Religious Beliefs, Knowledge about Science and Attitudes Towards Medical Genetics

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Background: medical genetics

- Genetics in medical research is one of the most important avenues currently being explored to enhance human health.
- therapeutic applications such as Parkinson's
- genetic tests that can detect or predict serious diseases that have a genetic basis such as Huntingtons.
- pre-implantation genetic diagnosis (PGD) during assisted fertility treatment, to identify embryos that will give best chances for viable pregnancy
- prenatal genetic testing (PGT) during pregnancy to screen the foetus for genetic diseases and conditions.

Medical genetics and public perception

- Majorities (60-70%) of publics in US and Europe support medical genetics broadly conceived (inc. stem cell research), but less enthusiasm amongst the most religious (e.g. Nisbet 2005, Pardo and Calvo 2008, Ho 2008)
- Genetics and religious objection?
  - meddling with human nature at a fundamental level?
  - Consequences for embryos in PGD and PGT? Link with abortion?

- Amongst positive correlates of support for medical genetics, including stem cell research is science knowledge (e.g. Nisbet and Goidel 2007). The more informed, the more public opinion converges to scientific

Motivated reasoning

- Recently, work explaining public beliefs about science focusses on how information is selectively attended to and alternate inferences drawn from same facts. 'Motivated reasoning' captures the idea. Leading flavours:
  - Brossard et al (religion as a 'perceptual filter' for nanotech)
  - Kahan et al – 'cultural cognition' of climate change and nuclear power (Republicans=hierarchist individualists? Democrats egalitarians?)
- Main conclusion – knowledge acquired and deployed differently by different groups coming to different interpretations.
- We contribute to this debate, deriving predictions about how knowledge and religiosity jointly influence beliefs about medical genetics

Hypotheses

- H1: We expect that the more religious will be **less supportive** of medical genetics.
- H2: We expect those with more science knowledge will have **more positive attitudes** towards medical genetics.
- H3: In line with motivated reasoning perspective, we expect that religion will **moderate** the association of knowledge with attitudes towards genetic medicine. Specifically, we expect religion to **attenuate** any positive effect of knowledge (less convergence to scientific consensus amongst religious)

Data and methods

- Wellcome Trust Monitor Survey 2009
  - http://www.wellcome.ac.uk/About-us/Publications/Reports/Public-engagement/WTX058859.htm
- Triennial f2f probability survey of 1100 adults and 300 young people in UK about engagement, knowledge and attitudes to biomedicine
- Multistage clustered sample, CAPI interviews
- Response rate 49.3% (AAPOR RR3)

