

Sex, benevolence and willingness to pay for screening

Introduction

Individuals are motivated by self-interest, but not exclusively. In addition to the prospect of purely-personal gain, behaviour can be inspired by benevolence and a concern for the welfare of others. This is evidenced by a willingness on the part of many people to donate money to charities, to engage in voluntary work and to provide support for dependent family members. Both men and women participate in such activities, prompting the question as to whether one of the sexes might be more benevolent, or less self-interested, than the other.

Experimental economists have attempted to address this issue by means of dictator and public goods games (Croson and Gneezy, 2009). In the case of the former, the dictating player determines the proportions of a common asset to be divided between him/herself and a second player whilst, in the latter case, the player makes an individual contribution to a communal fund. These experiments have proved inconclusive in that men have been shown to be more benevolent than women (Ben-Ner et al., 2004), less benevolent (Eckel and Grossman, 1998) and equally benevolent (Bolton and Katok, 1995). It has now become clear that experimental findings are heavily conditioned by experimental context. First, men and women respond differently when the experimental task involves a degree of risk, women typically being the more risk-averse (Eckel and Grossman, 2008b). Second, manifested benevolence is sensitive to the personal costs of being generous and the effect is more pronounced amongst women (Andreoni and Vesterlund, 2001; Cox and Deck, 2006). Finally, men and women may behave differently when their fellow game player(s) are of known sex, as opposed to anonymous, and when their decisions are witnessed, as opposed to confidential. Male players become relatively more benevolent when the recipients of that benevolence are known to be female (Boschini et al., 2012) and when the extent of the generosity is

disseminated to other players (van Vugt and Iredale, 2013). By the same token, fellow game players respond differently when the sex of the principal player is known, the expectation being that female principals will be more generous (Aguiar et al., 2009). Both sexes become more benevolent when required to collaborate (Kamas et al., 2008). Even so, such interpretations are themselves contradicted by reports that the gender-priming of experimental subjects has no effect on relative generosity (Cadsby et al., 2010; Dufwenberg and Muren, 2006). Unsurprisingly, systematic reviews have concluded that benevolence experiments to date “offer no clear evidence of a systematic difference between men and women” (Eckel and Grossman, 2008a p. 510).

Contingent valuation (CV) offers an alternative method of analysing attitudes, by considering stated preferences rather than experimentation’s revealed preferences. CV elicits monetary valuations contingent upon specific circumstances prevailing; it asks individuals to indicate their maximum willingness to contribute towards securing a new state of affairs or to preserve an existing one. The technique has been used extensively to estimate worth in non-market settings (Carson, 2012). Environmental economists solicit contingent values for public goods such as reduced levels of pollution, the enjoyment of an unspoiled wilderness or the preservation of animal populations. Health economists use CV to estimate the potential value added by including a novel medical procedure in the portfolio of publicly-funded health care interventions (Hanley et al., 2003).

As a means of investigating benevolence and self-interest by sex, the health care CV route offers attractive possibilities. It is well-established that CV is sensitive to the public’s altruistic motivations for supporting policies available to all, for example, health improvement via pollution control (Rodriguez and Leon, 2004) and immunisation programmes (Arana and Leon, 2002; Shiell and Rush, 2003). Moreover, CV studies in health have also identified benevolence, in the form of individuals’ willingness to contribute to care services from which they themselves would receive no direct private benefit. For example, people seem prepared

to contribute to health care services for others in need, especially if the latter's medical conditions are deemed serious (Hurley and Mentzakis, 2013; Jacobsson et al., 2005). Adults express willingness to pay for interventions which promote the health and safety of children, in the form of vaccinations (Brown et al., 2010), hearing aids (Sach et al., 2004), reductions in traffic accidents (Andersson and Lindberg, 2009) and prevention of minor infections (Liu et al., 2000). Rich individuals appear willing to subsidise care services for the poor with respect to health care insurance generally (Shiell and Seymour, 2002), infection prevention (Onwujekwe and Uzochukwu, 2004) and contraceptive services (Onwujekwe et al., 2012).

