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Marketing Fortified Rice: Effects of Aspirational Messaging and Credibility of Health Claims

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Abstract

Studies assessing the impact of information on uptake of preventive health products among the poor have shown mixed results, and little is known about what type of messages are most effective. Drawing on insights from the literature on marketing and consumer behavior, we argue that messages which position a product as aspirational or establish the credibility of its health benefits can increase consumer demand for the product. We test the individual and joint impacts of such messages through a field experiment eliciting willingness to pay for fortified rice in Chandpur District, Bangladesh. We find that the combination of these approaches increases the proportion of participants willing to pay a premium at least equal to the cost of fortification by 18 percentage points. In sharp contrast to the existing literature on welfare stigma, we also show that awareness of free distribution of fortified rice through government programs does not negatively affect consumer demand, but rather appears to lend credibility to health claims about the product.

Keywords: Aspirational messaging, willingness-to-pay, adoption, health preventive products, welfare stigma, fortification.

1. Introduction

Despite the proven cost-effectiveness of preventive health technologies such as water treatment, mosquito nets, and micronutrient fortification, demand for such technologies among the poor is typically low. Several studies have attributed this low demand to price sensitivity, arguing that heavy subsidies are required to generate adoption of preventive health goods (e.g. Dupas, 2014; Meredith et al., 2013; Cohen and Dupas, 2010; Dupas, 2009; Kremer and Miguel, 2007). Another potential reason for low demand may be that people underestimate the benefits of these products (Dupas, 2009). Researchers have investigated the impact of information and educational campaigns on demand for preventive health products including water purification kits, deworming medicine, shoes for children, hand soap, and long-lasting insecticide treated bed nets. The findings are mixed and often contradictory. While some studies show large behavioral effects (e.g. Dupas, 2011a; Jalan et al., 2009; Jalan and Somanathan, 2008; Chen et al., 2007; Madajewicz et al., 2007; Waterkeyn and Cairncross, 2005; Cairncross et al., 2005), others find no impact on either price sensitivity or demand (e.g. Meredith et al., 2013; Dupas, 2009; Kremer and Miguel, 2007). This inconsistency in the literature raises the questions of why some information campaigns fail, and how they could be made more effective (Meredith et al., 2013; Dupas, 2011b).

In this study, we test how two messages, one that positions a health product as a high-value aspirational product, and another that establishes the credibility of the product's health benefits by connecting it to a well-known government program, affect the impact of information about the product on demand among low-income Bangladeshi consumers. Aspirations are believed to stimulate forward-looking behavior (Ray, 2006), and a recent empirical study showed that future-oriented investments (e.g. investment in children's education) increase with

aspirations (Janzen et al., 2017). Studies on the effect of aspirational messages on demand – that is, messages positioning a product as something the consumer would wish to use but may not currently be able to – have received attention in the marketing literature in recent years (Nichols and Schumann, 2012; Prahalad and Hammond, 2002). However, evidence on the effect of aspirational marketing is limited, and almost exclusively based on studies of relatively affluent consumers in industrialized countries. Little is known about the effectiveness of aspirational messaging among poor consumers in developing countries (Beninger and Robson, 2015; Nichols and Schumann, 2012).

The product for which we examine demand is fortified rice, a blend of regular rice grains and fortified kernels made of rice flour and concentrated vitamin-mineral premix containing iron, folic acid, B-complex vitamins, vitamin A and zinc. Fortification of rice and other staple foods is a proven and cost-effective means of reducing micronutrient malnutrition among poor populations in developing countries (Ara et al., 2019; Bhutta et al., 2008; Dary and Mora, 2002).

The aspirational message used in the experiment highlighted the nutritional similarities between fortified rice and a high-price nutritional drink called Horlicks. Horlicks is a sweet drink mix made from wheat, milk and malted barley and fortified with micronutrients. This nutritional drink mix brand is heavily promoted through radio, television, and print media in Bangladesh. These commercial campaigns have, over the years, created a strong aspirational image of the product among consumers.

Our strategy of comparing the marketed product to a similar, aspirational good is inspired by previous studies of analogical learning. This literature argues that consumers' cognitive learning process for a new product is assisted by transferring knowledge from the domain of an existing and familiar product set (Kuijken et al., 2017; Gregan-Paxton and Moreau, 2003;

Hoeffler, 2003; Moreau et al., 2001; Gregan-Paxton and John, 1997). For example, to help consumers learn about digital camera technology and its value, early advertisements used pictorial and message cues to connect the camera with computers and distinguish it from traditional film-based cameras (e.g. “the computer camera”, “photography for the computer generation”, etc.). In addition to facilitating cognitive learning about a new product, analogical message cues can influence consumers’ monetary value assessment of a product simply by using high-value products as analogies. For example, Kuijken et al. (2017) found that consumers were willing to pay a higher price for a hand-held device used to assess food’s nutritional qualities when this product was introduced using cues from a high-valued category (“smart food analyzer”) compared to cues from a low-valued category (“calorie counter”).

The second message tested informed study participants that the government distributes fortified rice to poor households through the Public Food Distribution System (PFDS), the primary social support program for poor and vulnerable households in Bangladesh. The government of Bangladesh has been distributing fortified rice to vulnerable households through this program in five districts of the country since 2014 (Ara et al., 2019).

