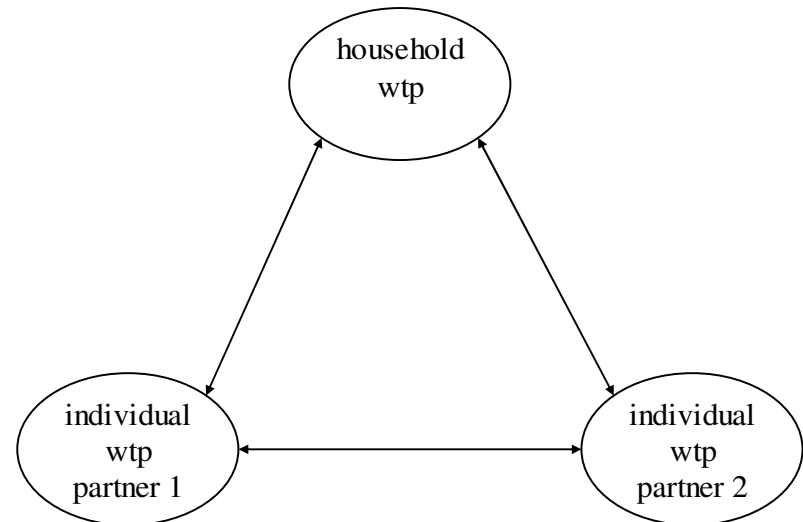


Ian Bateman & Alistair Munro, UEA

- One part of the Programme in Environmental Decision-Making at CSERGE
- Getting inside the black-box model of the household.
- Motivation:
 - Stated preference methods are widely used in environmental valuation
 - Typically
 - one person is selected at random from a household
 - Measure of value elicited
 - Measure is used to stand for the household as a whole
 - Is this reasonable?
 - Possible theoretical justification
 - Possible empirical justification

Theoretical justification: when does household wtp = individual wtp?

- Key concept:
 - Income pooling – when household choices are unaffected by who receives the income.
- Income pooling \leftrightarrow (household wtp = individual wtp)
- [Munro, forthcoming, Economic Letters]
- Note: Income pooling \rightarrow absence of gender effects (in relevant samples).
- Income pooling implied by:
 - Becker/unitary model
 - Noncooperative model



A decorative graphic at the top of the slide consists of two groups of three circles. The first group on the left has a solid light purple circle on the left, a white circle with a light purple outline in the middle, and a solid light purple circle on the right. The second group on the right has a solid light purple circle on the left, a white circle with a light purple outline in the middle, and a solid light purple circle on the right.

Empirical justification:

- Possibly household wtp is a simple average of individual wtp of partners.
 - Therefore in a random sample individual wtp is inefficient but unbiased estimate.
- Or all three measures are v. similar
- Or it is possible to identify decision maker &
 - Household wtp = individual wtp of decision maker.

Project outline: Empirical



- Experiment to test theories of the household:
 - Income pooling rejected (see Economic Journal, March 2005)
 - Unanimity rejected
 - Pareto efficiency rejected
 - Couples are more risk averse than individuals
- But experiment only gives us a qualitative answer.