In view of the record of the CV method in health care we decided to employ it in a field study to investigate the question of self-interest and benevolence of the sexes in relation to one other. We constructed a scenario in which both men and women would indicate how much money they would be willing to contribute to each of three comparable health care services. One of these services would be available only to members of the opposite sex, implying that the individual respondent would be unable to benefit directly from it. Such a construction facilitated a simple interpretation of the stated valuations. We construed a willingness to contribute only to services from which the respondent could benefit directly by virtue of his or her own sex as an absence of benevolence with respect to the opposite sex. We construed a willingness to contribute to the service from which the respondent could never benefit personally, but from which members of the opposite sex could, as benevolence towards that sex. We interpreted higher contingent values as greater willingness and stronger motivation, other things remaining equal. As the tasks facing men and women were identical, we reasoned that the existence of significant asymmetries in response by sex would allow us to infer whether the extent of self-interest and benevolence towards the opposite sex differed between men and women.

Method

To minimise the risk of bias we determined that the scenario should comprise interventions which were, as far as was possible, similar in purpose and process, as well as being familiar to both sexes. We accordingly selected three forms of screening for cancer. In England, where this study was conducted, screening for bowel cancer is available to asymptomatic men and women at zero price via the country's National Health Service (NHS). Both screening for breast cancer and screening for prostate cancer are available on similar terms, although for women only and for men only, respectively. An additional similarity is that the risk of each of these cancers is insubstantial amongst those aged 50 years or below, and screening is not usually recommended for that age-group.

Our data were obtained from a questionnaire survey using an instrument designed for self-completion without supervision. This instrument was based on those used in previous local studies of attitudes to, and valuations of, cancer screening (Philips et al., 2005; Whynes et al., 2003). After initial construction, the instrument and supporting materials were reviewed for intelligibility by lay representatives from the Nottingham Primary Care Research Partnership Consumer Panel. All documentation was revised in the light of their comments, presented for ethical approval and revised again. Two large primary care practices, one in Nottingham and one in Mansfield (approximately 12 miles farther north), distributed questionnaires on our behalf. Each practice was provided with pre-prepared survey packages containing an invitation letter, a blank questionnaire, a patient information sheet and a pre-paid response envelope for the return of the completed questionnaire. The practices were asked to mail packages to registered patients aged between 30 and 70 years, but were granted discretion in exclusion. Patients with a current diagnosis of cancer or with learning disabilities were to be excluded from the sample, on the grounds of the need to avoid distress and incapacity to complete the instrument, respectively. Guaranteed anonymity in response

prevented both compliance enhancement by contacting non-responders and the identification of the non-responders' characteristics.

In addition to eliciting contingent valuations by sex, the survey also collected information of men's and women's knowledge of cancer and of screening. These findings have been presented in detail elsewhere (Sach and Whynes, 2009). Briefly, differences in knowledge between the sexes related to differences in cancer types, which were themselves related to sex. Thus, women were more likely than men to cite alcohol, sexually-transmitted disease and family history as major risk factors for cancer, and these factors are indeed more appropriate to female cancers. With respect to the identity of the most common cancers, more women than men believed bowel and cervical cancers to be common, whereas more men than women cited prostate cancer. Over 70 per cent of both men and women believed breast cancer to be amongst the most common cancers. Comparable proportions of both sexes declared smoking to be a major risk for cancer and dismissed stress and lack of exercise as risk factors. A similar proportion of men and women (around half) believed correctly that cancer was less common amongst women, with around one quarter each believing the opposite or admitting ignorance. Virtually everyone in the sample agreed that the NHS should continue to provide cancer screening services. More than 90 per cent both of men and of women indicated that they had either attended, or would accept an invitation to attend, for prostate and breast screening, respectively.

The section of the questionnaire relevant to the present study opened with descriptions of bowel, breast and prostate cancers and screening in the United Kingdom. In each case, eligibility for screening by sex was emphasised i.e. bowel screening is available to everyone whereas breast and prostate screening are restricted to women and to men, respectively. The CV task itself was prefaced by a "person trade-off" (PTO) task, in which subjects were required to choose just one of the three types of screening to be offered, to the exclusion of the others, under the supposition that only one type could be afforded by the NHS. In making

their choices, therefore, subjects would implicitly decide whether or not to include members of their own sex in, and to exclude members of the opposite sex from, the available service.

