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ABSTRACT

The Asymmetry of Population Ethics: Experimental Social Choice and Dual-Process Moral Reasoning

Population ethics is widely considered to be exceptionally important and exceptionally difficult. One key source of difficulty is the conflict between certain moral intuitions and analytical results identifying requirements for rational (in the sense of complete and transitive) social choice over possible populations. One prominent such intuition is the Asymmetry, which jointly proposes that the fact that a possible child's quality of life would be bad is a normative reason not to create the child, but the fact that a child's quality of life would be good is not a reason to create the child. This paper reports a set of questionnaire experiments about the Asymmetry in the spirit of economists' empirical social choice. Few survey respondents show support for the Asymmetry; instead respondents report that expectations of a good quality of life are relevant. Each experiment shows evidence (among at least some participants) of dual-process moral reasoning, in which cognitive reflection is statistically associated with reporting expected good quality of life to be normatively relevant. The paper discusses possible implications of these results for the economics of population-sensitive social welfare and for the conflict between moral mathematics and population intuition.

JEL Classification: J10, J13, J18, D63

Keywords: population ethics, experimental social choice, the Asymmetry, dual-process moral reasoning, questionnaire-experimental method

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1 Introduction

Population ethics is widely considered to be exceptional both in its importance and in its difficulty.[1] One source of difficulty is the conflict between certain enduring moral intuitions, on the one hand, and efforts to rationalize social preference over population alternatives, on the other (Blackorby et al., 1997; Arrhenius, 2000). One important such intuition is the Asymmetry, originally named by McMahan (1981): "the fact that a person's life would be worse than no life at all (or 'worth not living') constitutes a strong moral reason for not bringing him into existence; the fact that a person's life would be worth living provides no (or only a relatively weak) moral reason for bringing him into existence" (p. 100). Other philosophers have investigated a stronger version of the Asymmetry, which omits "(or only a relatively weak)" and insists on *no* reason.[2] This intuition is contradicted by a variety of social welfare functions in economics that register the addition of any person with a sufficiently good life as an improvement (Blackorby et al., 2005).

McMahan claims that the Asymmetry is "approved... by common sense."[3] Because it has not been subjected to empirical study, it is not known how widespread belief in it would be. As Roberts (2011b) summarizes, whether the Asymmetry is intuitive is important: "Of course, further efforts on behalf of the Asymmetry don't make sense if we don't indeed find the Asymmetry itself highly intuitive" (p. 772). Beyond the value of documenting the extent of this intuition, a better empirical understanding of it could help clarify the enduring conflict

[1] As evidence of the importance of population ethics, Broome (2012) describes its open questions as the most important unknown in climate policy; see also Scovronick et al. (2017) and Lawson and Spears (2018). As evidence of its difficulty, Parfit (1984) emphasizes that the last word of his treatment of the subject could be "failure."

[2] For example, Holtug (2001) restates the Asymmetry as "Everything else being equal, if a person will have a life that is worth not living, we have a moral reason not to bring her into existence, while there is no level of well-being that she could have that will give us a moral reason to bring her into existence" (p. 383). Earl (2017) writes this half of the Asymmetry as "the fact that a person would be happy — i.e., his or her life would be worth living — gives us no moral reason to create that person." Frick's (2014) Normative Procreation Asymmetry similarly proposes that there is "no moral reason..." (p. 2-3). Note McMahan's (2009) own subsequent statement of the Asymmetry includes merely "...does not, on its own, provide a moral reason ...".

[3] Frick (2014) makes the empirical claim: "The Asymmetry strikes many people — even some of those who have opposed it in print — as intuitively highly plausible" (p. 4-5).

between intuition and "moral mathematics" in population ethics.

This paper reports two sets of questionnaire experiments in the spirit of Gaertner and Schokkaert (2011) in which respondents were asked to assess the ethical relevance of various hypothetical facts, including about expected quality of life, to a decision about whether or not to conceive a child. The studies present two empirical conclusions. First, there is only very limited support for an absolute Asymmetry among experiment participants, both in within-participant and across-participant studies; instead, most participants report believing that bad expected quality of a potential baby's life counts against procreation *and* that good expected quality of life counts in favor. Some results show support for a quantitative Asymmetry in which good quality of life counts normatively, but to a diminished degree relative to bad quality of life. To our knowledge this is the first paper to apply the tools of empirical social choice to study the Asymmetry of population ethics.

Second, the limited support for the Asymmetry that is observed behaves consistently with Greene's (2014a) theory of dual-process moral reasoning: Asymmetry-rejectng responses are statistically associated with controlled cognitive processing, rather than automatic processing. Greene (2014b) argues that in situations of dual-process moral reasoning, we should normatively discount automatic process, relative to cognitively controlled process, if the issue is morally unfamiliar (in a technical sense described below in the discussion section). In population ethics more broadly, a range of choice-theoretic results have argued that the goodness (in addition to badness) of potential lives must matter for any procreative ethics or population-sensitive social welfare function that is rational[4] and respects other minimal criteria (Broome, 2004; Blackorby et al., 2005). Although a prior literature has called for the abandonment of irrationalizable intuitions in population ethics, to our knowledge this is the first paper to ground such a suggestion in empirical evidence on judgment and decision-making.

[4]In the sense of rationalizable with a complete and transitive preference relation.

1.1 The Asymmetry in population ethics

This paper operationalizes the Asymmetry as the joint claim that

> facts about a potential child's expected quality of life being bad count as a normative reason[5] against creating the child; however facts about a potential child's expected quality of life being good do not count as a normative reason in favor of creating the child.

The Asymmetry is widely regarded to have intuitive appeal. Yet, McMahan (1981) ultimately rejects the Asymmetry, in a review of an argument by Narveson (1973). McMahan (2009) quotes this original formulation and reaffirms its appeal and its rejection, explaining: "My claim then was that although the Asymmetry is intuitively compelling, it is extraordinarily difficult to defend or justify. That will be my contention again now, 27 years later" (p. 49). However, debate on the Asymmetry continues (McMahan, 2009; Roberts, 2011a; Bradley, 2013). Leading arguments in favor of the Asymmetry offer arguments against the principle of independence of irrelevant alternatives, at least in the case of procreative ethics (Roberts, 2011a; Frick, 2014). Roberts (2011b) suggests that many philosophers agree that attempts to justify the Asymmetry have failed. However, arguing against an impression that "it is time to move on" from the Asymmetry, she suggests that the failure may not be of the Asymmetry but rather of existing accounts: "criticism [of such accounts] has not, in other words, moved us to say, 'Oh, now I see why the Asymmetry is false' " (p. 772). Perhaps an empirical understanding of moral judgments can help to so move us. If so, such an understanding

[5]Facts other than about the quality of a potential child's life may be relevant to procreation decisions, of course. McMahan (1981) repeatedly describes the Asymmetry as about *reasons*, rather than all-things-considered judgments, as in the opening quotation on page 2 of this paper. McMahan (1981) opens the article by asking "What moral reasons might there be, given certain conditions or expectations, for or against bringing people into existence?" (p. 96). However, some versions of the Asymmetry in the population literature take a different form: Roberts (2011b) discusses permissibility, defining the Asymmetry as the view that "it is wrong to bring a miserable child into existence but permissible not to bring a happy child into existence" (p. 765); clearly, one could hold the position that a fact could offer a reason to bring a child into existence and simultaneously that it is permissible not to do so. The survey questions in this paper do not ask about permissibility.

may be of value to the larger project of adjudicating conflict between moral intuitions and rationalizable population ethics.

1.2 Dual-process moral psychology

Psychologist Joshua Greene (2014a) has articulated a "dual-process" theory of moral reasoning, based on psychological experiments and other empirical studies. Greene argues that moral judgments and behaviors reflect an outcome of two distinct psychological and neural processes (which are sometimes in competition with one another): controlled, explicit, deliberative, slow, cognitive processes, on the one hand, and automatic, implicit, fast, emotional processes, on the other. This general dual-process categorization of mental processes is recognized throughout behavioral economics and the psychology of judgment and decision-making (i.e., far beyond *moral* psychology) and is sometimes described as "System 1" and "System 2" (Bargh and Chartrand, 1999; Stanovich and West, 2000; Kahneman, 2011; Spears, 2014). The empirical contributions of Greene and his colleagues have been, first, to document such dual-process reasoning in moral judgment in particular and, second, to notice an empirical correlation between reasoning processes and the theoretical alignment of moral judgments:

> Characteristically deontological judgments are preferentially supported by automatic emotional responses, while characteristically consequentialist judgments are preferentially supported by conscious reasoning and allied processes of cognitive control (Greene, 2014b, p. 699).

Assessing or replicating the full set of empirical evidence for this correlation is beyond the scope of this paper. Rather, we apply the empirical methods of Greene and coauthors to investigate whether dual-process moral reasoning is present as survey respondents consider questions which may invoke the Asymmetry. Most of this paper is devoted to reporting the details of this empirical investigation; discussion section 4 considers possible normative implications.

