Money, Masculinity, and Men’s Health: Experimental Evidence on Demand for a Preventive Health Input

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Abstract

A fundamental puzzle about human behavior is the low level of household investment in preventive health inputs. We conducted a field experiment testing advertising strategies designed to increase demand for a life-saving health technology characterized by low uptake. Our results reveal highly elastic demand with respect to factors that lie outside of standard consumer demand models of health behavior. Offering compensation of US$10 conditional on completing a counseling session for the technology tripled uptake. Framing the basic advertisement using the statement, “Are you tough enough?”, doubled uptake of the technology.

JEL classification: I12; J13; O12

Keywords: advertising, conditional cash transfers, framing, men’s health, preventive health

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1 Introduction

A fundamental puzzle about human behavior is the low level of household investment in preventive health inputs. Worldwide, household spending on preventive health inputs is approximately 0.33% of gross domestic product (GDP) (WHO 2013). This ratio appears to be particularly low in poor countries, where household spending on preventive health inputs may be less than 0.10% of GDP (WHO 2013). Even small increases in expenditures on preventive health inputs appear to have large benefits (Jones et al 2003).

We conducted a field experiment in Soweto, South Africa testing several advertising devices designed to increase demand for a widely available life-saving health technology characterized by low uptake. This health technology, voluntary medical male circumcision (VMMC), is highly effective at reducing the leading cause of adult mortality in sub-Saharan Africa and is widely available in most high HIV-prevalence countries in the region, yet take-up remains low.

We tested three mechanisms for increasing take-up of VMMC, a one-time health decision.

Our results reveal highly elastic demand with respect to factors that lie outside of standard consumer demand models of health behavior. Offering compensation of US$10 conditional on completing a counseling session for the technology approximately tripled uptake of the technology. Framing the basic advertisement with the statement, “Are you tough enough?”, roughly doubled uptake of the technology. Providing statistical information about partner preference for circumcised men did not have a statistically significant effect on take-up of circumcision.

The advertising devices do not appear to have alleviated a classical demand barrier such as price, information, credit constraints, or income. We offered VMMC at zero sticker price in all study arms, as do most health facilities in high HIV-prevalence countries in sub-Saharan Africa, and conditioned the cash transfer on the counseling session, not the procedure. HIV/AIDS is the leading cause of adult mortality in sub-Saharan Africa (WHO 2011). VMMC reduces the likelihood of female-to-male transmission of HIV by 51 to 76 percent (Auvert et al 2005, Bailey et al 2007, Gray et al 2007). As of the end of 2013, the fourteen World Health Organization priority countries had completed less than 6 million circumcisions out of the target number of approximately 21 million circumcisions (WHO 2014).
prevention benefits were relatively widely known in this setting at baseline, all study arms provided basic information about these prophylactic benefits, and the partner preference information treatment had little effect on behavior, suggesting that the advertising did not affect behavior through an information channel. Moreover, the “Are you tough enough?” message increased demand for the health technology despite the message having zero informational content.

Although we cannot fully rule out the possibility that the offer of US$10 increased demand by relaxing credit constraints, the relatively small offer amount, the relatively small opportunity cost of forgone labor due to the three-day recovery period, and the fact that the compensation was conditional only on the counseling session suggest that credit constraints were not the primary barrier. Furthermore, the “Are you tough enough?” message increased demand for the health technology despite the message not affecting credit constraints. Similarly, although we cannot rule out an income effect as the mechanism by which the offer of US$10 increased demand for the health technology, the implied income elasticity of demand is extremely high. Instead, as we discuss in Section (5), the advertising devices may have caused procrastinating men to act on latent demand for the health technology. The offer of US$10 was a reduction in the price of a complement to the procedure (from a baseline sticker price of zero), yet the effect of the “Are you tough enough?” message and the yearly universal conversion from counseling session to procedure suggest that the mechanism underlying the US$10 effect was not a classical cross-price effect. An effect of conditioning on the counseling session instead of the procedure and a nearly universal conversion rate from counseling sessions to procedures in that study arm suggests that the main barrier may have been psychological, rather than a classical opportunity cost.

This study speaks to a variety of literatures within economics including those addressing partner involvement in human capital investments, conditional cash transfers for health, procrastination, and identity economics.

There is a literature spanning several decades demonstrating that the gender of the

\[2\text{US$10 is approximately one-half of one day’s wage.}\]
decision-maker and partner involvement affect household human capital investments and other economic outcomes (e.g. Thomas 1990, Thomas et al 1990, Duflo 2003, Ashraf 2009, Ashraf et al 2014a). We find that providing information on possible partner preference had no effect on health input take-up, suggesting that asymmetrical information within partnerships, one possible reason partner control over decision-making may affect outcomes, is not the main barrier to take-up in this setting.