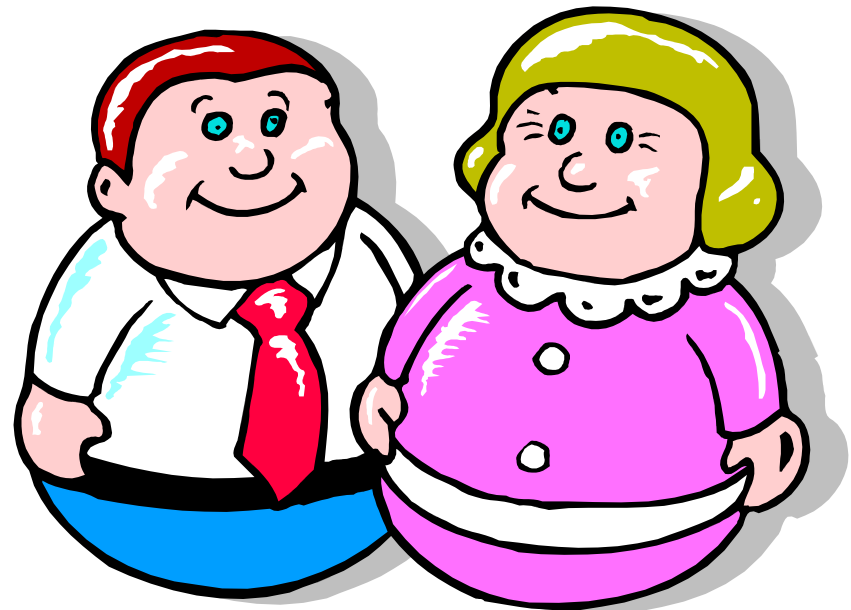


Project outline: Field survey

- Aim:
 - to test the quantitative significance of deviations from income pooling.
- Goods:
 - Topical issues, private goods
 - Food fat content
 - Risk of consuming pesticide residue

Project outline: Field survey

- Method:
 - Choice experiment
 - Population: couples
- Treatments:
 - Interviews with couples
 - Interviews with individuals from a couple



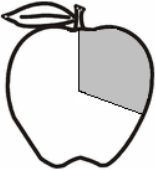
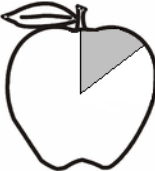
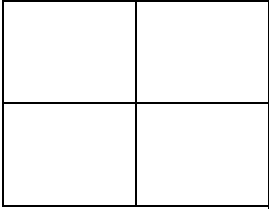
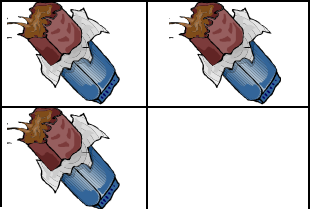
The goods

A decorative graphic consisting of two groups of circles. The first group on the left has a solid light purple circle on the left and an outlined light purple circle on the right. The second group on the right has a solid light purple circle on the left, an outlined light purple circle in the middle, and a solid light purple circle on the right.

- Reductions in percentage of food testing positive for pesticide residues
- Reductions in percentage energy intake from fat for average diet
- No lifestyle change
 - Hence subjects are valuing options

The goods

- 16 choices per household

	'No Change'	'Alternative A'
Percentage of positive tests for pesticides in food	30% 	15% 
Percentage average fat content in food	40% 	25% 
Addition to your weekly household food shopping bill	£0	£21

Choose
'No Change'

Choose
Alternative A

Which would you choose?
(tick one box only)

