Strategic Ambiguity and Decision-making: An Experimental Study

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- In games ambiguity arises from the behaviour of other people. This is more like actual economic behaviour than experiments on ball and urn problems.
- In games subjects create ambiguity for one another rather than the experimenter creating ambiguity.

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- This effect is reversed in games of strategic complements.

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  - We conjectured that players in a game might likewise view a foreign opponent as being more ambiguous than a domestic opponent.

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  - Tests difference in ambiguity attitude between games and single person decision problems.
  - Elicits an independent measure of subjects' ambiguity-attitudes.

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- Computer simulated Ellsberg urn available at: http://people.exeter.ac.uk/dk210/Ellsberg-110708.xls

Ellsberg Urn Rounds

- "An urn contains 90 balls, of which 30 are labelled X. The remainder are either Y or Z. Which of the following options do you prefer?
  a) Payoff of λ if an X ball is drawn.
  b) Payoff of 100 if a Y ball is drawn.
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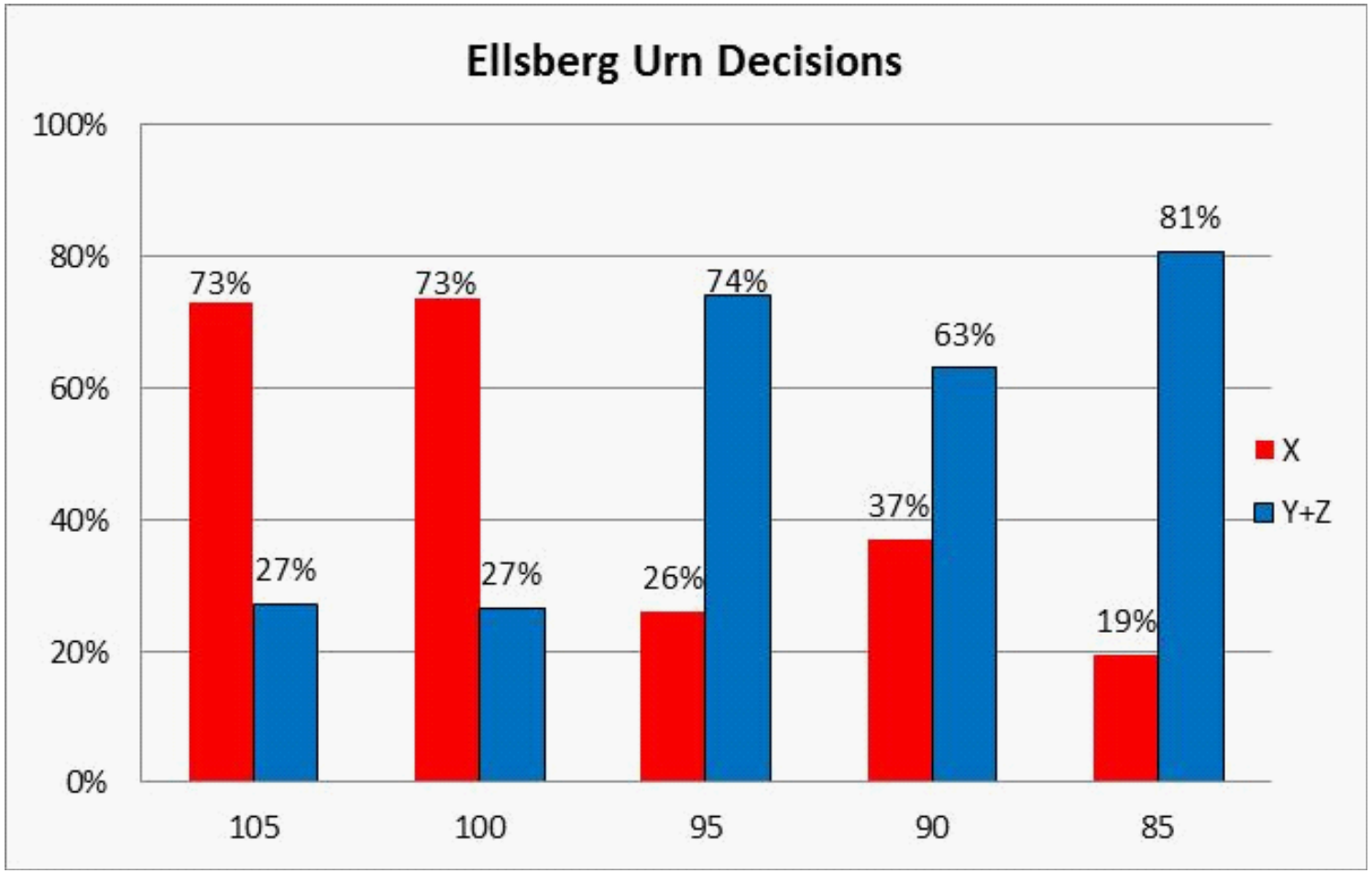
- We use balls labelled X, Y and Z instead of coloured balls to avoid biases.

