

The Risky Business of Asking for Help

An ABM of Unmet Need in Older Adults

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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)

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Conjecture

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

Conjecture

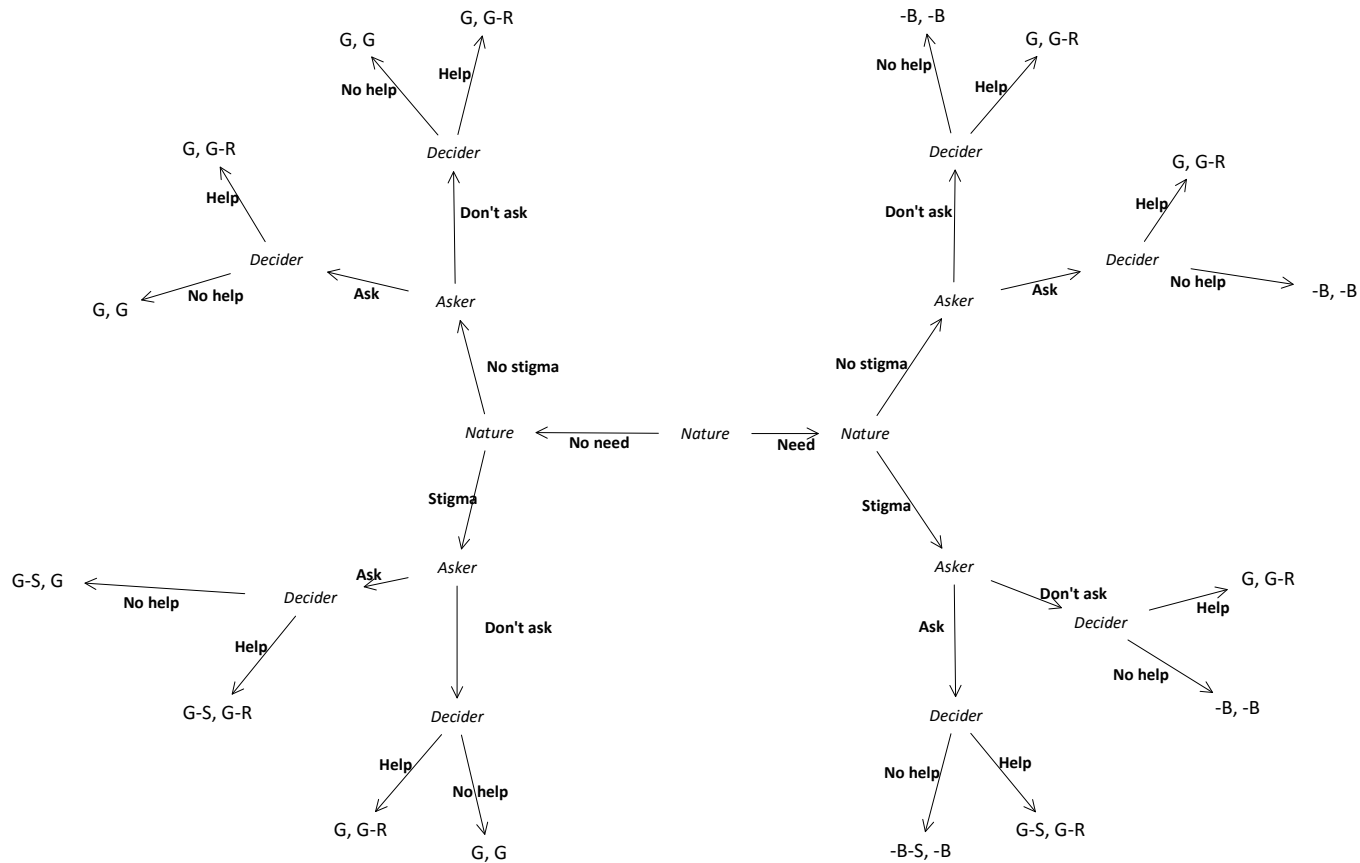
Not everybody *asks* for help,
because asking feels risky.

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



The figure consists of two extensive form game trees, labeled 'No stigma' and 'Stigma', which are connected by a horizontal line representing the state of Nature.

