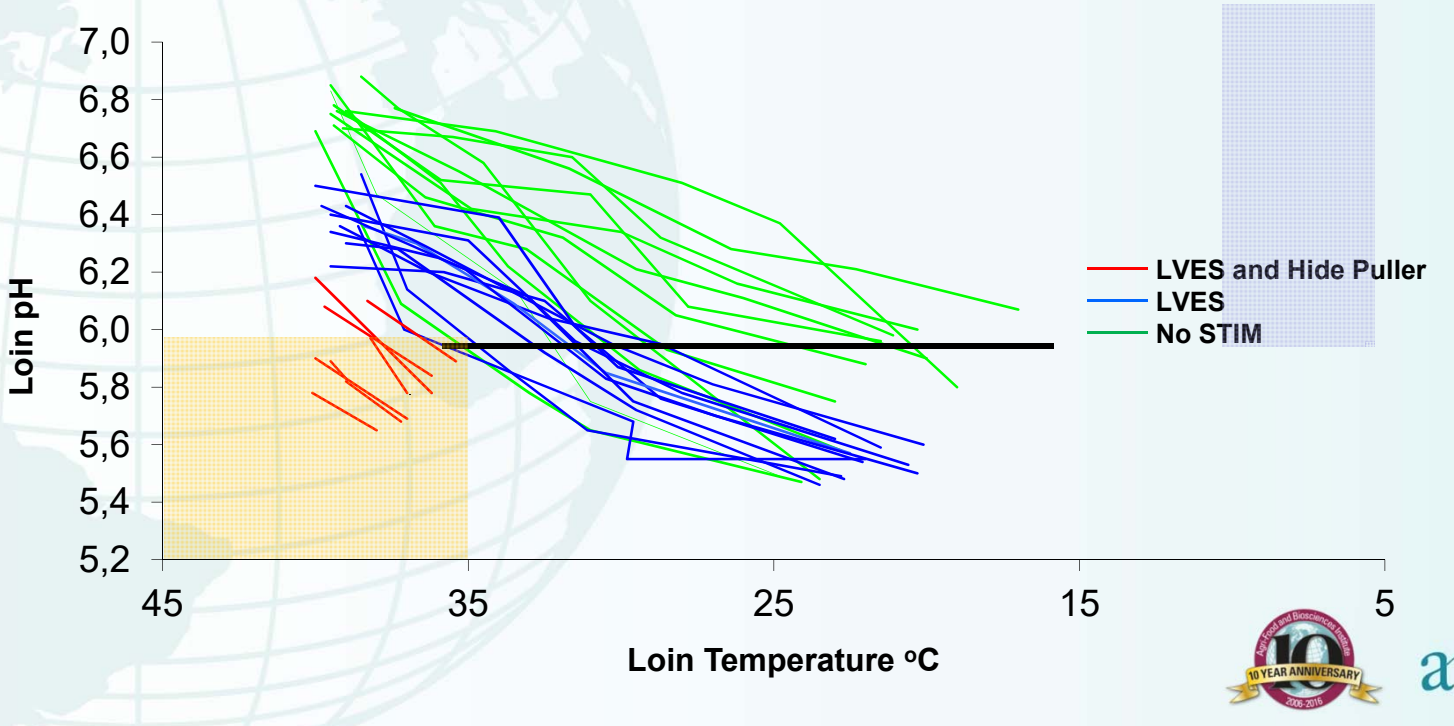


Post Slaughter Carcase Processing

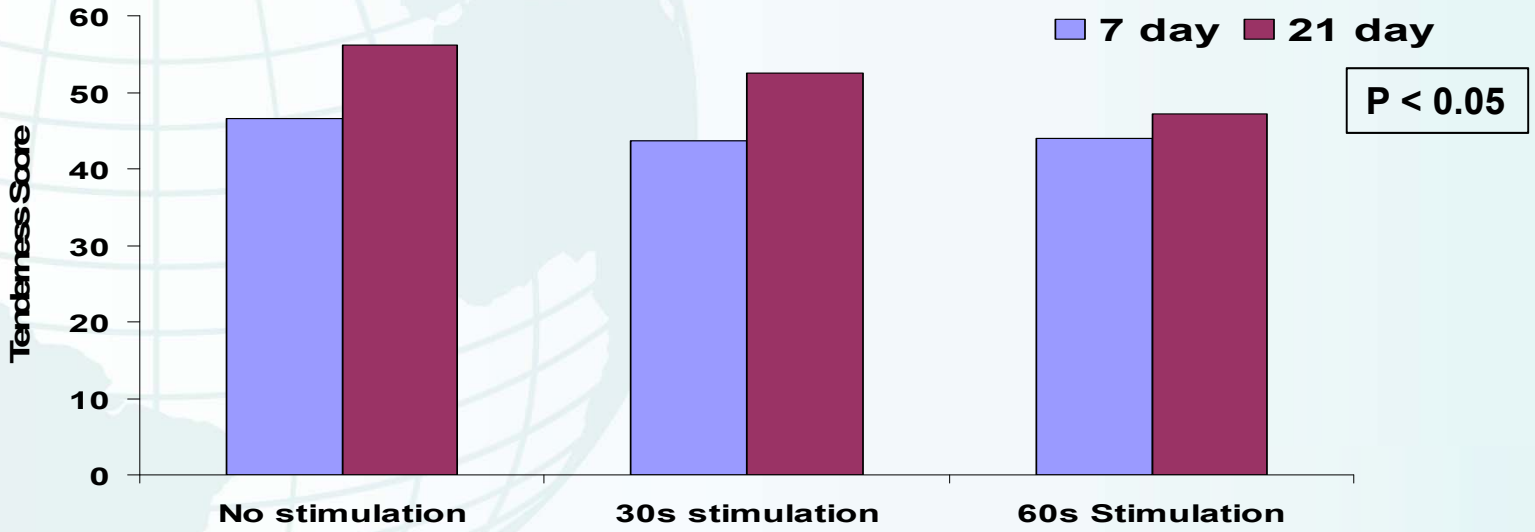
Effect of pH Temperature decline on Meat Quality



