EPSRC
Engineering and Physical Sciences Research Council

The Care Life Cycle CLC

UNIVERSITY OF Southampton

The Risky Business of Asking for Help

An ABM of Unmet Need in Older Adults

Jonathan Gray, Jakub Bijak and Seth Bullock

Department of Social Statistics and Demography
University of Southampton, UK

BSPS 2015

Leeds, 7th of September, 2015

Outline

1. Motivation
2. Conjecture
3. Data & Model
4. Results

Motivation

~25% of over 65s need help washing or dressing

~47.5% of that 25% actually get help
(Vlachantoni et al, 2011)

Motivation

~25% of over 65s need help washing or dressing

~47.5% of that 25% actually get help
(Vlachantoni et al, 2011)

What's up with that?

Motivation

~25% of over 65s need help washing or dressing

~47.5% of that 25% actually get help
(Vlachantoni et al, 2011)

What's up with that??

Conjecture

Not everybody *asks* for help, because asking feels risky.

Conjecture

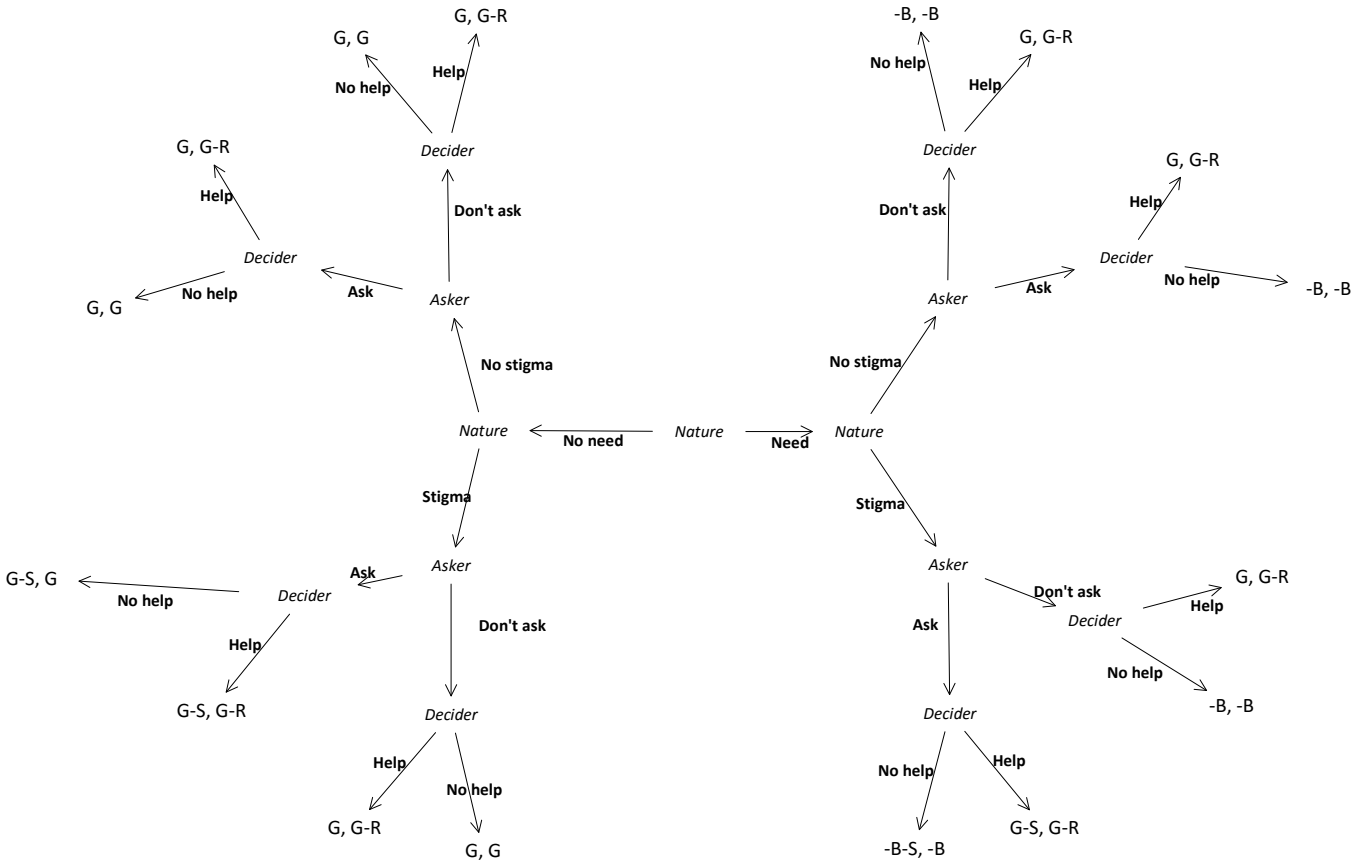
Not everybody *asks* for help, because asking feels risky.

People's decisions are based on risk.