No stigma game:

- Nature** starts at the root, choosing between **No need** and **Need**.
- If **No need**, the game ends with payoffs **G, G**.
- If **Need**, the **Asker** moves and chooses between **Ask** and **Don't ask**.
 - If **Ask**, the **Decider** moves and chooses between **Help** and **No help**.
 - Help** leads to **G, G-R**.
 - No help** leads to **G, G**.
 - If **Don't ask**, the game ends with payoffs **G, G**.

Stigma game:

- Nature** starts at the root, choosing between **No stigma** and **Stigma**.
- If **No stigma**, the game follows the same structure as the 'No stigma' game.
- If **Stigma**, the **Asker** moves and chooses between **Ask** and **Don't ask**.
 - If **Ask**, the **Decider** moves and chooses between **Help** and **No help**.
 - Help** leads to **G, G-R**.
 - No help** leads to **G, G**.
 - If **Don't ask**, the **Decider** moves and chooses between **Help** and **No help**.
 - Help** leads to **G, G-R**.
 - No help** leads to **-B, -B**.

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.
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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..

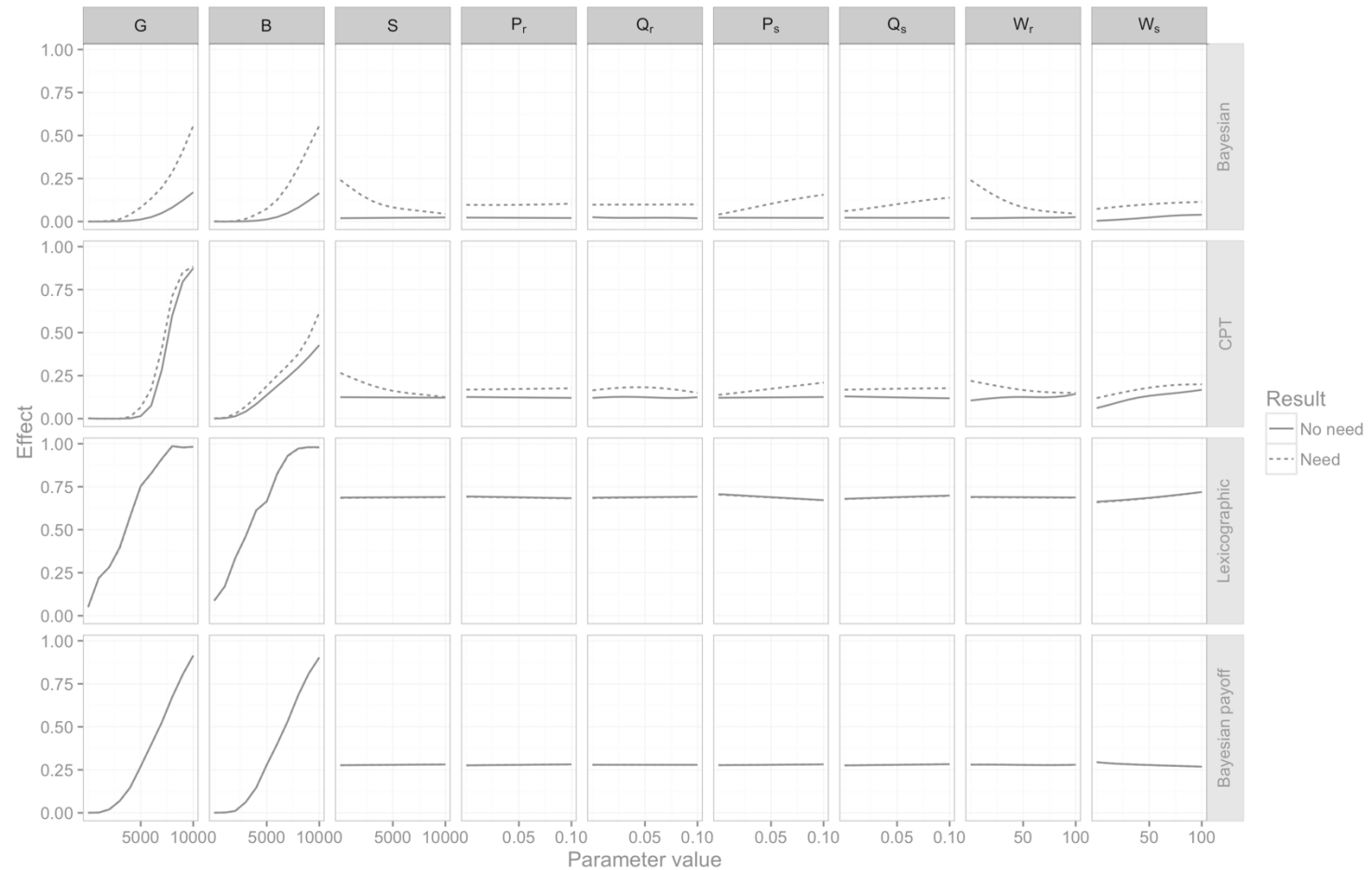
Four rules:

