New Zealand Agricultural & Resource Economics Society (Inc.)

Introducing and contrasting "revealed" ANA data collection approach vs "stated" and "inferred" approaches for choice experiments for NZ water valuation in irrigated dairy farms

Alex Kravchenko

University of Waikato, N.Z.

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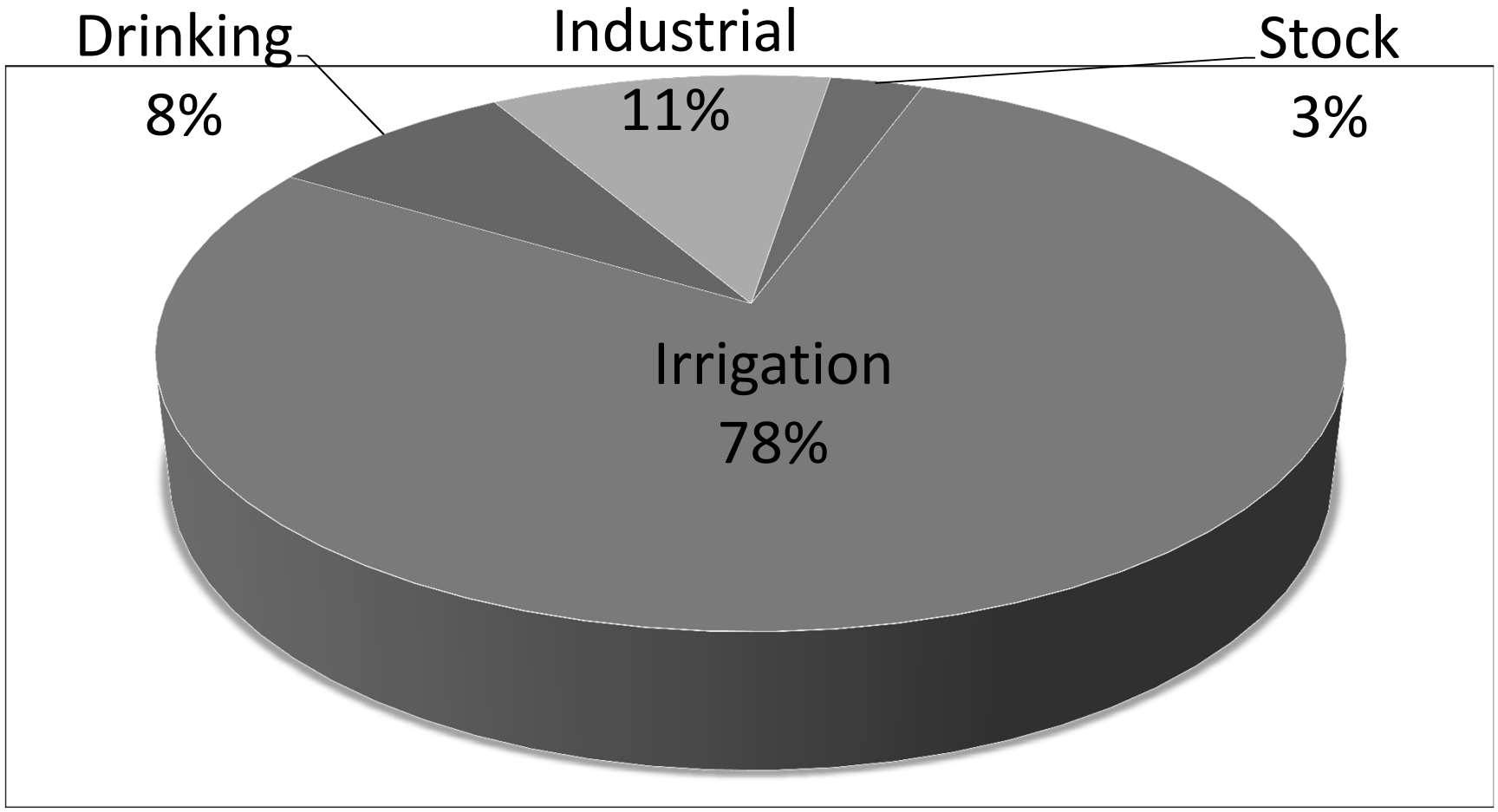
Main Water Users



Source: Aqualinc Research, 2010

The Problem[s]

- Further growth of irrigation is expected
- Many water catchments are fully allocated
- A “first-come-first-served” system
- Seasonality of availability