Effect of Electrical inputs on pH Decline Striploin (normal chilling) AFBI Data



Eating Quality of Beef subjected to Electrical Stimulation



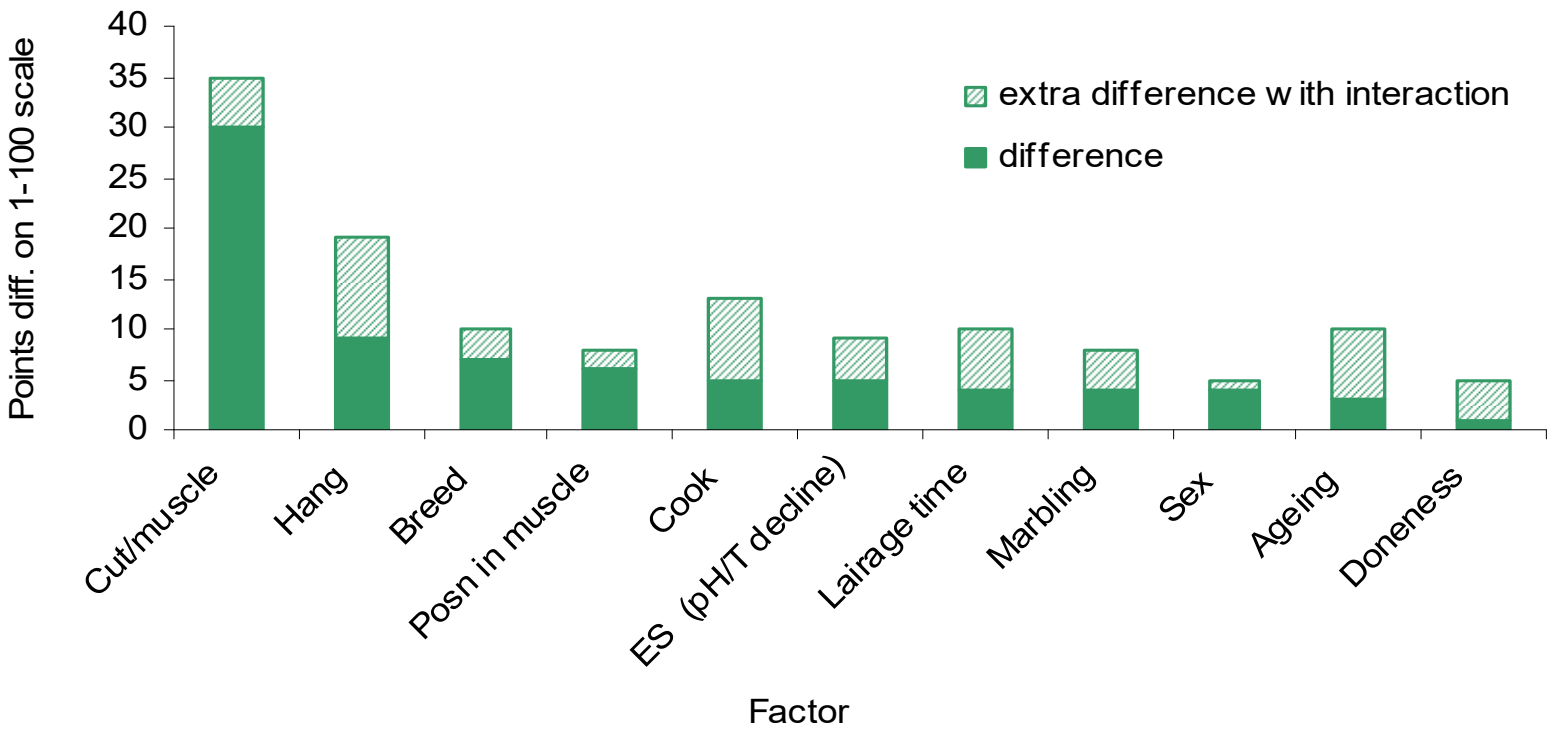
Effect of Breed on Eating Quality

- Effect of genotype on eating quality
- Interaction with post slaughter processing (hang and ageing)
- 40 Steers
- 2 Genotypes
- Holstein (100%) and Charolais (>75%)