A recent literature has examined the effects of conditional cash transfers (CCTs). One set of studies has examined the effects of CCTs for health on health outcomes (e.g. Fernald et al 2008, de Walque et al 2012, Akresh et al 2014, Thirumurthy et al 2014). Another set of studies has examined the effects of CCTs for human capital on outcomes not directly linked to the conditional behavior (e.g. Barham and Maluccio 2009, Behrman et al 2011). We find that conditioning a cash transfer on a health clinic visit increases take-up of an inexpensive life-saving health input, highlighting the fact that cash transfers may affect behavior through a channel other than a pure substitution effect (Baird et al 2011) or an income effect.

A subset of papers demonstrating the effects of conditional cash transfers to change behavior are consistent with the theory that individuals procrastinate important health-seeking behaviors and some formats of cash transfers help them avoid this. Procrastination has been modeled by behavioral economists as an application of present-biased preferences and hyperbolic discounting, beginning with (Rabin and O’Donoghue 1999). In the canonical example, an individual can perform a costly task once, which will yield small benefits in all future periods. The cost of this action is low enough that it is clearly better to do it at some point and reap the rewards. The issue arises when - for an individual who is present biased - it may be preferable to do it tomorrow rather than today. But then tomorrow, it is preferable to do it the next day. And so on. In the end, an individual who does not see that this is happening may never complete the task, forfeiting enormous benefits. Thus, present-biased preferences and the resulting procrastination may lead an individual to postpone making a costly investment for a little while or even forever.

Empirically, studies have found evidence of this long-term procrastination by showing the
importance of defaults and deadlines. There is evidence of procrastination leading individuals to postpone actions forever in the case of saving (Madrian and Shea 2000, Thaler and Benartzi 2004, Brune et al 2016) and purchasing fertilizer (Duflo et al 2008). Procrastination may lead students to postpone submitting assignments forever (Ariely and Wertenbroch 2002). In the case of health, long-term procrastination has been shown to put off cancelling gym memberships (DellaVigna and Malmendier 2006), quitting smoking (Gine et al 2010), and immunizing children (Banerjee et al 2010). Procrastination could postpone or even prevent health investments whenever a single costly action yields long-term benefits. For example, people may procrastinate sterilization, starting to use new birth control methods, learning to use blood sugar tests, hanging mosquito nets, or forming healthier habits.

Besides those that explicitly mention procrastination, a broader set of studies are also consistent with procrastination preventing important health investments. Studies that show that relatively small incentives encourage take-up, especially when the incentive can only be used during a fixed window of time, suggest that respondents were previously procrastinating. In the context of HIV/AIDS, this includes studies examining the decision to obtain HIV test results in Malawi (Thornton 2008) and in the United States (Montoy et al 2016). One qualitative study suggested that procrastination may be a factor in men not seeking VMMC (Price et al 2014). Our study is the first that we know of to present results consistent with procrastination in the case of VMMC and men’s health more generally.

Recent work in behavioral economics has demonstrated that minor differences in presentation can have large impacts on health and other economic investments (e.g. Bertrand et al 2010, Dupas and Robinson 2013, Ashraf et al 2014b). This includes work on framing, in which researchers have demonstrated that how information is presented can be as important as the content in changing behavior. For example, Bertrand et al (2010) find that including an image of a woman on a mailed advertisement for a loan increased take-up as much as a 25% reduction in the interest rate. Another related strand of literature is work on identity economics, demonstrating that individuals make important decisions in order to express a desirable identity (e.g. Akerlof and Kranton 2000). Our study combines these ideas by testing
the effect of an advertising device that suggests a link between a valuable health investment and a masculine identity.

Our study also contributes to the very small body of economic literature on men’s health (e.g. Francis 2009). In addition, it expands on the preliminary analysis in Wilson et al (2015) by examining interaction effects among the advertising devices, exploring selection into the VMMC cascade by socioeconomic and demographic characteristics, and evaluating economic explanations for the findings.

More broadly, our study adds to the broader literature examining barriers to demand for preventive health inputs and mechanisms designed to overcome these barriers (e.g. Dupas 2011, Meredith et al 2013), including demand for VMMC (e.g. Kim et al 2014, Thirumurthy et al 2014, Chinkhumba et al 2015, Evens et al 2015). Finally, these papers build on earlier work demonstrating low or non-existent increased risk-taking among men who are both circumcised and know about the HIV risk reduction (Wilson et al 2014, Godlonton et al 2016).

The paper is organized as follows. Section 2 details the design of our field experiment. Section 3 discusses the data and statistical analysis. Section 4 presents the results. Section 5 discusses our findings. Section 6 concludes.