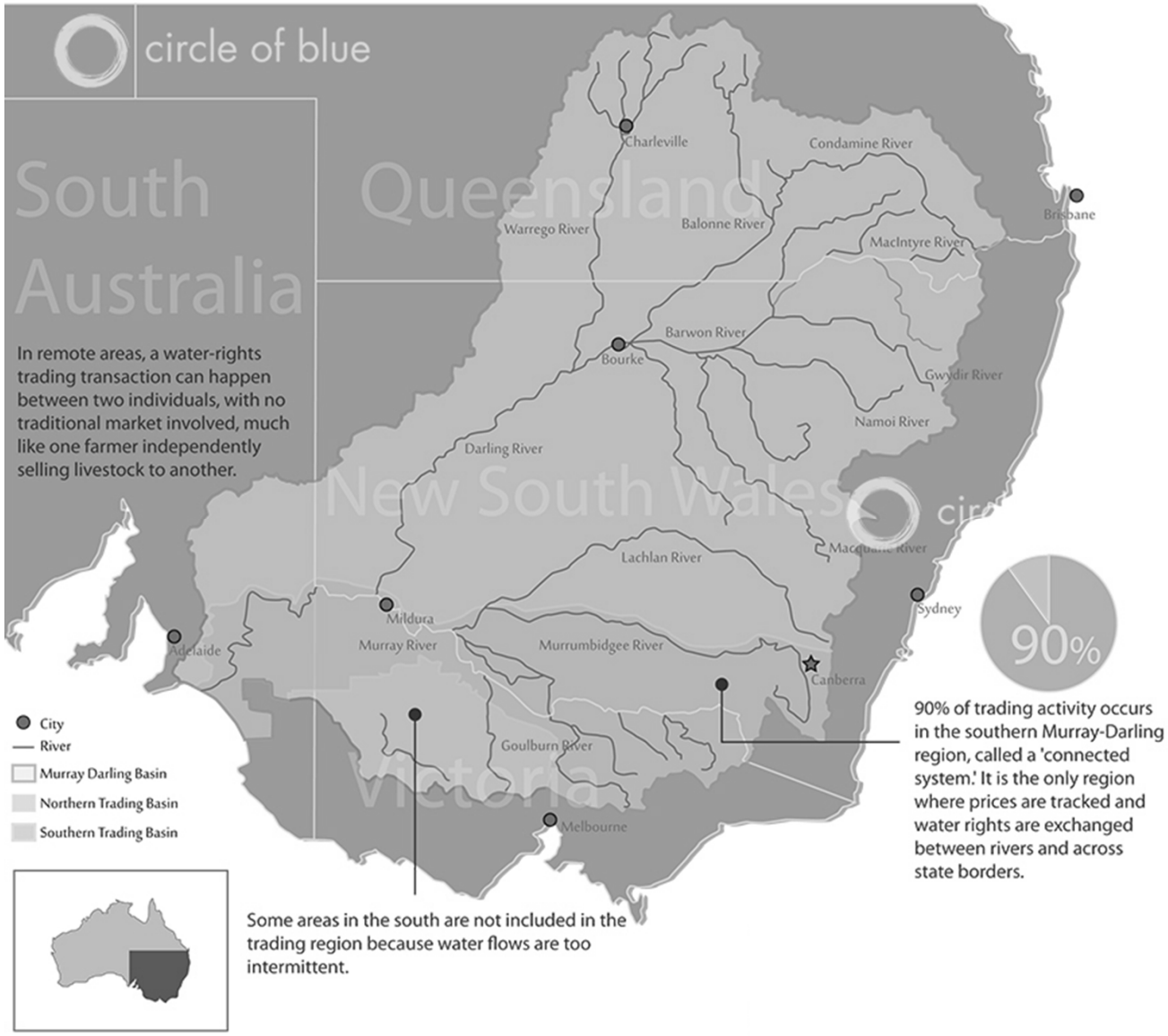
The Solution

Source: Huffington Post, 2009; **image credit**: Inspiration room, 2014

The Solution

Charge for water?

Trading water in Australia



Source: Circle of Blue, 2014

The Question

?

What will happen if water becomes priced[*]

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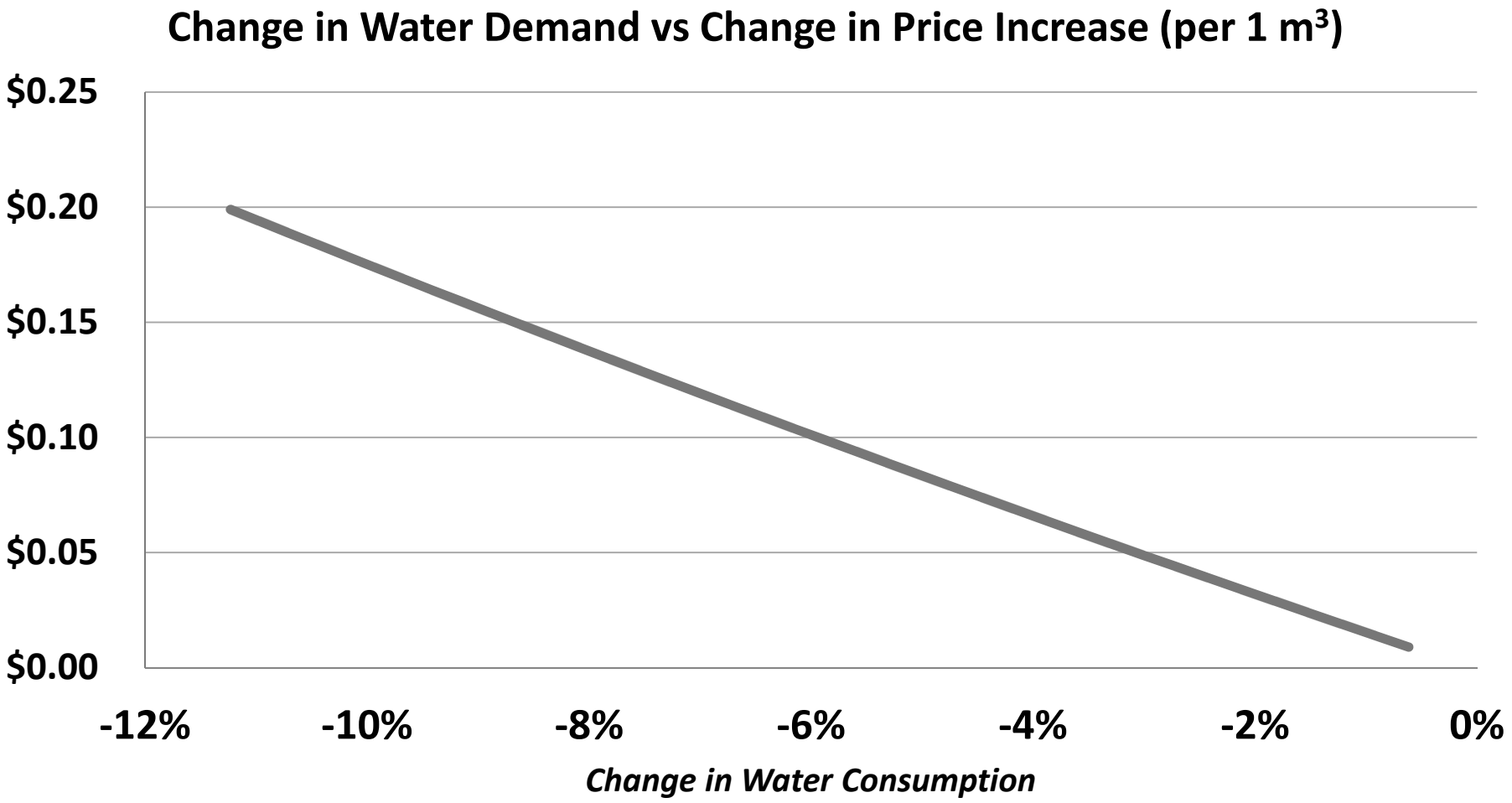
[*] *someone somewhere controls water rights*

First attempt



Kravchenko, A. (2014). Estimating an Average Dairy Farm's Demand for Water in New Zealand. In T. Bournaris, J. Berbel, B. Manos, & D. Viaggi, *Economics of Water Management in Agriculture* (pp. 297-318).

Ask the farmers?

- Use stated choice methodology
- Normally used to examine consumers' willingness to pay for some sort of improvements in the ***quality*** of water (*for examples see* Blamey, Gordon, & Chapman, 2002; Marsh & Baskaran, 2009; and Peters & Adamowicz, 1995; Young, 2005).
- Barton & Bergland (2010) conduct a choice experiment among farmers in Karnataka State, India.
- Rigby, Alcon, & Burton (2010) used CM methodology to reveal the marginal values of irrigation water in Campo de Cartagena, Spain.

Conducting a CE study

- Special thanks to
  - Waikato Regional Council
  - Hawke's Bays Regional Council
  - Otago Regional Council
- Ran a pilot in July – 40 complete responses, 80 partial that have full stated choice data

Solution to serial non-participation

- Full ban vignettes:

Imagine that...

- It is the month of **December**;
- Soil moisture deficit is **-20mm**;
- MetService forecasts a cumulative of **00mm** of rain over the next 10 days;
- Drought **has** been officially declared by the MPI.