Behaviour in Ellsberg Urn Rounds



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- 133 subjects chose X when $\lambda = 100$, 68 switched to $Y + Z$ at $\lambda = 95$, 7 switched to $Y + Z$ at $\lambda = 90$, 5 switched to $Y + Z$ at $\lambda = 85$, while 21 subjects chose X for all values of λ.

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- 49 subjects chose $Y + Z$ when $\lambda = 105$, 11 never chose X in the Urn rounds.
- 12 of these 49 subjects always chose the ambiguity-safe options in the game rounds – context-dependant ambiguity-attitude.

Games

(SC1)	Left	Middle	Right
Top	90 / 85	90 / 95	90 / 0
Centre	0 / 90	110 / 95	110 / 0
Bottom	5 / 105	105 / 95	105 / 110

(SC2)	Left	Middle	Right
Top	115 / 95	115 / 100	115 / 0
Centre	0 / 95	135 / 100	135 / 0
Bottom	5 / 105	105 / 100	105 / 135

(SS1)	Left	Middle	Right
Top	0 / 0	70 / 0	170 / 150
Centre	100 / 70	165 / 165	165 / 150
Bottom	150 / 170	150 / 165	150 / 150

(SS2)	Left	Middle	Right
Top	95 / 5	5 / 0	5 / 90
Centre	0 / 5	100 / 100	100 / 90
Bottom	90 / 95	90 / 100	90 / 90

- $(SC1)$ and $(SC2)$ are strategic complements game/positive externalities. Nash:(C, M). EUA:(T, M).
- $(SS1)$ is a strategic substitutes game/negative externalities. Nash:$(T, R), (C, M), (B, L)$. EUA:(B, R).
- $(SS2)$ is a strategic substitutes game/negative externalities. Nash:(C, M). EUA:(B, R).

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(SC2)	Left	Middle	Right
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Centre	0 / 95	135 / 100	135 / 0
Bottom	5 / 105	105 / 100	105 / 135