1.3 Outline

This paper uses economists' questionnaire-experimental method, recently reviewed in detail by Gaertner and Schokkaert (2011), who summarize an active literature in empirical studies of social choice. They explain two principles of this method, both of which this paper adopts. First, participants are not monetarily incentivized for their choices, unlike in experimental economics studies of game theory: although the standard rationale for incentive payments is to predict behavior, the purpose of empirical social choice is not to predict behavior but to study normative choices. Second, rather than ask directly about abstract axioms, "respondents are confronted with specific stories that are related to real-world situations, and then are asked to give their opinion" (p. 20).

Participants were recruited through Amazon Mechanical Turk (hereafter mTurk), an online labor marketplace for brief internet tasks at www.mturk.com. mTurk is widely used in decision-making experiments in psychology and in economics (*e.g.*Kuziemko et al., 2016). Experimental methodologists have confirmed that classic findings from behavioral economics can be replicated using mTurk (Paolacci et al., 2010; Buhrmester et al., 2011). One advantage of mTurk over traditional lab-based experimentation on university undergraduate students is the ability to study a more diverse participant pool. The mTurk software was set to require participants to be in the U.S. and to prevent any participant from completing the survey more than once (including in separate sub-studies), which was verified by mTurk using IP addresses and in the data using anonymized mTurk user ID codes.

Section 2 reports Study 1a and Study 1b, which make within-respondent comparisons of the reported relevance of information about good and bad prospective quality of life. Section 3 reports Study 2 which makes across-respondent comparisons of respondents who were experimentally assigned to be told about different levels of prospective quality of life and were assigned to different treatment conditions that are known in the literature to influence cognitive reflection. Section 4 discusses these results with reference to Greene's (2014b)

theory of the normative significance of dual-process moral reasoning. Section 5 concludes.

2 Study 1: The Asymmetry, within respondents

2.1 Empirical method

Overview. Study 1 conducted an approximately five-minute survey experiment with participants recruited through mTurk in the fall of 2014. The survey had three parts:

1. the main Asymmetry questions, about whether each of a series of hypothetical facts is ethically relevant for a couple's procreation decision. As an experimental treatment, half of the participants are asked about the relevance of a life being good before being asked about the relevance of a life being bad; the order is reversed for the other half.

2. demographic survey questions.

3. the Cognitive Reflection Test, a standard tool in the psychology and behavioral economics literature.

Survey question. The following was the text of the survey question presented to participants:

> In this part of the survey, you will be asked about your views on a series of moral or ethical questions. The questions are all about a couple deciding whether or not to have another child. They already have two children, and their family is happy. The mother is not currently pregnant, so they are deciding whether or not to conceive a new baby. The couple sees reasons for and against conceiving another child, and has not yet decided what the right thing to do is.
>
> The next survey questions are going to ask you about a series of possible facts, and whether you believe they ethically should matter for the couple's decision.

> For each of the possible facts you will be asked whether you believe that fact should count as a moral or ethical reason in favor of or against having the child, or if you believe the fact would be irrelevant to whether the couple morally should have an additional child.
>
> The purpose of the survey is to learn what you believe. Some of these possible facts would actually be something that potential parents would be unlikely to know; in these cases you should imagine that the couple nevertheless somehow knows the fact. To be clear, you are only asked whether the potential facts count morally for or against having the child; they do not have to settle the question or be the only thing that matters.
>
> Morally, should the following facts influence whether the couple should have an additional child?

These were the seven facts, which were presented to the respondent in a random order:

- The couple will soon receive a large inheritance from a distant relative which will make their family rich.
- The new child would have an especially good and happy life, well worth living and full of very much joy and well-being.
- The new child would have an especially bad and unhappy life, not worth living and full of very much pain and suffering.
- The father has an inherited disease which means that he is likely to die 10 to 20 years from now, and is unlikely to live into old age.
- Both members of the couple are busy doctors who would have to take time off of their life-saving work when the new baby is born.
- The new child would be especially good at sports.

- The parents and relatives of the couple hope they will have an additional child.

Each of the facts was followed by these three options, among which the respondent selected:

- This fact should count as an ethical reason[6] in favor of having an additional child; morally, this counts for having the child.
- This fact should count as an ethical reason against having an additional child; morally, this counts for not having the child.
- This fact is ethically irrelevant to whether or not to have an additional child.

Dependent variables. In analyzing these data, we are interested in the fraction of respondents who report that the child having a good life is an ethical reason counting in favor of having a child and in the fraction who report that the child having a bad life is an ethical reason counting against. The other five facts were presented merely to aid the respondent in considering how to answer such an unusual survey question.[7]

In the presentation of results, we contrast Asymmetry-supporting outcomes with outcomes that regard both a bad life and a good life as morally relevant. Sometimes we refer to such Asymmetry-rejecting outcomes as "utilitarian." Here "utilitarian" is used in Blackorby et al.'s (2005) "generalized utilitarian" sense, which includes many welfarist axiologies, including prioritarianism, versions of egalitarianism, variable-value axiologies, and more, alongside total and average utilitarianism (Greaves, 2017).

Study 1a was conducted first and asked the exact question presented above. Study 1a forced a trichotomization of respondents' answers (counts in favor, counts against, irrelevant).

[6]See footnote 5: the Asymmetry is a claim about moral reasons, not about all-things-considered judgments. This is convenient to an empirical test, because it would be implausible to ask a survey respondent to make a final judgment about whether an unknown couple should have a child, based an unavoidably incomplete set of facts.

[7]10.1% of respondents who completed the survey gave a perverse answer such as that a good life counted as a reason not to create the child; we interpret these as inattentive respondents, and they are excluded from all further analysis. Such screening is common in the judgment and decision-making literature using internet-based survey experiments (Oppenheimer et al., 2009).

To permit more nuanced responses, Study 1b presented the same scenario, but required respondents to choose on a nine-position scale in response to the question:

> Morally, should this fact influence whether the couple should have an additional child? Is the fact ethically a reason to have the child, or not to have the child, or does the fact not matter to the morality of the decision?

The first, third, fifth, seventh, and ninth positions on the scale were labeled:

- ethically counts very strongly against having the child
- should not have child: ethically counts against having the child
- ethically irrelevant; does not matter morally to couple's decision
- should have child: ethically counts in favor of having the child
- ethically counts very strongly in favor of having the child.

Because the question is more cumbersome, only the good life and bad life facts were asked about in Study 1b, again presented in a random order.

Cognitive Reflection Test. The Cognitive Reflection Test (CRT), developed by behavioral economist Frederick (2005), is widely used in the experimental literature both to measure and to manipulate controlled, deliberative processing. The CRT is a tricky math test of three questions, each of which has an intuitively appealing but incorrect answer. In addition to the many applications of the CRT throughout the behavioral economics literature, Paxton et al. (2012) employ it to show evidence of dual-process moral reasoning: participants with higher CRT scores are more likely to make characteristically utilitarian judgments in hypothetical moral dilemmas. Similarly, experimentally *inducing* participants to complete the CRT immediately before making moral decisions increases the probability of utilitarian-type judgments. In Studies 1a and 1b we use the CRT to measure differences across participants at the time; in Study 2, following the method of Paxton et al., we experimentally vary the timing of the CRT relative to survey questions in order to manipulate reflexive reasoning.

2.2 Choices only infrequently reflect the Asymmetry

Table 1 presents the main results from Studies 1a and 1b. In Study 1b, the good and bad facts are each classified as "relevant" if they are not rated at zero on the nine-point scale. Especially in light of the fact that no participant completed both surveys, the quantitative similarity of the distribution of participants into categories between Study 1a and 1b is striking. Among these respondents, there is wide support for the characteristically utilitarian position that both facts — that the prospective child's life would be good and that it would be bad — are morally relevant to the couple's decision. Nearly three-fourths of respondents report this view. In contrast, the Asymmetry is such a relatively uncommon answer as to be statistically indistinguishable from the position that both facts are irrelevant, good and bad; that is to say, in the sense of statistical significance, we cannot conclude from these data that the Asymmetry is more commonly held, on average in the population of respondents studied, than is the "neither is relevant" position.

2.3 A quantitative Asymmetry?

In McMahan's (1981) statement of the Asymmetry — in which the expectation of a good life provides "no (or only a relatively weak) moral reason" — the possibility is left open for a *quantitative* Asymmetry, where the goodness and badness of different lives are both normatively relevant, but perhaps goodness receives less weight.[8] Frick (2014) calls such a view "the Weak Normative Asymmetry," although he does not directly discuss it beyond identifying its possibility. Like the absolute Asymmetry, it is not clear how a quantitative Asymmetry could be formulated in a rational social welfare function. A distinct but related quantitative Asymmetry view is advanced within economics by Dasgupta (1998), who, while denying that his views imply that "creating a good life is not a good thing," argues that "good lives may indeed be part of the intrinsic good, but ceteris paribus an improvement in

[8] As footnote 2 notes, other statements of the Asymmetry in the philosophical literature, including by McMahan, do not include this possibility.

the quality of life of an actual person is better still" (p. 147). Some results of Study 1b suggest the possibility that some respondents would endorse such a quantitative Asymmetry.