Your regional council is enacting a full ban on water withdrawal until further notice. You have the option to choose an easing on the restriction, but at a cost.

Please consider the following hypothetical scenario. Imagine that...

Choice Card 1 of 8

- It is the month of **September**;
- Soil moisture deficit is **-20mm**;
- MetService forecasts a cumulative of **60mm** of rain over the next 10 days;
- Drought **has not** been officially declared by the MPI.

Your regional council is enacting a full ban on water withdrawal until further notice. You have the option to choose an easing on the restriction, but at a cost. Please choose the most desirable option for your farm:

	Alternative 1	Alternative 2	Alternative 3	Current condition	Alternative 4
Flow Limit	75%	50%	50%	Full ban	100%
Volume Limit	50%	100%	100%	Full ban	100%
Can to buy water	yes	yes	no	no	no
Can sell water	yes	no	no	no	yes
Zero intake days	5 days	5 days	10 days	N/A	10 days
Contract Duration	1 month	2 months	2 months	N/A	1 month
Price per 1 m^3	$0.05	$0.01	$0.02	free	$0.10
	Choose this	Choose this	Choose this	Choose this	Choose this

Combined Results – multinomial logit

	Estimate	Std.Error	t-value	Pr(>|t|)	
volrestrict	0.07	0.04	1.81	0.07	.
flowrestrict	0.15	0.04	4.04	0.00	***
zerointake	-0.04	0.01	-3.51	0.00	***
dur	-0.13	0.05	-2.56	0.01	*
buywater	0.28	0.09	3.12	0.00	**
sellwater	-0.09	0.09	-0.99	0.32	
cost	-3.99	0.88	-4.52	0.00	***

Please consider the following hypothetical scenario. Imagine that...

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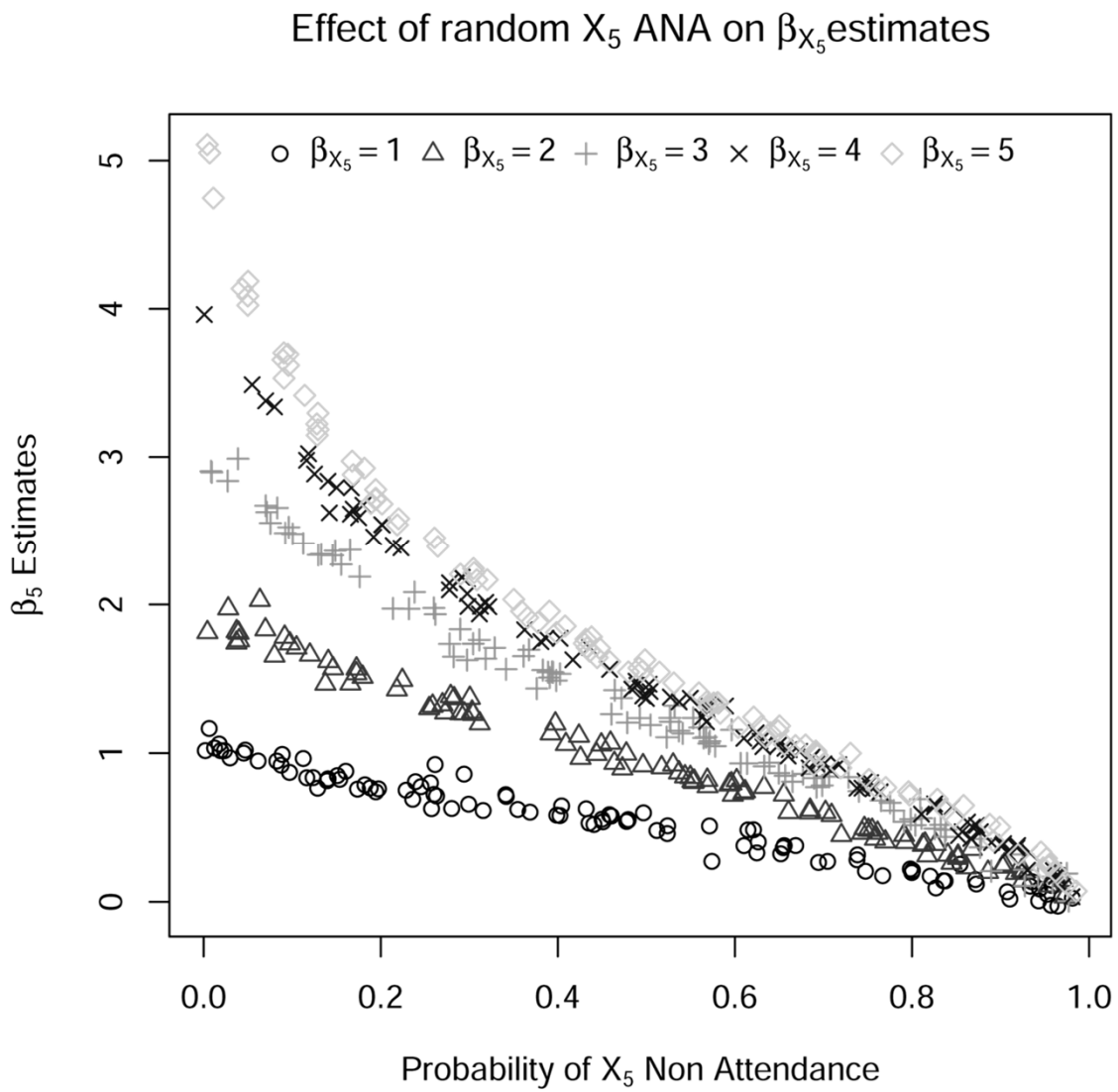
Effects of Attribute Non Attendance (ANA)