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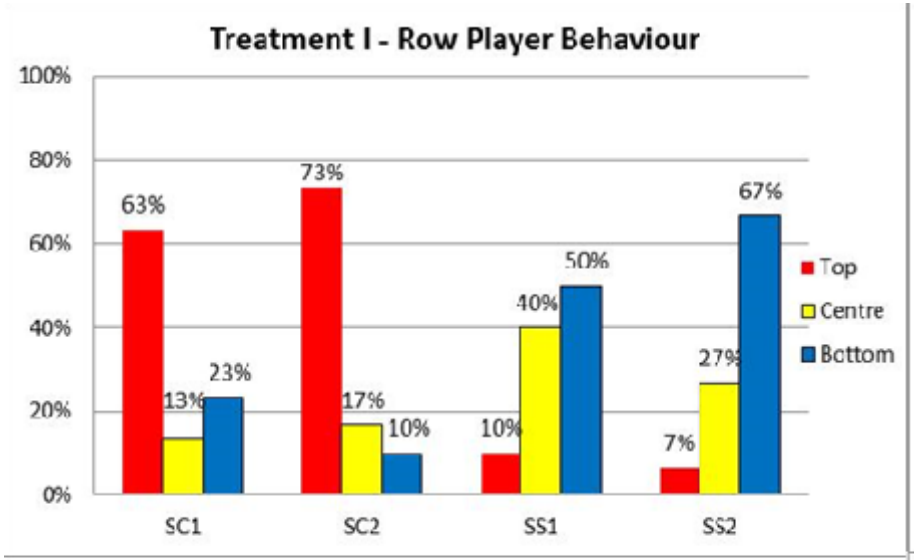
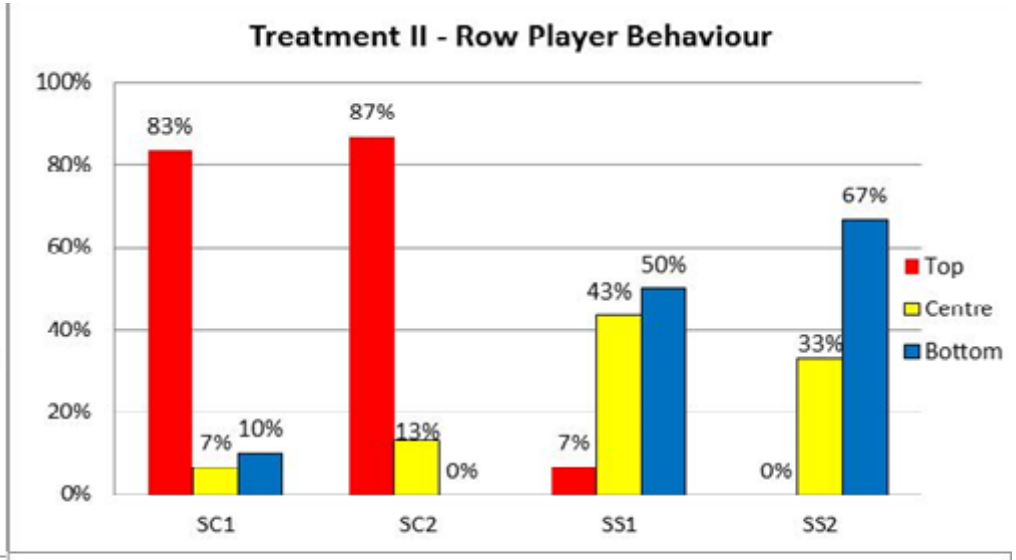
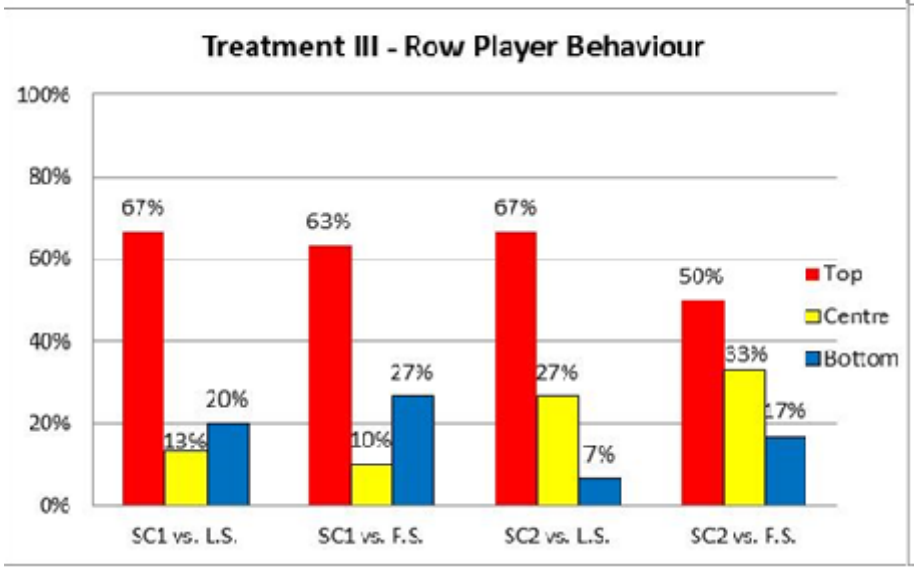
Centre	100 / 70	165 / 165	165 / 150
Bottom	150 / 170	150 / 165	150 / 150

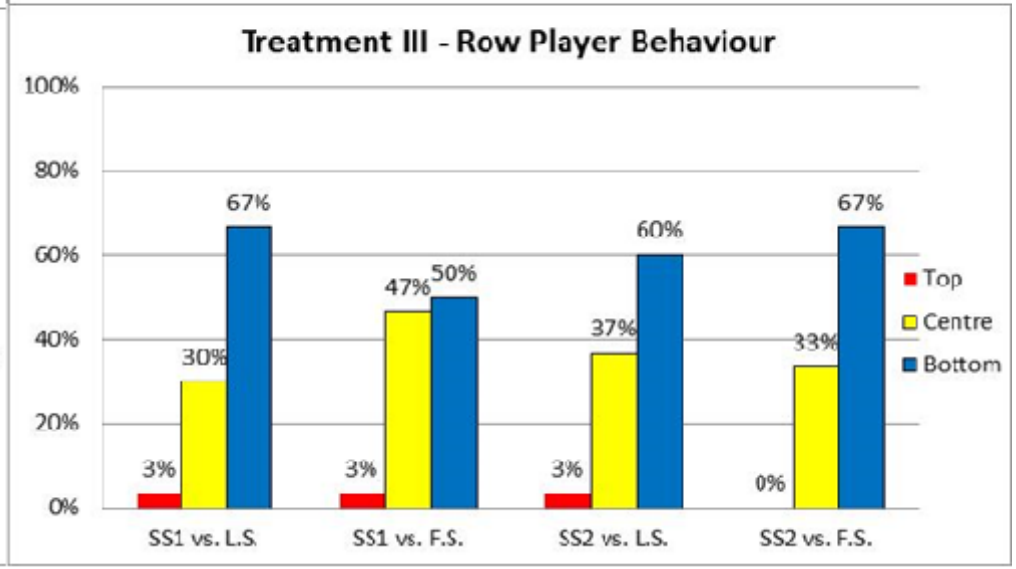
(SS2)	Left	Middle	Right
Top	95 / 5	5 / 0	5 / 90
Centre	0 / 5	100 / 100	100 / 90
Bottom	90 / 95	90 / 100	90 / 90