2 Experimental Design

In order to test the importance of classical and non-classical demand factors in explaining low take-up of a preventive health input, we conducted a public health advertising experiment in Soweto, Gauteng Province, South Africa. We distributed 6,000 postcards with six different overlapping designs in a random order to households encouraging men to visit any of four participating clinics for a counseling session about voluntary medical male circumcision (VMMC). Below, we describe the study setting, the way the different treatments were presented on the postcards (including the overlapping treatment design), and the postcard distribution.
2.1 Setting

The context of our study, Soweto, is an area of Johannesburg in Gauteng Province, South Africa. South Africa has the highest number of people living with HIV in the world (5.6 million) with an HIV prevalence of 17.3% (UNAIDS 2012). Estimates from 2008 indicate that HIV prevalence in Gauteng Province is 10.3% (Shisana et al 2009), approximately equal to median HIV prevalence in South Africa (Shisana et al 2009). Urban informal settlements have the highest HIV prevalence rates in South Africa (Shisana et al 2005). Although data is unavailable for specific settlements, following this pattern, HIV prevalence likely is higher in Soweto, a dense urban area, than in Gauteng Province as a whole. As of 2007, Gauteng Province also had the lowest rate of circumcision in the country with 25.2% of adult males circumcised (Department of Health et al 2007). Gauteng was the site of the first randomized trial demonstrating the effectiveness of circumcision in reducing HIV infections (Auvert 2005) and at the time of our study there was widespread interest in circumcision for HIV prevention.

2.2 Treatment and control arms

We designed advertising devices to test three main marketing strategies, each addressing a specific possible demand barrier. The first advertising device was an offer of compensation of 100 Rand (approximately US$10), conditional on completing the counseling session about VMMC at one of the four participating clinics. This amount is approximately one-half of one day’s wage in the area, although unemployment is high (Magruder 2012).

The second advertising device provided information about partner preferences. Based on an earlier survey among women in South Africa (Simbayi et al 2011), these postcards included the statement “A recent national survey of women in South Africa conducted by the Human Sciences Research Council showed that 2 out of 3 partners of uncircumcised men would prefer that their partner be circumcised.”

The third advertising device was designed to appeal to a desire to assert a masculine identity by including the question, “Are you tough enough?” This, like the other advertising devices, was included in addition to the general information (described below) presented on
all postcards.

We implemented these devices in an overlapping design, yielding six distinct postcards. Two-thousand postcards included the message about partner preferences (1,000 postcards with the compensation offer and 1,000 postcards without it). Two-thousand postcards included the challenge, “Are you tough enough?” (again, 1,000 postcards with the compensation offer and 1,000 postcards without it). One-thousand postcards included the compensation offer without the partner preference information or the challenge statement. One-thousand postcards were control postcards that included none of the three aforementioned advertising devices.

All postcards, including the control postcard, stated that VMMC reduces HIV transmission by 51 to 75%. They listed the four participating clinics and the days when each one would be open as well as the expiration date of August 29, 2014 for any compensation provided through the postcard. All postcards also stated that to redeem the postcard, an individual must be male and at least 18 years old, and indicated that the postcard was part of a research project studying VMMC decisions.

In order to encourage men to bring the postcard to a clinic so that the research team could know which postcard each man had received, all postcards offered light refreshments to those who brought in the postcard. In Section (5), we discuss the role of this incentive in understanding our results.

In case men had questions about the offer and to allow the researchers to measure an additional proxy for interest generated, all postcards also provided a number that men could call or text to speak with a VMMC counselor. Each of the six different postcard types included a different phone number so that these calls and messages could also be tracked by postcard type.

2.3 Distribution

Prior to distribution, postcards were placed in sealed envelopes. The sealed envelope meant that distributors would not know which postcard was in each envelope so they would be less
tempted to select who got which postcard. Each envelope had a number on it that referred to a pre-specified and randomized order. This order randomized each of the six postcard types into each sequential set of six. In this way, we stratified the sample based on distribution timing, location, and the identity of the distributor.

Distributors were then instructed to hand out the postcards in the pre-specified order indicated on the envelopes to every fifth household, starting at different points where they would not overlap with each other. They were given detailed instructions about flipping a coin at each intersection to choose which direction to turn and which side of the street to follow. At each house, they were to give the postcard to a man if he was present or to a woman if a man was not present. If no adult was present, the distributor continued to the fifth house after the empty one.

3 Data and Statistical Analysis

The primary analysis reported in this paper is based on records of take-up of the hotline, the counseling session about VMMC, and the procedure itself. Below, we describe how each of these was collected and how the analysis was implemented.

3.1 Data collection

Phone calls and text messages for more information came to six different phones with six different SIM cards, one for each type of postcard. A trained VMMC counselor recorded the timing of each call. Then this counselor responded to each request, answered any questions, and asked the men if they would be willing to answer a short survey. Once consent was obtained, this survey was administered. This survey was similar to the longer survey conducted with those who came to the clinics. However, we were only able to complete 67 surveys, and thus we have not used this survey data. In total, 125 calls and texts came to these phones during the experimental period.