Study 1b allowed participants to rate the strength of the two facts as normative reasons on a nine-point scale around zero, as opposed to the forced trichotomization of Study 1a. Using this information, figure 2 presents further detail on the results of Study 1b: the average *net* asymmetry computed for each respondent i as

$$-1 \times (\text{rating of bad life fact})_i - (\text{rating of good life fact})_i \,,$$

where the scale runs from -4 to 4. In a rejection of an absolute Asymmetry, we have already seen in table 1 that 78% of participants in Study 1b reported that the good life fact counts as at least some degree of moral reason to have the child. In the further absence of any Asymmetry, a bad life fact and a good life fact of equal magnitude would be rated as equally important in opposite directions, so the average value of this difference would be zero.

2.4 Evidence consistent with dual-process moral reasoning

In Studies 1a and 1b, two features of the experimental design may speak to the possibility that participants applied dual-process reasoning: first, the order in which the good life and bad life facts were presented was randomly assigned as an experimental treatment, and second the CRT-measured differences across participants at the time of the survey.

We randomized the order of the two facts because we anticipated that many respondents' automatic, intuitive response to the bad fact would be to say that it is relevant, while their automatic, intuitive response to the good fact would be to say that it is not. Thus, the random assignment of question order could be a random manipulation of cognitive reflection: participants who see the bad fact first are implicitly encouraged to compare the two cases *before* evaluating the relevance of the good fact.

Figure 1 for Study 1a and Figure 2 for Study 1b present evidence that question order

matters in the way that this reasoning predicts.[9] Respondents presented with the good fact first are more likely to show the Asymmetry than respondents presented with the bad fact first; respondents presented with the bad fact first are more likely to give the utilitarian pattern of answers than respondents presented with the good fact first.

Furthermore, the effect of question order statistically interacts with individual differences in cognitive reflection scores: in both studies, the effect of question order is principally or only seen among participants with a below average CRT score.[10] Note the similarity between the matching Figures 1(b) and 2. Thus, participants who displayed low cognitive reflection in another part of the same survey were more influenced by a (presumably otherwise normatively irrelevant) randomized question order manipulation that had the statistical effect of switching some respondents from utilitarian-type answers to the Asymmetry. Collectively, the results of this section of the paper are consistent with an interpretation that some respondents may feel an intuitive attraction to the Asymmetry, but resolve it under cognitive reflection.

2.5 A difference between male and female respondents

Figure 3 presents an observed difference across respondents in Study 1a: averaging across experimental treatments, female participants are less likely to present the utilitarian pattern of answers and are more likely to present the Asymmetry, largely because they are less likely to report that the good fact matters.[11] This is related to another fact in the empirical social choice literature: in a study of social preferences between possible future aggregate populations that differ in their sizes and in their high levels of average well-being, Spears

[9]Further information on statistical significance and robustness for Study 1a is presented in regression Table A1 in the supplementary statistical appendix. For Study 1b, the effect of question order is statistically significant with $t = 2.70$.

[10]Regression table A2 in the supplementary statistical appendix presents robustness checks and tests of statistical significance for Study 1a. For clarity in the figure, "low CRT" corresponds to a CRT score of 0 and "high CRT" corresponds to a CRT score of 3; 60% of respondents were at these extreme values. For completeness and as a robustness check, the regressions in table A2 alternatively use the full range of the CRT score (0, 1, 2, 3) as a linear interaction.

[11]Table A3 in the statistical supplementary appendix presents regression results corresponding to this figure.

(2017) found that female participants were less likely than male participants to choose larger, less mean-rich populations (rather than smaller, more mean-rich populations).

This study was not originally designed to explain or to investigate *why* it might find a difference between male and female respondents. However, costs of childbearing before and during birth, and costs of child rearing after birth, fall disproportionately (and in many cases exclusively) on women. Plausibly, male respondents could, on average, simply underappreciate the full social costs of bearing and raising children. However, respondents were specifically asked not to weigh the benefits of a good life against other costs of procreation, but rather to simply consider in isolation whether each factor acts as a reason in favor; this instruction may not have been strictly followed, but a further experiment discussed in the appendix found no effect of a randomized treatment that made this instruction even more explicit.

Moreover, in many countries including the participants', whether and how the state may regulate fertility is a contested topic of continuing political salience. This context may have influenced responses. The prompt only asked respondents what facts should matter "for the couple's decision" (not whether or how procreation should be a matter of public policy, or be anyone else's decision) and, consistently with the focus of the Asymmetry on "reasons," elaborated "you are only asked whether the potential facts count morally for or against having the child; they do not have to settle the question or be the only thing that matters." In particular, the claim "the expectation of it having a very good life would be a reason for potential parents to count in favor of having a child" would not remotely imply that the state should restrict abortion or that any woman should be prohibited from terminating a pregnancy. Further research could seek to clarify the implications of the politics and policy of abortion and fertility on social preferences over population, and more broadly could further investigate correlations in answers across population groups.

3 Study 2: The Asymmetry, across respondents

Study 2, conducted through mTurk in early 2015, builds further from Study 1 in four ways. First, Study 2 *manipulated* cognitive reflection, by manipulating the placement within the questionnaire of the CRT. Second, Study 2 randomly assigned a wide range of possible qualities of life (rather than only good and bad), in order to verify a continuous mapping from quality of life to normative implications for procreation. Verifying that an exceptionally good life provides affirmative reasons for procreation beyond what even a good life does is a strong test of the relevance of goodness.[12] Third, this wide range of possible qualities of life permits further investigation of the possibility of a quantitative (rather than absolute) Asymmetry, raised in section 2.3. Finally, because each participant sees only one expected quality of life, comparisons are between-respondent; this is a robustness check of the within-respondent results of Study 1 and rules out any possible implications of question order for cognitive reflection, as discussed in section 2.4.

3.1 Empirical method

Study 2 makes use of a standard survey question in the literature on subjective well-being, the Cantril life satisfaction ladder. The ladder question asks:

> Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you, and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?

This question, commonly referred to as a measure of "life satisfaction," has been thoroughly studied in the economics literature, such as by Deaton (2013) and Fleurbaey (2009). The survey of Study 2 opened with this life satisfaction ladder question, followed by three more

[12]For example, in Study 1a, some participants may have initially interpreted a good life as merely "not a bad life;" this approach rules out that interpretation.

versions, intended to familiarize respondents with the scale:

- On which step of the ladder would you say the average American probably stands?
- On which step of the ladder would you say the average very poor person in a developing country probably stands?
- On which step of the ladder would you say the average financially secure American with a fulfilling career and a healthy family probably stands?

After completing these four life satisfaction questions, respondents were presented with the three-question CRT and with an Asymmetry question, in a randomized order. This follows the methodology of Paxton et al. (2012). Thus, half of the respondents experienced

$$\text{life satisfaction ladder} \;\rightarrow\; \text{CRT} \;\rightarrow\; \text{Asymmetry},$$

and half of the respondents experienced

$$\text{life satisfaction ladder} \;\rightarrow\; \text{Asymmetry} \;\rightarrow\; \text{CRT}.$$

In the question on the Asymmetry, participants first read introductory text that was identical to that in Study 1. Then they read:

> Recall the ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life (10), and the bottom of the ladder represents the worst possible life (0).
>
> Imagine that the couple learned that if they have the additional child, it will certainly have a life of quality Q on the ladder.
>
> Morally, should this fact influence whether the couple should have the additional child? [three options:]

- This fact should count as an ethical reason in favor of having an additional child; morally, this counts for having the child.
- This fact should count as an ethical reason against having an additional child; morally, this counts for not having the child.
- This fact is ethically irrelevant to whether or not to have an additional child; this does not matter to the morality of their decision, although it might matter to the couple for reasons unrelated to morality.

The quality Q was randomly assigned across participants with equal probability on the integers 0-10.

3.2 Relevance throughout the range of life quality

Figure 4 presents the results graphically; Table A4 in the statistical supplementary appendix presents regression results with robustness checks.[13] In contrast with an absolute Asymmetry, the slope is both positive in panel (a) for counting in favor and negative in panel (b) for counting against. This is true throughout the relevant range, so that a life of quality 9 is more likely to count favorably than a life of quality 7.[14] Thus, according to these respondents, a life being great is more likely to count as a reason to procreate than is a life being good enough not to be bad.