Row Player Behaviour in Treatments I, II and III

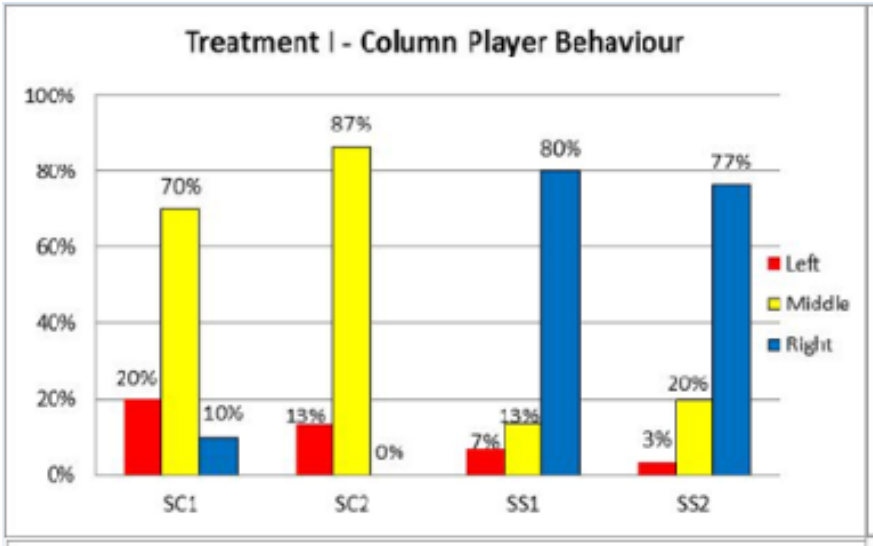


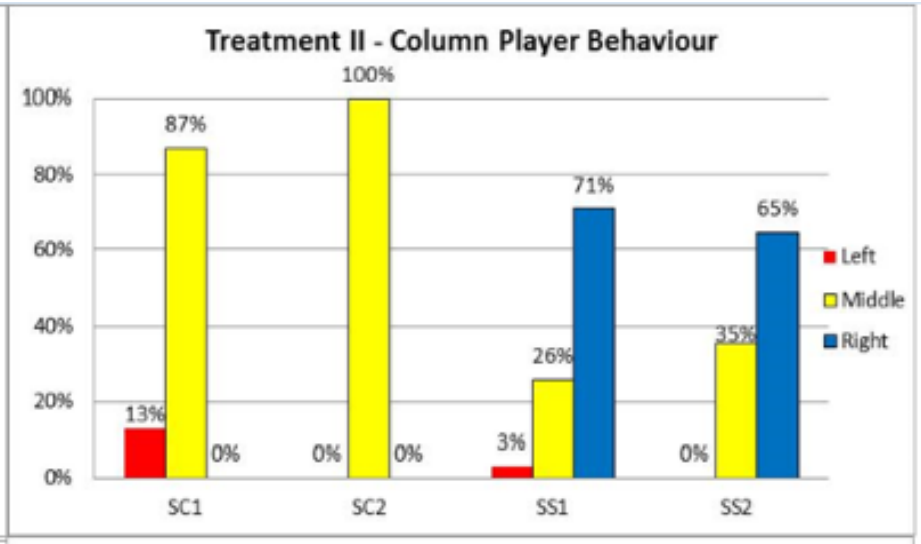


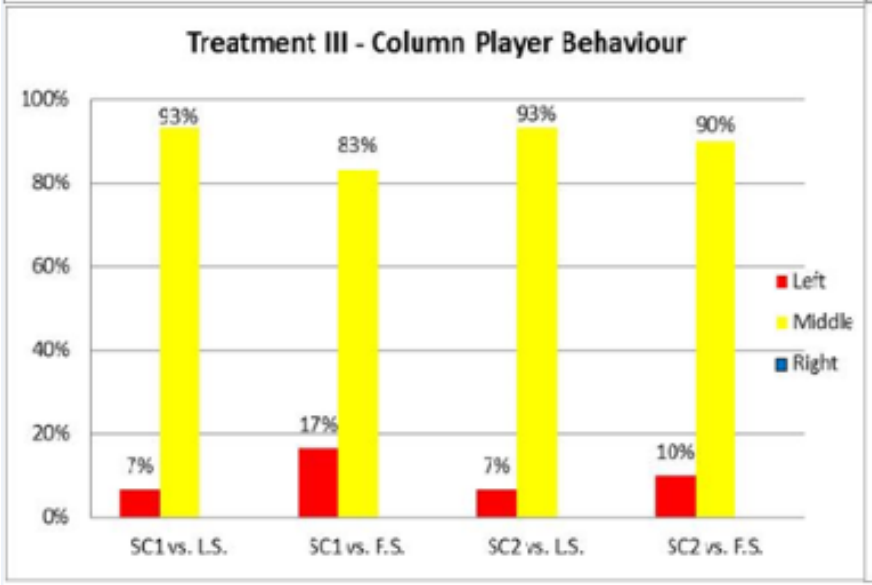


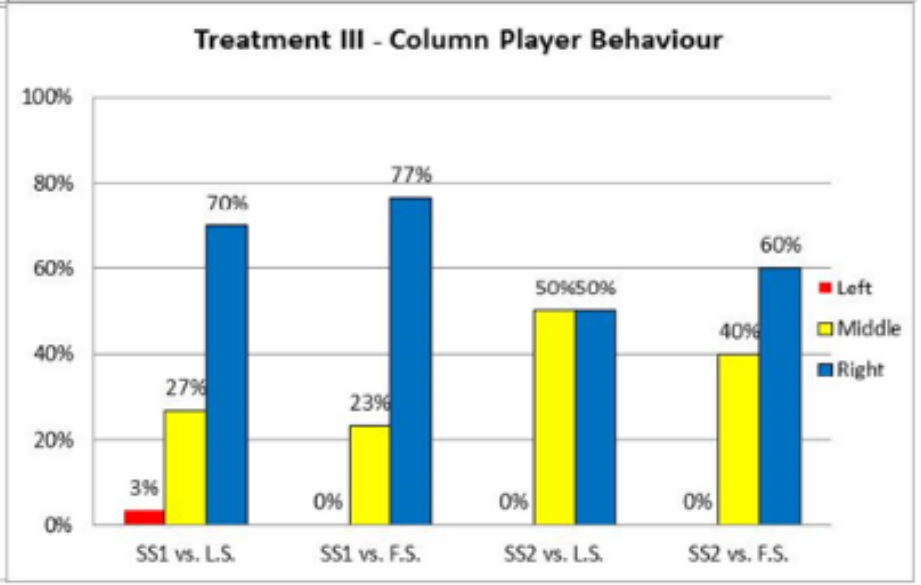


Column Player Behaviour - Treatments I, II and III









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- The ambiguity effect was stronger among subjects studying technical subjects such as mathematics or science.
- Behaviour in game $SS2$ supports our hypothesis that when faced by both foreign and local subjects simultaneously, the safe act would be taken more often against foreign subject.

Conclusions II

- Subjects' ambiguity attitudes appear to be context-dependant. They are more ambiguity-loving in single person decisions and more ambiguity-averse in games.
- In the Ellsberg Urn rounds, we find that for $\lambda = 105$ and $\lambda = 100$ subjects prefer to opt for X rather than Y or Z.
- Even small reductions in λ lead to subjects choosing Y or Z.
- When $\lambda = 95/90/85$, $Y + Z$ was chosen significantly more often than X. At the individual level, we found steep drops in the number of subjects choosing X, for every reduction in the value of λ.
- A very small subset of our subject pool (5%), showed strong ambiguity-averse behaviour always choosing the ambiguity-safe option in the game rounds and X in the Urn rounds, while 27% of our subjects showed mildly ambiguity-seeking behaviour by opting for $Y + Z$ when $\lambda = 105$.

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