Trained clinical staff recorded a register of information for each individual who brought a postcard to a participating clinic. This included which postcard was brought, whether the
counseling session was completed, and whether a circumcision was performed. In total, 123 men brought postcards to one of the four clinics by the expiration date. All 123 of these men completed the counseling and 110 underwent VMMC.

In addition, men who brought postcards to participating clinics were also asked to participate in a survey about demographic characteristics, knowledge of circumcision, previous risk-taking, and risk preferences. Table 1 presents summary statistics based on these surveys. The respondents’ mean age was 29 years old, the vast majority had attended secondary school, approximately one-half were employed, and the nearly all were sexually active.

3.2 Statistical analysis

Our primary analysis relies on ordinary least squares (OLS) regression. We compare the take-up of the hotline, the counseling session, and the circumcision procedure among those who received a particular advertising device with those who did not in three ways.

For each demand step, we first examine take-up among those who received a simple treatment postcard with a single advertising device relative to those who received the pure control postcard. In these regressions, each sample consists of 2,000 postcards (i.e. 1,000 treatment and 1,000 control). For example, we compare the 1,000 postcards offering compensation without any additional message to the 1,000 pure control postcards. We estimate the following equation:

\[ Y_i = \alpha + \beta \ast \text{Treat}_i + \epsilon_i \]  

where \( Y_i \) is an indicator variable equal to one if postcard \( i \) was returned to a given step in the VMMC cascade, \( \text{Treat}_i \) is an indicator equal to one if postcard \( i \) included a particular advertising device, and \( \epsilon_i \) is an idiosyncratic error term. The coefficient of interest, \( \beta \), is equivalent to the difference in means and the p-value of this coefficient is equivalent to that in a t-test of the significance of the difference in the two means.

The second set of regressions measure the difference in means between all of those who
received a postcard with a given advertising device and all of those who received a postcard without it. That is, the estimating equation is the same as above, but the comparison samples are different. In our second set of regressions, we include those postcards with and without additional advertising devices. For example, we compare take-up among all compensation postcards (i.e. pooling compensation-only, compensation-partner preference, and compensation-challenge postcards) to take-up among all postcards not offering compensation.

After using these two methods to examine each of the three demand steps, we estimate fully interacted, pooled regression models. These regressions test for interaction effects among the advertising devices (e.g. compensation and challenge). We estimate them using the following equation:

\[
Y_i = \alpha + \beta_1 * \text{Comp}_i + \beta_2 * \text{PartPref}_i + \beta_3 * \text{Chall}_i \\
+ \beta_4 * \text{Comp}_i * \text{PartPref}_i \\
+ \beta_5 * \text{Comp}_i * \text{Chall}_i + \epsilon_i 
\]  

(2)

where \(\text{Comp}_i\) is an indicator variable equal to one if postcard \(i\) included compensation and the other terms are defined similarly. As in Equation (1), \(Y_i\) is an indicator variable equal to one if postcard \(i\) was returned to a given step in the VMMC cascade and \(\epsilon_{ijt}\) is an idiosyncratic error term.

For each of the three demand steps, we also present figures displaying mean take-up (and 95% confidence intervals) disaggregated by each of the six distinct postcard types.

4 Results

4.1 Effects on hotline

Figure 1 presents take-up of the hotline disaggregated by study arm. Overall, hotline take-up was approximately 2%. The likelihood of calling or texting the hotline did not vary
substantially across study group. Although take-up in the challenge-only and information-only study arms was slightly lower than in the other study arms, these differences are not statistically significant.

Table 3 presents ordinary least squares (OLS) regression estimates of the effect of the advertising devices on hotline take-up. For each of the treatment arms, the estimates in Columns (1)-(3) correspond to the pairwise analyses in Figure 1. The estimates in Columns (4)-(6) come from regressions each estimating the effect of a given advertising device (e.g. compensation) by pooling postcards with this device as a single treatment group and comparing to the pooled group of all postcards without this device as the control group. Invariant of specification, none of the treatments appear to have increased hotline take-up relative to the control group.

4.2 Effects on counseling session

Figure 2 displays take-up of the counseling session disaggregated by study arm. Mean counseling take-up in the entire study was approximately two percent. Several additional facts emerge from this figure. First, adding the offer of US$10 to any postcard appears to have increased take-up of the counseling session. Take-up in the money-only arm was more than three times take-up in the control arm. Similarly, adding the offer of US$10 to either the partner preference information postcard or to the challenge postcard yielded higher take-up than the partner preference information and challenge postcards, respectively. Second, adding the challenge, “Are you tough enough?”, to the control postcard doubled uptake of the counseling session. Third, adding the information that among partners of circumcised men, 2 out of 3 would prefer that their partner be uncircumcised had no statistically significant effect on take-up of the counseling session.