These responses clearly disagree that the expectation of a good life is altogether normatively

[13]The experimental text in Studies 1 and 2 explained "the couple sees reasons for and against conceiving another child," which was intended as a non-technical suggestion for non-academic readers that the decision is otherwise balanced. However, the possibility remains that some of the participants' responses may have been motivated by beliefs about consequences for the potential child's parents. A further experiment was conducted as a robustness test, in which the basic text of Study 2 (although without the CRT) was repeated, either with or without a randomized treatment in which it was explicitly stated that "the parents, their other children, and every other person (except the new baby itself) will be just as well off whether the parents have the baby or not." This explicit balancing treatment had no effect on participants' judgments, and in particular did not interact with the effect on Asymmetry judgments of the possible child's quality of life. Full details about this experiment are presented in the supplementary appendix.

[14]For example, an indicator for a life of quality 8 or above is statistically significantly positive even controlling for the assigned quality linearly; alternatively, focusing even only within the top half of 6-10, those 8-10 are statistically significantly more likely to count favorably than 6-7.

irrelevant. However, section 2.3 suggested that a quantitative Asymmetry might be consistent with these results, whereby expected goodness counts, but counts to some degree less. The positive slope in panel (a) is less steeply positive, in absolute value, than the negative slope in panel (b) is negative. This difference is statistically significant (interaction $t = 3.2$, $p < 0.01$). Of course, respondents could bring essentially any scaling of cardinal levels of well-being into this ordinal scale (Decancq et al., 2015), so this numerical interaction cannot be interpreted quantitatively literally nor taken as any definitive evidence of a quantitative Asymmetry. It could simply be the shape of a curved, rational, social welfare function; however, it could be consistent with a quantitative Asymmetry. What is clear, however, is that it is not consistent with respondents endorsing an *absolute* Asymmetry, in which a good quality of life offers no moral reason to create.

3.3 Evidence consistent with dual-process moral reasoning

By plotting averages separately by assigned cognitive reflection treatment, Figure 4 also presents evidence that is consistent with Asymmetric dual-process moral reasoning. In contrast with Study 1, here the cognitive reflection difference is randomly assigned, and therefore is more readily interpreted as a casual effect. In panel (a), for reasons in favor of having a child, there is an interaction between cognitive reflection and quality of life: the affirmative moral relevance of quality of life rises more steeply over good lives for participants who have been primed to employ cognitive reflection than for participants who have not.[15] In panel (b), for reasons against, there is no such interaction. This pattern is what would be predicted by an account of the Asymmetry in the dual-process sense of Greene.

[15]Note that a two-sided statistical test is conservatively shown, although the theory in fact predicts a one-sided alternative hypothesis.

4 Discussion: Population intuition and cognitive reflection

The normative relevance of empirical evidence such as in this paper is currently an unsettled topic of debate; this section offers an interpretive discussion of the results.

Population ethics is an important case where intuition and reasoning famously collide. Several key moral intuitions – the Asymmetry, the Repugnant Conclusion, the Intuition of Neutrality – are named and treated with careful attention in the philosophical literature. The collision between intuition and deduction is so stark in population ethics in part because such intuitions appear opposed to a collection of strong results from a choice theoretic literature that is at home in the economics of social welfare functions (Blackorby et al., 1995; Arrhenius, 2000; Rachels, 2004; Blackorby et al., 2005; Bradley, 2013). Crucially, Broome (2004) demonstrates that attending to differences in the well-being of even very-well-off potential people is necessary for any social ordering of variable-size populations that is complete and transitive (the minimal requirements for a rational preference relation) and that respects Pareto improvements. Yet, some philosophers have been willing to abandon even these minimal goals for population ethics: see, for example, Singer (1976) or Temkin (2012).[16]

An alternative response to the conflict would be to conclude, following Broome, that the technical results from the social choice literature are not mathematical flukes, but instead are informative. Unintuitive results, on this view, reflect the inevitable consequences of

[16]Other philosophers have taken other approaches to understanding the Asymmetry. Roberts (2011a) proposes Variabilism, an account which centrally distinguishes between "morally significant and insignificant losses" in such a way as to produce a complete and transitive ranking of procreative options *within* choice sets which can differ *across* choice sets. Frick (2014) argues that "our reasons to confer well-being on people are conditional on their existence" and that "facts about the comparative goodness of outcomes are a function of our reasons for bringing about one outcome rather than another under certain conditions." Thus, both of these accounts incorporate a dependence on context of value, goodness, or moral losses, which embraces the implication of discarding the independence of irrelevant alternative principle that economists use to build a social welfare function out of choice data. Earl (2017) suggests a revision of the Asymmetry that distinguishes between beginning and finishing creating people.

desiring to completely and transitively rank our actions (or society's policies), given that one consequence of human actions is to change the set of people who are born. Adopting this view may require abandoning some intuitions. As Greaves (2017) concludes: "One's choice of population axiology appears to be a choice of which intuition one is least unwilling to give up." This is an old dilemma (Singer, 2005). Axiomatic theorems tell us what our axioms amount to, but not whether to keep them. How are we to know which intuitions to abandon?

Greene (2014b) and other empirical researchers have documented characteristic patterns of dual-process moral psychology across multiple domains of ethical decision-making. As Rini (2013) and others have observed, one cannot reason immediately from empirical facts (of the sort that Greene and this paper have documented) to normative implications: one needs further careful reflection and an additional normative premise. As such a further normative principle, Greene suggests approaching an ethical question differently based on the extent to which it is *unfamiliar**, rather than *familiar**. Greene defines *unfamiliar** situations as those in which automatic moral judgment would be unlikely to function well, because it has not been shaped by trial-and-error experience: "Let us define *unfamiliar** problems as ones with which we have inadequate evolutionary, cultural, or personal experience" (p. 714).

In particular, Greene recommends that we could safely and conveniently rely on low-cost, automatic moral judgments in *familiar** cases, but should instead defer to deliberative, perhaps calculating, controlled cognitive reasoning in *unfamiliar** cases. The motivation for this conclusion is that there is less likely to have been an informative experience or selective process that would tailor automatic processes to judge *unfamiliar** problems well.[17] de Lazari-Radek and Singer (2012) make a similar suggestion, when they observe that the evolutionary processes that created humans and other animals have both *selected* consequences and non-selected byproducts.

[17]Greene (2014b): "It would be a cognitive miracle if we had reliably good moral instincts about unfamiliar* moral problems. This suggests the following more general principle: The No Cognitive Miracles Principle: When we are dealing with unfamiliar* moral problems, we ought to rely less on automatic settings (automatic emotional responses) and more on manual mode (conscious, controlled reasoning), lest we bank on cognitive miracles" (p. 715). See also Unger's (1996) Liberationist Hypothesis.

Population ethics – and especially the present-day opportunity to make policy decisions that quantitatively importantly shape the size of the human population, or that influence the probability of human extinction – is decidedly *unfamiliar**. If Greene's principle is applicable here, then population ethics is a case in which we should favor deliberative, controlled reasoning over automatic intuition. And then, the recommendation would be clear: dual-process moral psychology in combination with a normative proposal such as Greene's would offer a principled reason to abandon some such intuitions. Of course, even if this *normative* principle were widely accepted, it would still be the case that considerably more *empirical* evidence would be required before we could conclude that intuitive judgement behavior about population ethics (or even just the Asymmetry) were fully documented and understood.

5 Conclusion

This paper can be read by two audiences. In the first, this paper is a straightforward exercise in the growing field within economics of empirical social choice (Gaertner and Schokkaert, 2011). Such papers seek to inform the selection of models, axioms, and social welfare functions in social choice theory by documenting those that are empirically observed to achieve support among study participants (Yaari and Bar-Hillel, 1984). In this case, one conclusion would be that these respondents did not demonstrate an absolute Asymmetry and, instead, many saw the expectation of good and even great lives as a reason counting in favor of creating a child. Versions of the Asymmetry differ in the philosophy literature, but a wide variety include a claim phrased similarly to the expectation of a good life being no moral reason to create someone (Holtug, 2001; McMahan, 2009; Frick, 2014; Earl, 2017): this view is directly rejected by the choices of our average survey participant. That said, Roberts (2011b) instead discusses the Asymmetry in terms of what is permissible, and McMahan (1981) and Frick (2014) allow the possibility of a quantitative Asymmetry; these other versions of the

Asymmetry are not spoken to as directly by these empirical results.

Of course, as in any empirical study of this kind, the results must be read in light of the limitation that we cannot be sure that experimental participants understood concepts in the same way that the literature does. The questionnaires use concepts such as "a life full of very much pain and suffering" or simply "good and bad consequences." It may be that participants' ordinary-language reading of these terms is good enough to learn their views. But how these ideas should be understood is debated even by experts in the philosophical literature: some philosophers think that the average financially-secure person living in a developed country today has a life that is only barely worth living, and some even think that privileged present-day human lives are not lives worth living (Tännsjö, 2002; Benatar, 2017).