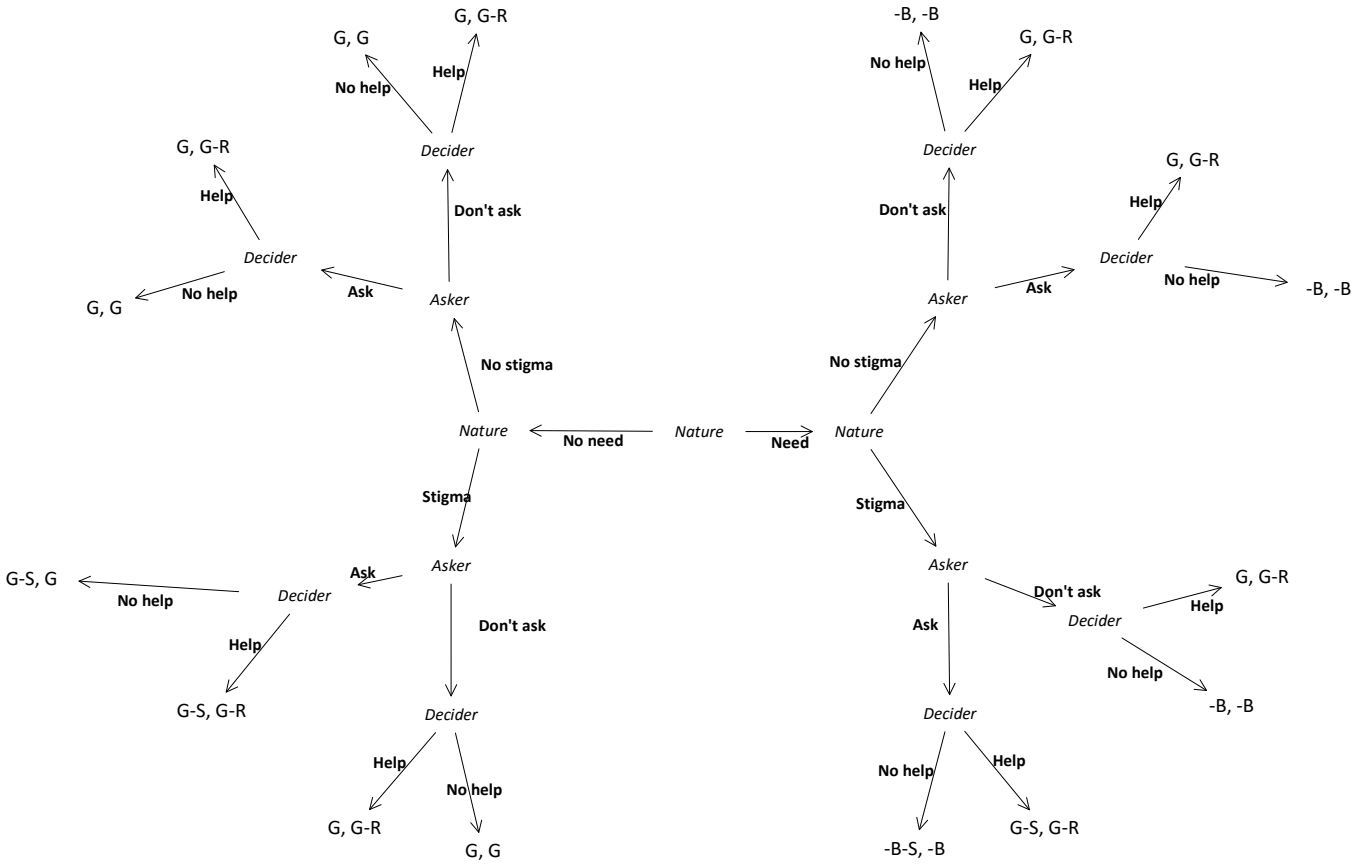
Testing the Conjecture

- Need a few things to test that:
  - A formal representation of our conjectured process
  - A synthetic population to test it in
  - Synthetic psychologies for that population
  - Something to test against

A Process


Nature
No need
Nature
Need
Nature
No stigma
Stigma
Asker
Don't ask
Ask
Decider
Help
No help
G, G-R
G, G
Decider
Help
No help
G, G-R
G, G
Decider
Help
No help
G, G-R
-B, -B
Asker
Don't ask
Ask
Decider
Help
No help
G, G-R
-B, -B
Asker
Ask
Don't ask
Decider
Help
No help
G-S, G
G-S, G-R
Decider
Help
No help
G, G-R
G, G
Decider
Help
No help
-B, -B
-B-S, -B
Decider
Help
No help
G, G-R
G-S, G-R

A Process


Nature
No need
Nature
Need
Nature
No stigma
Stigma
Asker
Don't ask
Ask
Decider
Help
No help
G, G-R
G, G
Decider
Help
No help
G, G-R
G, G
Decider
Help
No help
G, G-R
-B, -B
Asker
Don't ask
Ask
Decider
Help
No help
G, G-R
-B, -B
Asker
Ask
Don't ask
Decider
Help
No help
G-S, G
G-S, G-R
Decider
Help
No help
G, G-R
G, G
Decider
Help
No help
-B, -B
-B-S, -B
Decider
Help
No help
G, G-R
G-S, G-R

Synthetic Psychology

- Using learning decision rule agents – actions are based on costs/payoffs & beliefs
- Two kinds of learning
  - Experiential
  - Social
- Two kinds of belief
  - What kind of player is the other guy?
  - What will the other player do next?
- Use opinion surveys to generate distributions of these beliefs

Signaller Psychology

- Is the decider going to make me feel bad if I ask for help?
  - ESS 2008
  - Latent trait analysis on 8 likert type items
  - Fitted a logistic distribution to the underlying trait
- Will I get help?
  - EuroBarometer 67.3 asks exactly that
  - Multinomial distribution over definitely, yes, etc.