Table 3 displays OLS regression estimates of the effect of the advertising devices on take-up of the counseling session. As in Table 2, Columns (1)-(3) present the pairwise comparisons and Columns (4)-(6) present the group comparisons. The pairwise comparisons in Columns (1)-(3) suggest that the compensation postcard and the challenge postcard increased counseling
take-up by approximately 2.5 and 1 percentage points, respectively (statistically significant at the 1 percent and 10 percent levels, respectively), and that the information postcard did not increase take-up. The group-wise comparisons in Columns (4)-(6) support these inferences for the compensation and information postcards. In contrast, the group-wise comparison in Column (6) suggests that there was no effect of the challenge postcard on counseling take-up. As we discuss in Section 4.4, adding either sort of messaging to the compensation postcard appears to have reduced the effect of the compensation. This means that the group-wise comparisons in Columns (4)-(6) may partly reflect underlying interaction effects between advertising devices and not just the direct effects of a particular advertising device.

4.3 Effects on procedure

Figure 3 presents take-up of the procedure disaggregated by study arm. A conversion rate (i.e., probability of completing the procedure conditional on completing the counseling session) of approximately 90 percent in each study arm means that take-up of the procedure across study arms closely follows take-up of the counseling session. The offer of US$10 approximately tripled take-up of the procedure, the challenge “Are you tough enough?” roughly doubled take-up, and the information about “2 out of 3 partners” did not have a statistically significant effect on take-up.

Table 4 displays OLS regression estimates of the effect of the advertising devices on take-up of the counseling session. As in Tables 2 and 3, Columns (1)-(3) present the pairwise comparisons and Columns (4)-(6) present the group comparisons. The regression results in Table 4 are virtually identical to those in Table 3. The very high conversion rate (i.e., approximately 90 percent in each treatment arm and two-thirds in the control arm) from counseling session to procedure helps explain this consistency.

4.4 Interaction effects

Table 5 tests for interaction effects between the advertising devices. Columns (1)-(3) allow for the full set of interaction effects. Columns (4)-(6) present the results of a restricted
specification testing the hypothesis that adding either information or the challenge to the compensation postcard changed its effectiveness.

The results in Table 5 suggest that adding additional messaging to the compensation postcard reduced the effect of compensation on VMMC take-up. For example, as shown in Column (3), the challenge statement reduced the effect of compensation on procedure take-up by more than 50% (statistically significant at the 5% level). Similarly, the restricted estimate in Column (6) indicates that adding messaging reduced the effect of compensation on procedure take-up by approximately 50% (statistically significant at the 5% level). Although the point estimate of the compensation-partner preference interaction is not statistically different from zero, we cannot reject equality of the two compensation-messaging terms for any of the three demand steps in Columns (1)-(3) (p-values=0.91, 0.31, 0.41, respectively).

4.5 Selection

Table 6 examines possible differential selection across study arm by observable characteristics into the counseling session. It displays estimates from OLS regressions of various demographic variables and risky sexual behavior on indicator variables for study arm in group comparisons (i.e., regressions corresponding to Columns (4)-(6) in Tables 2, 3, and 4). Aside from a small difference in mean age between the compensation group and the information group, there appears to be little statistical evidence of selection on these handful of variables.

5 Discussion

The postcards appear to have caused procrastinating men to act on latent demand for this health service. Several facts support this interpretation. We begin by discussing the main competing mechanisms that would link the postcards with increased take-up of the technology, finding evidence that is inconsistent with these explanations. Then we discuss evidence directly supporting the hypothesis that the postcards alleviated procrastination.

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3 An overall conversion rate of 90 percent means that the results for differential selection into the procedure are very similar.
Three main competing hypotheses for the mechanism underlying the postcard effects include a relaxation of credit constraints, increased information, and income effects. At least two key pieces of evidence are inconsistent with the credit constraint hypothesis. The “Are you tough enough?” statement doubled take-up, yet would not have affected credit constraints. Similarly, the US$10 transfer was sufficiently small (i.e. approximately one day’s wages) that it seems unlikely to have reduced credit constraints enough to explain the large increase in take-up. Neither the “Are you tough enough?” statement nor the offer of US$10 included any additional informational content beyond that contained in the control postcard. Income effects seem highly unlikely as the “Are you tough enough?” statement did not include any monetary compensation and, if the income effect hypothesis were true, the implied income elasticity of demand for VMMC in the US$10 study arm is seemingly implausibly high.

Several auxiliary results from our survey analysis provide direct evidence supporting the procrastination hypothesis. More than 60% of men who presented a study postcard at a clinic reported discussing VMMC with their partner and more than 70% reported that their partner had a preference for circumcised men. An even greater fraction, 90%, reported that they were interested in getting circumcised, suggesting that men in the US$10 study arm did not attend a clinic with the intention to simply take the cash transfer offered conditional on the counseling session and leave without getting circumcised.