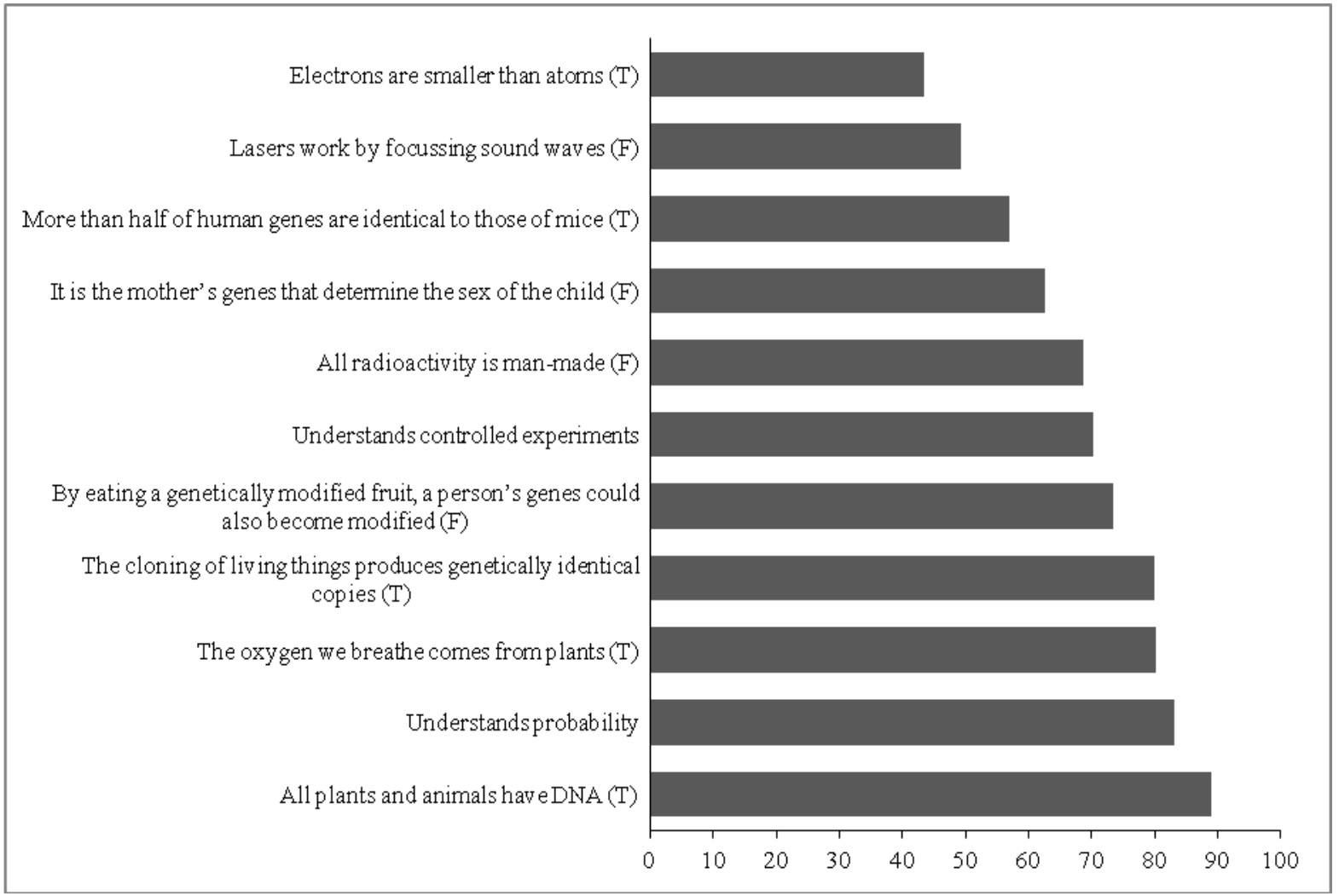
Data and methods

- Perceptions about genetics measured with four questions
  - Prenatal testing
  - Personal predictive testing
  - Public ‘do it yourself’ or direct to consumer tests
  - General optimism about medical genetics
- Simple analytic strategy – regressing each of these outcomes on:
  - Knowledge
  - Religiosity
  - Demographic covariates – education, age, gender to account for other differences amongst religious groups likely to affect attitudes to genetics
  - Interaction of knowledge and religiosity to capture motivated reasoning/perceptual filter