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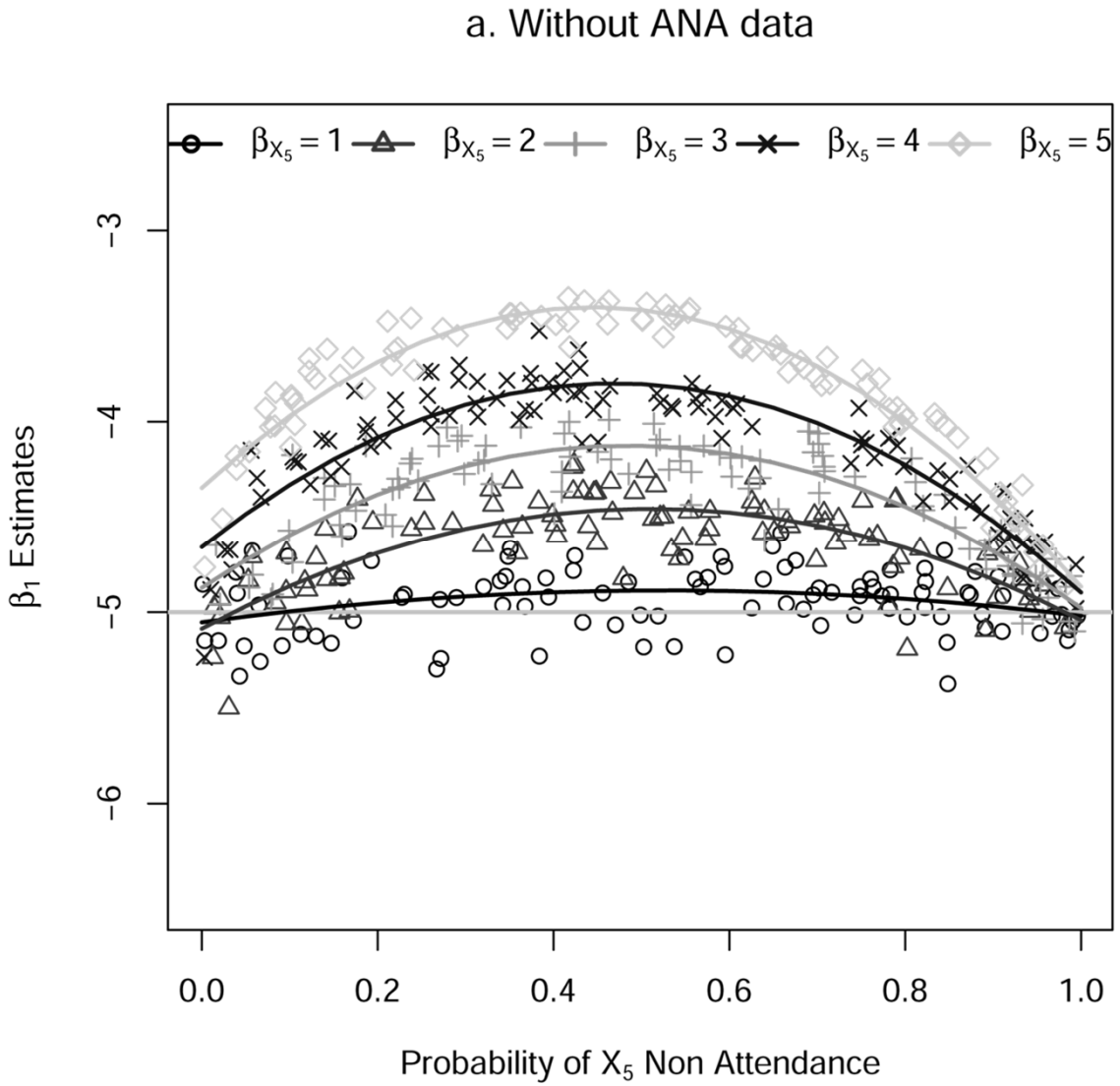
Effects of Attribute Non Attendance (ANA)



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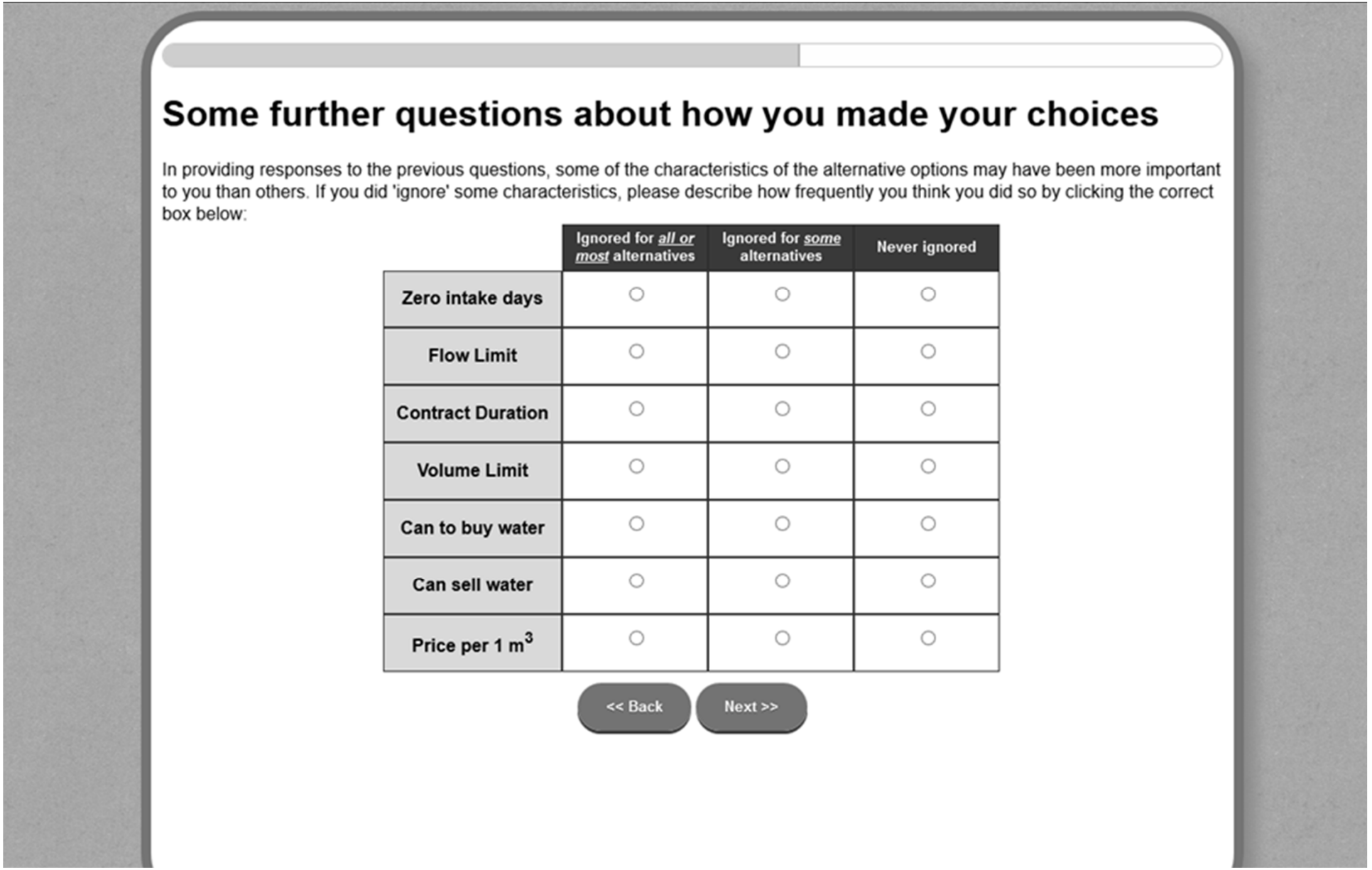
Current methods of dealing with ANA

- Inferred ANA
  - Latent class models
- Stated ANA
  - Serial ANA
  - Choice task ANA

Stated Serial ANA condition



Some further questions about how you made your choices

In providing responses to the previous questions, some of the characteristics of the alternative options may have been more important to you than others. If you did 'ignore' some characteristics, please describe how frequently you think you did so by clicking the correct box below:

	Ignored for *all or most* alternatives	Ignored for *some* alternatives	Never ignored
Zero intake days	○	○	○
Flow Limit	○	○	○
Contract Duration	○	○	○
Volume Limit	○	○	○
Can to buy water	○	○	○
Can sell water	○	○	○
Price per 1 m^3	○	○	○

<< Back Next >>

Choice Task ANA condition

Please consider the following hypothetical scenario. Imagine that...