An important alternative hypothesis deserves additional discussion. One might believe that men may have attended counseling sessions with equal frequency across study arms and our results reflect differences in the incentive to bring the postcard to the counseling session conditional on attending the counseling session. The fact that the challenge postcard increased take-up suggests this was not the mechanism behind our results. There could have also been differences in the rates of sharing different postcards, but 89% of men who visited a clinic reported that they had received the postcard directly, with another 5.7% who had received it from family members. This leaves less than 6% who got the postcard from someone outside their household.
The role of procrastination is important in interpreting the implications of this study. Even if an individual plans to take an action, Rabin and O’Donoghue (1999) show that it’s possible to procrastinate indefinitely. Even if men do not procrastinate forever, circumcising earlier confers a much larger health benefit because HIV incidence declines with age. In Kwa-Zulu Natal, Barnighausen et al (2008) find that the incidence rate among 25-29 year-old men is 8.7, among 30-34 year-olds, it is 7.6, and among 35-39 year-olds, the incidence is 1.9. The average age of respondents on our study was 29, so delaying at this age can have a disproportionate impact on life-time HIV risk.

The presence of procrastination as a barrier to VMMC demonstrates that entirely non-coercive interventions can effectively increase take-up. If postcard recipients did not want to get the procedure, they could have come for the counseling session and left with the compensation. Thus, this type of intervention that subsidizes a complement can encourage those who are interested to make this investment in health while not coercing anybody who is not interested. This has important policy implications as international donors are hesitant to incentivize an irreversible behavior because of the risk of coercion.

Our results on the interaction between compensation and messaging suggests that including additional messaging on the compensation offer inhibited the demand response. This contrasts with some of the existing evidence on this interaction (e.g. Ashraf et al 2014c). One explanation for this difference is that our messaging may have been less informative than information provided in other studies.

The effect of our CCT for the VMMC counseling session on VMMC take-up is remarkably similar to the CCT effects reported in Thirumurthy et al (2014) and Evens et al (2015). Thirumurthy et al (2014) and Evens et al (2015) offered CCTs of approximately US$10 conditional on completing the VMMC procedure and these offers approximately tripled take-up of the VMMC procedure. These similarities support the external validity of our results, yet also highlight the puzzle that the effects on procedure take-up were approximately the same across studies despite the pre-specified conditionality differing substantially across studies.
6 Conclusion

Low household investment in preventive health inputs is a fundamental puzzle about human behavior. We conducted a field experiment testing several small advertising devices designed to increase demand for voluntary medical male circumcision (VMMC), a widely available life-saving health technology currently characterized by low uptake. Demand for this preventive health technology appears to have been highly elastic with respect to factors outside of standard consumer demand models of health behavior. Taken as a whole, the results suggest that the advertising devices may have caused procrastinating individuals to act on latent demand for the health technology, rather than alleviating a barrier such as lack of information or credit constraints.

Our analysis illuminates several questions that future research should address. First, to what extent and in what ways do non-classical factors affect demand for preventive health technologies? Second, how might cash transfers affect behavior aside from through conditionality with respect to that behavior and aside from income effects?
7 References


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of male circumcision in South Africa. 10th Annual AIDS Impact Conference, New Mexico, USA.


Table 1: Summary Statistics of Demographic Characteristics of Respondents

<table>
<thead>
<tr>
<th></th>
<th>All Respondents</th>
<th>Initially Uncircumcised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 29.03</td>
<td>(9.29)</td>
<td>(9.36)</td>
</tr>
<tr>
<td>Single 0.64</td>
<td>(0.48)</td>
<td>(0.48)</td>
</tr>
<tr>
<td>Has Any Children 0.47</td>
<td>(0.50)</td>
<td>(0.50)</td>
</tr>
<tr>
<td>Worked in the last 7 days</td>
<td>0.46</td>
<td>0.45</td>
</tr>
<tr>
<td>Has ever taken HIV test 0.77</td>
<td>(0.42)</td>
<td>(0.44)</td>
</tr>
<tr>
<td>Has family member with HIV</td>
<td>0.29</td>
<td>0.29</td>
</tr>
<tr>
<td>Had an STI in last 12 months</td>
<td>0.11</td>
<td>0.11</td>
</tr>
<tr>
<td>Has ever had STI 0.93</td>
<td>(0.50)</td>
<td>(0.50)</td>
</tr>
<tr>
<td>Age at which first had sex</td>
<td>16.45</td>
<td>16.62</td>
</tr>
<tr>
<td>Used a condom at last sex</td>
<td>0.57</td>
<td>0.59</td>
</tr>
<tr>
<td>Had more than 1 partner last month 0.10</td>
<td>(0.50)</td>
<td>(0.50)</td>
</tr>
<tr>
<td>Had more than 1 partner last year 0.52</td>
<td>(0.50)</td>
<td>(0.50)</td>
</tr>
<tr>
<td>Attended any secondary</td>
<td>0.93</td>
<td>0.92</td>
</tr>
<tr>
<td>Believes &gt;50% of Soweto HIV+</td>
<td>0.65</td>
<td>0.66</td>
</tr>
</tbody>
</table>