For philosophical audiences, this paper joins a debate between intuitions and formal derivations in population ethics. Advocacy exists in the population literature both for abandoning intuitions and for abandoning transitive rationality. Outside of population ethics, some reject the normative relevance of experimental evidence, while some have suggested that accumulating, domain-general empirical evidence of dual-process moral reasoning may offer a principled tool for abandoning some intuitions. For a reader who finds such a suggestion attractive, the evidence in this paper may indicate that it applies to population ethics — or, at least to the Asymmetry, which is investigated here.

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References

Arrhenius, Gustaf. 2000. "An impossibility theorem for welfarist axiologies." *Economics & Philosophy*, 16(2): 247–266.

Bargh, John A and Tanya L Chartrand. 1999. "The unbearable automaticity of being.." *American psychologist*, 54(7): 462.

Benatar, David. 2017. *The Human Predicament: A Candid Guide to Life's Biggest Questions*: Oxford University Press.

Blackorby, Charles, Walter Bossert, and David Donaldson. 1995. "Intertemporal population ethics: critical-level utilitarian principles." *Econometrica*: 1303–1320.

——— 1997. "Critical-level utilitarianism and the population-ethics dilemma." *Economics and Philosophy*, 13(02): 197–230.

——— 2005. *Population issues in social choice theory, welfare economics, and ethics*: Cambridge University Press.

Bradley, Ben. 2013. "Asymmetries in Benefiting, Harming and Creating." *Journal of Ethics*, 17: 37–49.

Broome, John. 2004. "Weighing lives." *Oxford*.

——— 2012. *Climate Matters: Ethics in a Warming World*: Norton.

Buhrmester, M., T. Kwang, and S. D. Gosling. 2011. "Amazon's Mechanical Turk:

A New Source of Inexpensive, Yet High-Quality Data?" *Perspectives on Psychological Science*, 6(1): 3–5.

Dasgupta, Partha. 1998. "Population, consumption and resources: ethical issues." *Ecological Economics*, 24(2): 139–152.

de Lazari-Radek, Katarzyna and Peter Singer. 2012. "The Objectivity of Ethics and the Unity of Practical Reason." *Ethics*, 123(1): 9–31.

Deaton, Angus. 2013. *The great escape: Health, wealth, and the origins of inequality*: Princeton University Press.

Decancq, Koen, Marc Fleurbaey, and Erik Schokkaert. 2015. "Happiness, Equivalent Incomes and Respect for Individual Preferences." *Economica*, 82(s1): 1082–1106.

Earl, Jake. 2017. "A portable defense of the Procreation Asymmetry." *Canadian Journal of Philosophy*, 47(2-3): 178–199.

Fleurbaey, Marc. 2009. "Beyond GDP: The quest for a measure of social welfare." *Journal of Economic Literature*: 1029–1075.

Frederick, Shane. 2005. "Cognitive reflection and decision making." *The Journal of Economic Perspectives*, 19(4): 25–42.

Frick, Johann David. 2014. "'Making People Happy, Not Making Happy People': A Defense of the Asymmetry Intuition in Population Ethics." Ph.D. dissertation, Harvard.

Gaertner, Wulf and Erik Schokkaert. 2011. *Empirical social choice: questionnaire-experimental studies on distributive justice*: Cambridge University Press.

Greaves, Hilary. 2017. "Population axiology." *Philosophy Compass*, 12(11).

Greene, Joshua. 2014a. *Moral tribes: Emotion, reason and the gap between us and them*: Atlantic Books.

Greene, Joshua D. 2014b. "Beyond Point-and-Shoot Morality: Why Cognitive (Neuro) Science Matters for Ethics." *Ethics*, 124(4): 695–726.

Holtug, Nils. 2001. "On the value of coming into existence." *The Journal of Ethics*, 5(4): 361–384.

Kahneman, Daniel. 2011. *Thinking, fast and slow*: Macmillan.

Kuziemko, Ilyana, Michael I. Norton, Emmanuel Saez, and Stefanie Stantcheva. 2016. "How elastic are preferences for redistribution? Evidence from randomized survey experiments." *American Economic Review*.

Lawson, Nicholas and Dean Spears. 2018. "Optimal population and exhaustible resource constraints." *Journal of population economics*, 31(1): 295–335.

McMahan, Jeff. 1981. "Problems of Population Choice." *Ethics*, 92(1): 96–127.

——— 2009. "Asymmetries in the Morality of Causing People to Exist." in M. Roberts and D. Wasserman eds. *Harming Future Persons*: Springer: 4968.

Narveson, Jan. 1973. "Moral problems of population." *The Monist*, 57: 62–86.

Oppenheimer, Daniel M, Tom Meyvis, and Nicolas Davidenko. 2009. "Instructional manipulation checks: Detecting satisficing to increase statistical power." *Journal of Experimental Social Psychology*, 45(4): 867–872.

Paolacci, G., J. Chandler, and P. G. Ipeirotis. 2010. "Running Experiments on Amazon Mechanical Turk." *Judgment and Decision Making*, 5(5).

Parfit, Derek. 1984. *Reasons and Persons*, Oxford: Oxford.

Paxton, Joseph M, Leo Ungar, and Joshua D Greene. 2012. "Reflection and reasoning in moral judgment." *Cognitive Science*, 36(1): 163–177.

Rachels, Stuart. 2004. "Repugnance or intransitivity: a repugnant but forced choice." in *The Repugnant Conclusion*: Springer: 163–186.

Rini, Regina A. 2013. "Making psychology normatively significant." *The Journal of ethics*, 17(3): 257–274.

Roberts, Melinda A. 2011a. "The Asymmetry: A Solution." *Theoria*, 77: 333–367.

——— 2011b. "An asymmetry in the ethics of procreation." *Philosophy Compass*, 6(11): 765–776.

Scovronick, Noah, Mark B Budolfson, Francis Dennig, Marc Fleurbaey, Asher Siebert, Robert H Socolow, Dean Spears, and Fabian Wagner. 2017. "Impact of

population growth and population ethics on climate change mitigation policy." *Proceedings of the National Academy of Sciences*, 114(46): 12338–12343.

Singer, Peter. 1976. "A Utilitarian Population Principle." in Micheal D. Bayles ed. *Ethics and Population*, Cambridge, MA: Schenkman, Chap. 5: 81–99.

——— 2005. "Ethics and intuitions." *The Journal of Ethics*, 9(3-4): 331–352.

Spears, Dean. 2014. "Decision costs and price sensitivity: Field experimental evidence from India." *Journal of Economic Behavior & Organization*, 97: 169–184.

——— 2017. "Making people happy or making happy people? Questionnaire-experimental studies of population ethics and policy." *Social Choice and Welfare*: 1–25.

Stanovich, Keith E and Richard F West. 2000. "Advancing the rationality debate." *Behavioral and brain sciences*, 23(05): 701–717.

Tännsjö, Torbjorn. 2002. "Why we ought to accept the repugnant conclusion." *Utilitas*, 14(3): 339–359.

Temkin, Larry S. 2012. *Rethinking the Good: Moral Ideals and the Nature of Practical Reasoning*: Oxford University Press.