Decider Psychology

- Should I believe what this guy is saying?
  - ESS 2008 again
  - Latent trait on 3 likert type items
  - Fitted a normal distribution

Decision Rules

Briefly..

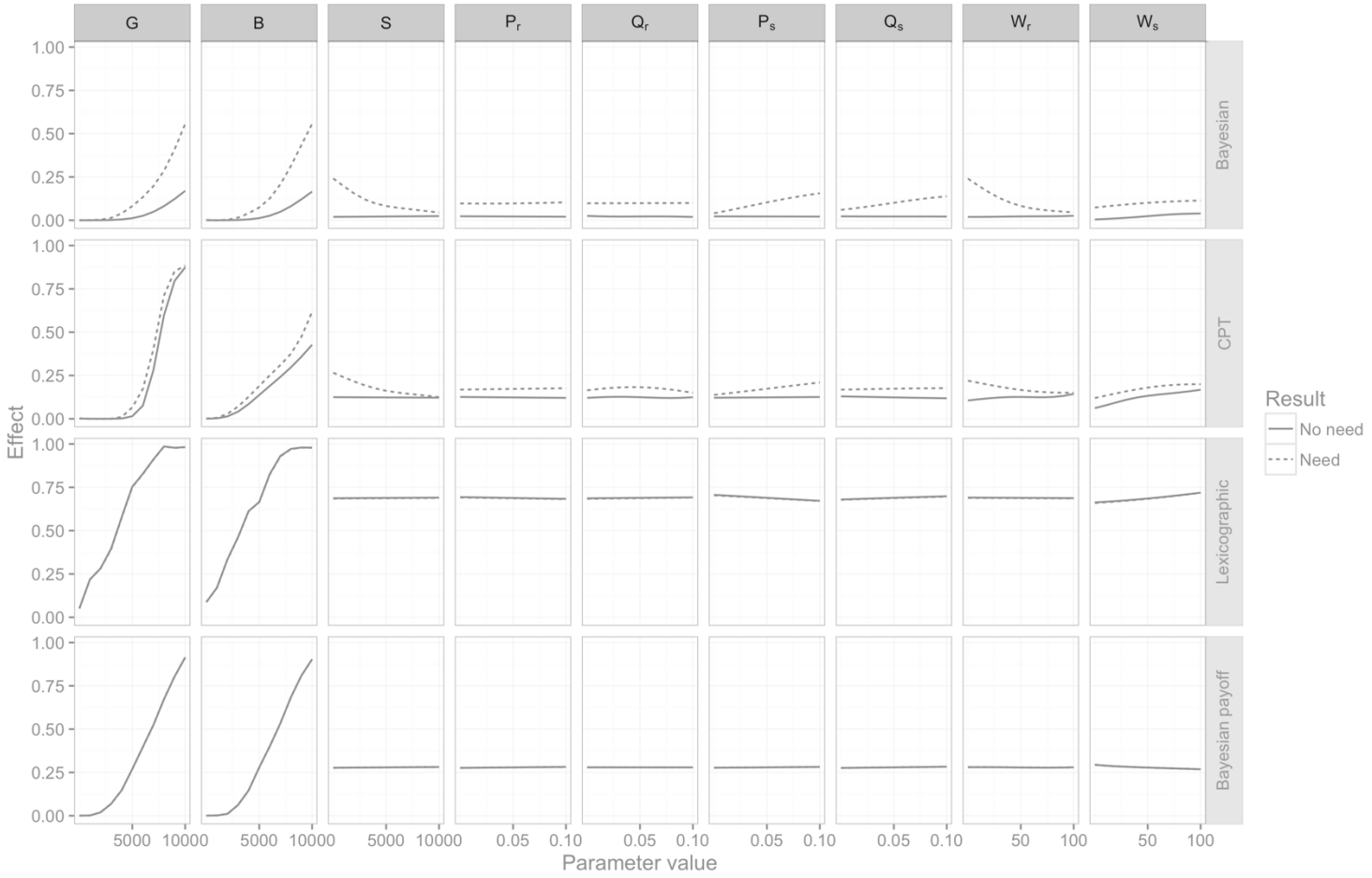
Four rules:

Model free	Model based
Lexicographic	Bayesian
Bayesian	Cumulative Prospect

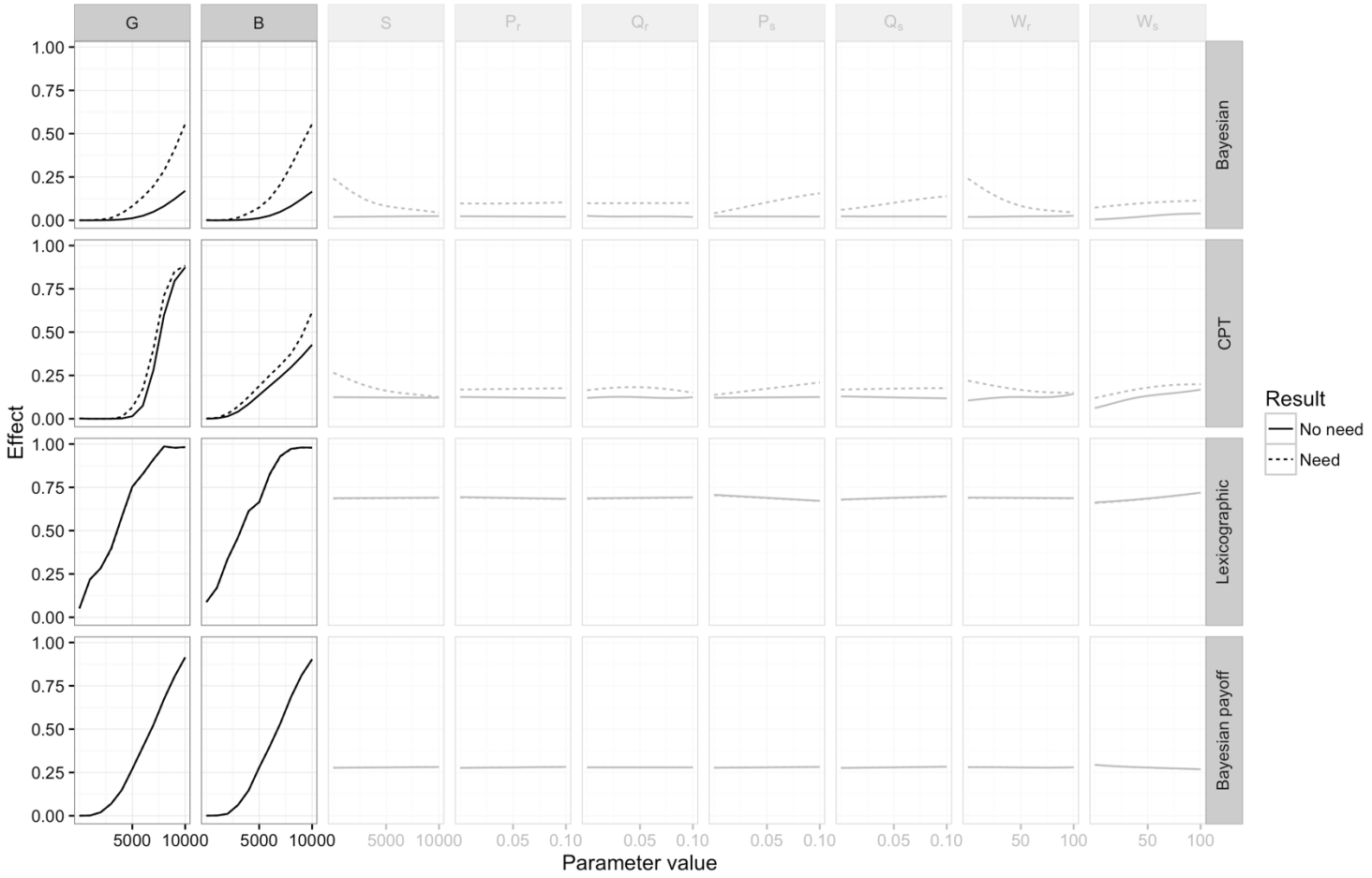
Model

- Draw populations
- Have them play the game
- Beliefs based on social surveys
- Cost for giving help as the mean LA cost of providing care for 1 year, in 2008 (£7881)
- Quite a few free parameters..
  - Payoffs, learning, magnitude of beliefs, decision models
- Build a statistical emulator of the simulation
  - Look at sensitivity
  - Use to fit the model