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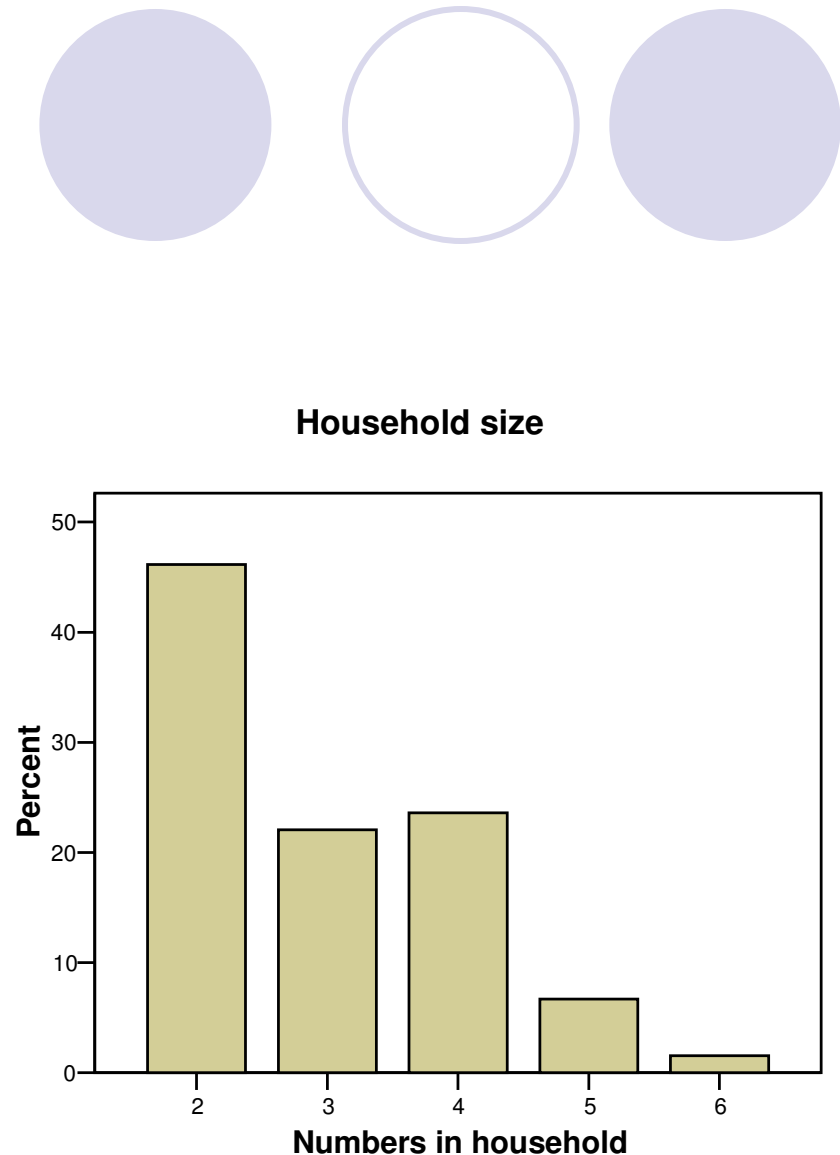


More design features

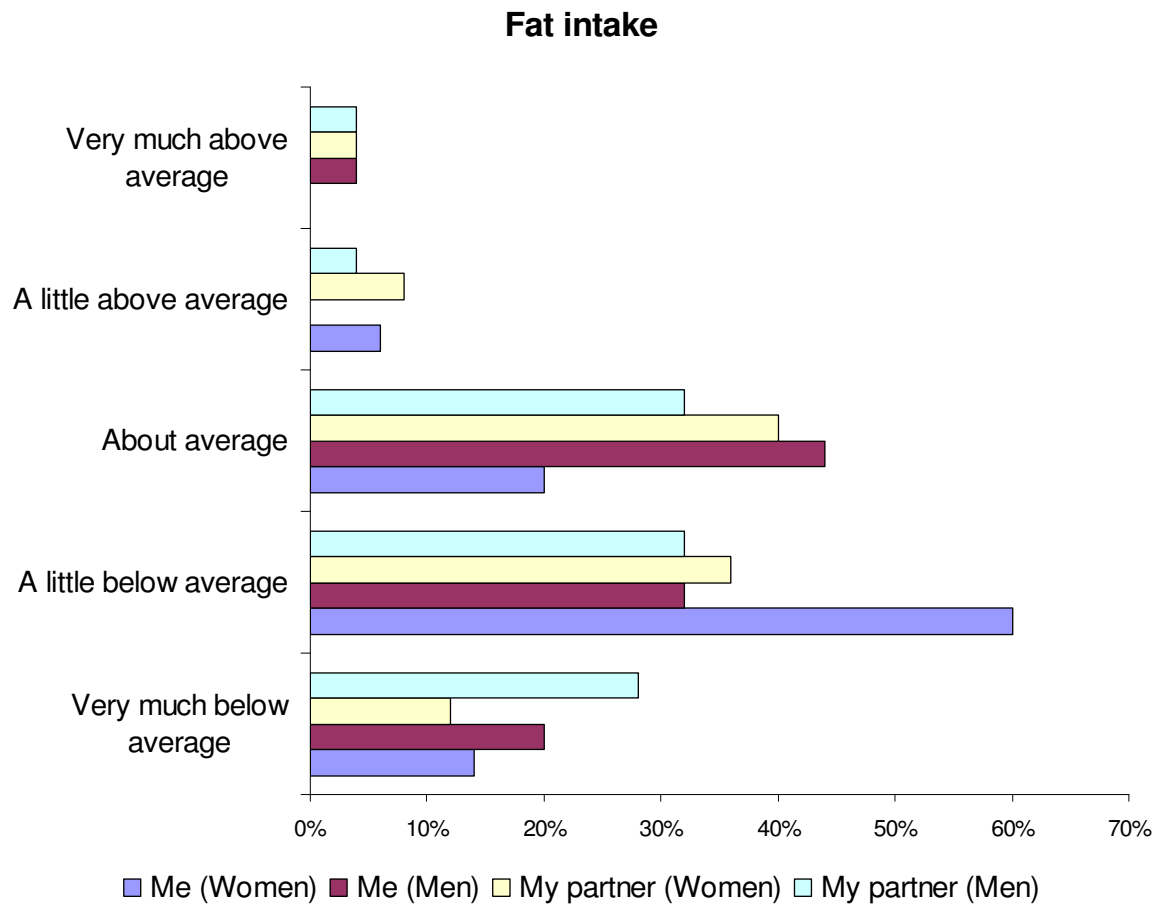
- Household size checked prior to interview
- Levels
 - Price: £1, £2, £3.50, £5 per person per week on food bill (but presented as a total per household)
 - Fat: 40%, 35%, 30%, 25%
 - Pesticide: 30%, 25%, 20%, 15%.
- Four variants (to test for order effects)
- All possible questions except dominated