Choice Card 1 of 8

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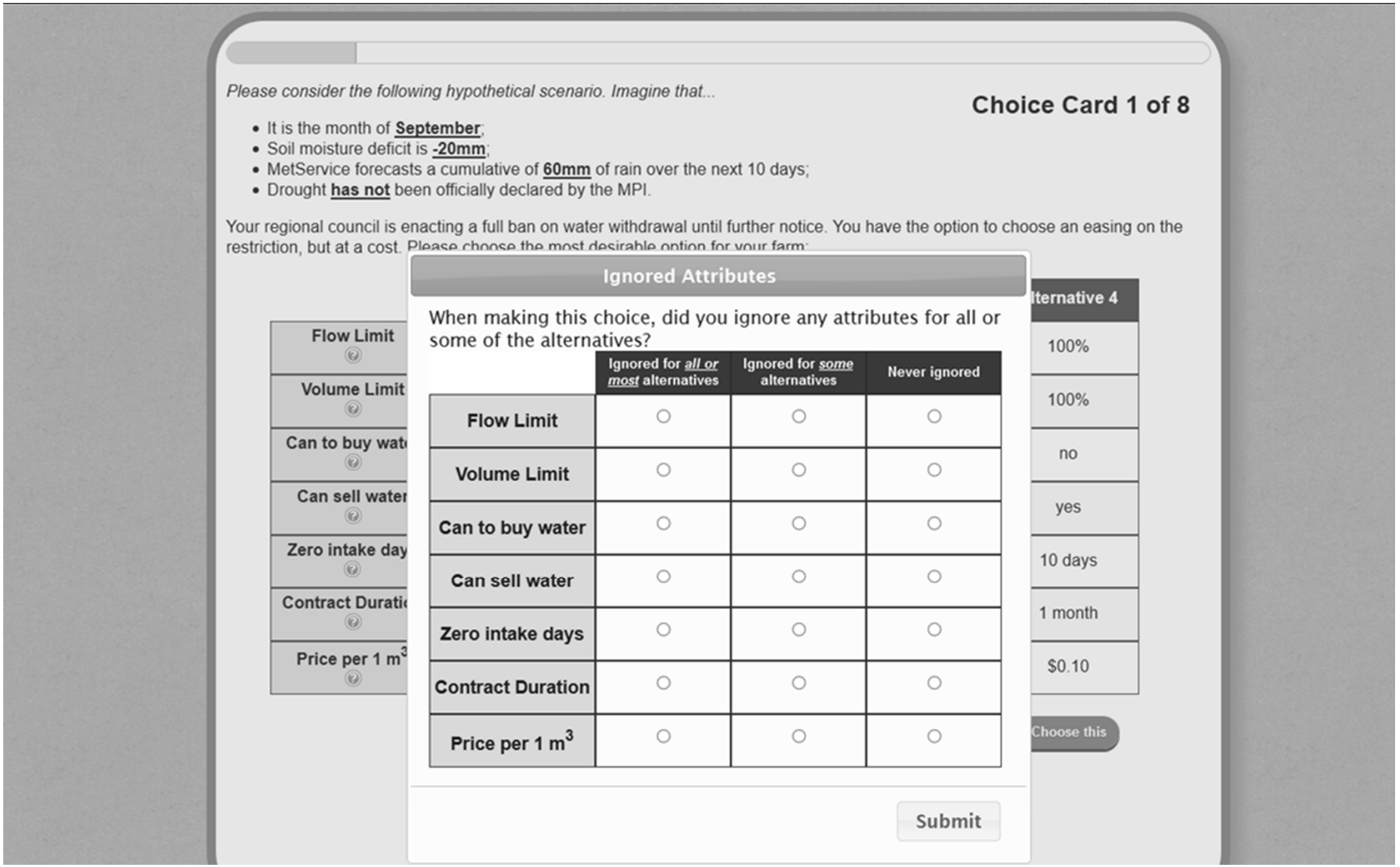