The CV task asked subjects to assume that NHS screening services could continue only if people were prepared to contribute financially. CVs for contributions to each of the three types of screening were requested. We chose to elicit valuations using the open-ended format. Compared with alternatives in real-world health care settings, this format demonstrates good construct validity, i.e. a strong association between willingness to contribute and household income (Grutters et al., 2009; van der Pol et al., 2008). It replicates how people choose to donate money (Borghgi and Jan, 2008) and has been shown to be the elicitation format least prone to upward bias when valuing willingness to pay for cancer screening (Whynes et al., 2005a). As an adjunct, subjects were asked to select up to six possible explanations for their selection of CVs, from a list informed by those volunteered by the subjects of a CV analysis of bowel cancer screening (Whynes et al., 2003). As people often report difficulties in associating monetary valuations with zero-price public health care, subjects were invited to score the degree of difficulty experienced in selecting their valuations on a 0-10 linear scale. The instructions for the CV task are reproduced in the Appendix to this paper.

In the final section of the questionnaire, socio-demographic information was requested, including sex, age, cohabitation status (whether the respondent was living alone or with a spouse or partner), ethnic background, and age on leaving full-time education. Annual household income was represented as a choice of one from four income bands, beginning at 0-£10,000 and thereafter in increments of £10,000 to £30,000 and above. Subjects were asked whether they or a close family member had ever experienced cancer, their assessment of their personal cancer risk in comparison with persons of their own age and sex, and whether or not they were worried about the prospect of succumbing to cancer in the future.

Results

Out of a total of 6,939 survey packages distributed to the general practices, 1,787 questionnaires in which subjects had completed the PTO task, the CV task or both were returned. The response rate (25.8 per cent) was similar to that achieved in a previous local study (Philips et al., 2005). In 207 (11.6 per cent) of the responses, a preference for screening type had been indicated yet no CVs had been recorded, i.e. all three values were missing. These questionnaires were excluded from the subsequent analyses. The study sample thus comprised only those responses in which at least one CV was offered (n = 1,580). Of these, 55.5 per cent were from women.

Table I presents the characteristics of the sample by sex. The test statistics derive from Pearson chi-squared tests for discrete variables and the t-test for comparisons involving continuous variables. Screening preference evidently differed significantly by the sex of respondent. A higher proportion of women than of men chose own-sex screening in the PTO task and a lower proportion chose opposite-sex screening. Similar proportions chose both-sex (bowel) screening. By implication, 75.0 percent of men chose a type of screening from which a woman could benefit, compared with 41.3 per cent of women choosing a type from which a man could benefit. Women in the sample tended to be younger than men and drawn from lower-income households. Significantly fewer men than women expressed worries about cancer, had personal or family experience of cancer and perceived their risks of the disease to be above average. Women found the CV task more difficult than did men. Unsurprisingly in view of the income distributions, more women than men explained their CVs in terms of affordability.

-- Table I near here --

A comparison of the characteristics between those excluded from the study owing to three missing values and those providing CVs indicated a greater representation of women

amongst the former (64.7 vs. 55.5 per cent, $\chi^2 = 6.34$, $p = 0.01$). Lower household incomes were more common in the excluded group ($\chi^2 = 36.96$, $p < 0.01$) whose members had, on average, left education at an earlier age (16.5 vs. 17.5 years, respectively, $\chi^2 = 3.45$, $p < 0.01$). Unsurprisingly, the excluded had found the CV task more difficult than had the main sample (score 8.2 vs. 7.0, respectively, $t = 4.17$, $p < 0.01$). However, there was no evidence of disproportionate representation amongst the excluded with respect to the relative preference for screening types (PTO task), ethnicity, cancer experience, perception of personal risk and cancer worries.

CV data

A total of 4,701 CVs were supplied by the respondents. Of these, 3,761 (80.0 per cent) were positive amounts and the remaining 940 (20.0 per cent) were zero. Of the 769 women willing to pay a positive amount for breast cancer screening, 605 (80.2 per cent) were also willing to pay a positive amount for prostate screening. Of the 564 men willing to pay for prostate screening, 474 (86.7 per cent) were willing to pay for breast screening also. The difference in proportions was significant ($Z = 3.12$, $p < 0.01$).