Model free	Model based
Lexicographic	Bayesian
Bayesian	Cumulative Prospect

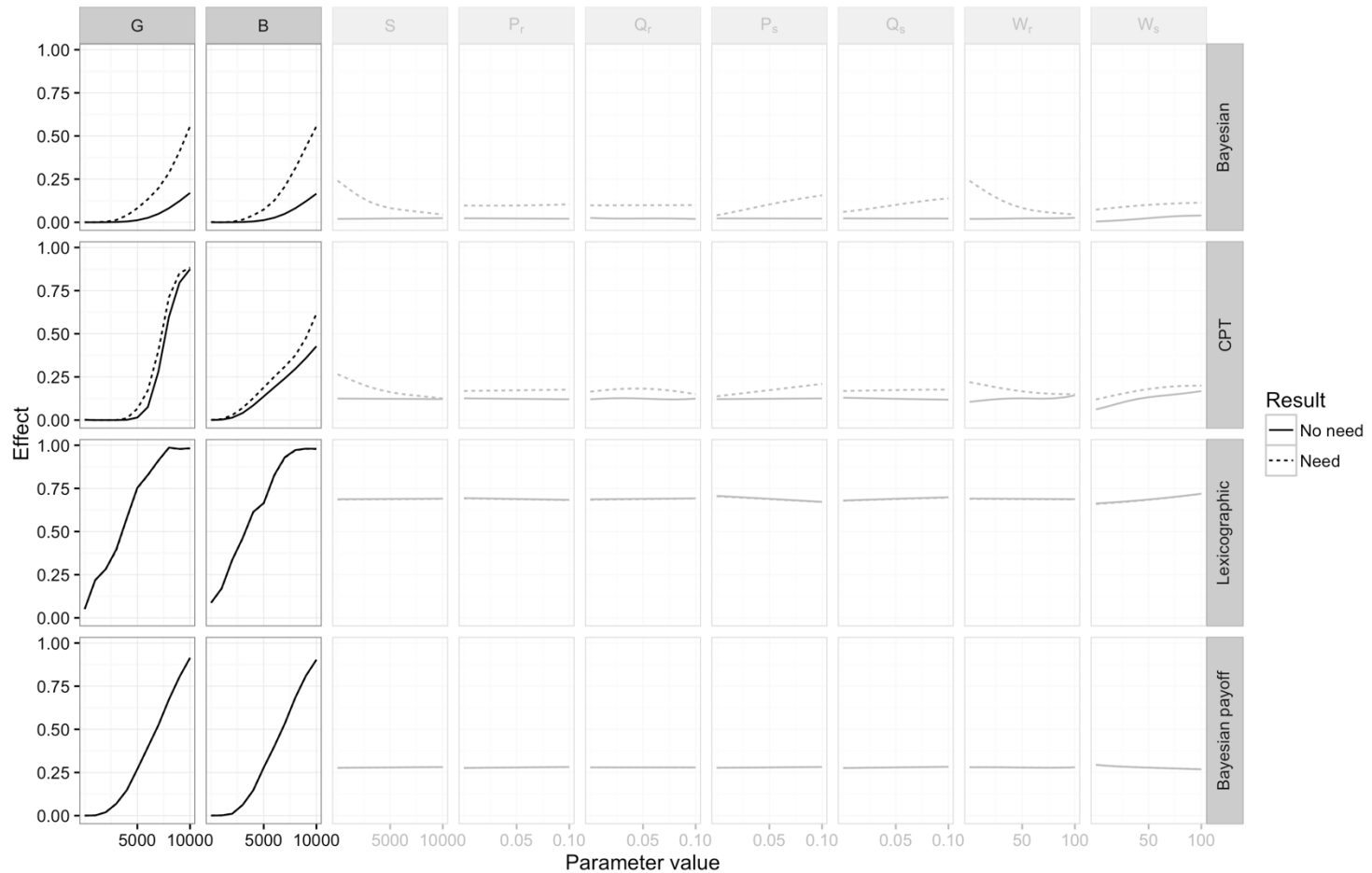
Model

- 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
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Sensitivity