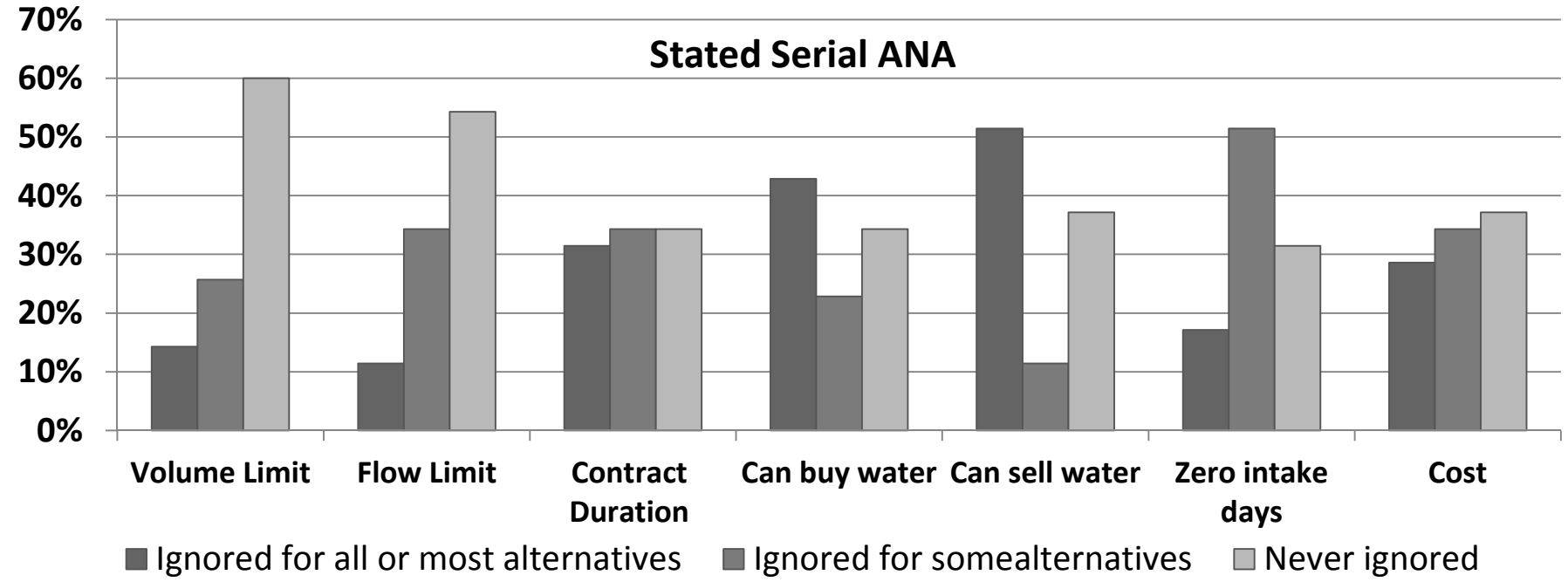
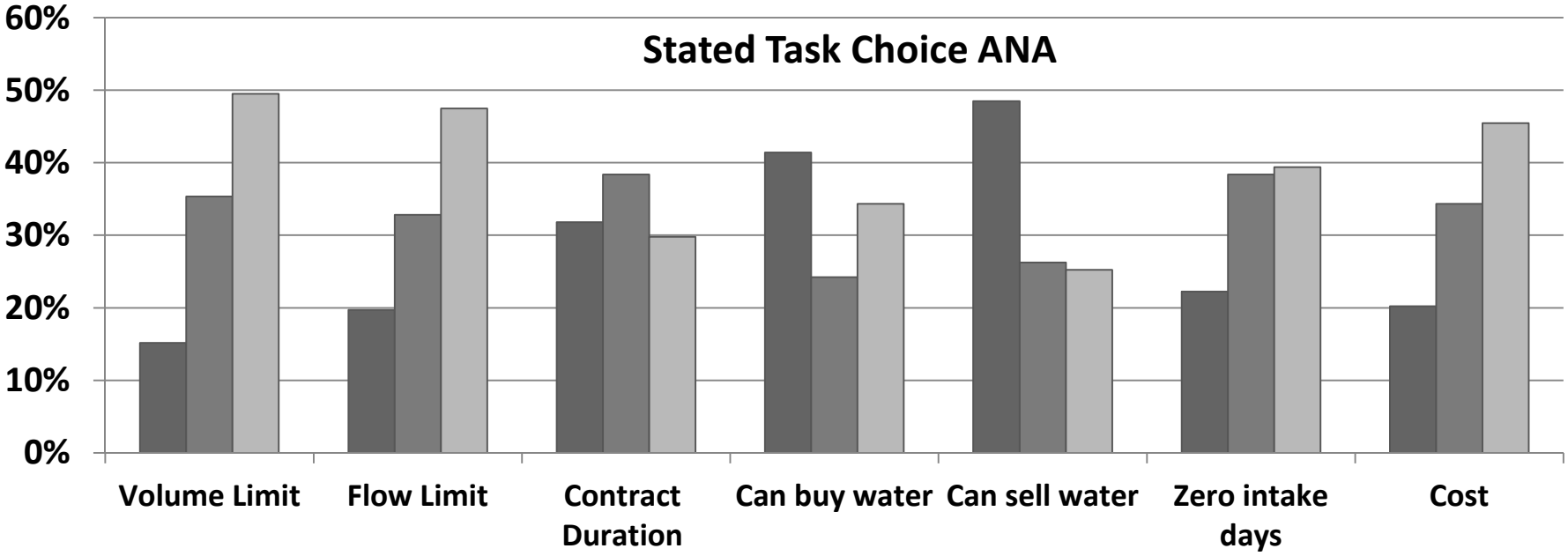
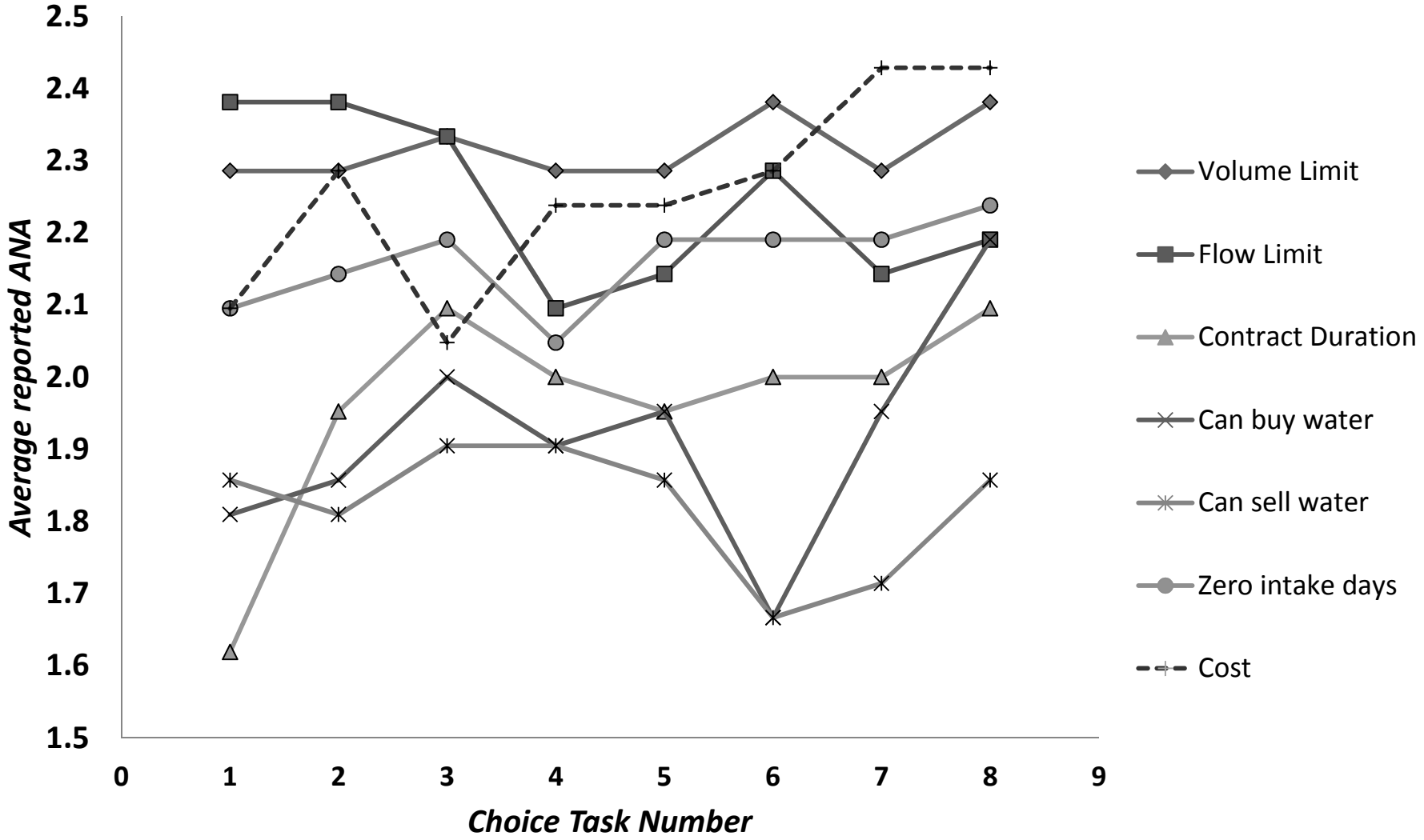
Choice task ANA condition