An initial review of the consolidated CV data revealed two characteristics which determined the methods of analysis. First, most CVs had been expressed as prominent numbers. Prominent numbers take the form $N10^X$, where $N = 1, 2$ or 5 and X is an integer, $0, 1, 2$ and so on. Individuals appear to find prominence a helpful heuristic when constructing their contingent valuations and a high prevalence has been observed before in stated preference studies of screening, both for cancer (Whynes et al., 2005b) and for chlamydia (Ryan and Watson, 2009). Of the total of 3,761 non-zero CVs provided, 2,947 (78.4 per cent) were prominent numbers. Just four of these numbers (10, 20, 50, 100) accounted for 67.9 per cent of all non-zero CVs and the value of £50 alone accounted for 22.7 per cent. The

ostensibly-continuous CV distributions were therefore essentially discrete, requiring us to consider the CVs as limited dependent variables.

Second, the majority of individuals ($n = 1,107$, 70.1 per cent) in the sample had provided an identical CV for each of the three types of screening. Put another way, only a minority ($n = 473$, 29.9 per cent) assigned dissimilar CVs to different types of screening, thereby discriminating between the types in terms of willingness to contribute. Of those offering the same three CVs, 228 (14.4 per cent) indicated a value of zero whilst 160 (10.1 per cent) and 208 (13.2 per cent) chose three CVs of £10 and of £50, respectively. The value reported was £50 or greater in 39.8 per cent of the cases of identical CVs. Amongst those providing dissimilar CVs, values of £50 or greater were reported in 52.8, 45.9 and 30.9 per cent of responses, for bowel, breast and prostate screening, respectively. We decided that the two classes of response to the CV task – identical vs. dissimilar CVs – necessitated independent analyses, because deciding to supply the same or different values would itself have been a conscious act on the part of each respondent. Whether or not CV response varied by sex would be observable in the sex composition of each response class and the relative size of CVs when values differed.

CVs were re-coded as binary variables, below £50 vs. £50 and above, and the data were subjected to three binary logistic regression analyses. The first model (A) sought to discriminate between individuals who chose to offer dissimilar CVs and those who offered identical or similar CVs. The second model (B) predicted CVs of £50 and above amongst those providing three identical CVs only. The third model (C) predicted CVs of £50 and above amongst those who offered dissimilar CVs only. As the three CVs were not the same in this last sub-sample, separate models were built for each of the three types of screening. Each model was fitted using the backwards stepwise procedure with all Table I variables entered initially. The majority of these were dummy variables. In the case of household

income, three dummies were entered with £20-30,000 omitted as the reference case. Table II presents the regression results.

-- Table II near here --

In logistic regression, $\text{Exp}(b)$ is interpretable as the odds ratio. From Regression A, it appears that men, those cohabiting, those unworried by cancer and those valuing on the basis of expected benefit to others were more likely to provide identical CVs. Those explaining their valuations on the basis of fairness, guesswork, benefits to themselves and the cost of screening were more likely to offer CVs which differed by screening type. Regression B indicates that, amongst those offering identical CVs for the three screening types, values of £50 and higher were more likely if respondents were older, had experienced cancer and explained their valuation in relation to benefits to themselves. Values below £50 were more probable amongst individuals in lower-income households or unworried by the prospect of cancer. The three Regression C models together contained just three independent variables. In two, CVs above £50 were less likely amongst lower-income respondents and more likely amongst those perceiving themselves to be at high risk. Men were more prepared to offer above £50 for both-sex (bowel) screening, whilst both women and men, in turn, were more likely to offer above £50 for own-sex screening (breast for women, prostate for men).

Relative values

The relative magnitudes of the contributions for each of the three screening types offered by individuals choosing identical CVs were obviously the same in all cases. However, relative contributions in the sub-sample of dissimilar CVs responses ($n = 473$) were potentially variable. Of those individuals providing CVs in which at least one value differed from the others, only a small minority (4.9 per cent of women and 2.8 per cent of men) were unwilling to contribute a positive amount to both-sex (bowel) screening ($\chi^2 = 1.18, p = 0.28$). Amongst men, 45.1 per cent were unwilling to contribute any positive amount to breast screening for

women, whereas 54.2 per cent of women were unwilling to contribute to prostate screening for men. The difference in proportions was of borderline significance ($Z = -1.91$, $p = 0.06$).