Sensitivity

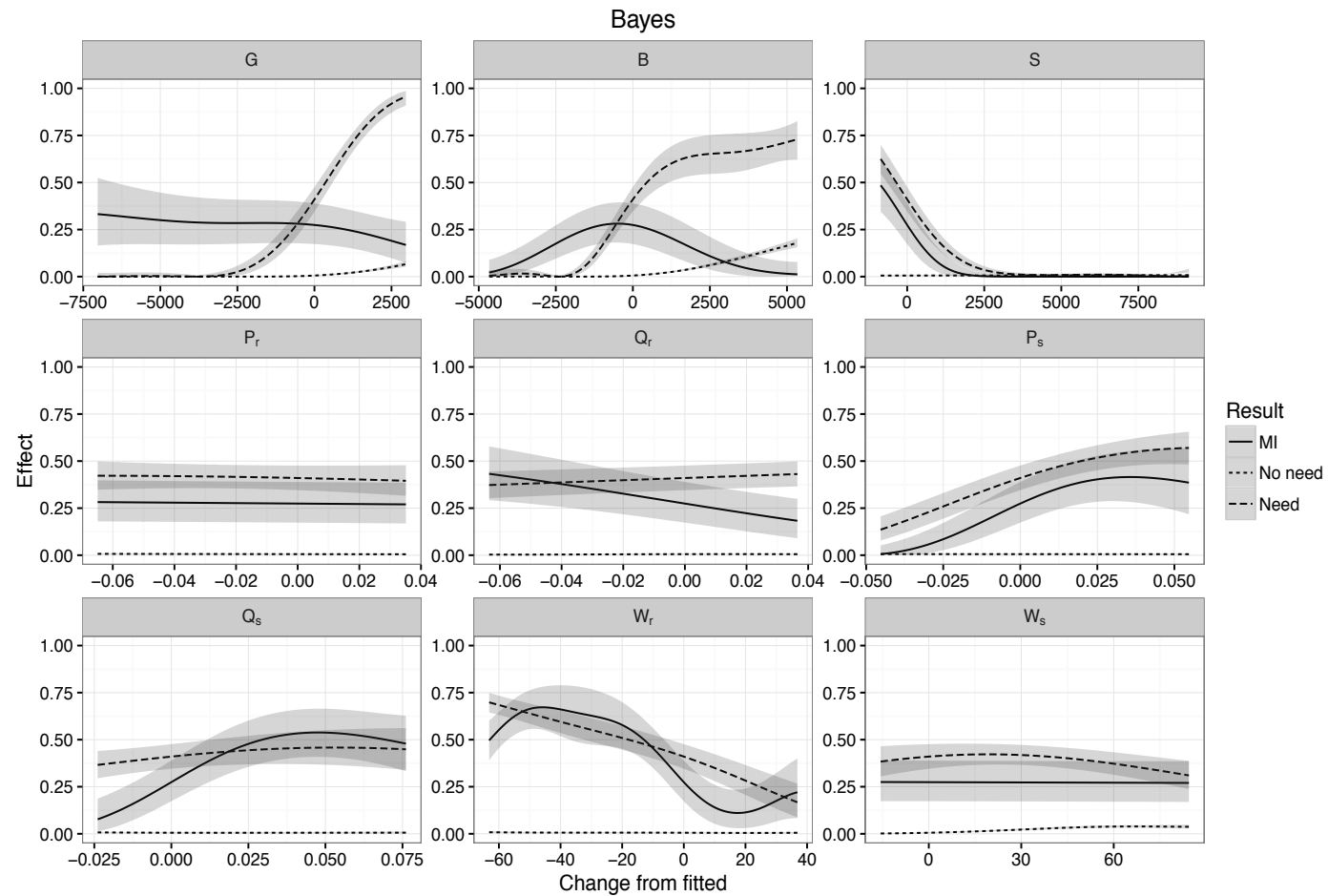


Fitting

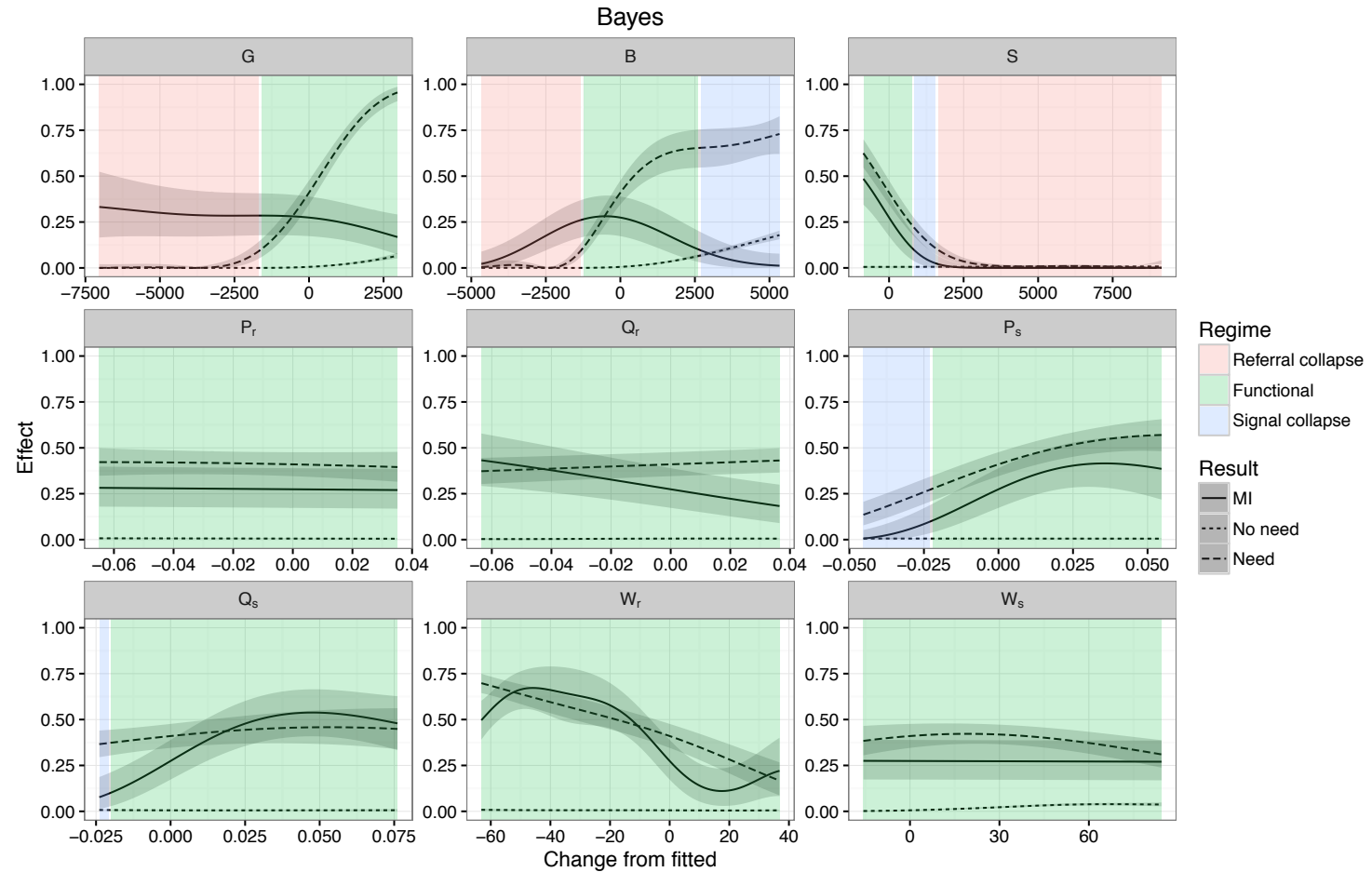
- Can't fit the heuristics!
 - Need more than cardinality
 - Need a mental model