Note: Standard deviations in parentheses. The sample sizes in the first column range from 107-123, and in the second column, the range is 95-111.
Table 2: OLS Regression Estimates of Effect of Advertising on Hotline Take-up

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compensation</strong></td>
<td>.004</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.007)</td>
<td>(.004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Partner preference</strong></td>
<td>-.007</td>
<td>-.005</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.006)</td>
<td>(.005)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Challenge</strong></td>
<td>-.008</td>
<td></td>
<td></td>
<td>-.009</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.006)</td>
<td></td>
<td></td>
<td>(.005)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>6,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity robust standard errors in parentheses. Each column presents the results of a single regression with hotline take-up as the outcome variable and the single independent variable listed on the left. Estimates in columns 1-3 are based on simple comparisons between those receiving a postcard with the treatment listed on the left and the pure control, while estimates in columns 4-6 include compare all those with the treatment (including combined with others) with all of those without. Significantly different from zero at 99 (***)**, 95 (**), 90 (*) percent confidence.
Table 3: OLS Regression Estimates of Effect of Advertising on Counseling Session Take-up

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation</td>
<td>.024***</td>
<td>.016***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.006)</td>
<td>(.004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner preference</td>
<td>.002</td>
<td>-.002</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.004)</td>
<td>(.004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Challenge</td>
<td>.009*</td>
<td>.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.005)</td>
<td>(.005)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>6,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity robust standard errors in parentheses. Each column presents the results of a single regression with counseling session take-up as the outcome variable and the single independent variable listed on the left. Estimates in columns 1-3 are based on simple comparisons between those receiving a postcard with the treatment listed on the left and the pure control, while estimates in columns 4-6 include compare all those with the treatment (including combined with others) with all of those without. Significantly different from zero at 99 (***), 95 (**) 90 (*) percent confidence.
Table 4: OLS Regression Estimates of Effect of Advertising on Procedure Take-up

<table>
<thead>
<tr>
<th>Dependent variable: Procedure take-up</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation</td>
<td>.025***</td>
<td>.015***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.006)</td>
<td>(.003)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner preference</td>
<td>.004</td>
<td>-.002</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.004)</td>
<td>(.004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Challenge</td>
<td>.010**</td>
<td>.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.005)</td>
<td>(.004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>6,000</td>
<td>4,000</td>
<td>4,000</td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity robust standard errors in parentheses. Each column presents the results of a single regression with circumcision take-up as the outcome variable and the single independent variable listed on the left. Estimates in columns 1-3 are based on simple comparisons between those receiving a postcard with the treatment listed on the left and the pure control, while estimates in columns 4-6 include compare all those with the treatment (including combined with others) with all of those without. Significantly different from zero at 99 (***), 95 (**), 90 (*) percent confidence.
Table 5: OLS Regression Estimates of Interaction Effects of Advertising

<table>
<thead>
<tr>
<th></th>
<th>Hotline Counseling</th>
<th>Circumcision</th>
<th>Hotline Counseling Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation</td>
<td>.004</td>
<td>.024***</td>
<td>.025***</td>
</tr>
<tr>
<td></td>
<td>(.007)</td>
<td>(.006)</td>
<td>(.006)</td>
</tr>
<tr>
<td>Partner preference</td>
<td>-.007</td>
<td>.002</td>
<td>.004</td>
</tr>
<tr>
<td></td>
<td>(.006)</td>
<td>(.004)</td>
<td>(.004)</td>
</tr>
<tr>
<td>Challenge</td>
<td>-.009</td>
<td>.009*</td>
<td>.010**</td>
</tr>
<tr>
<td></td>
<td>(.006)</td>
<td>(.005)</td>
<td>(.005)</td>
</tr>
<tr>
<td>Compensation*Partner preference</td>
<td>.004</td>
<td>-.008</td>
<td>-.011</td>
</tr>
<tr>
<td></td>
<td>(.009)</td>
<td>(.009)</td>
<td>(.008)</td>
</tr>
<tr>
<td>Compensation*Challenge</td>
<td>.003</td>
<td>-.017*</td>
<td>-.018**</td>
</tr>
<tr>
<td></td>
<td>(.009)</td>
<td>(.009)</td>
<td>(.009)</td>
</tr>
<tr>
<td>Compensation*(Message)</td>
<td>.004</td>
<td>-.013</td>
<td>-.015**</td>
</tr>
<tr>
<td></td>
<td>(.008)</td>
<td>(.008)</td>
<td>(.007)</td>
</tr>
<tr>
<td>F-stat of difference</td>
<td>.01</td>
<td>1.02</td>
<td>.68</td>
</tr>
<tr>
<td>(p-value)</td>
<td>(.91)</td>
<td>(.31)</td>
<td>(.41)</td>
</tr>
<tr>
<td>Observations</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
</tr>
</tbody>
</table>