Information about free distribution of fortified rice through government programs could potentially have two opposing effects. First, this information could serve as an endorsement of the credibility of claims about its health benefits. Fortified rice is a credence good: consumers cannot observe whether their health has improved due to consuming it, even after repeated consumption. Rather, they must decide whether to believe claims about this benefit. Previous literature suggests that consumers tend to rely on external cues such as brand name, price, or third party endorsements as signals of the credibility of benefit claims made about credence goods (Bloom and Pailin, 1995; Zeithaml, 1988). s

On the other hand, associating fortified rice with the PFDS could also potentially lead to an anti-aspirational image of the product and thus reduce willingness to pay. Based an association between heavy price promotion and unfavorable product evaluation (Darke and Chung, 2005; Raghubir and Corfman, 1995; Lichtenstein et al., 1989), it is sometimes argued that free distribution signals low product quality, which can lead to low perceived value and low adoption (Ashraf et al., 2010). A related strand of literature contends that negative social attitudes toward the beneficiaries of social support programs can have negative effects on program participation. Various studies have shown that nontrivial proportions of eligible groups self-select out of such programs to avoid public shame (Mirtcheva and Powell, 2009; Currie, 2003; Raghubir and Corfman, 1995; Besley and Coate, 1992). A marketing message that mentions free distribution of fortified rice through the PFDS could thus have a positive effect, through enhanced credibility, or a negative effect, through the implication of low value or social stigma.

We test the effect of each message alone, as well as their interaction, on demand for fortified rice through a 2-by-2 randomized design. Our field experiment involved eliciting willingness to pay for both fortified and non-fortified rice through a BDM (Becker-DeGroot-Marschak) auction from 1,057 low-income households in 10 unions[1] in rural Chandpur district. Auction participants were first administered a household survey and later randomly assigned to four groups of equal size. A *health information-only* group (also referred as the *comparison group*), against which effects of the other three message treatments are compared, was provided with information about the consequences of micronutrient deficiency and the health benefits of fortified rice. Participants in the second, *aspirational cue* group, were given the same

[1] The smallest government administrative units

information as the first group, and also read a message about the nutritional similarities between fortified rice and the high-price nutritional drink mix brand Horlicks. The third, *credibility cue* group, were informed about the free distribution of fortified rice through the PFDS. Participants in the fourth group were read both the aspirational and the credibility scripts, in addition to the cross-cutting information about health benefits.

Our results show that neither associating fortified rice with a well-known, high-value fortified product, nor informing participants that such rice is distributed to the poor through a government program, significantly affected willingness to pay relative to health information alone. However, when these two messages were combined, the proportion of participants willing to pay a premium that covers the cost of fortification increased by 18 percentage points relative to the health *information-only* group. The lack of individual impact, but strong joint impact of the messages tested suggests that connecting fortified rice to a known, high-status brand can help consumers understand the nature of this unfamiliar product – but that this only increases their willingness to pay for the rice if health claims made about its health benefits are believed. The fact that the government distributes fortified rice to the poor through a well-known and respected government program lends credibility to these claims.

Our study makes two contributions to the existing literature. First, we present new evidence on the role of information in stimulating demand for health products by testing the impact of an aspirational message and a credibility cue side by side. Several previous studies (for example, Luoto et al., 2014; Ashraf et al., 2013; Dupas, 2009) have investigated how marketing messages affect demand for health products in developing countries, though none have tested these particular marketing strategies. Ashraf et al. (2013) tested whether a marketing message comparing the attributes of a new water purifier with a familiar substitute product

(chlorine) yielded higher demand compared to messages that do not compare the product with an existing substitute. A similar field experiment in Kenya by Dupas (2009) investigated whether a marketing message emphasizing the health risk of malaria was more effective at generating demand for insecticide-treated bed nets compared to a message emphasizing the potential financial gain from usage of the nets. Neither of the studies found a significant effect of information manipulation on demand. While Dupas (2009) and Ashraf et al. (2013) studied the effects of marketing messages on purchases of health products, Luoto et al. (2014) examined whether information manipulation affects usage of a water treatment product given out for free. In both Bangladesh and Kenya, Luoto el al. (2014) found that marketing messages that combined information on the health benefits of usage and potential health risks of non-usage of the product led to higher usage compared to messages emphasizing health benefits alone.

Second, we address a challenge to the scale-up of fortified rice in low-income settings, by assessing the effect of marketing messages on consumer acceptance and demand for this product. While consumer acceptance of fortification is generally high, it is not universal. Our experiment shows that when exposed to a message that both positions the rice as an aspirational product and informs about the free distribution of the rice, almost all poor consumers (99%) were willing to pay at least as much for fortified rice as for unfortified rice, compared to 89% of those in the comparison group. Further, while we hesitate to draw conclusions from the experiment about the level of consumer demand for fortified rice in more natural settings, we do find a strong effect of marketing messages on demand as expressed through the auction procedure. These findings suggest that well-designed social marketing campaigns have a role to play in scaling up consumption of fortified rice.