	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%

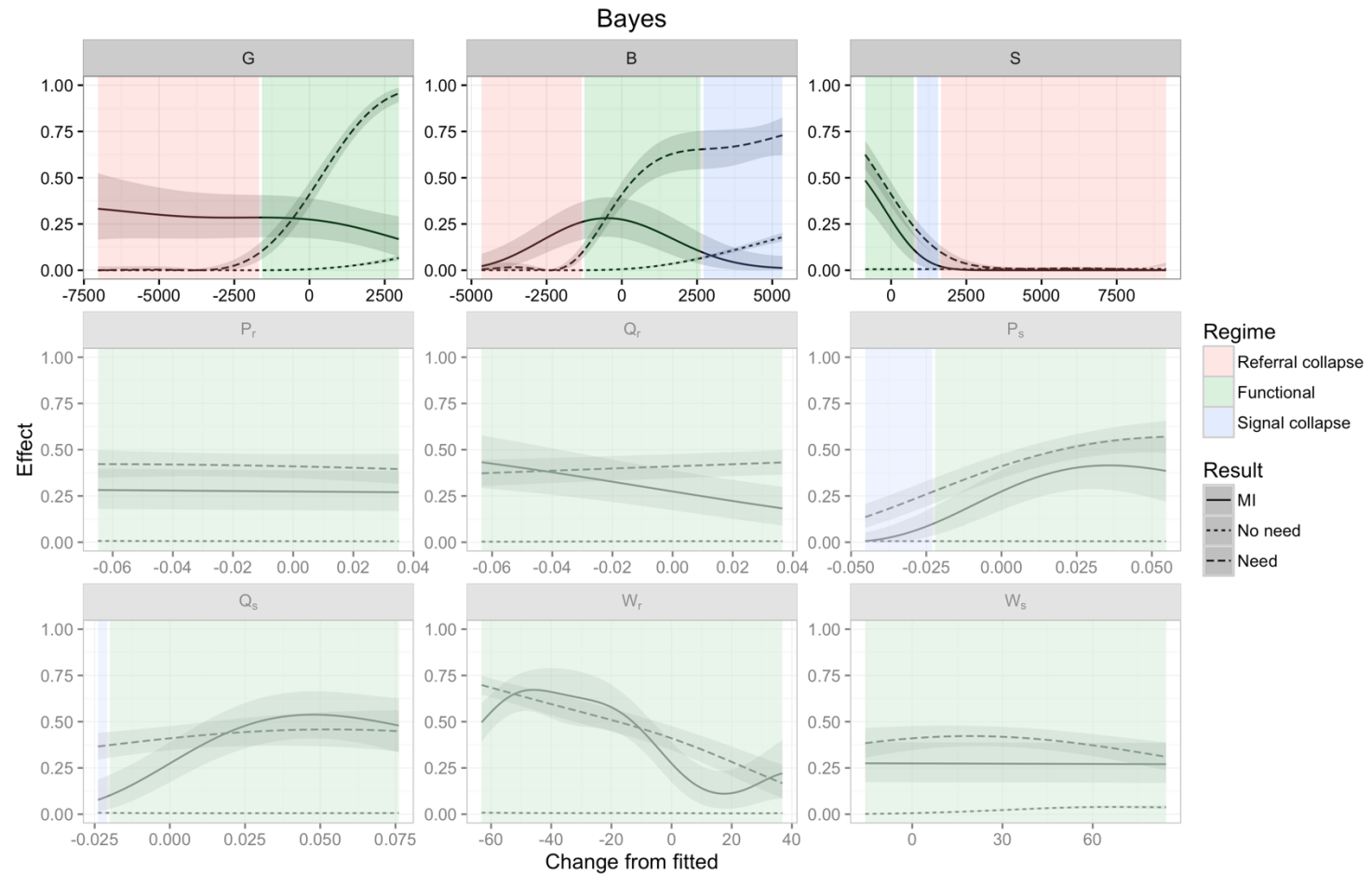
Interventions