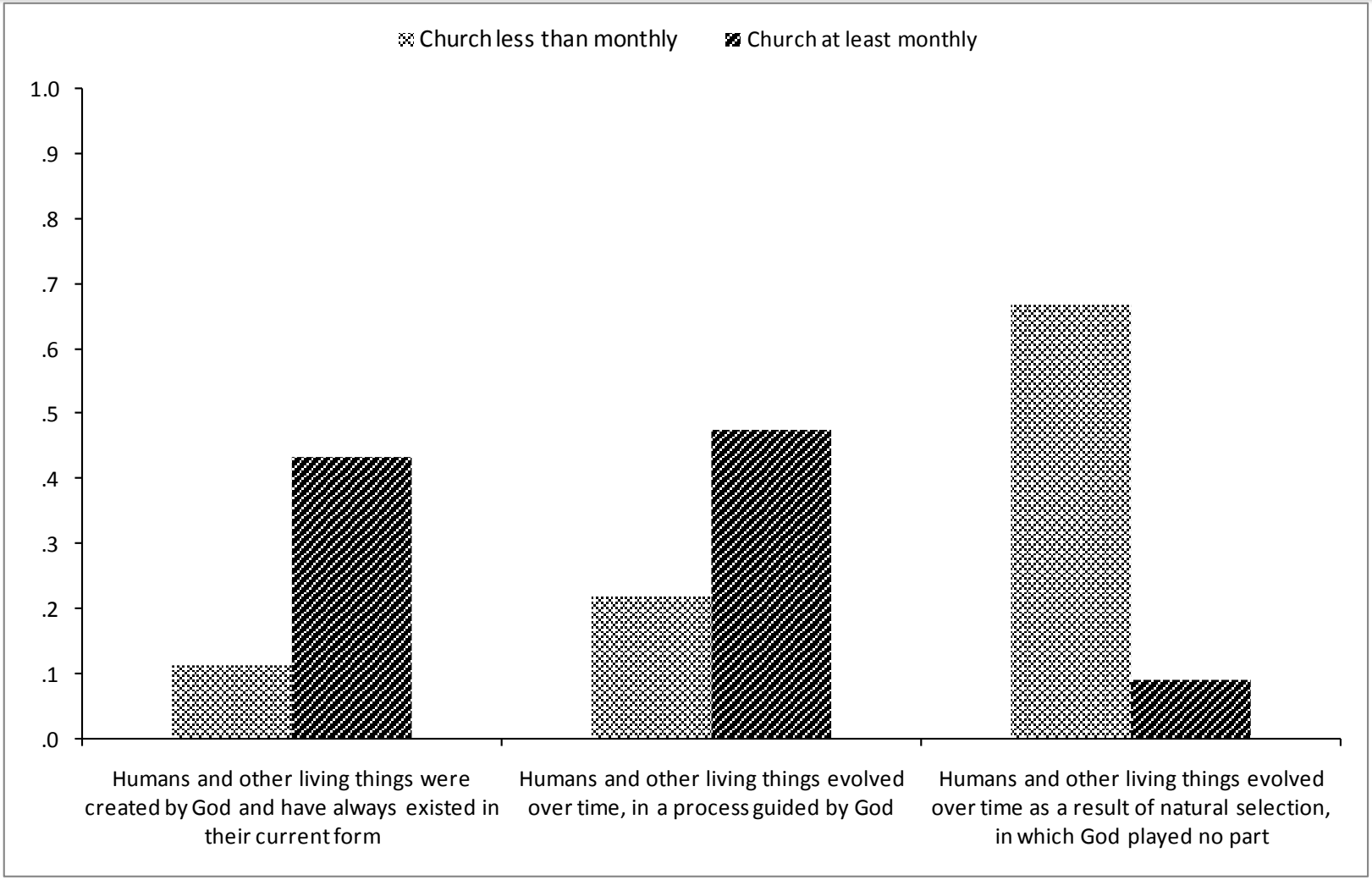
Capturing religiosity in three ways

- frequency of attendance at services apart from weddings etc (dummy variable - at least once per month)
- self identification as belonging to a particular organised religion (C of E, Catholic, non-Christian, no religion as ref category)
- Beliefs about origins of life (dummy variable for creationist beliefs vs others)