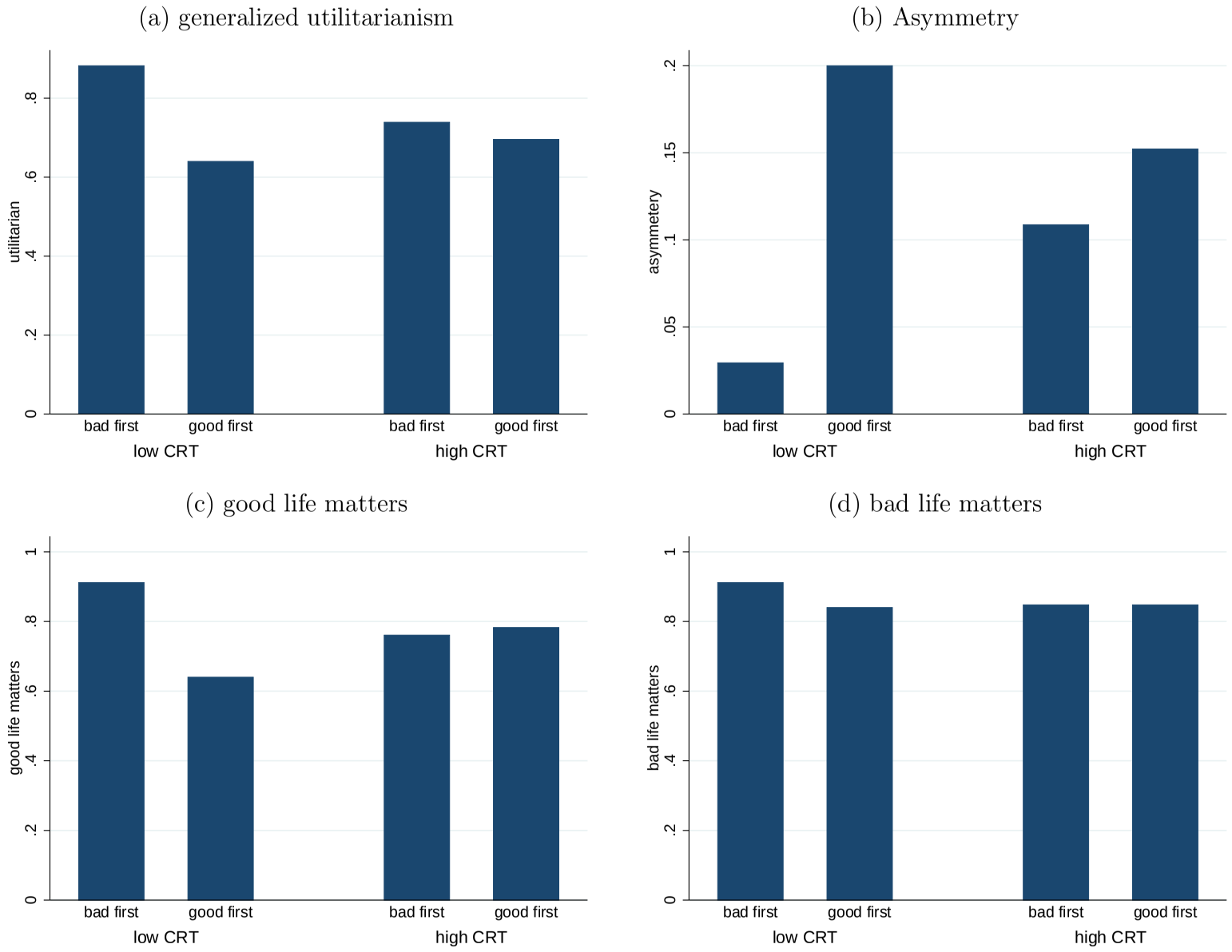
Unger, Peter K. 1996. *Living high and letting die: Our illusion of innocence*: Cambridge Univ Press.

Yaari, Menahem E and Maya Bar-Hillel. 1984. "On dividing justly." *Social choice and welfare*, 1(1): 1–24.

Table 1: Studies 1a and 1b: Most respondents did not choose the Asymmetry

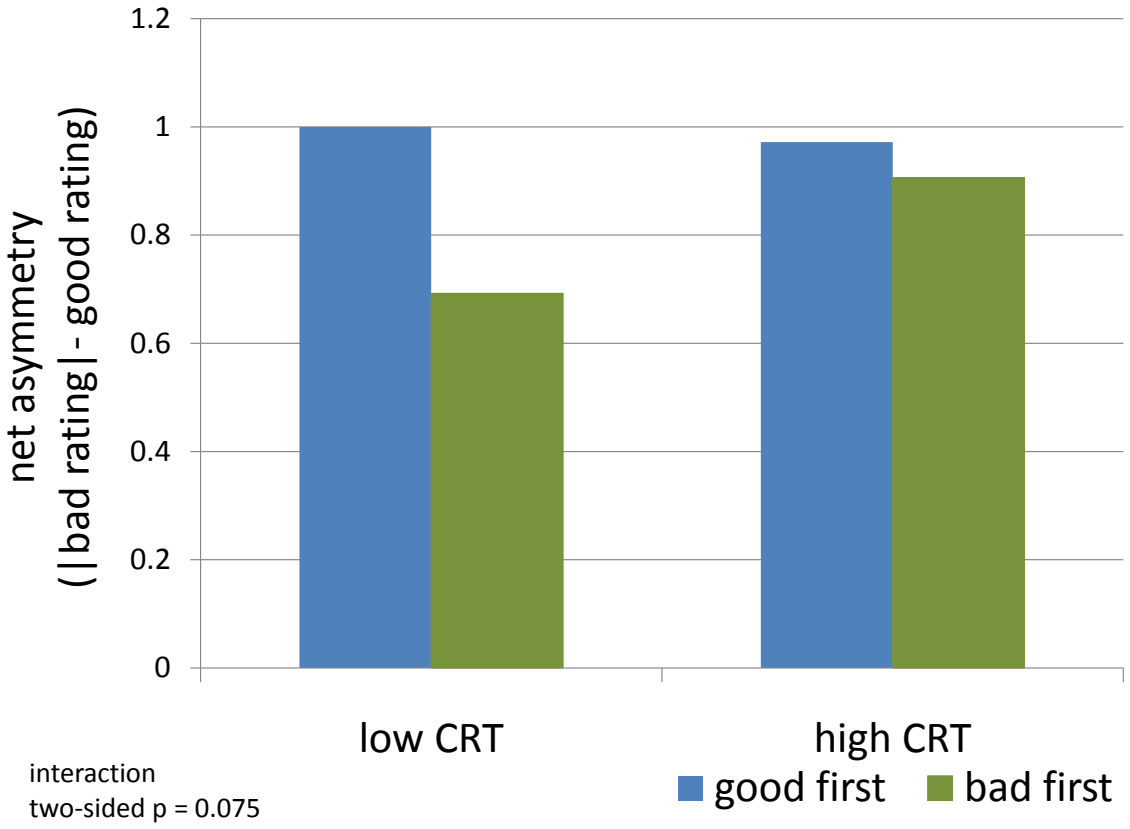
	child's life will be bad		
child's life will be good	relevant	irrelevant	
relevant	utilitarianism 74.1% 74.7%	4.7% 3.2%	78.9% 78.0%
irrelevant	asymmetry 12.5% 15.1%	8.6% 7.0%	21.1% 22.0%
study 1a on top **study 1b on bottom**	86.6% 89.8%	13.4% 10.2%	*n* = 232 *n* = 186

Figure 1: Study 1a: Question order predicts judgment among participants with low cognitive reflection



CRT stands for Cognitive Reflection Test.

Figure 2: Study 1b: Net Asymmetry is associated with question order, cognitive reflection