Table III presents average values for the different types of cancer screening provided by the individuals offering dissimilar CVs. These data are prefaced by the results of the PTO task for this sub-sample. When constrained to choose only one type of screening for the NHS considerably more women than men expressed a preference for own-sex screening rather than for opposite-sex screening, although the proportion preferring both-sex (bowel) screening did not differ between the sexes ($\chi^2 = 0.72$, $p = 0.40$). For women, breast screening was significantly more highly valued than bowel screening which, in turn, was valued more than prostate screening. For men, the values of bowel and prostate screening were similar and both were higher than that of breast screening. Across the sexes, the average CVs of bowel screening were not significantly different ($Z = -1.31$, $p = 0.19$) although those of both breast and prostate screening were ($Z = -7.38$ and -11.26 , respectively, $p < 0.01$ in both cases).

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In Table III, “total contributions” represents the sum of the CVs of the three screening types. Those made by men and women did not differ ($Z = -1.23$, $p = 0.22$), although the share of values in the totals did. For men, the average CV for opposite-sex screening was 60.4 per cent of the CV for own-sex screening; for women, the corresponding proportion was considerably lower, at 30.8 per cent. Amongst the women, the CVs mirrored the popularity of screening types from the PTO task, i.e. higher CVs were accorded to types more frequently preferred. For men, however, prostate screening was the least-popular preference but was valued as highly as the most-popular preference.

The distribution of household incomes of men and women in this sub-sample did not differ significantly ($\chi^2 = 2.07$, $p = 0.56$) although a higher proportion of women than men offered affordability as an explanation for their CVs (59.3 vs. 46.4 respectively, $\chi^2 = 7.48$, $p <$

0.01). A higher proportion of women than men believed their risk of succumbing to cancer was greater than average (19.4 vs. 11.7 per cent, $\chi^2 = 4.87$, $p = 0.03$) and reported experience of cancer, either personal or their families (64.5 vs. 43.6 per cent, $\chi^2 = 19.68$, $p < 0.01$). Relatively fewer women than men reported experiencing no worries about cancer (10.7 vs. 23.8 per cent, $\chi^2 = 14.25$, $p < 0.01$).

Discussion

In the PTO task, more than half of respondents selected a service (breast or prostate screening) which would have excluded one particular sex. At the same time, over two-thirds offered identical CVs for all three services, thereby effectively electing not to discriminate. These people were evidently willing to make the same contribution to a service from which they could not benefit as to one from which they could. Previous CV studies have also reported a high proportion of identical multiple values in the presence of strong preferences over alternatives and have questioned the consistency of such findings (Olsen et al., 2005). However, in the present study as in the earlier ones, the results surely arose because the PTO and CV tasks were qualitatively different. On the one hand, the CV task allowed individuals to express different values for each service if they so wished but did not oblige them to do so. On the other hand, the PTO task made an explicit choice unavoidable.

The most plausible explanation for identical values in the CV task is the use of the equality heuristic, whereby different services to different groups of individuals are all deemed equally legitimate and therefore necessitate the assignment of equal contributions. Indeed, PTO experiments using hypothetical scenarios have suggested that people are often anxious to avoid discriminating between care services. They either flatly refuse, or require implausibly high compensation, to trade off one person's care for that of another (Damschroder et al., 2007). Even when given the option of allocating all care resources to a service which is manifestly superior in outcome to a rival targeting different individuals, many people still

chose to divide the resources equally (Schwappach, 2005). An implicit presumption of equality in contribution would seem especially plausible in a country such as the UK, where the NHS has been government-directed, tax-funded and zero-price at the point of delivery since the mid-twentieth century. The provision of services, and entitlements to consume them, has long been divorced from personal contributions which, as taxpayers, individual citizens have little voice in determining.