Stated Serial ANA
70%
60%
50%
40%
30%
20%
10%
0%
Volume Limit
Flow Limit
Contract Duration
Can buy water
Can sell water
Zero intake days
Cost
Ignored for all or most alternatives
Ignored for somealternatives
Never ignored

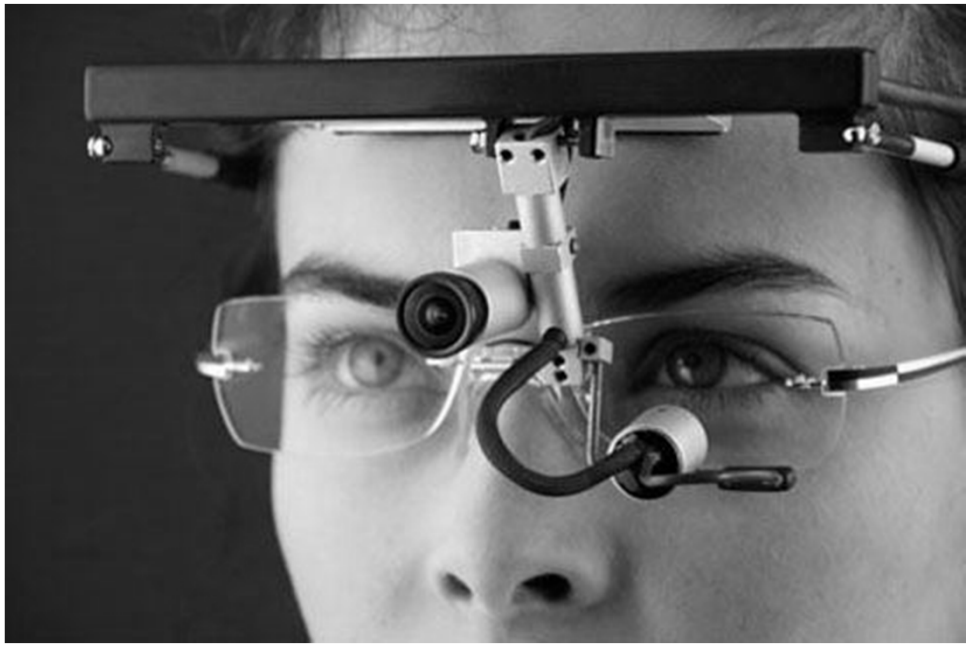

Stated Task Choice ANA
60%
50%
40%
30%
20%
10%
0%
Volume Limit
Flow Limit
Contract Duration
Can buy water
Can sell water
Zero intake days
Cost