Sensitivity



Sensitivity

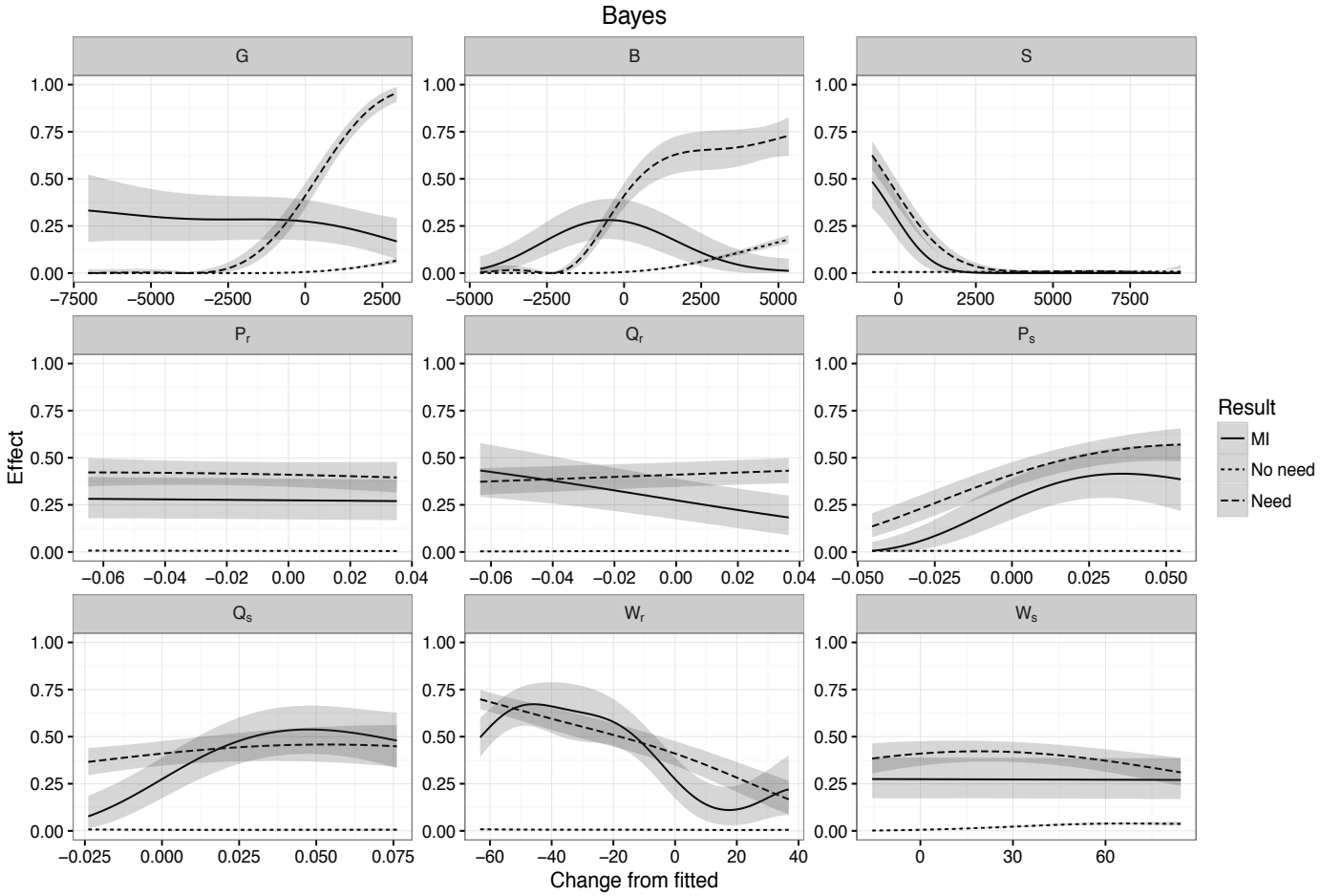


Fitting

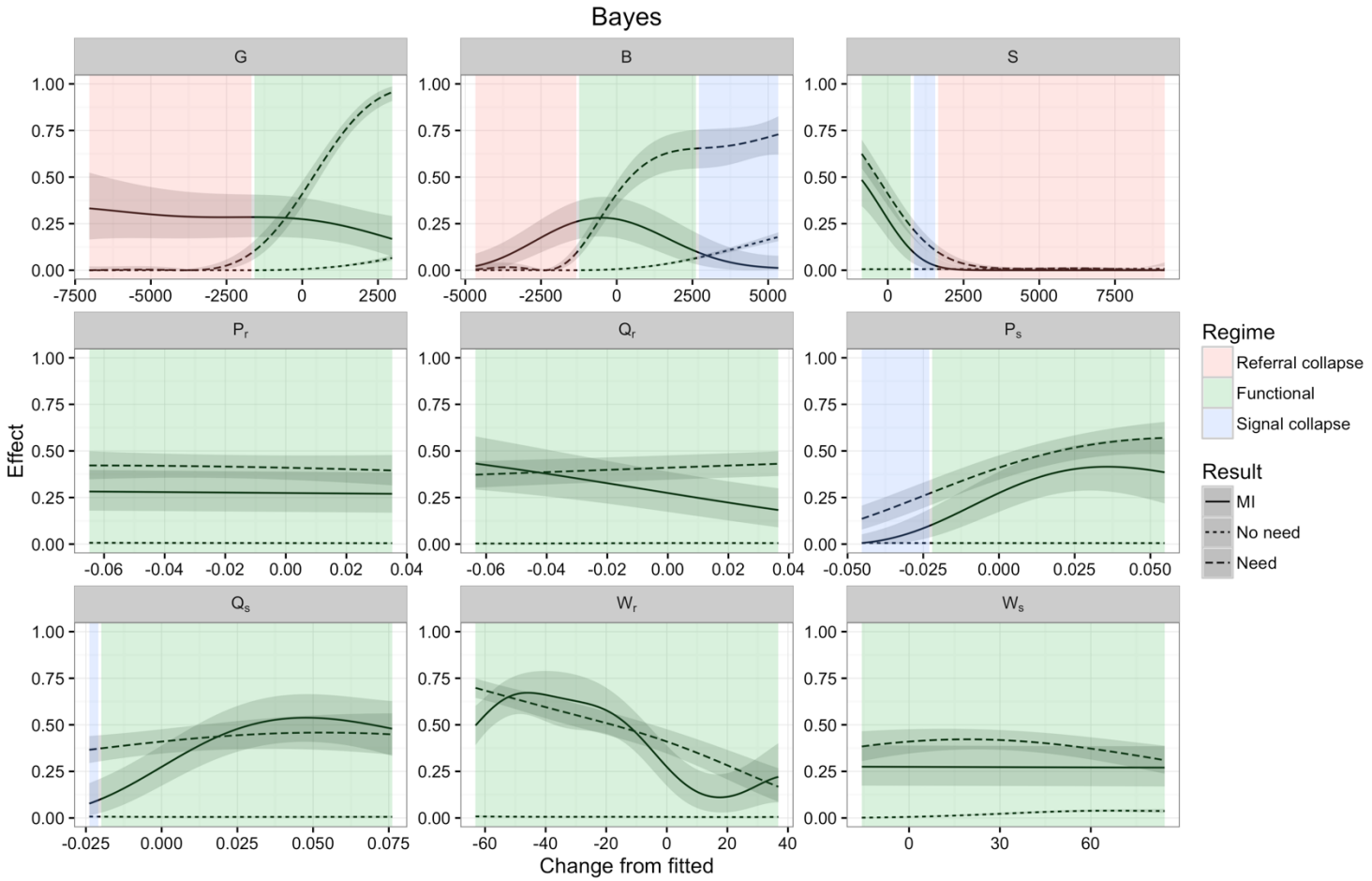
- Can’t fit the heuristics!
  - Need more than cardinality
  - Need a mental model