Distribution of science knowledge scale items



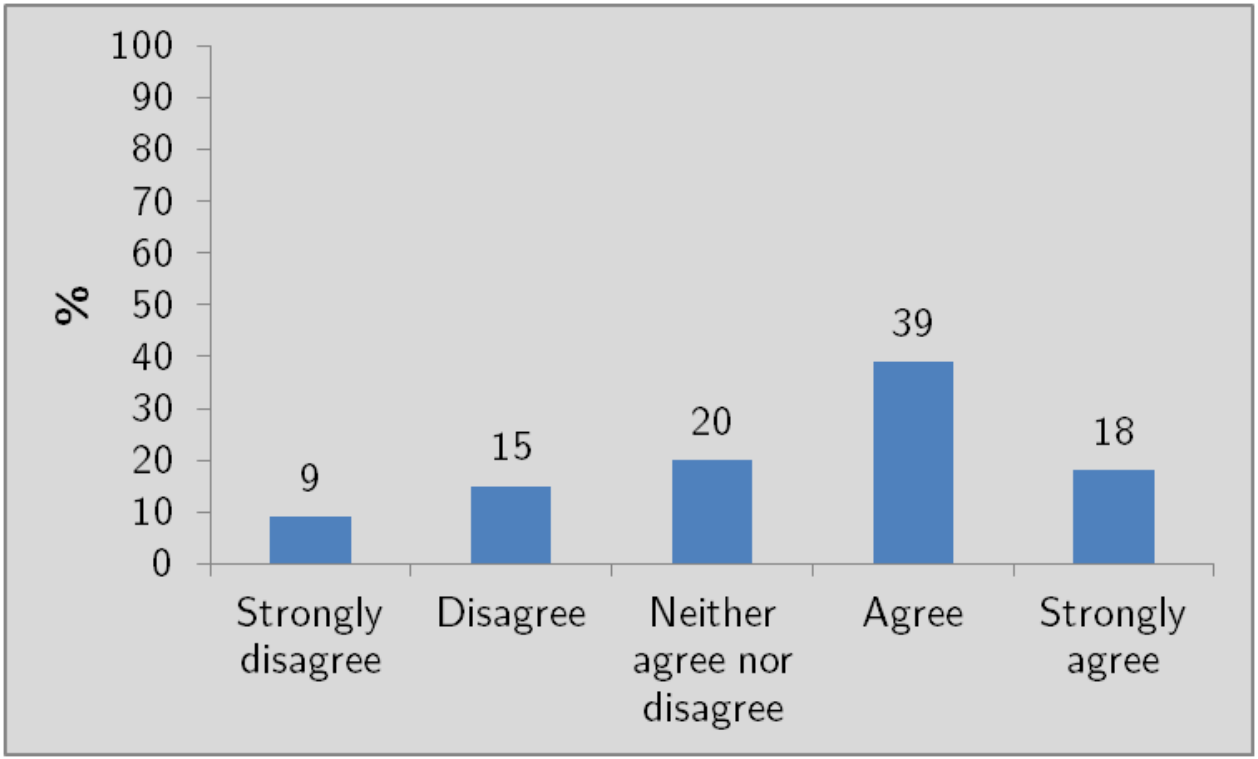
Origins of life by church attendance



- Sig. variation in beliefs within and between churchgoing groups

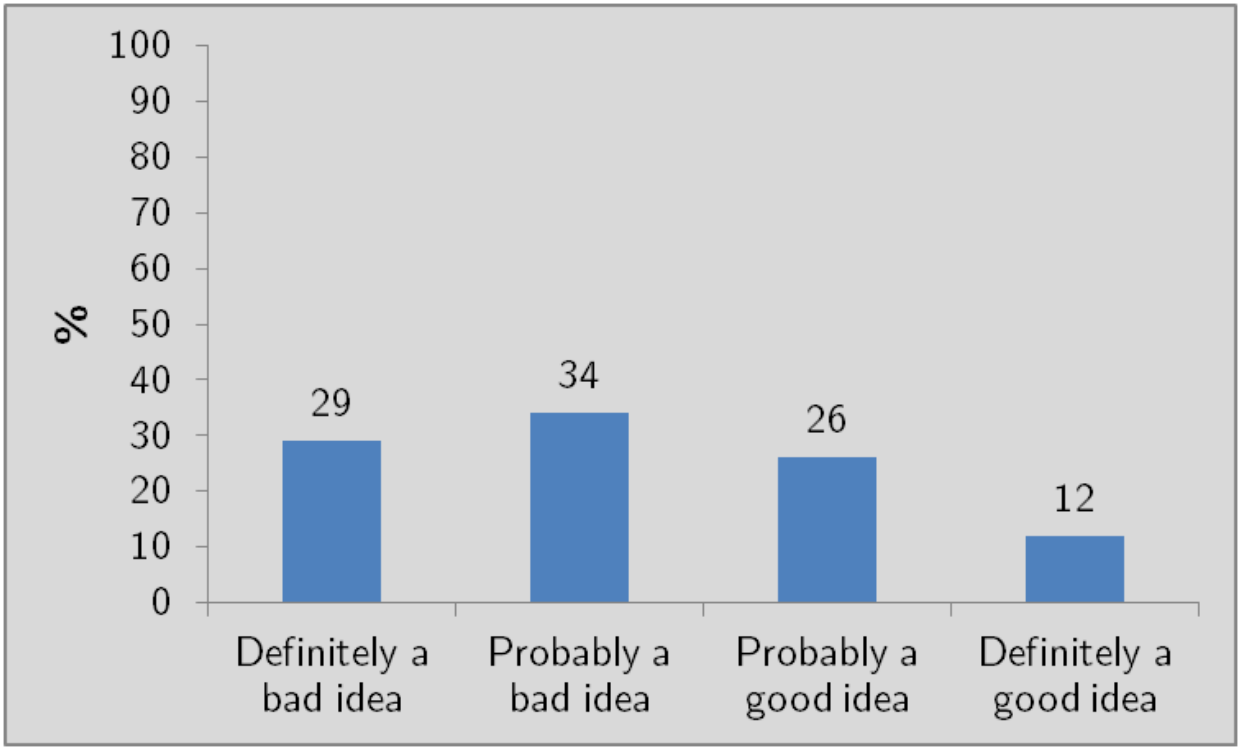
DV1: Testing of unborn babies

- “Please say whether you agree or disagree with the following statement: I would support the genetic testing of unborn babies for any serious diseases they might get in the future, if the discovery of a serious disease could lead to a decision to terminate a pregnancy.”