2. Background

The prevalence of micronutrient deficiency or 'hidden hunger' in South Asian countries is high, and Bangladesh is no exception. Approximately half of Bangladeshi children under 5 years (U-5) and 11% of school-aged children suffer from anemia (Khan et al., 2016; UNICEF, 2013). Anemia is one of the leading causes of pregnancy-related complications and maternal mortality in the country, with approximately 50% of reproductive-age women classified as anemic (UNICEF, 2013). Zinc deficiency is also common, affecting 45% U-5 children and 66% of non-pregnant non-lactating women (National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International, 2016; UNICEF, 2013).

Fortification of staple foods with vitamins and minerals is a cost-effective strategy to reduce micronutrient deficiency (Bhutta et al., 2008; Dary and Mora, 2002). In many developing countries, national food policies mandate fortification of staple foods; for example, fortification of wheat flour is mandatory in 85 countries.

In Bangladesh, rice is the main staple food and accounts for 70% of caloric intake (Sayeed and Yunus, 2018), with average daily per capita consumption at 426 grams (Yunus et al., 2019). Fortified rice is not currently marketed in Bangladesh, and low manufacturing capacity for fortified kernels precludes mandatory fortification. Instead, the government has taken a more targeted approach, distributing rice fortified with vitamin A, vitamin B1, vitamin B12, folic acid, iron and zinc to ultra-poor households in selected districts through the PFDS since 2014. After 12 months, anemia prevalence among women in households receiving this rice dropped by 11% and zinc deficiency dropped by 6% compared to those in non-beneficiary households (Ara et al., 2019). Provision of fortified flour through the PFDS is set to expand, and

policymakers have expressed interest in making the product available through the private market as well.

Fortified rice in Bangladesh constitutes an ideal case in which to study the effect of an analogical aspirational message on consumer demand. First, consumers in this setting generally, and particularly the low-income consumers in our sample, are unfamiliar with fortified rice. To our knowledge, the only company to sell fortified rice in Bangladesh did so for just a few months in 2017 before discontinuing the product due to lack of demand. During this short time, the fortified brand was marketed as a premium product in supermarkets frequented by relatively high-income consumers. Second, rice is perceived as an essential staple rather than as a source of nutrients, thus fortified rice does not align with typical conceptions about the product category of rice. Finally, since rice is the main staple in Bangladesh, the study population is familiar with the characteristics and market price of unfortified rice and is therefore able to form a meaningful assessment of the value of the fortified product.

3. Experimental and Survey Design

In this section we describe the study site selection, participant recruitment process, and data collection methods in detail.

3.1 Study Site Selection

The experiment was conducted in the Chandpur District in Bangladesh. Chandpur district is in Chittagong Division which has the lowest per-capita rice production among the eight divisions in the country. Households in low rice production areas rely on markets – as opposed to subsistence production – for the rice they consume, and thus constitute the primary target market for fortified rice. Within Chittagong division there are 11 districts, of which Chandpur has the highest incidence of extreme poverty; 51% of households are below the poverty line and 30% are below

the extreme poverty line (Bangladesh Bureau of Statistics, 2016). By conducting the study in this district, we purposively selected a population with low dietary diversity and thus high potential health benefit from the consumption of fortified rice.

Four of the eight sub-districts in Chandpur district were excluded from the sample for various reasons, namely their urban or semi-urban classification (associated with higher wealth status), flood risk (which could imply inaccessibility during the study period), and involvement in other research activities. From the remaining four sub-districts, namely Haziganj, Fairdganj, Shahrasti, and Kachua, we randomly selected a total of ten unions for inclusion in the study.

3.2 Participant Recruitment

In each of the selected unions, we obtained beneficary lists for the saftey net program 'Food Friendly Program for the Ultra-Poor', through which households are offered 30 kg of rice per month for five months of the year at a subsidized price ($0.12/kg) (FAO, 2016). This subsidy is offered during the lean seasons months of March to April and September to November, which do not overlap with the timing of our field experiment (July to August). Participation in this program signifies food insecurity, but also significant reliance on unsubsidized rice, as the quantity of subsidized rice for which a household is eligible is low relative to total annual consumption needs.

From this set of poor, rural households, we randomly selected and interviewed 120 households in each union, based on the following inclusion and exclusion criteria. Households which had received any free food transfer from the government in the last year were excluded due to the risk that receiving another such transfer immediately prior to the experiment, or expecting to receive one shortly thereafter, could affect their demand for rice. Those who did not have at least one child aged between 0–16 years were also excluded, as micronutrient

fortification is especially beneficial to the health of children and the health information provided stressed this fact. In addition, households had to satisify at least two of the following five inclusion criteria indicating their reliance on marketed rice and vulnerability to food insecurity: 1) the household purchases rice from market during at least four months of the year; 2) an adult female household memeber sells labor; 3) the main income earner is disabled; 4) a school-aged child sells labor at least occasionally; and 5) no household member has a regular salaried job. To ensure that participants had authority to make food purchases on behalf of the household, the male household head or another adult male who usually buys groceries for the household was designated as the primary respondent.