Effect of Breed on the Eating Quality of Grilled Striploin (CMQ4)

		Achilles				Tender Stretch		
AGED		**CH**		**HOL**		**CH**		**HOL**
7 day		48.86	*	56.85		60.15	ns	64.35
		ns		*		*		ns
21 day		52.73	*	63.12		66.51	ns	63.86

Factors affecting beef eating quality in NI



Impact on eating quality depends on **combined** impact of different factors = "Interactions"

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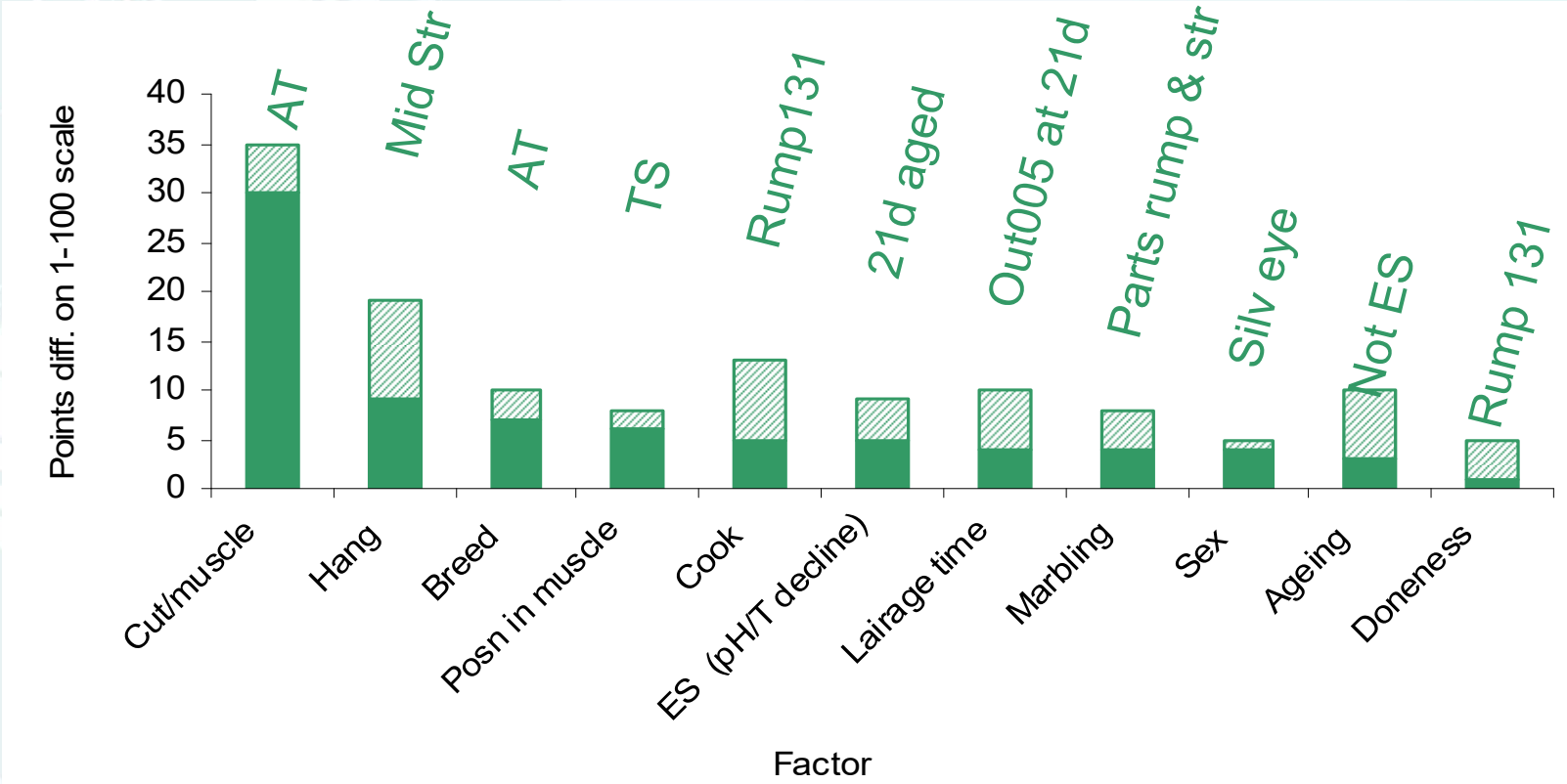

Impact on eating quality depends on **combined** impact of different factors = "Interactions"

Conclusions

- The most important factors that affect the eating quality of N.I. Beef are:
  - Muscle, hanging method, dairy vs beef breed, position in muscle, cooking method, ageing, pH/T decline, pre-slaughter stress, marbling, animal age and carcase conformation/fat class
- Stress did not have a big effect in this experiment, but other research shows that it often does
- Overall impact on meat eating quality often depends on interactions occurring between these factors

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