Notes: Heteroskedasticity robust standard errors in parentheses. Each column presents the results of a fully-interacted OLS regression with the outcome variables listed above. Estimates in columns 1-3 include interactions between compensation and each type of message, while estimates in columns 4-6 interact compensation with either type of message in a single variable. In columns 1-3, we report the F-stat of the difference between the coefficients on the interaction terms with the p-value in parentheses below. Significantly different from zero at 99 (***), 95 (**), 90 (*) percent confidence.
Table 6: Demographic Differences by Advertising Device

<table>
<thead>
<tr>
<th></th>
<th>Age (1)</th>
<th>Has children (2)</th>
<th>Asset index (3)</th>
<th>Family member HIV+ (4)</th>
<th>More than one partner last year (5)</th>
<th>Risk index (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation</td>
<td>1.91</td>
<td>.20</td>
<td>.22</td>
<td>.05</td>
<td>-.02</td>
<td>-.08</td>
</tr>
<tr>
<td></td>
<td>(1.85)</td>
<td>(.21)</td>
<td>(.22)</td>
<td>(.10)</td>
<td>(.05)</td>
<td>(.10)</td>
</tr>
<tr>
<td>Partner preference</td>
<td>-2.88</td>
<td>-.15</td>
<td>-.16</td>
<td>-.18</td>
<td>.01</td>
<td>.09</td>
</tr>
<tr>
<td></td>
<td>(2.08)</td>
<td>(.23)</td>
<td>(.25)</td>
<td>(.11)</td>
<td>(.06)</td>
<td>(.11)</td>
</tr>
<tr>
<td>Challenge</td>
<td>-1.25</td>
<td>-.02</td>
<td>-.02</td>
<td>-.05</td>
<td>.05</td>
<td>-.17</td>
</tr>
<tr>
<td></td>
<td>(2.04)</td>
<td>(.23)</td>
<td>(.25)</td>
<td>(.11)</td>
<td>(.06)</td>
<td>(.11)</td>
</tr>
<tr>
<td>Control mean and (SD)</td>
<td>29.89</td>
<td>.55</td>
<td>0.00</td>
<td>.38</td>
<td>.43</td>
<td>.00</td>
</tr>
<tr>
<td>of dependent variable</td>
<td>(11.94)</td>
<td>(.53)</td>
<td>(1.00)</td>
<td>(.52)</td>
<td>(.53)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>Observations</td>
<td>123</td>
<td>119</td>
<td>105</td>
<td>123</td>
<td>123</td>
<td>121</td>
</tr>
</tbody>
</table>

Notes: Estimates from OLS regressions with demographic variables as outcomes and three postcard characteristics as independent variables. The sample for these estimates is the group of men who brought postcards to one of the participating clinics and completed the survey about background demographic characteristics and risk preferences. Heteroskedasticity robust standard errors in parentheses. Has children is an indicator for having ever fathered a child, and Asset index is a normalized principle component index combining electricity, tv, radio, fridge, telephone, bicycle, motorcycle, and car ownership. Family member HIV+ is an indicator for having an immediately family member who is HIV positive or has died of AIDS. Risk index is a normalized principle component index combining the age at first sex, whether the respondent had sex in the last year current or previous STI infection or symptoms, having been tested for HIV, whether the respondent used a condom the last time they had sex, the number of partners in the last 1 and 12 months. Significantly different from zero at 99 (***) 95 (**), 90 (*) percent confidence.
Figure 1: Hotline Take-Up (%) by Postcard Type

- control: 2.3%
- compensation only: 2.7%
- partner preference only: 1.6%
- compensation + part. pref.: 2.4%
- challenge only: 1.4%
- compensation + challenge: 2.1%

*percentage of recipients contacting VMMC hotline*
**Figure 2: Counseling Session Take-Up (%) by Postcard Type**

- Control: 0.9%
- Compensation only: 3.3%
- Partner preference only: 1.1%
- Compensation+part pref: 2.7%
- Challenge only: 1.8%
- Compensation+challenge: 2.5%

*percentage of recipients completing VMMC counseling session*
Figure 3: Procedure Take-Up (%) by Postcard Type

- control: 0.6
- compensation only: 3.1
- partner preference only: 1.0
- compensation + part. pref.: 2.4
- challenge only: 1.6
- compensation + challenge: 2.3

*percentage of recipients completing VMMC procedure*