3.3 Survey

Upon recruitment into the study, respondents were administered a structured, quantitative survey through a face-to-face interview. The survey included several sections with questions about household income, expenditures, land ownership, rice cultivation, rice consumption, and recent rice purchases. The survey also included questions regarding household food security and dietary diversity, which were administered to a female household member responsible for food preparation. Upon completion of the survey, the primary respondent was invited to participate in an auction session to be held on a later date in a school building within the community where he lived. Participants were not informed about the purpose of the session, but were informed about its expected duration, and that they would receive compensation of BDT 200 (USD 2.42)[2] for attending.

3.4 Auction Sessions and Experimental Treatments

[2] Calculated using the official exchange rate of 1 USD = 82.78 BDT

Of the 1,200 primary respondents interviewed, 1,057 (≈ 88%) participated in the auction sessions. Respondents in each union were randomly assigned to one of four treatment arms: a comparison group given information about the health benefits of fortification; treatment group 1 (T-1), which in addition received an aspirational message; treatment group 2 (T-2) to whom a message designed to increase the credibility of the health information was read, and treatment group 3 (T-3), which received all three messages.[3] In each union, auction sessions for the four groups were held simultaneously in different classrooms within a schoolhouse to avoid any potential spillover effects that from participants in different groups interacting between sessions. The health message read to all participants, including the comparison group, consisted of information on the consequences of micronutrient deficiency and the benefits of fortified rice. Participants in group T-1 were in addition read a script that connected the nutritional characteristics of fortified rice with those of the high-price nutritional drink mix brand Horlicks. Horlicks is a sweet malt-flavored drink mix made from wheat, milk and malted barley, and fortified with micronutrients, which has been heavily promoted through radio, television, and print media in Bangladesh. These commercial campaigns have, over the years, created a strong aspirational image of the product, as shown by data from our household survey. As shown in Appendix Table A.1, 77% of participants had heard of Horlicks. Of these, 79% recalled hearing or seeing advertisements for the product, and 92% believed that households richer than their own consume it. Those who had been exposed to Horlicks advertising were further asked to mention some health benefits of the product. These participants recalled that regular consumption of the drink mix helps children grow physically stronger (80%), more intelligent (61%), and taller (58%).

[3] Experimental scripts are provided in Web Appendix.

Participants in the third group, group T-2, were read, in addition to the cross-cutting health script, information about government distribution of fortified rice to ultra-poor households in certain parts of the country. Information about free distribution of the rice through the PFDS was expected to either signal government endorsement of the rice and thus enhance the credibility of health claims made about it, or create an anti-aspirational image of the product leading to lower willingness to pay. For simplicity, we refer to as the *credibility cue* treatment.

Finally, the participants in group T-3 were read a message that combined both the aspirational (Horlicks) and credibility (free government distribution) cues. If association with the PFDS lends credibility to information on the benefits of fortified rice, we would expect that exposure to this message would have the strongest positive impact on willingness to pay. If, however, there is a stigma or negative association with the PFDS, we would expect the association with free distribution to weaken any positive effect of aspirational messaging on willingness to pay. Table 1 below illustrates the combinations of messages delivered to each of the four experimental groups.

Table 1. Messages by experimental treatment group

Information/Messages	**Control**	**Treat.-1**	**Treat.-2**	**Treat.-3**
Health risks of anemia and zinc deficiency + benefits of consuming fortified rice	✓	✓	✓	✓
Aspirational cue: Analogy to Horlicks	×	✓	×	✓
Credibility cue: Distribution through PFDS	×	×	✓	✓

After the treatment-specific message was read, participants were invited to inspect samples of fortified and unfortified rice. The fortified rice offered was mixed using the unfortified rice offered, so that the two types differed only in terms of the presence of fortified kernels (Figure A-1 in Appendix). Then, they were asked to bid on 1 kg of fortified rice and 1 kg of unfortified rice using the Becker-DeGroot-Marschak (BDM) mechanism.

BDM auctions are commonly used in experimental economics to induce participants to bid their actual valuation of a good, and proceeded as follows. First, each participant was asked to submit the maximum price he was willing to pay for 1 kg of each type of rice. Then, a random price was drawn from a distribution of prices ranging from 1 to 100. If a participant's price was higher than or equal to the randomly drawn price, the participant had to purchase the rice at the random price, using the compensation provided for attendance. Under this procedure, participants do best for themselves by bidding their true valuation. A bid below one's actual valuation risks losing the good if the randomly drawn price is lower than the participant would be willing to pay. On the other hand, if the participant bids too high, he may be forced to buy the good at a price that is higher than his actual valuation of the good.

Although participants were asked to submit bids for both fortified and unfortified rice, only one of the two types (selected through a second random draw) was sold in each auction session. To ensure that participants understood the BDM bidding process, two practice rounds were conducted prior to the auctions for rice: the first round using a packet of biscuits and the second round using a bar of soap.

4. Data and Results

Table A.2 in the appendix presents summary statistics on household demographic characteristics, socio-economic status, rice cultivation, consumption, foods perceived as nutritious, and knowledge of Horlicks. Column 1 and Column 2 report summary statistics (means and standard deviations) for the full sample and the comparison group households respectively. Columns 3 through 5 present balance tests for random assignment of the treatment groups.