	G	B	S	P_r	Q_r	P_s	Q_s	W_r	W_s	H_h	N_h
Bayes	7032	4662	860	0.06	0.06	0.05	0.02	63	16	45%	0.1%
CPT	4886	6978	3500	0.09	0.02	0.07	0.06	18	28	44%	0.1%

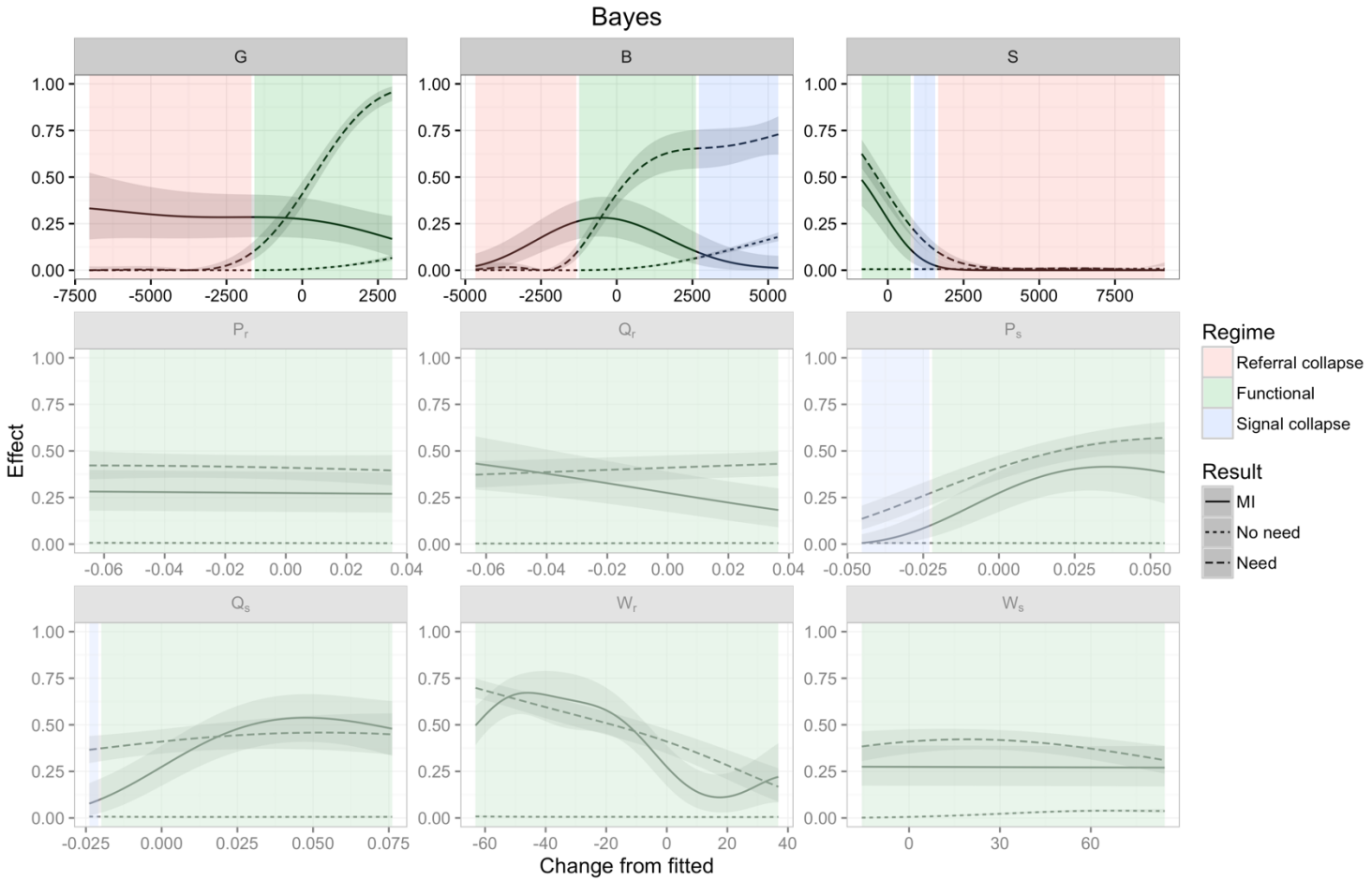
Interventions



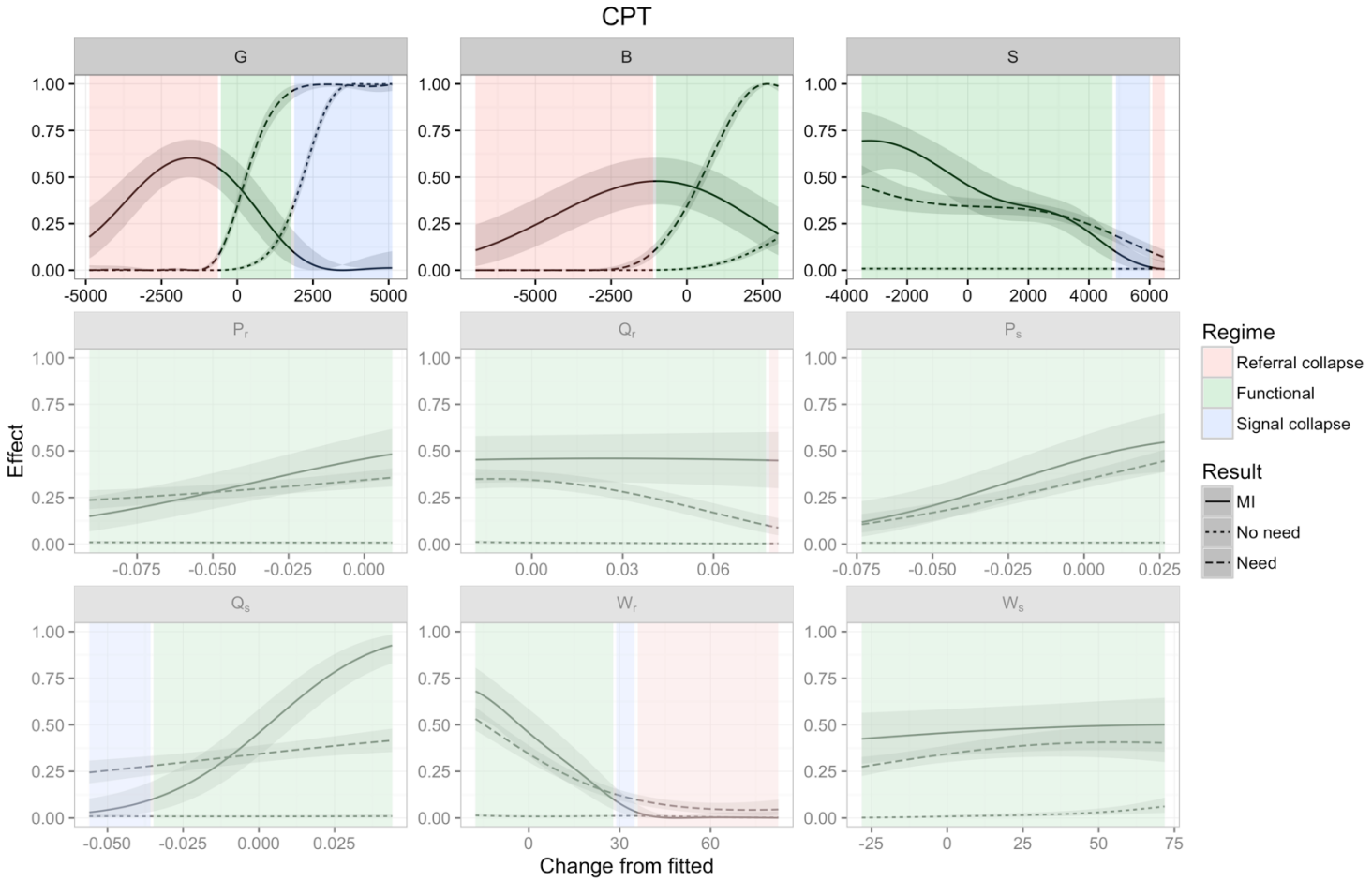
Interventions



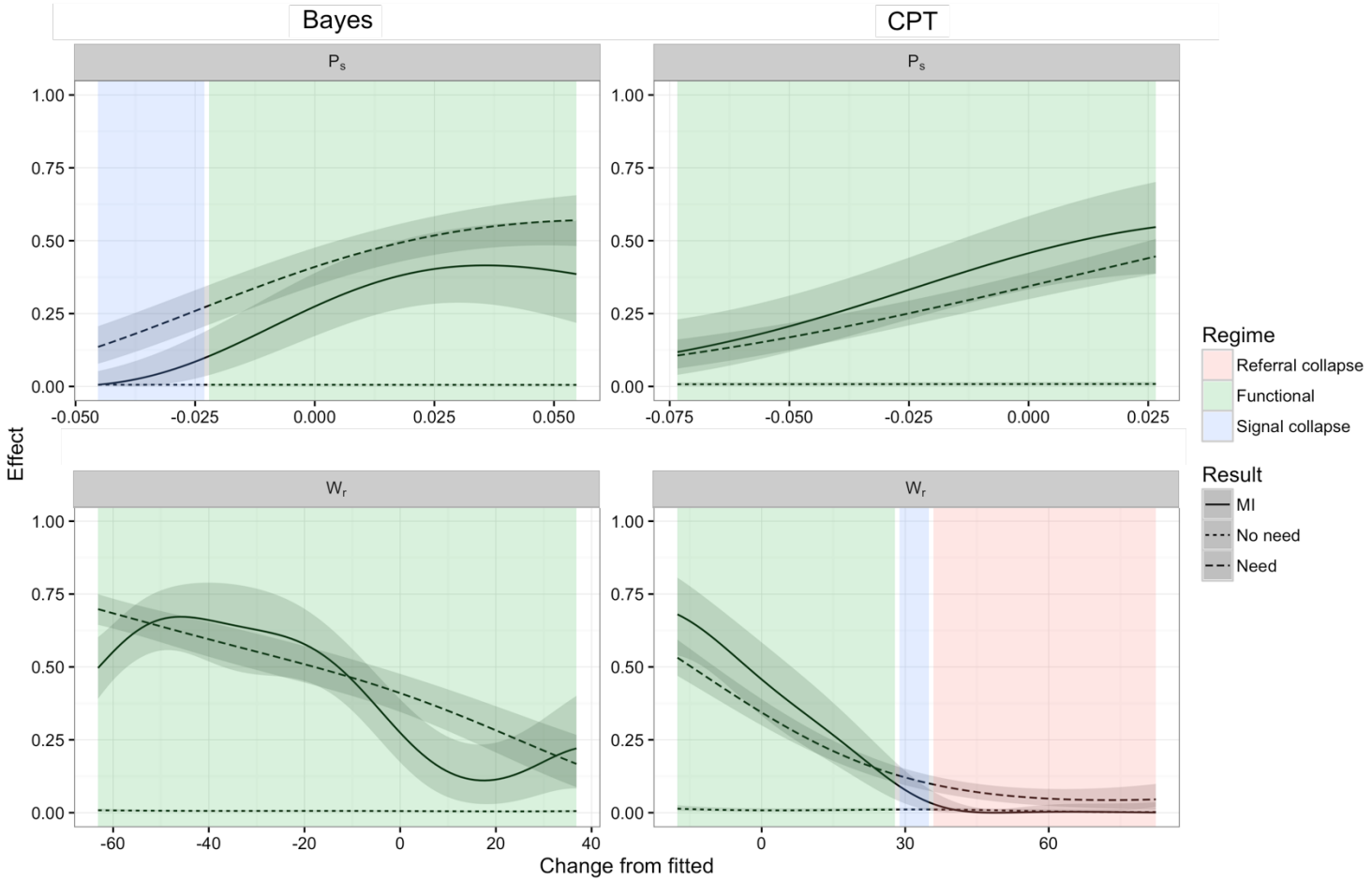
Interventions



Interventions



Commonalities



Take Away

- Not the complete data generating process, but can't reject outright
- Simple heuristics are insufficient
- Biggest impact on referrals is from payoffs…
- But! Better to target
  - Information sharing
  - Prior beliefs

References