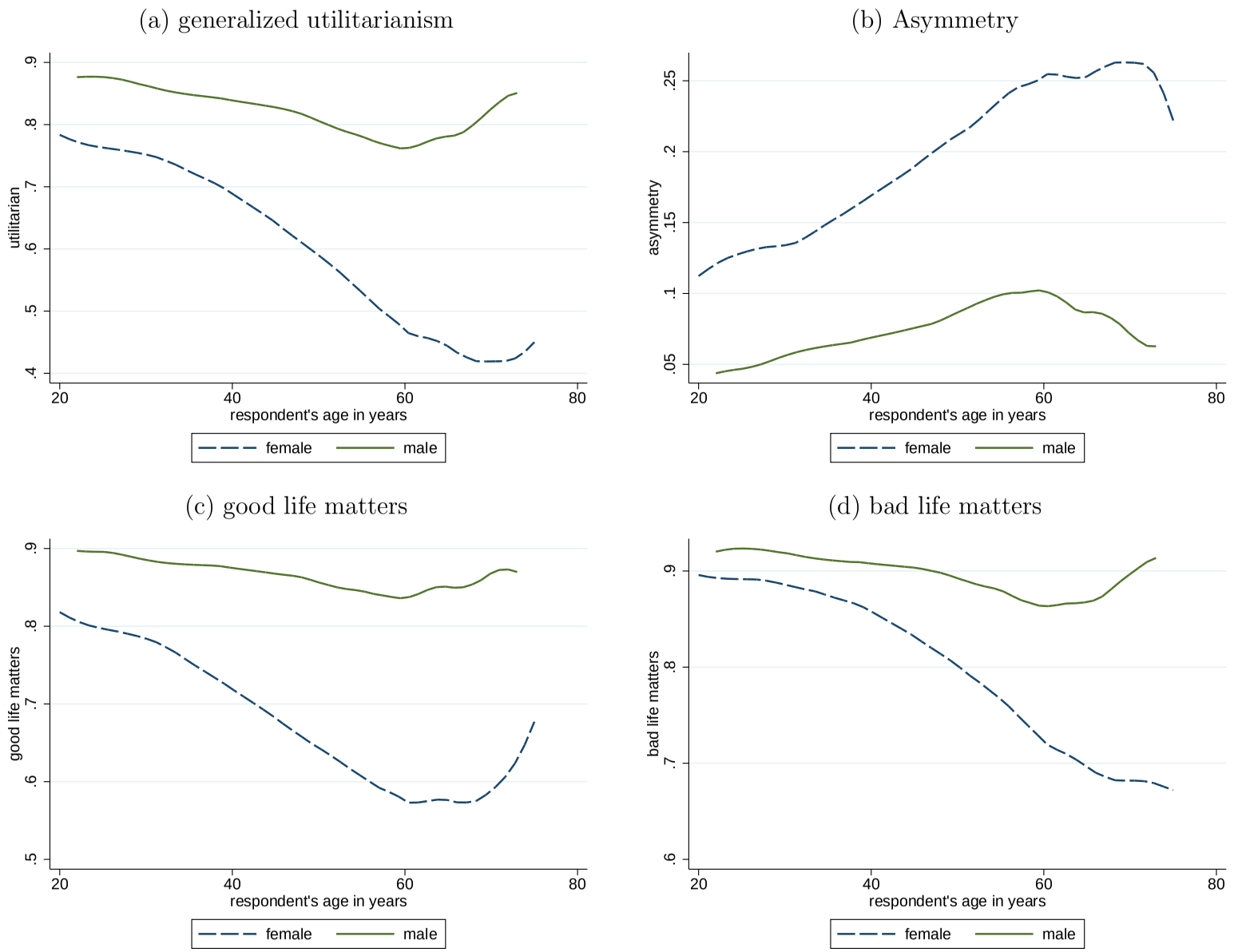
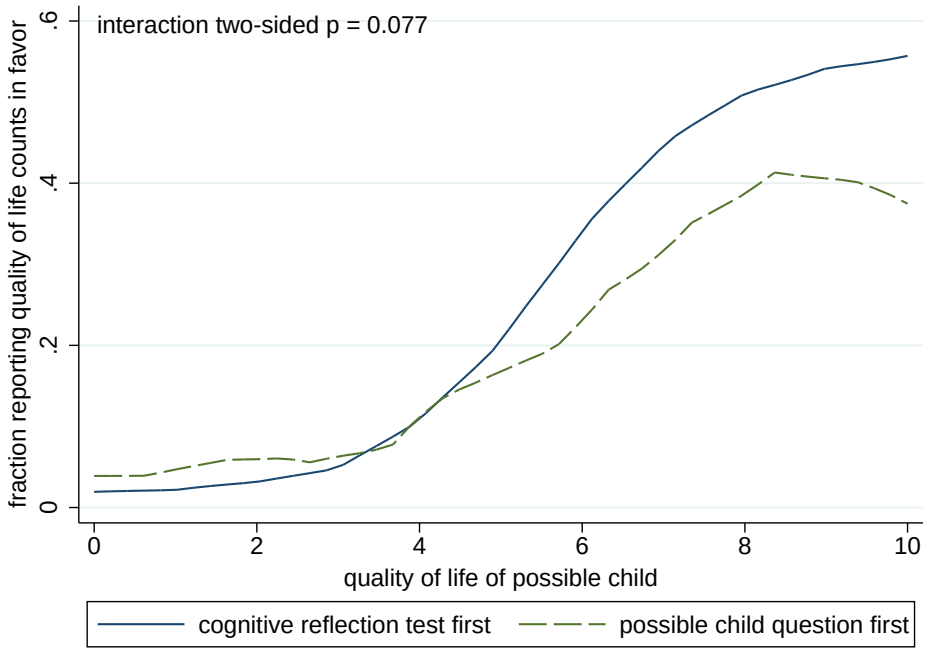


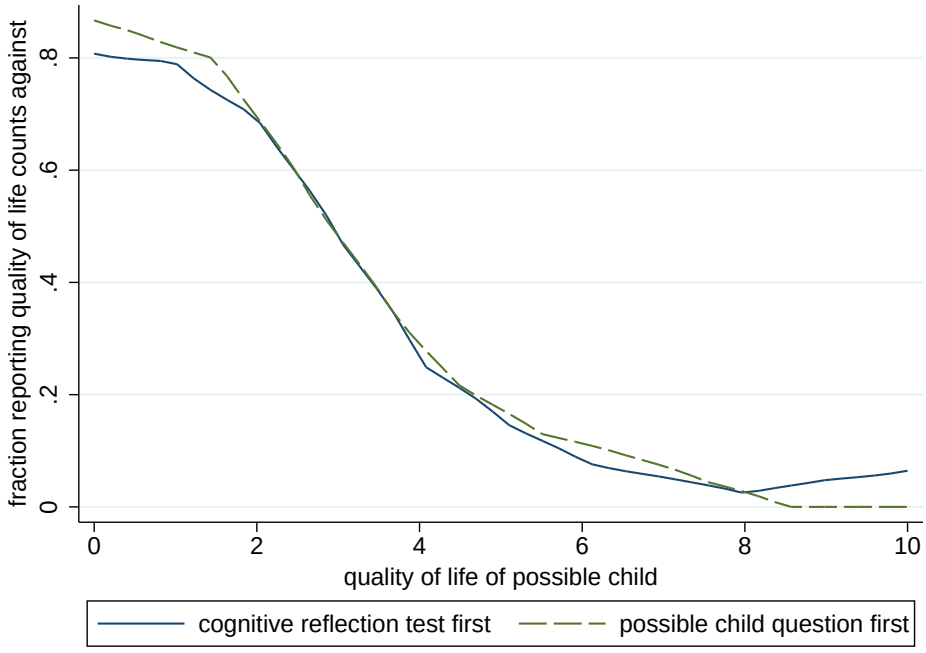
Figure 3: Study 1a individual differences: Female respondents were more likely to support the Asymmetry than males, on average

Figure 4: Study 2: Relevance of quality of life under experimentally manipulated cognition

(a) fraction of respondents reporting quality of life counts ethically **in favor of** having child



(b) fraction of respondents reporting quality of life counts ethically **against** having child



Note: For further results, see Table A4 of the Statistical Supplementary Appendix. The p-value in panel (a) tests for the interaction between the child's quality of life and the cognitive reflection treatment, in predicting judgments that the quality of life counts in favor of having the child.

A1 Details on Study 3

The experimental text in Studies 1 and 2 explained "the couple sees reasons for and against conceiving another child," which was intended as a non-technical suggestion for non-academic readers that the decision is otherwise balanced. However, the possibility remains that some of the participants' responses may have been motivated by beliefs about consequences for the potential child's parents.[1] Study 3 was conducted[2] to test this possibility explicitly. Its experimental text was identical to that in Study 2, except that the cognitive reflection test[3] was omitted, and the quality of life treatment was interacted with a binary treatment, in which it was either made further explicit or not that there would be no effect on other people. This randomized treatment, received by half of the participants, was the inclusion in the text of:

> For the purposes of this survey question, you should assume that, although life will be different for the parents if they have the additional baby, the good and bad consequences are balanced: the parents, their other children, and every other person (except the new baby itself) will be just as well off whether the parents have the baby or not.

This explicit balancing treatment had no effect on participants' judgments, and in particular did not interact with the effect on Asymmetry judgments of the possible child's quality of life. Figure A2 presents this result: the lines are visually similar with and without the explicit balancing treatment. In the statistical supplementary appendix, Table A5 and Figure A2 present more details, alternative functional forms, and statistical significance tests. These results emphasize that test statistics on the interaction are small: the absence of a statistically significant interaction is not merely because the results are noisy, but is rather because the interaction coefficient is small and close to zero.

The results of Study 3 are also quantitatively close to the results of Study 2, as comparing Tables A4 and A5 shows. For example, an extra point of quality of life for the potential child is linearly associated in Study 2 with a 5.98 percentage point increase in the fraction of respondents reporting that the fact counts in favor of creating the child, and with a 5.38 percentage point increase in Study 3.

[1] Not all statements of the Asymmetry in the literature are fully explicit about ruling out this indirect mechanism: **?**) begins a statement of the Asymmetry with "everything else being equal," but **?**) does not, for example. **?**) argues that "there is no moral reason to create a person whose life would foreseeably be worth living, just *because* her life would be worth living," where the emphasis on because rules out an effect because the parents' lives would be improved (p. 2-3).

[2] 264 participants (12 for each of 22 experimental treatment categories) completed Study 3 over mTurk in January 2018.

[3] The purpose of Study 3 was to confirm that the general method of this paper, and the specific method of Study 2, is robust to clarification of this *ceteris paribus* assumption. The triple interaction required to fully interact Study 3's treatment with Study 2's CRT treatment would have required a very large sample to be adequately powered.