The descriptive statistics in Column 2 shows that households assigned to the comparison group are similar to the sample overall. In Columns 3 through 5, we test how each of the treatment groups (T-1, T-2, and T-3) differs from the comparison group on the same variables reported in Column 2. We do so by regressing each of these variables on an indicator for assignment to the specific treatment group, with the comparison group as the excluded category. In running these simple regression models, we cluster standard errors at the auction session level to account for correlation that could result from potential differences in the delivery of messages or implementation of the auction.

As shown in Columns 3 and 5, groups T-1 and T-3 do not differ significantly from the comparison group in terms of any of the 25 variables tested. Households assigned to group T-2 are similar to comparison group households for all but one variable (mobile phone ownership). In sum, we find that our randomization was effective in creating comparable treatment groups, and respondents across the four groups are mostly similar in terms of socio-demographic characteristics, rice consumption, and their perceptions of the aspirational good used in the messages delivered to groups T-1 and T-3.

4.1 Acceptability of and Willingness to Pay for Fortified Rice

Column 1 of table 2 shows the proportion of study participants overall and by treatment group to whom fortified rice is acceptable, defined as those who were willing to pay at least as much for fortified rice as for unfortified rice. Overall, fortification was acceptable to 93% of participants. In the group that received information only on the health benefits of fortified rice, 89% bid at least as much for fortified as unfortified rice, whereas this proportion was 91% of those to whom the aspirational cue was communicated, and 93% of those to whom credibility messaging was delivered. Acceptability was highest in group T-3, who received both messages; 99% of these participants bid at least as much for fortified rice as they did for the regular, unfortified product.

Considering willingness to pay a premium for fortified rice (Column 2), we find that 76% of participants overall were willing to pay at least BDT 3.96 (USD 0.048) more for fortified than unfortified rice, reflecting the per-KG cost of fortification paid by the Government of Bangladesh for rice distributed through the PFDS. Again, this proportion is highest among the group to which both messages (credibility and aspirational cues) were delivered, lowest among the group that only received health information, and intermediate among the two treatment groups that received either the credibility or messaging cue.

Table 2. Acceptability and willingness to pay for fortified rice

	Message		Willing to pay at least as much for fortified rice as unfortified rice	Willing to pay premium of at least USD 0.048 (cost of fortification)	N
			(1)	(2)	(3)
Full Sample		proportion	93%	76%	1,057
		95% CI	[0.91, 0.94]	[0.73, 0.78]	
Comparison	Health benefits only	proportion	89%	69%	264
		95% CI	[0.85, 0.92]	[0.63, 0.75]	
T-1	Health benefits + Aspirational Cue	proportion	91%	72%	264
		95% CI	[0.87, 0.94]	[0.66, 0.77]	
T-2	Health benefits + Credibility Cue	proportion	93%	77%	275
		95% CI	[0.90, 0.96]	[0.72, 0.82]	
T-3	Health benefits + Aspirational + Credibility Cues	proportion	99%	86%	254
		95% CI	[0.97, 1.00]	[0.82, 0.90]	

Table 3 presents the means and confidence intervals of participants' bids for both unfortified and fortified coarse rice. Combining all the groups, participants were willing to pay an average of BDT 6.8 (USD 0.082) more for fortified rice than comparable unfortified rice, representing a 25% premium. While the premium for fortified rice is positive and statistically significant for all four treatment groups, it is highest in T-3 (combined credibility and aspirational cues) at (30%), followed by T-2 (credibility cue) (27%). The premium among T-1 (aspirational cue) and comparison group subjects is the same, at 21% above the average bid for unfortified rice. The mean bid for unfortified rice in the control group, at 24.4 BDT, was lower than the market price of unfortified rice used in the experiment (30 BDT). This is expected, as participants were not necessarily in need of rice at the time of the auction, and suggests that any potential upward bias in overall bids due to the participation incentive provided was minimal.

We note that mean willingness to pay for unfortified rice follows a similar pattern across the four groups as the fortification premium. While the treatment was not expected to affect WTP for this rice, it is possible that information on fortified rice altered the reference price for other rice. A number of studies, including by Thaler (1985) and Lattin & Bucklin (1989), demonstrate that WTP for a product can be influenced by purchase context, for example the prices of other products available at the same shop (Mazumdar et al., 2005). Since our interest is in the magnitude of the premium, we control for these reference effects in the next section, by analyzing the effect of the experimentally varied messages on the difference in bids between fortified and unfortified rice.