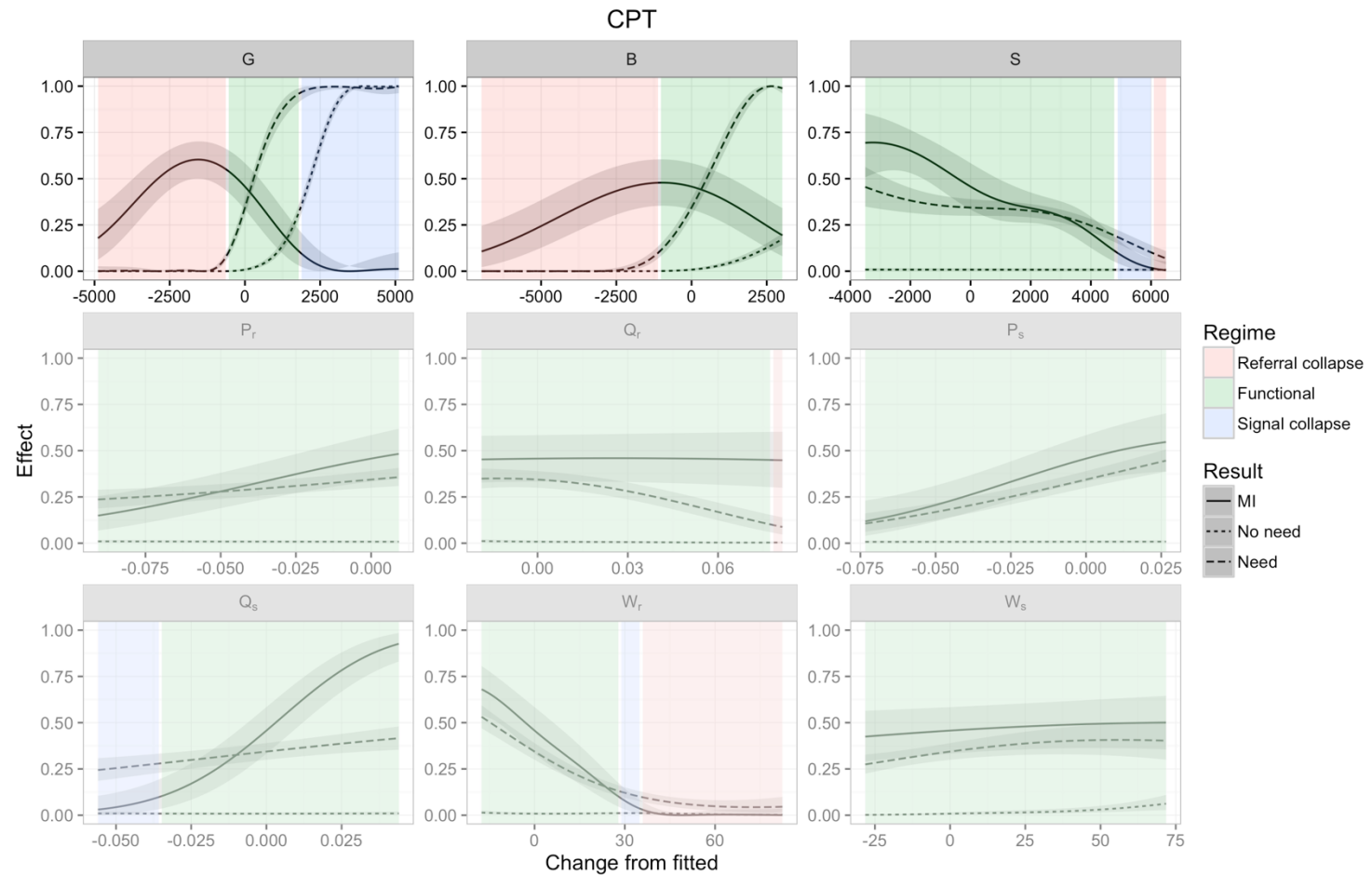
Interventions



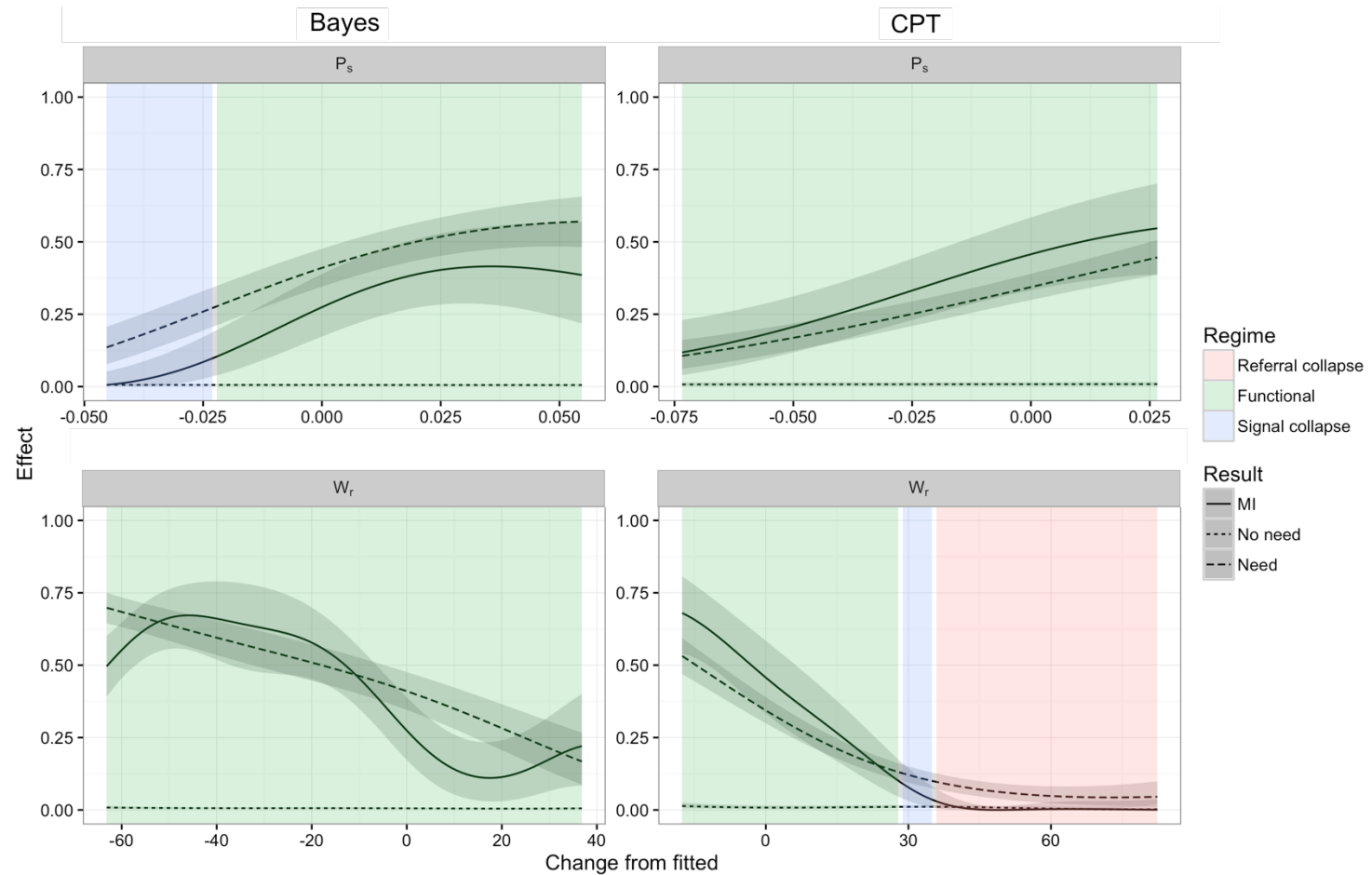
Interventions



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)
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Thank you!

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