For members of either sex who offered equal CVs, that which they were willing to contribute to benefit members of their own sex (including themselves) was the same as that which they were willing to contribute to benefit members of the opposite sex (excluding themselves). Those citing benefits to others as the explanation for their valuation were more likely to offer similar CVs and, where men and women provided equal CVs, there are clearly no grounds for concluding that one sex was the more other-regarding. However, other aspects of the results do suggest that self-interest and benevolence by sex might not be completely symmetrical. First, in the PTO task, men were more likely to choose a type of screening from which a woman could benefit than women were to choose a type from which a man could benefit. Moreover, proportionately more men than women chose opposite-sex screening at the expense of a type from which they could benefit personally. Second, the offer of identical CVs across the three types of screening was more likely to be made by men. Women were more likely to discriminate by offering different valuations, amongst which own-sex screening was accorded the highest valuation. Judged in these terms, men appeared to be more inequality-averse than women. Third, amongst those discriminating, a willingness to contribute to own-sex screening coupled with an unwillingness to contribute to opposite-sex screening was more common amongst women than amongst men. Finally, when discriminating between willingness to contribute for different types of screening there was no difference between the sexes in the average CV for the type in which both could participate (bowel). Both sexes valued own-sex screening more highly than opposite-sex screening, yet

women were prepared to offer proportionately less for the latter relative to the former than were men. Men's mean valuation of own-sex screening was no different from their valuations of both-sex screening, whereas that of women was significantly higher.

Our results suggest that, whilst the majority of both men and women were willing to contribute to a health care service from which only the opposite sex could benefit, there existed a benevolence bias of men towards women amongst the remainder. A possible explanation lies within the data themselves. A significantly lower proportion of men than women perceived their cancer risk to be above-average and reported worries about the disease (Table I). This was the case both for the sample as a whole and for the individuals providing different CVs. At the same time, breast cancer was by far the most frequently cited as a high-prevalence cancer, by both men and women alike. It seems possible, therefore, that both men and women believed women to be the more threatened personally by cancer, thereby necessitating greater relative support for breast screening. Put simply, concern for the opposite sex was more affordable for men than it was for women.

In addition to sex, cohabitation status emerged as a predictor of whether individuals discriminated between contributions by screening type (Table II). Cohabiting individuals were more likely to offer equal CVs than were those not cohabiting. The intuition here is that, as the preponderance of cohabitations would have involved heterosexual couples, an individual's concern for the opposite sex became personalised in the form of one particular member of that sex. To assign a lower contribution value to the opposite-sex intervention would have been to relegate a potential service for someone with whom an emotional attachment existed. Unsurprisingly, cohabiting is a strong predictor of actual participation in cancer screening, sex-specific or otherwise (Meiser et al., 2007; van Jaarsveld et al., 2006; von Euler-Chelpin et al., 2008). Presumably, the desire to alleviate one's own concerns about one's susceptibility to illness is reinforced by the need to alleviate the same concerns of one's partner.

It must be noted that the CV approach itself remains controversial, not least because the values elicited seem to depend on a wide variety of contextual factors, such as elicitation format (Whynes et al., 2005a), hypothetical bias (Liljas and Blumenschein, 2000) and task ordering (Stewart et al., 2002). Individuals are known to respond differently to choice tasks when asked to play different roles (Dolan and Green, 1998) and it remains unclear whether the method actually elicits true monetary valuations or more generalised representations of psychological dispositions (Ryan and Spash, 2011). In defence of the construct validity of our results, the directions of the influences of income, perceived risks, worries and cancer experience accord with economic intuition. As our primary purpose was to make relative judgements, confidence in the results would diminish only if we accepted that the effects of any biases or distortions in the CV method had affected the sexes differently. There appears to exist little evidence on which to make a judgement on this issue. Men have been shown to exhibit greater hypothetical bias than women when expressing a willingness to pay for public goods (Brown and Taylor, 2000; Mitani and Flores, 2009) but there are no comparable studies for private goods such as cancer screening.

The empirical literature on contingent valuation in health care is extensive, yet most studies have considered only the views of those eligible to receive the services being investigated. Beyond the present study, there appear to be few instances of members of one sex being asked to value services provided exclusively for the other. Two exceptions are men's valuations of services for improving the health of mothers in Burkina Faso (Ternent et al., 2010) and in Nepal (Borghetti and Jan, 2008). In both cases, men would be ineligible to receive the services yet they expressed a higher average willingness to pay than did the women themselves. The authors explained the difference in terms of male control over household income in those countries although the Nepalese study also explicitly recognised men's benevolence towards women. This having been said, neither study is strictly comparable to ours, as the services being evaluated were asymmetrical by sex (women were

not asked to value any services for men). A closer match to our investigation, in intention if not in method, was a PTO survey (Charny et al., 1989) in which UK subjects were asked to prioritise potential recipients of non-emergency medical treatment. When asked whether the treatment for a women should be given priority over the same treatment for a man “slightly more men favoured women ... at the expense of a larger proportion of women who did not choose” (p.1335). These findings of preponderant indifference with a degree of benevolence bias on the part of men towards women seem similar to our own.