Other features

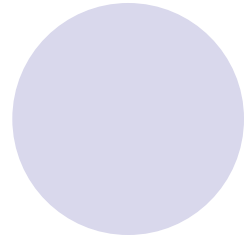
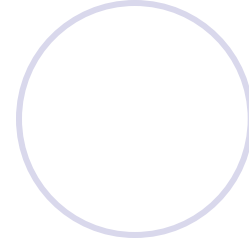
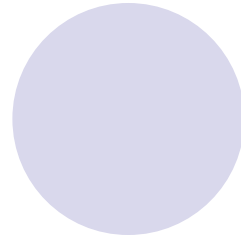
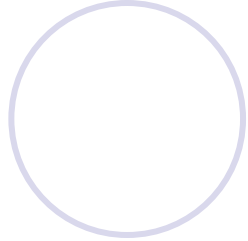
- Two parts to sample:
 1. Couples in database contacted by phone
 2. Informal approaches – e.g. in parks, railway stations etc.
- Problems of separation & distraction with latter
- 194 couples



Views on each other....

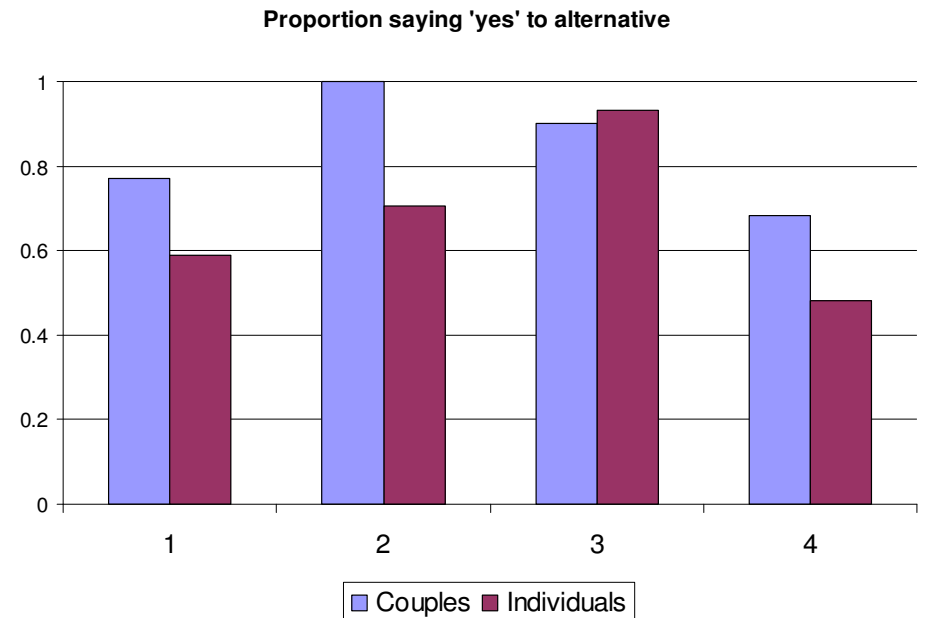


Results



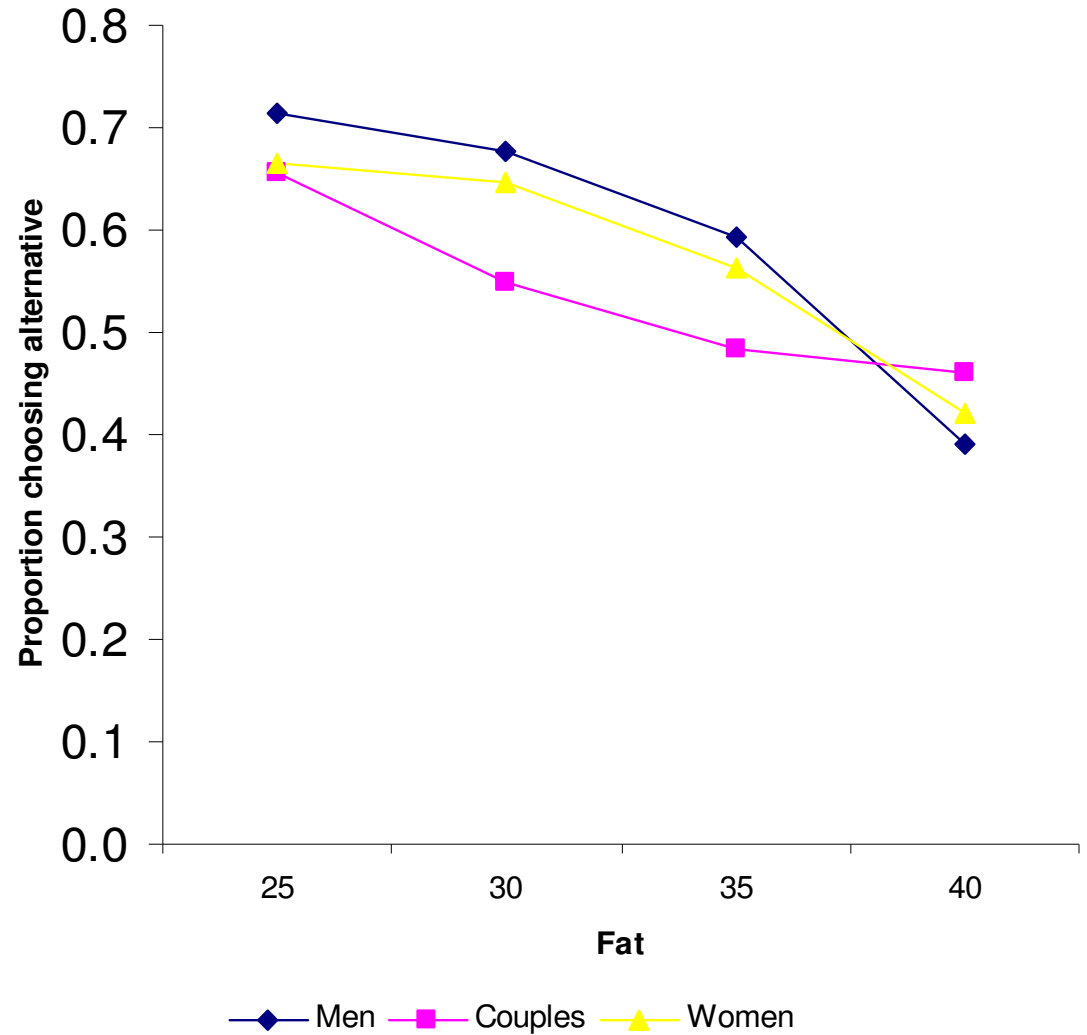
Couples versus individual responses

- Qn 1. Fat = 25%, Pest = 30%, Price = £2, n = 30
- Qn 2. Fat = 30%, Pest = 25%, Price = £2, n = 30
- Qn 3. Fat = 40%, Pest = 15%, Price = £2, n = 50
- Qn 4. Fat = 30%, Pest = 15%, Price = £7, n = 50



Proportion choosing alternative - fat

Fat content sensitivity



Econometric results

- Utility functions of the form:

$$U = \alpha + \beta_{pr} PRICE + \beta_{pe} PEST + \beta_f FAT + \beta_{prc} CPRICE + \beta_{pec} CPEST + \beta_{fc} CFAT \\ + \beta_{prf} FPRICE + \beta_{pef} FPEST + \beta_{ff} FFAT \\ + \dots$$

- Where
 - 'c' indicates couple
 - 'f' indicates female
- Looking for significance of c and f variables.
- Controls for household size, income, attitudes etc.
- Probit
 - Random effects probit
 - Random parameters probit (normal & triangular distributions)

Table 3. Random effects models (s.e. in brackets)

		RE Probit 1	RE Probit 2
Variable			
Constant		5.820(0.284)	5.815(0.285)