A2 Cognitive Reflection Test text

The three questions are:

- A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?
- If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?
- In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

Table A1: Study 1a: Randomized question order influences utilitarian judgment

	(1) utilitarian	(2) asymmetry	(3) good life	(4) bad life	(5) good | bad
Panel A: Without controls					
good before bad	-0.119*	0.0500	-0.0491	-0.0691	-0.070
	(0.0583)	(0.0444)	(0.0544)	(0.0458)	(0.051)
constant	0.795***	0.102***	0.811***	0.898***	0.886***
	(0.0360)	(0.0270)	(0.0349)	(0.0270)	(0.0299)
Panel B: With controls					
good before bad	-0.129*	0.0659	-0.0616	-0.0628	-0.089†
	(0.0615)	(0.0481)	(0.0574)	(0.0487)	(0.052)
n	232	232	232	232	201

"Good before bad" is an indicator that the participant was randomly assigned to be asked about a good life before being asked about a bad life. "Utilitarian" is an indicator for saying that a good life and a bad life both matter ethically; "asymmetry" is an indicator for saying that a bad life matters but a good life does not. "Good life" and "bad life" are indicators that these are judged to matter, rather than be irrelevant. "Good | bad" is an indicator for believing a goood life is relevant, with the sample restricted to those who think a bad life is relevant. Two-sided p-values: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table A2: Study 1a: Question order interacts with cognitive reflection for utilitarian judgment

	(1) utilitarian	(2) asymmetry	(3) good life	(4) bad life
good before bad	0.0853†	-0.0473	0.107*	0.0380
× CRT score	(0.0494)	(0.0384)	(0.0473)	(0.0403)
good before bad	-0.273*	0.146†	-0.244*	-0.126
	(0.106)	(0.0833)	(0.102)	(0.0844)
CRT score	-0.0689*	0.0377	-0.0714*	-0.0312
	(0.0319)	(0.0238)	(0.0303)	(0.0265)
other controls	✓	✓	✓	✓
n	232	232	232	232

"Good before bad" is an indicator that the participant was randomly assigned to be asked about a good life before being asked about a bad life. "Utilitarian" is an indicator for saying that a good life and a bad life both matter ethically; "asymmetry" is an indicator for saying that a bad life matters but a good life does not. "Good life" and "bad life" are indicators that these are judged to matter, rather than be irrelevant. Two-sided p-values: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table A3: Study 1a: Female participants are less likely to make utilitarian judgments

	(1) utilitarian	(2) asymmetry	(3) good life	(4) bad life
female	-0.168**	0.103*	-0.153**	-0.0657
	(0.0556)	(0.0416)	(0.0515)	(0.0439)
constant	0.835***	0.0680**	0.874***	0.903***
	(0.0367)	(0.0249)	(0.0329)	(0.0293)
n	232	232	232	232

"Female" is an indicator that the participant is female. "Utilitarian" is an indicator for saying that a good life and a bad life both matter ethically; "asymmetry" is an indicator for saying that a bad life matters but a good life does not. "Good life" and "bad life" are indicators that these are judged to matter, rather than be irrelevant. Two-sided p-values: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table A4: Study 2: Quality of life matters for judgments in favor of and against having a child

	(1)	(3)	(2)	(4)
dependent variable:	counts for	counts for	counts against	counts against
child's quality of life	0.0543***	0.0598***	-0.0863***	-0.0947***
	(0.00605)	(0.00765)	(0.00528)	(0.00680)
CRT first		0.0569		0.0179
		(0.0490)		(0.0465)
constant	-0.0160	-0.0994*	0.747***	0.787***
	(0.0267)	(0.0410)	(0.0381)	(0.0532)
n	426	239	426	239
sample	full	high-quality	full	high-quality

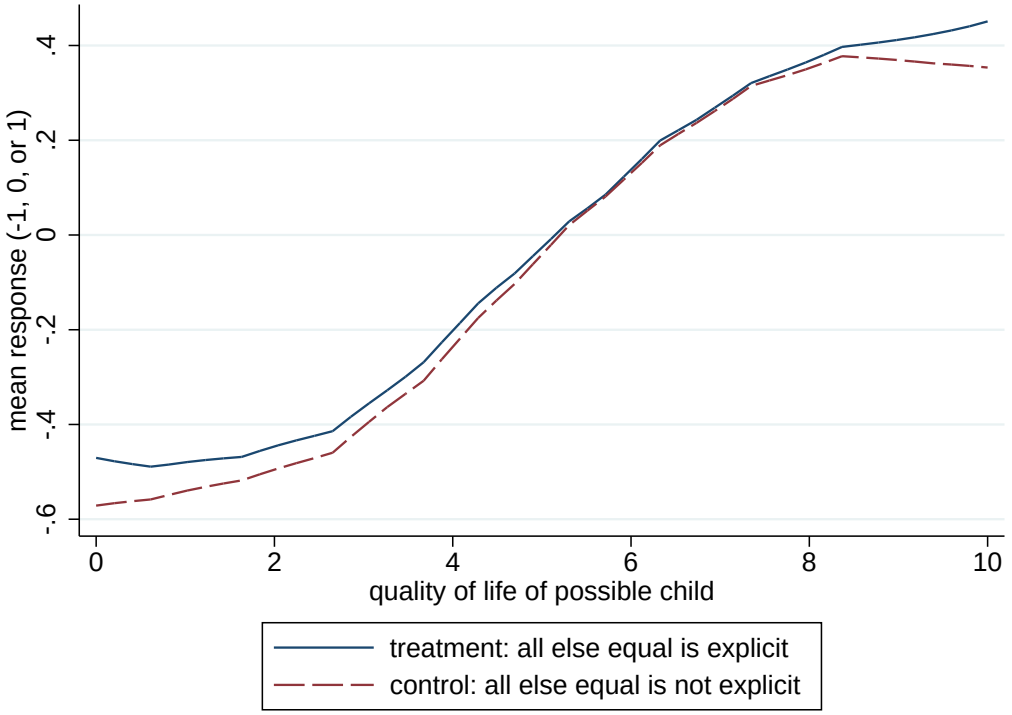
The high quality sample correctly reported at the end of the survey the randomized child's quality of life which was that respondent's experimental treatment and correctly reported that the woman in the question was not pregnant. Two-sided p-values: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table A5: Study 3: Robustness: The effect on judgments of quality of life information does not interact with whether the *ceteris paribus* assumption for parents is made explicit

	(1)	(2)	(3)	(4)
dependent variable:	response (-1, 0, 1)	positive	negative	response (-1, 0, 1)
model:	OLS	OLS	OLS	ordered logit
child's quality of life	0.124***	0.0538***	-0.0705***	0.417***
	(0.0162)	(0.0103)	(0.0110)	(0.0630)
explicit balance treatment	0.0720	0.0341	-0.0379	0.113
	(0.143)	(0.0661)	(0.111)	(0.504)
interaction	-0.00379	0.00379	0.00758	0.0106
	(0.0247)	(0.0156)	(0.0159)	(0.0864)
interaction test statistic:	$t = -0.15$	$t = 0.24$	$t = 0.48$	$z = 0.12$
n (responses)	264	264	264	264

Two-sided p-values: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. "Interaction test statistic" tests whether the interaction between the quality of life and the explicit balance treatment is statistically significantly different from zero.

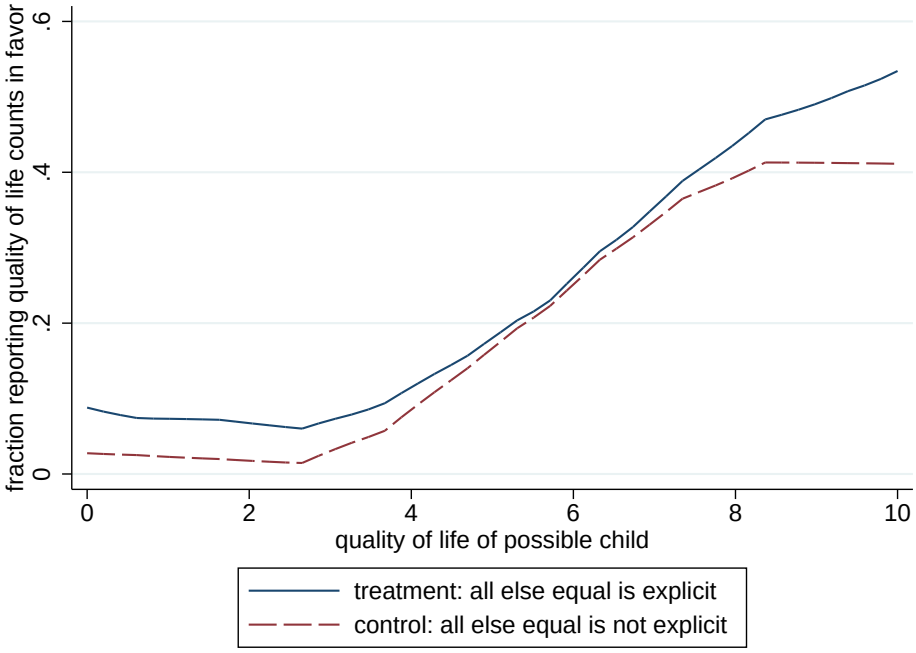
Figure A1: Study 3: Robustness check that results of Study 2 are not sensitive to making explicit the *ceteris paribus* assumption about parents' lives



Note: For further results, see Table A5 and Figure A2 of the Statistical Supplementary Appendix.

Figure A2: Study 3: Graphical results (see Table A5)

(a) fraction of respondents reporting quality of life counts ethically **in favor of** having child



(b) fraction of respondents reporting quality of life counts ethically **against** having child