Although speculation about the root of benevolence towards the opposite sex goes beyond our data, we conjecture that socially-defined gender stereotypes contributed to the observed asymmetry in response. The psychological literature on masculinity in Westernised industrial societies is extensive and seems relevant to our investigation in two respects. First, studies suggest that, relative to that of women’s, men’s helpfulness increases as the social distance between the helper and the helped increases. It is argued that chivalry is integral to the male gender role, chivalry being the imperative to help without solicitation those, even strangers, who face a need, especially when the recipient is female (Eagly, 2009; Eagly and Crowley, 1986). Second, masculinity entails understating the significance of personal illness. This is manifested as dismissing one’s health needs as unimportant (Galdas et al., 2005), engaging in risky behaviours (Courtenay, 2000) and having little regard for preventive interventions (Mahalik et al., 2007). Our benevolence findings are consistent with both aspects of masculinity, namely, male support for female screening at potential personal sacrifice and a relative lack of concern about cancer prevention.

We end by noting that, whilst a concern for the welfare of others is considered laudable in most societies, men’s deference to women’s needs in this particular context might be considered ill-judged. In the UK, both age-specific incidence of, and mortality from, cancer are around 20 per cent higher for men than they are for women (Westlake and Cooper, 2008) and this difference contributes, in part, to UK women’s longer life expectancies. If

gender stereotyping is indeed a cause of male reticence then individual change is unlikely in the absence of structural change (Cameron and Bernardes, 1998). Public health policies, however, tend to be gender-blind, essentially because of a presumption that gender-sensitivity in services is unnecessary and concerns about appearing discriminatory (Ostlin et al., 2007). Although gender's significance in health is becoming recognised by researchers, the active promotion of men's health has thus far has been minimal, both in the UK (Wilkins et al., 2008) and in other industrial countries (Wilkins and Savoye, 2009). Moreover, combating the male stereotype of deference to female health needs by making men more alert to their own could, on the basis of the arguments above, reduce men's existing propensity for benevolence to women.

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Appendix: Instructions for the contingent valuation task

We want to understand how much people value NHS cancer screening services, so now please imagine the following. Suppose that the NHS could only continue to provide cancer screening if everyone was willing to contribute something towards the costs. What's the maximum amount of money you'd be prepared to contribute each year, to enable each type of screening to continue ? Please write in the amounts. In thinking about this question it might be helpful to consider what else you could buy with the amounts of money you state. Note the amounts could be any values you like, including zero. Please be re-assured that we believe that people shouldn't have to pay for NHS cancer screening and the information you give won't be used to introduce charges. Providing a money value is just a way of indicating to us how important (or un-important) you think cancer screening is.

- (i) My contribution to the bowel cancer screening services would be: £...
- (ii) My contribution to the breast cancer screening services would be: £...
- (iii) My contribution to the prostate cancer screening services would be: £...

Which of the following best describe how you worked out your answers to these contribution questions (please tick all those which apply):

- (a) These are reasonable or fair amounts for me to contribute.
- (b) These are just guesses, token or nominal amounts.
- (c) These amounts reflect the benefits I'd get from screening.

- (d) The amounts reflect the benefits others would get from screening.
- (e) These are how much I think the tests would cost.
- (f) This is how much I can afford to pay.