Pesticide risk		-0.067(0.006)	-0.080(0.010)
Fat content		-0.074(0.007)	-0.064(0.012)
Price		-0.239(0.013)	-0.250(0.020)
Couple x	Pesticide risk	-0.037(0.007)	-0.024(0.011)
Couple x	Fat content	0.028(0.007)	0.017(0.012)
Couple x	Price	-0.057(0.017)	-0.046(0.023)
Female x	Pesticide risk		0.021(0.012)
Female x	Fat content		-0.015(0.012)
Female x	Price		0.018(0.025)
Rho		0.587(0.044)	0.586(0.044)

Table 3. Random effects and random parameter models.

Variable		RP Probit 2	RP Probit 3	RP Probit 4
Constant		6.344(0.175)	7.057(0.201)	7.709 (0.224)
Pesticide risk		-0.103(0.090)	-0.102(0.008)	-0.100(0.008)
Fat content		-0.068(0.007)	-0.069(0.006)	-0.074(0.007)
Price		-0.258(0.018)	-0.188(0.019)	-0.303(0.018)
Couple x	Pesticide risk	-0.023(0.010)	-0.012(0.008)	-0.024(0.008)
Couple x	Fat content	0.014(0.007)	0.016(0.005)	0.019(0.006)
Couple x	Price	-0.135(0.021)	-0.130(0.022)	-0.061(0.022)
Female x	Pesticide risk	0.047(0.011)	0.028(0.008)	0.024(0.009)
Female x	Fat content	-0.015(0.007)	-0.024(0.006)	-0.022(0.007)
Female x	Price	0.002(0.024)	-0.083(0.024)	-0.015(0.025)
Household Size			-0.236(0.028)	-0.299(0.030)
Rho			-	-
Scale parameters	Constant	0.009(0.026)	0.293(0.029)	0.936(0.040)
	Pesticide risk	0.058(0.002)	0.042(0.002)	0.043(0.002)
	Fat content	0.035(0.001)	0.019(0.001)	0.021(0.001)
	Price	0.230(0.008)	0.231(0.008)	0.126(0.006)
	Couple x Price (CP)	-	-	0.226(0.006)
	Female x Price (FP)	-	-	0.210(0.013)