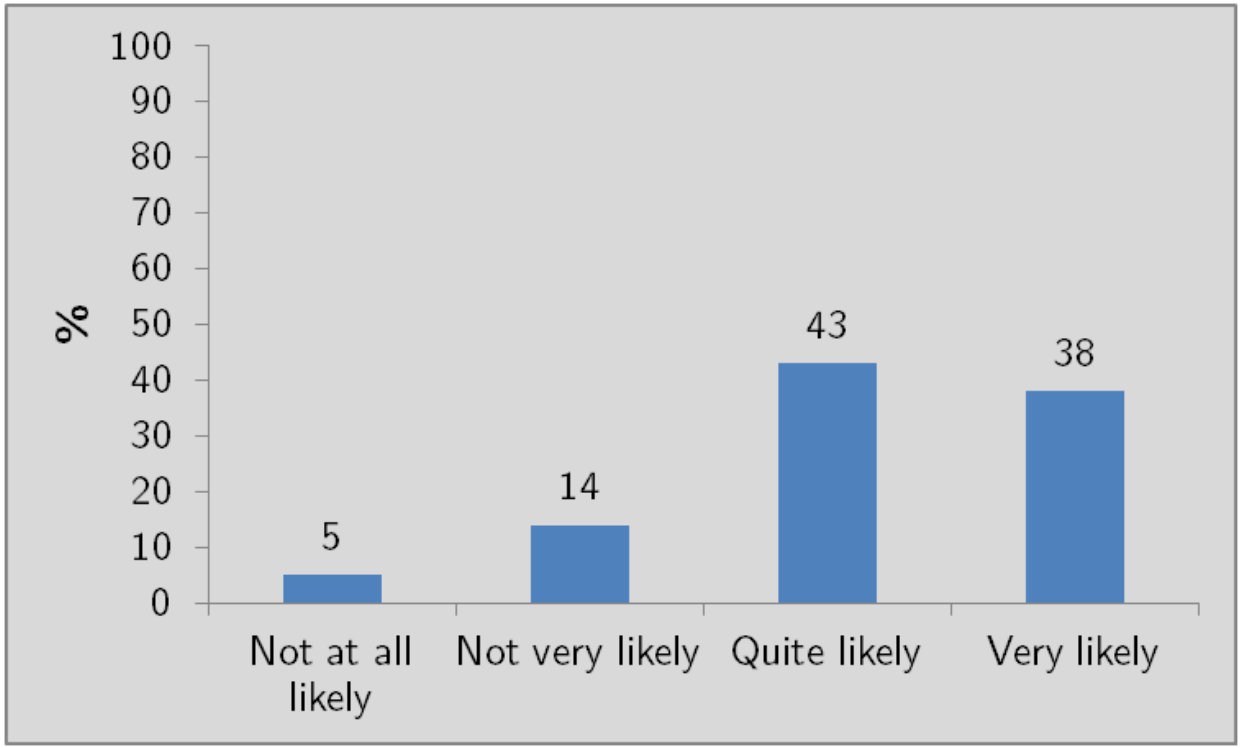
DV2: Public ‘do-it-yourself’ tests

- “Genetic tests are now available directly to the public, without a having to go through a doctor or other medical practitioner. This might be done, for example, by ordering a test from a website, taking a swab and sending if off in the post and then receiving results directly by post or in an email. Generally speaking, please tell me whether you think that making genetic tests available to the public in this way is a good idea or a bad idea?”