How difficult was it to estimate money values for screening ? Please indicate by putting a cross on the scale below:

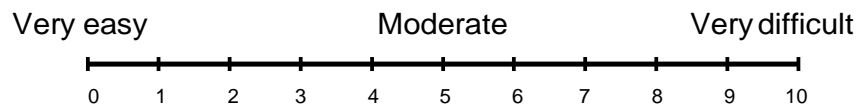


Table I - Sample characteristics

	Women	Men	χ^2 or t	P =
Preferred type of screening, %				
Bowel	39.7	38.3	211.8	0.00
Breast	58.7	36.7		
Prostate	1.6	24.9		
Socio-demographics				
Mean age, years	49.5	52.2	-4.8	0.00
Ethnic group (% white)	97.6	97.1	0.3	0.56
Cohabiting, %	78.6	81.5	2.2	0.14
Mean age leaving education, years	17.5	17.5	-0.1	0.95
Household income (£'000), %				
up to 10	16.6	14.3	8.6	0.04
10 to 20	29.6	24.5		
20 to 30	16.4	19.6		
over 30	37.4	41.6		
No worries about cancer, %	15.1	24.7	22.9	0.00
Experience of cancer, %	62.0	46.4	38.0	0.00
Chances above average, %	17.9	12.4	8.9	0.00
CV task difficulty, mean	7.4	6.5	6.0	0.00
Explanations for CV, % offering:				
Fairness	43.9	43.2	0.8	0.77
Guess	34.8	32.9	0.6	0.43
Benefit to self	18.8	16.0	1.9	0.17
Benefit to others	19.0	18.4	0.1	0.74
Cost	11.6	15.1	4.0	0.04
Affordable	60.4	45.1	34.3	0.00

Table II - Binary logistic regression analysis of contingent valuations (CVs)

	b	SE	P =	Exp(b)	Nagelkerke R squared
A. Predicting different (=1), rather than identical (=0), CVs for the three types of screening					
Sex (male=1)	-0.37	0.12	0.00	0.69	0.07
Cohabiting =1	-0.45	0.14	0.00	0.64	
No worries about cancer =1	-0.27	0.16	0.09	0.76	
Explanations (=1)					
Fairness	0.31	0.13	0.02	1.36	
Guess	0.32	0.13	0.01	1.38	
Benefit to self	0.94	0.19	0.00	2.56	
Benefit to others	-0.38	0.19	0.05	0.69	
Cost	0.41	0.17	0.01	1.51	
Constant	-0.66	0.17	0.00		
B. Predicting higher (\geq £50 =1), rather than lower ($<$£50=0), valuation when CVs are identical					
Household income $<$ £10,000 =1	-0.85	0.21	0.00	0.43	0.10
Household income, £10-20,000 =1	-0.55	0.16	0.00	0.58	
No worries about cancer =1	-0.64	0.18	0.00	0.53	
Experience of cancer =1	0.25	0.14	0.08	1.28	
Age, years	0.05	0.02	0.03	1.05	
Explanation: benefit to self = 1	0.99	0.20	0.00	2.68	
Constant	-0.48	0.21	0.02		
C. Predicting higher (\geq £50 =1), rather than lower ($<$£50 =0), valuation when CVs are dissimilar					
<i>Bowel screening</i>					
Sex (male=1)	0.39	0.21	0.06	1.48	0.06
Household income $<$ £10,000 =1	-0.87	0.29	0.00	0.42	
Chances above average =1	0.71	0.27	0.01	2.04	

Constant	0.01	0.14	0.92		
<i>Breast screening</i>					
Sex (male=1)	-0.86	0.21	0.00	0.42	0.07
Household income < £10,000 =1	-0.76	0.30	0.01	0.47	
Constant	0.27	0.13	0.04		
<i>Prostate screening</i>					
Sex (male=1)	1.99	0.24	0.00	7.33	0.24
Chances above average =1	0.71	0.30	0.02	2.03	
Constant	-1.84	0.19	0.00		

Table III - Valuations of those offering different CVs, by sex

	Preference, %	CV, £			Z	P =
		Mean	Median	IQR		
Women						
Bowel	39.9	66.1	50	85		
Bowel vs. breast					-3.1	0.00
Breast	59.0	79.3	50	80		
Breast vs. prostate					-12.4	0.00
Prostate	1.0	24.5	0	20		
Prostate vs. bowel					-11.8	0.00
Total contribution		168.3	100	160		
Men						
Bowel	43.9	68.8	50	80		
Bowel vs. breast					-5.6	0.00
Breast	29.4	41.5	10	50		
Breast vs. prostate					-6.1	0.00
Prostate	26.7	68.7	50	80		
Prostate vs. bowel					-0.6	0.57
Total contribution		173.2	100	152.5		