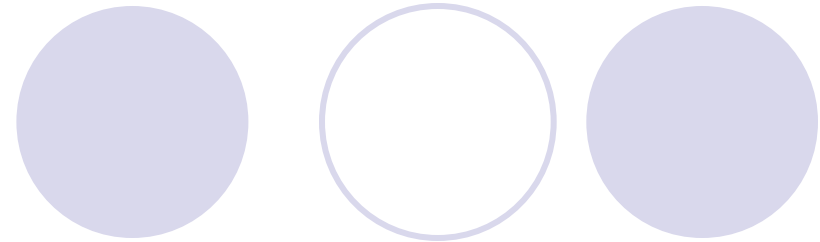


Summary

- Fat, price, pesticide residues have predictable signs (negative), robust and always significant
- Controls (esp. indicators of healthy eating lifestyle) are often significant
- Household size is important
- Random parameter specifications reduce role of characteristics
- Model with random parameters for 3 attributes works well, but wide number of 'acceptable' specifications.
- Pattern found for treatments is robust, more so for couples difference than for men v. women.

Marginal values.

- Couples have more extreme marginal values
 - All differences are statistically significant at 1% level except men-women for price
- Note: direction of extreme depends on attribute



Absolute Marginal values



Respondent type affects marginal wtp

- Fat:

- Male v female not significantly different

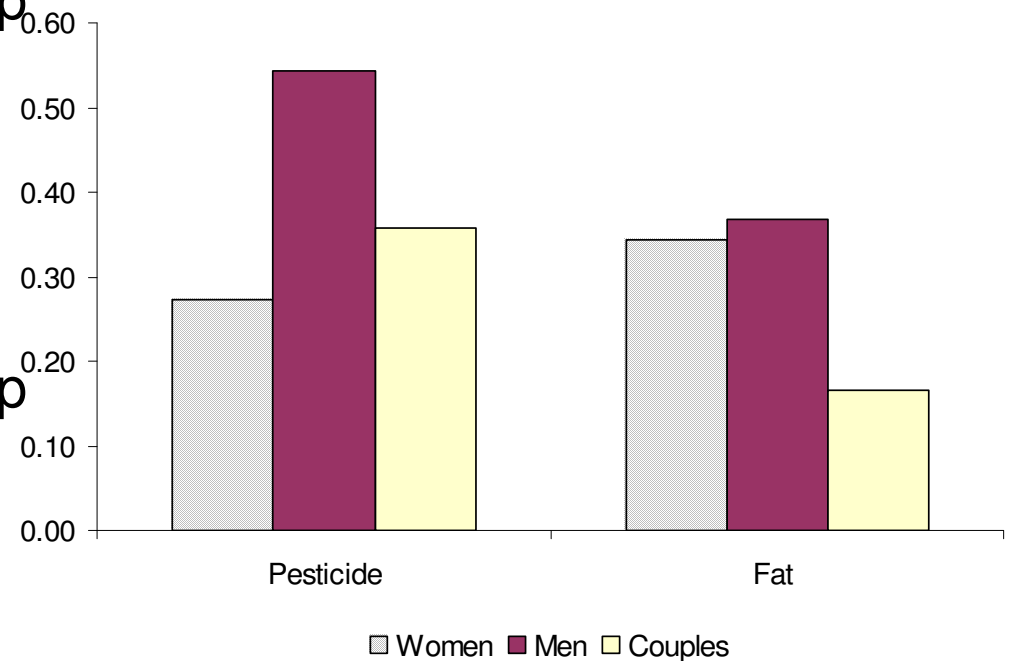
- Other differences sig. at $p < 0.01$

- Pesticide

- Women v couple not significantly different

- Other differences sig. at $p < 0.01$

Marginal wtp (£ per percentage point)





Psychology of group decisions

- So couples' responses are not necessarily an average of responses by gender.
- Group decision-making literature:
 - Original view: risky shift (groups shift to riskier decision)
 - Later view: choice shift (i.e. groups differ from individuals, more extreme, but not always riskier)

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Summing up:

- Using theory, experiments and field work to examine the methodology of environmental valuation
- Unanswered questions about
 - What determines choice shifts
 - Locus of decision-making
- Need for more work on intra-household differences in environmental preferences
- Sampling couples might need to be a standard treatment in valuation (and market research).