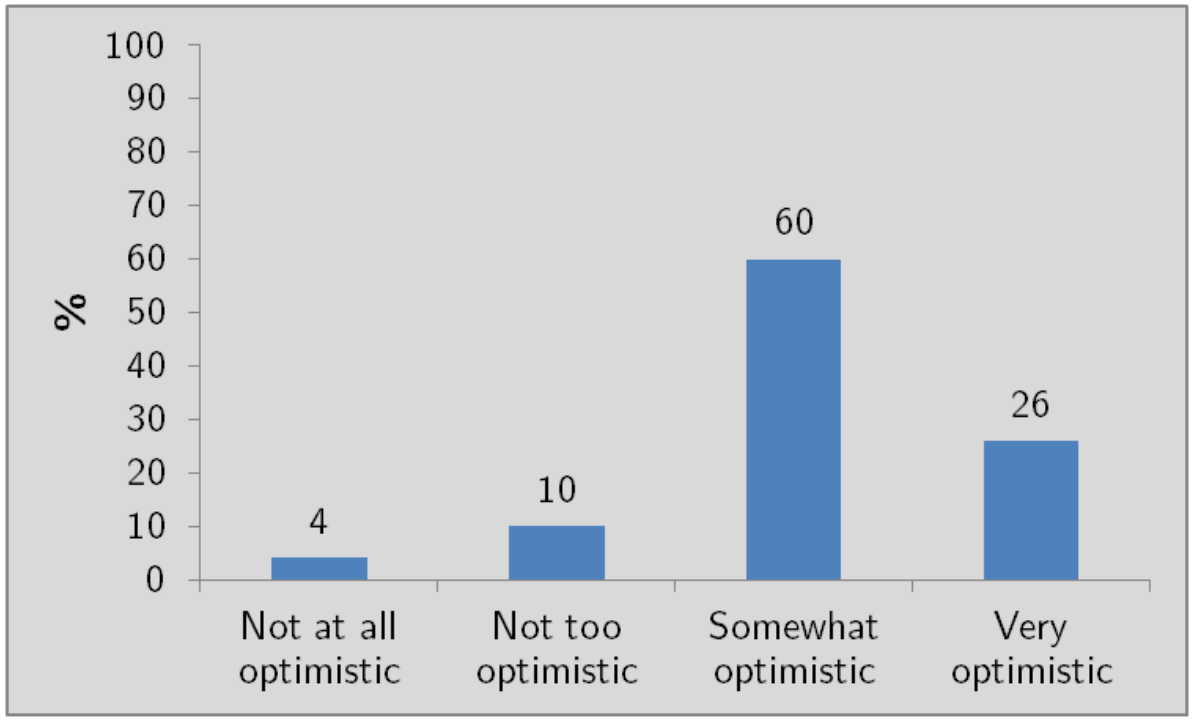
DV3: Take a personal test

- "Please say how likely you would be to take a genetic test to detect any serious disease you might get in the future if there were treatments or other ways of greatly reducing the risks of developing any diseases detected?"



DV4: Optimism about medical genetics

- "Are you very optimistic about the possibility of medical advances as a result of genetic research, somewhat optimistic, not too optimistic or not at all optimistic?"



Ordered probit model

- Ordinal items – 4 or 5 point scales
- Assumption of the model
- y_i^* = latent index of attitude/belief about genetics

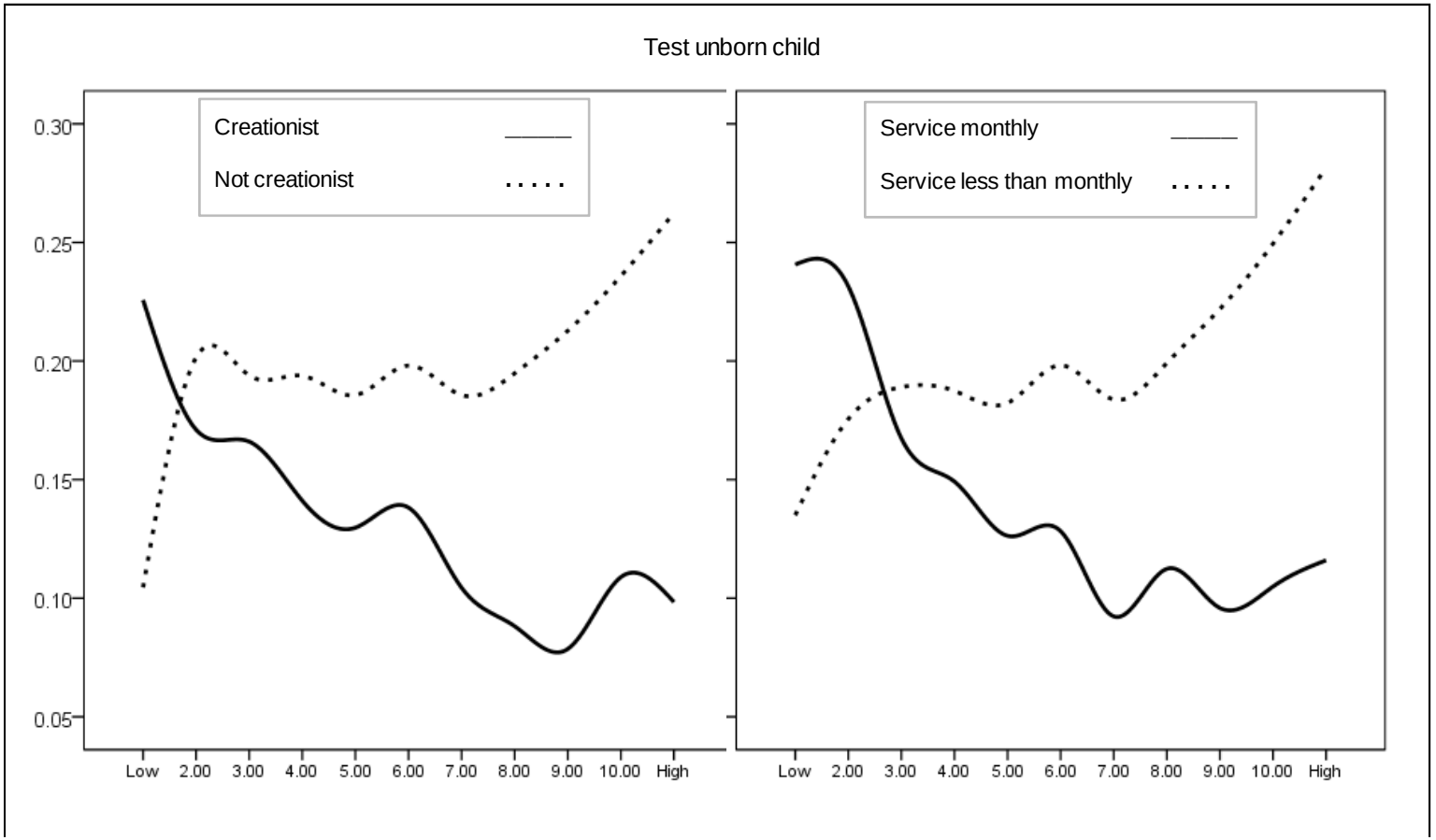
- coefficients represent expected change in underlying y* for a one unit change in the predictor.
- (very similar results obtained using OLS regression too)