Table 3. Willingness to pay for unfortified and fortified Rice

	Message	(1) Unfortified Rice	(2) Fortified Rice	(3) Fortification Premium	(4) N
Full Sample		27.11 [26.56 27.65]	33.91 [33.11 34.70]	25%	1,057
Comparison Group	Health benefits only	24.38 [23.25 25.50]	29.69 [28.2 31.2]	21%	264
T-1	Health benefits + Aspirational Cue	27.53 [26.59 28.5]	33.23 [31.84 34.63]	21%	
T-2	Health benefits + Credibility Cue	27.04 [26.01 28.06]	34.34 [32.75 35.94]	27%	275
T-3	Health benefits + Aspirational + Credibility Cues	29.57 [28.36 30.77]	38.52 [36.79 40.25]	30%	254

The distribution of WTP, plotted in Figure 1, shows substantial dispersion in preferences for both unfortified and fortified rice, with longer right tails for fortified rice in all groups. For instance, among participants in the comparison group, the 90th percentile bid was BDT 42 (USD 0.51), almost three times the 10th percentile bid. The dispersion in WTP for fortified rice is greatest in groups T-2 and T-3, the groups for which the average fortification premium was highest, indicating that the mean premium is to some extent driven by a subset of consumers who are willing to pay much more for fortification than average. For this reason, and because the commercial viability of fortified rice depends on whether a sufficient number of consumers are willing to pay a premium that covers its cost, we focus below on the binary outcome of whether participants' fortification premium is at least equal to the government's cost of fortifying rice for the PFDS program.

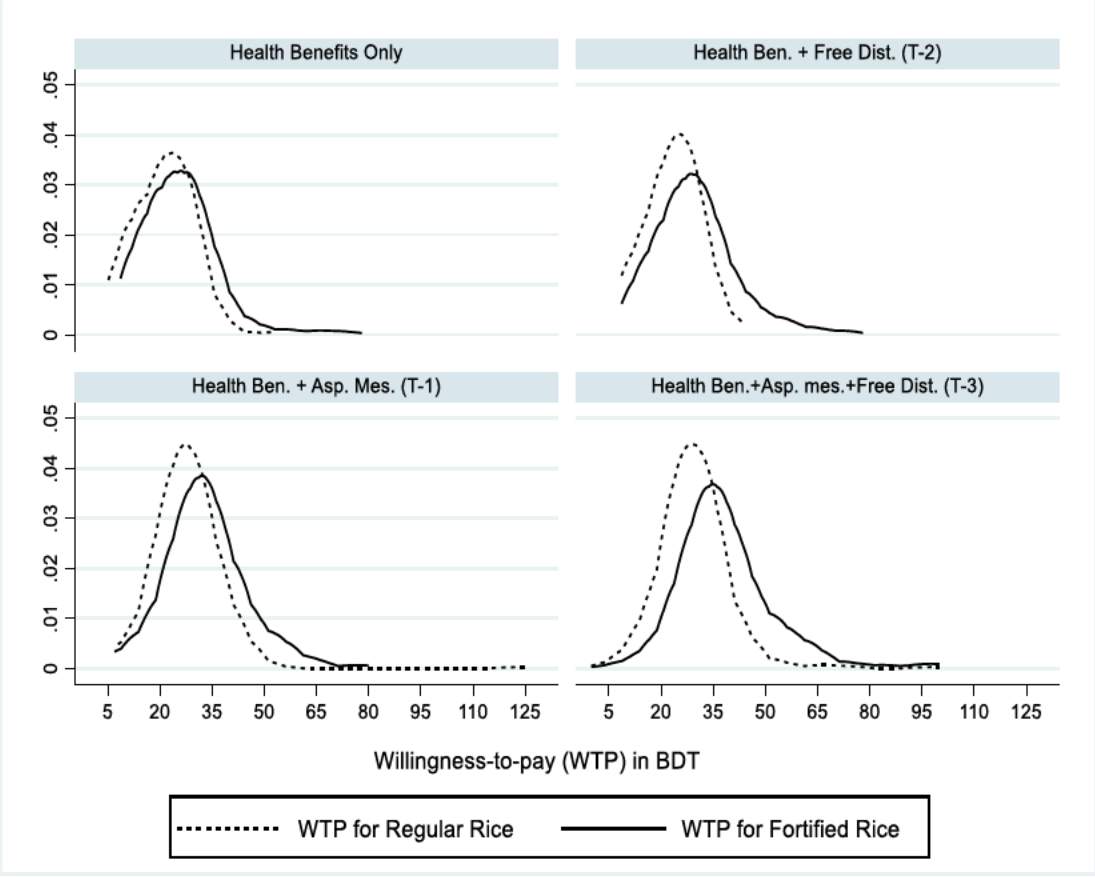

Figure 1. Kernel distribution of the willingness-to-pay (WTP) for unfortified and fortified rice by treatment groups, in Bangladeshi Taka (BDT).

4.2 Determinants of Willingness to Pay a Premium for Fortified Rice

To evaluate the change in consumers' willingness to pay a price premium for fortified rice in response to aspirational and credibility message cues, we estimate the following model:

$$WTP_{required\ premium_{ij}} = \beta_0 + \sum_{j=1}^{3} \beta_j T_j + \beta_x X_i + e_i \qquad (1)$$

Where $WTP_{required\ premium_{ij}}$ is a dummy indicating the willingness to pay a premium at least as high as the fortification cost for participant *i* in treatment group *j*. T_j are treatment group indicators. X_i is vector of household and auction level covariates for participant *i*, and e_i are individual error terms. The vector of covariates, in addition to baseline characteristics, includes a variable – *auction weeks* – to control for the week when an auction session took place and thus the level of experience of auction session moderators. In addition to this specification, which shown in Column 3 of Table 4, we also present results for specifications in which the covariates (X_i) are excluded (Column 1), and in which a subset are included (Column 2).