Vlachantoni, A., Shaw, R., Willis, R., Evandrou, M., Falkingham, J., & Luff, R. (2011). Measuring unmet need for social care amongst older people. Population Trends, (145), 56–72.

European Social Survey Round 4 Data (2008). Data file edition 4.3. Norwegian Social Science Data Services, Norway – Data Archive and distributor of ESS data.

European Commission (2012): Eurobarometer 67.3 (May-Jun 2007). TNS OPINION & SOCIAL, Brussels [Producer]. GESIS Data Archive, Cologne. ZA4561 Data file Version 2.1.0

Marmot, M. et al. , *English Longitudinal Study of Ageing: Wave 0 (1998, 1999 and 2001) and Waves 1-5 (2002-2011)* [computer file]. *17th Edition.* Colchester, Essex: UK Data Archive [distributor], December 2012. SN: 5050.

Personal Social Services Expenditure and Unit Costs England, 2008-09, HSCIC (2010)

EPSRC
Engineering and Physical Sciences Research Council

The Care CLC Life Cycle

UNIVERSITY OF Southampton

Thank you!

Jonathan Gray

j.gray@soton.ac.uk

@lime_ape

https://github.com/greenape/risky-aging-model

EPSRC grant EP/H021698/1 *Care Life Cycle,* EPSRC Doctoral Training Centre grant EP/G03690X/1, and IRIDIS High Performance Computing Facility are gratefully acknowledged.