- Results...

Testing unborn children (ordered probits)

	Main Effects	Knowledge*Religiosity
Other Christian	-0.04	-0.02
Catholic	-0.24*	-0.23
C of E	0.03	0.06
Other non-Christian	0.14	0.13
Attends church => monthly	-0.34***	0.19
Creationist	-0.18*	0.21
Science knowledge	0.03	0.06**
Female	0.03	0.04
35-49	0.11	0.11
50-64	0.19*	0.18
>=65	0.47***	0.46***
Degree	0.16	0.15
Science degree	0.14	0.14
Routine occupation	-0.17*	-0.15
Managerial occupation	-0.08	-0.08
High income	0.06	0.05
Life begins at birth	0.32***	0.34***
Knowledge*Creationist		-0.06
Knowledge*Church attender		-0.07*

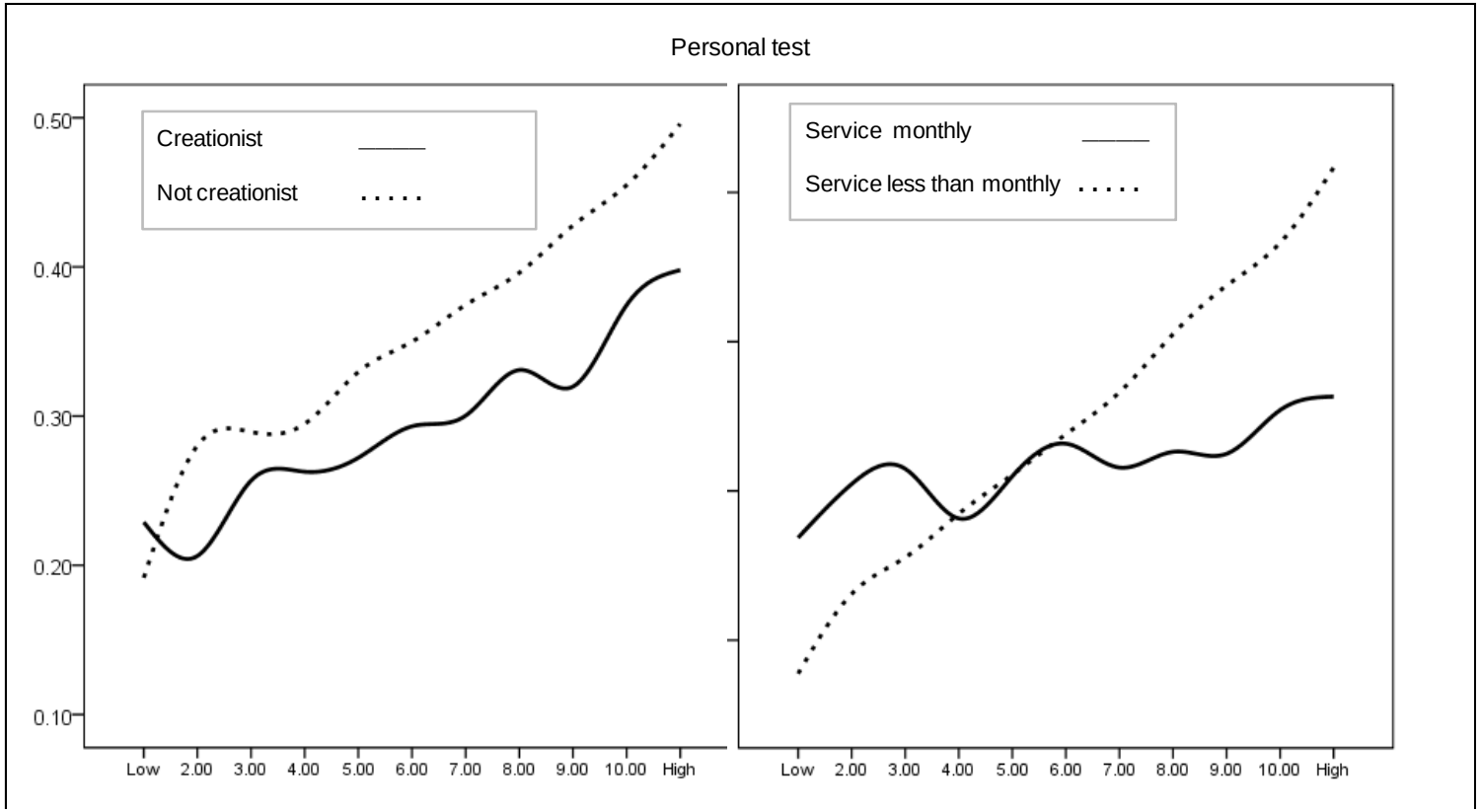
Probability of most +ve response by religiosity