Across specifications, we do not find any significant effect of adding either the aspirational or credibility cue to the cross-cutting information about product attributes and health benefits. However, combining these two messages (in group T-3) increases the proportion of participants willing to pay the required premium relative to health information alone by 17-18 percentage points relative to the *health information only* group ($p < 0.01$). Respondents with higher household dietary diversity scores were less likely to pay the required premium for the rice in two of the three specifications that include this variable, suggesting that they may have perceived fortification as less important to their family's health.

Though not statistically significant in any of the estimated models, the estimated effect of the credibility cue (T-2) is consistently positive, contrasting with the idea that the affiliation with a social support program could have a negative effect on product valuation. The aspirational cue similarly has a positive but statistically insignificant effect on the demand for fortified rice.

We estimated the same models shown in Table 4 with the price premium for fortified rice as the outcome variable. Results are presented in Appendix Table A.3. Results are consistent with those shown in Table 4; we find a significant effect on the premium only when both aspirational and credibility message cues are combined. Participants in the combined message group were willing to pay an additional BDT 3.57 (USD 0.043) on average for fortified rice relative to those in the *health information only* group.

We note that connecting fortified rice to the PFDS is unlikely to have improved participants' perceptions of the rice on other dimensions. In fact, data from the baseline survey shows that of those who knew about free distribution of rice, 94% mentioned that the government distributes low-value coarse rice (see Table A.1). When asked if they knew of any special characteristics of the rice distributed through PFDS, only 4% of participants indicated that they did; of these, the majority stated that PFDS rice is of poor quality or mentioned a negative characteristic (see Table A.1). We thus argue that the information about free distribution of fortified rice through PFDS signals the credibility of the micronutrient claim, rather than some other quality attribute of the rice.

Table 4. Determinants of consumer willingness to pay for the cost of fortification

	(1)	(2)	(3)
T-1: Health Ben. + Asp. Messaging	0.027	0.020	0.024
	(0.075)	(0.072)	(0.074)
T-2: Health Benefits + Cred. Cue	0.082	0.082	0.074
	(0.082)	(0.081)	(0.082)
T-3: Health Ben. + Asp. Messaging + Cred. Cues	**0.173**	**0.173**	**0.176**
	(0.063)* **	**(0.064)*** **	**(0.065)*** **
Food insecurity access score		0.004	0.004
		(0.003)	(0.003)
Dietary diversity score		-0.028	-0.021
		(0.013)**	(0.012)*
Cultivates rice		0.021	0.041
		(0.033)	(0.042)
Auction week		0.019	0.019
		(0.014)	(0.013)
Additional baseline characteristics	No	No	Yes
Constant	0.689	0.759	0.445
	(0.060)***	(0.108)***	(0.278)
N	1,057	1,057	1,057

Note: Willingness to pay a premium at least as high as the fortification cost is the dependent variable in all models. Standard errors clustered by auction session, the unit of randomization, are shown in parentheses. *, **, *** denote statistical significance of coefficients at the 10%, 5%, and 1% confidence level. Additional baseline variables included in the model reported in column (3), but not shown in this table, are those in Table A.1.

4.3 Heterogenous Effects

We next test whether the response to messages depends on participant characteristics. Understanding heterogeneous effects can shed light on which message interventions are most effective for inducing demand among subgroups of interest, for example the poorest or most food insecure households. This analysis can also allow us to develop insights regarding the mechanism through which a message affects participants' valuation of fortified rice.

We begin by testing whether the effects of the messages vary depending on two proxy measures of poverty: Food Insecurity Access Score (FIAS), and an index variable representing households' asset holdings. In Column 1 of Table 5, we include a dummy indicating whether the household is above the sample median value of the Food Insecurity Access Score (FIAS) and thus relatively more food insecure, and the interaction of this variable with indicators for each message treatment. We find no evidence that either WTP a premium, nor message effects, vary by FIAS. Dividing the sample into three subgroups according to their food insecurity status following Coates et al. (2007), and estimating the effects of messages separately for each group (see Appendix Table A.4) likewise shows similar effects across FIAS terciles.

In Column 2, we test whether message effects vary by whether a household's asset score is above versus below the median value. Consistent with the analysis based on food insecurity status, asset wealth is not significantly correlated with WTP. We note a significant heterogeneity result for one of the messages: participants from households with an asset score above the median are 10 percentage points were more likely to be willing to pay the required premium for the rice when exposed to the aspirational cue ($p<0.05$).

Next, we test whether the impact of messages depends on whether participants live with at least one woman between the ages of 15 and 49, or one child aged below 5 years (U-5). We

focus on these two groups because the auction scripts described the health risks of micronutrient deficiency for expectant mothers and U-5 children. We find no evidence that the effect of the experimental messages differed for households that included a woman of reproductive age versus those that did not (Column 3). However, we do observe heterogeneity across households with and without U-5 children. Within the comparison group, a larger proportion of respondents from households with at least one U-5 child were willing to pay the required premium for fortified rice compared to those without young children (Column 4). However, this subgroup was significantly less responsive to the aspirational cue than others. This could be because Horlicks marketing targets school-aged children and pregnant woman and does not focus on U-5 children, hence these households may not have perceived any additional benefits due to the association with Horlicks, or may even have inferred that fortification is less important for young children. Lower responsiveness to additional messages could also arise if there exists a ceiling in potential willingness to pay, which is reached by households with U-5 children when they are provided with health information alone.