Stated Task Choice ANA

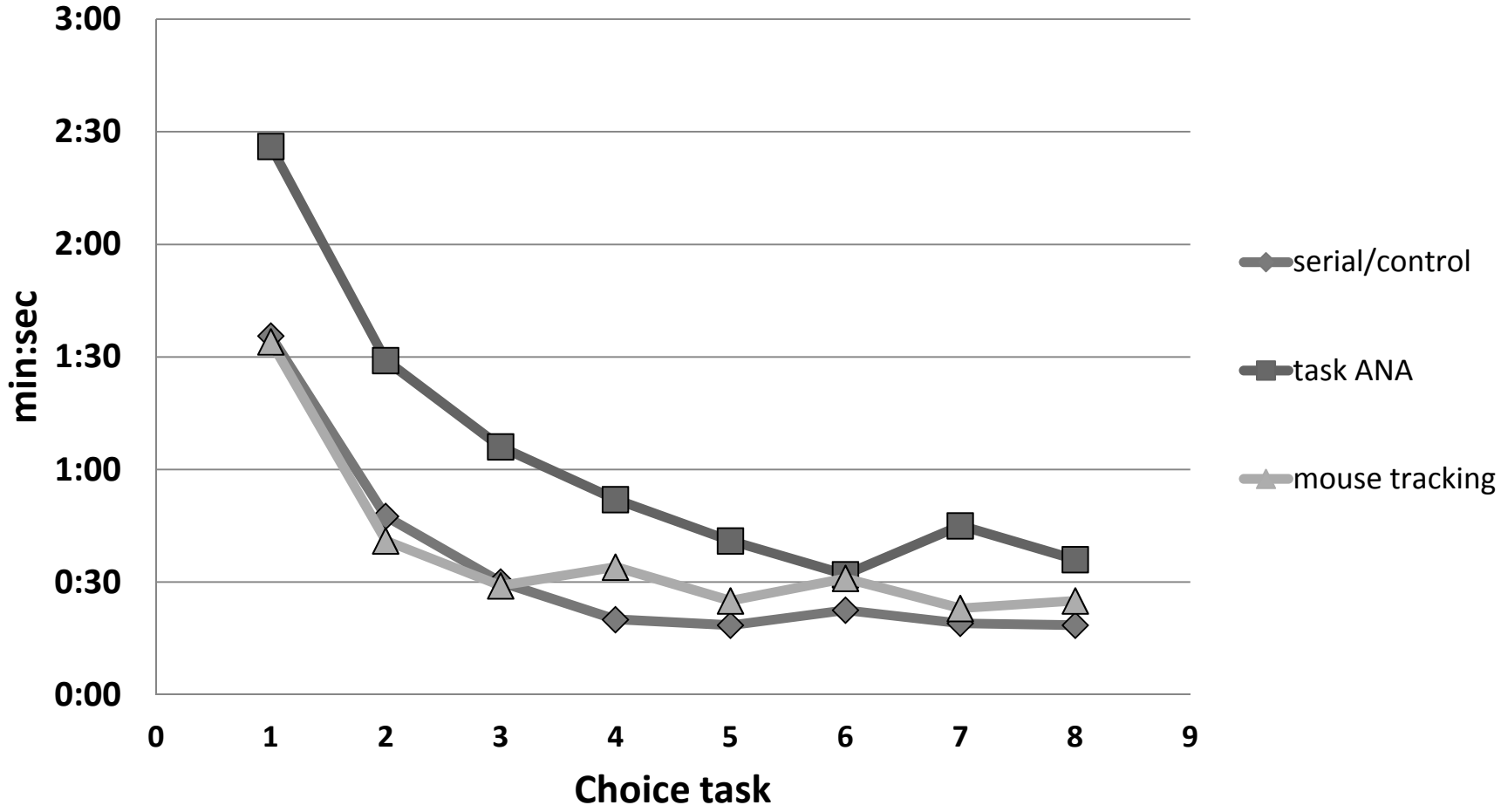


Third Condition

- Revealed ANA



Median time spent by ANA tracking type on each choice task



Attrition – last question index

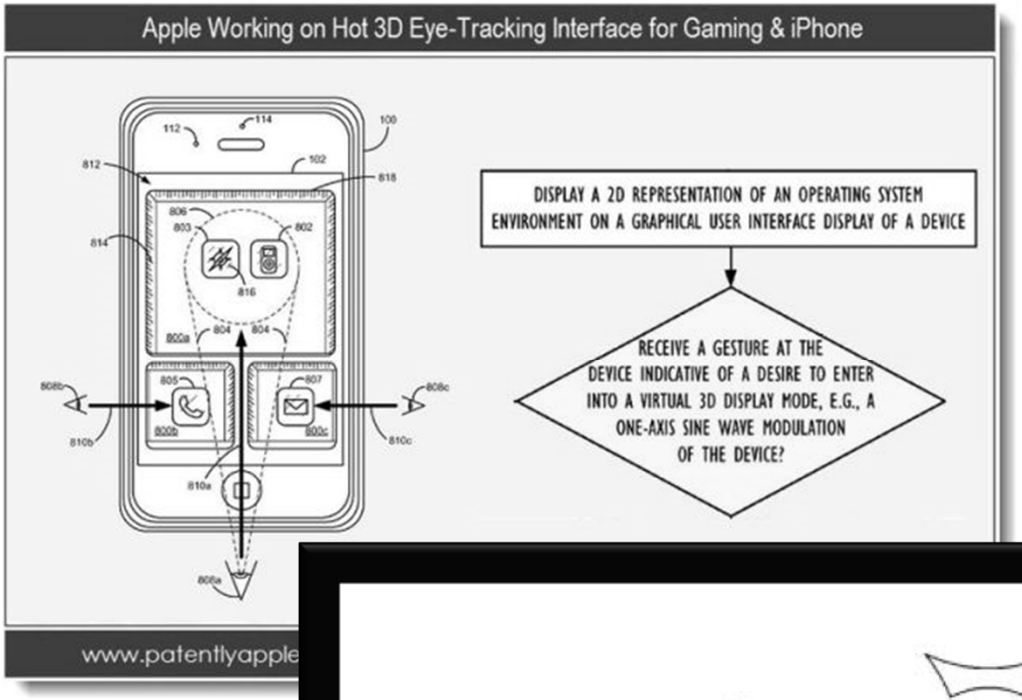
	Intro	Q 1	Q 2	Q3	Q 4	Q 5	Q6	Q7	Q8	Total Drop outs	Completion Rate
Serial ANA	18	8	2	185	1	0	0	0	41	30	42%
Choice task ANA	23	10	3	1	0	2	1	0	23	40	63%
Revealed ANA	25	6	0	2	0	0	0	0	21	33	61%
Total	*66*	*24*	*5*	*4*	*1*	*2*	*1*	*0*	*85*	*103*	

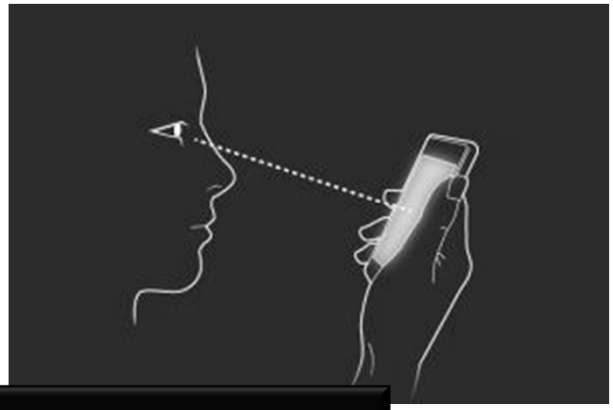
Revealed ANA data – randomization is a must!

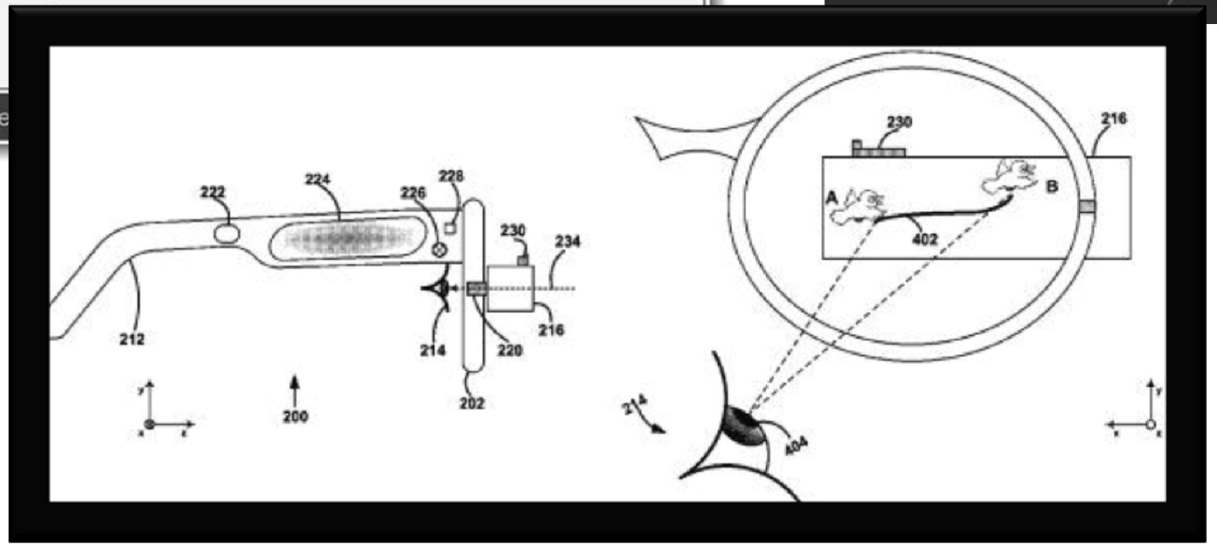
COUNT (>200ms)

Vertical Position	Horizontal Position 1	2	3	4	5
1	310	299	275	233	170
2	271	247	218	189	139
3	196	195	174	167	124
4	175	186	185	175	127
5	171	190	154	147	100
6	175	184	149	144	96
7	159	169	160	126	94

The future… is almost now…







Conclusion

- Preliminary analysis based on the pilot survey results
- Suggests there is scope for water pricing
- Out of 553 completed choice tasks
  - only 148 opted for status quo (free/full ban)
  - 85 would pay as much as $\$0.15/m^3$
- ANA data has the potential to provides useful insights