Personal test (ordered probits)

	Main Effects	Knowledge*Religiosity
Other Christian	0.11	0.13
Catholic	0.12	0.14
C of E	0.10	0.12
Other non-Christian	-0.09	-0.10
Attends church => monthly	-0.15	0.44
Creationist	-0.13	-0.25
Science knowledge	0.05**	0.06**
Female	-0.15*	-0.15*
35-49	-0.02	-0.02
50-64	0.05	0.05
>=65	-0.10	-0.10
Degree	0.09	0.10
Science degree	0.20	0.20
Routine occupation	-0.07	-0.06
Managerial occupation	0.00	0.00
High income	-0.10	-0.10
Knowledge*Creationist		0.01
Knowledge*Church attender		-0.08*

Probability of most +ve response by religiosity



Public test (ordered probits)

	Main Effects	Knowledge*Religiosity
Other Christian	-0.15	-0.15
Catholic	-0.14	-0.14
C of E	-0.11	-0.11
Other non-Christian	-0.12	-0.12
Attends church => monthly	0.08	0.01
Creationist	-0.07	-0.05
Science knowledge	-0.03	-0.03
Female	-0.14*	-0.14*
35-49	-0.11	-0.11
50-64	-0.30**	-0.30**
>=65	-0.44***	-0.43***
Degree	-0.15	-0.15
Science degree	0.20	0.20
Routine occupation	-0.02	-0.02
Managerial occupation	-0.12	-0.12
High income	-0.08	-0.08
Knowledge*Creationist		0.00
Knowledge*Church attender		0.01

Genetics optimism (ordered probits)

	Main Effects	Knowledge*Religiosity
Other Christian	0.08	0.09
Catholic	0.10	0.10
C of E	0.18	0.19
Other non-Christian	-0.04	-0.05
Attends church => monthly	0.02	0.07
Creationist	-0.20*	0.15
Science knowledge	0.12***	0.14***
Female	-0.18*	-0.18*
35-49	0.05	0.05
50-64	0.04	0.03
>=65	0.10	0.10
Degree	0.04	0.03
Science degree	0.61***	0.61***
Routine occupation	-0.34***	-0.34***
Managerial occupation	-0.10	-0.10
High income	0.28**	0.28**
Knowledge*Creationist		-0.05
Knowledge*Church attender		-0.01

Summary

- H1: We expected that the more religious will be **less supportive** of medical genetics.
  - For prenatal testing and general optimism, more religious are indeed less supportive, although this is from a high baseline.

- H2: We expect those with more science knowledge will have **more positive attitudes** towards medical genetics.
  - Yes, most strongly for optimism (in line with previous research) but also for personal tests. Perhaps showing more confidence in understanding the issues involved in personal diagnostics

Summary

- H3: In line with motivated reasoning, we expected that religion would act as a **moderator,** or perceptual filter on attitude to medical genetics
  - Yes, for specific applications that (may?) conflict with religious orientation but not so much for general optimism about genetics Most strikingly, **for the highly religious, high science knowledge is associated with lower probability of support for prenatal testing**. This is a reversal of the pattern for other citizens.
  - Implication – there will be no full convergence of religious views with secular one about prenatal testing just by enhancing the information environment…
  - Note: Support for medical genetics is generally high, even amongst the religious

Implications?

- Support for medical genetics is generally high, even amongst the religious
- Worldviews, cultural orientations can and do condition how knowledge and information is processed and deployed to form attitudes about medical genetics
- For some applications of genetics, generating more understanding and public knowledge will not persuade the highly religious to support. Other aspects will need to be emphasised (benefits?)
- Paper is under review and a draft can be obtained by emailing me: nallum@essex.ac.uk
- Thanks!