Finally, in Column 5 we test whether participants' responses to the message interventions differed based on educational attainment. We do not find any heterogeneity in effects on this dimension. Table A.4 in the Appendix shows similar effects across three educational subgroups: respondents with no formal education, with some primary education, and with high school and above education.

Table 5. Heterogenous Effects by Food Security Status, Assets Holdings, Household Demographics, and Education Level

	Median Food Insecurity Score (1)	Median Asset Holding Score (2)	HHs with/out Reproductive Aged Female (3)	HHs with/out U-5 Children (4)	Respondent with High School and Above Education (5)
T-1: Aspirational cue	-0.01	-0.04	0.02	0.12	0.06
	(0.09)	(0.08)	(0.13)	(0.09)	(0.08)
T-2: Credibility cue	0.06	0.12	-0.02	0.13	0.07
	(0.11)	(0.08)	(0.16)	(0.09)	(0.09)
T-3: Aspirational + credibility	0.18	0.18	0.10	0.21	0.18
	(0.08)**	(0.07)**	(0.17)	(0.08)**	(0.07)**
Auction weeks	0.02	0.02	0.02	0.02	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Subgroup indicator	-0.01	-0.05	0.07	**0.13**	0.06
	(0.07)	(0.05)	(0.10)	**(0.07)***	(0.06)
T-1 # Subgroup	0.07	**0.10**	0.01	**-0.25**	**-0.12**
	(0.10)	**(0.05)****	(0.14)	**(0.08)*****	**(0.07)***
T-2 # Subgroup	0.05	-0.06	0.10	-0.11	0.02
	(0.10)	(0.06)	(0.19)	(0.09)	(0.07)
T-3 # Subgroup	-0.01	-0.01	0.08	-0.09	-0.03
	(0.08)	(0.06)	(0.18)	(0.08)	(0.07)
Baseline characteristics	No	No	No	No	No
Constant	0.63	0.66	0.57	0.58	0.62
	(0.07)***	(0.07)***	(0.08)***	(0.07)***	(0.07)***
N	1,057	1,057	1,057	1,057	1,057

Note: Willingness to pay a premium at least as high as the fortification cost is the dependent variable in the models. Standard errors clustered by auction session, the unit of randomization, are shown in parentheses. *, **, *** denote statistical significance of coefficients at the 10%, 5%, and 1% confidence level.

The total effect of the combined message (T-3) on demand for fortified rice among households especially vulnerable to micronutrient malnutrition, whether defined as those with a high food insecurity score, low wealth holdings, inclusion of a member in a vulnerable demographic group, or low educational attainment, is always positive and significant at $p<0.1$ (see Appendix table A.5).

5. Policy Implications

Rice fortification can be instrumental in fighting malnutrition among the low-income people in Bangladesh and other South Asian countries. However, high price sensitivity and lack of knowledge about its health benefits may lead to low adoption of the rice among low-income consumers. Previous studies (e.g. Meredith et al., 2013; Dupas, 2009; Kremer and Miguel, 2007) show that educational information campaign is necessary but not sufficient to increase adoption of health preventive products among the poor. In this paper, we test three marketing messages to see what message effectively increases the acceptability and willingness to pay for the rice among consumers living in poverty with low dietary diversity and high risk of micronutrient malnutrition.

Our results show significant potential for marketing messages to increase consumer demand for fortification. Neither associating fortified rice with a well-known and high-value fortified product, nor informing participants that such rice is distributed through the PFDS, a well-known social protection program, significantly increased the proportion of participants willing to pay a premium equal to the fortification cost. However, when these two messages were combined, the proportion of participants willing to pay the premium increased by 17-18

percentage points relative to those who were only given information about health benefits of fortification.

The lack of individual impact, but strong joint impact of the messages tested suggests that connecting fortified rice to a known, high-status brand can help consumers understand the nature of this unfamiliar product – but that this understanding is insufficient on its own to induce higher willingness to pay, perhaps due to doubts about the credibility of health claims. The fact that the government distributes fortified rice through the PFDS appears to lend credibility to these claims. In contrast to some studies from developed countries that show evidence of stigma associated with social support programs (e.g. Yu et al., 2019; Mirtcheva and Powell, 2009), our results suggest that free distribution of a product does not necessarily harm the image of that product.

The positive reputation of the PFDS is likely key to the trust its affiliation with fortified rice appears to instill. As noted by Dupas in her review of health behavior in developing countries (Dupas, 2011b), the source of information is an important determinant of the success of information campaigns in the health sector. As an example, she cites the failure of a government-run effort to promote oral rehydration therapy (ORT) in India in the early 1990s, which she ties to mistrust of government initiatives after forced sterilization campaigns between 1975 and 1977. The public sector in Bangladesh, on the other hand, has been praised for its achievement of strong health outcomes through equitable and extensive outreach programs (El Arifeen et al., 2014; Ahmed et al., 2013; Chowdhury et al., 2013). Given the long track record of government-run pro-poor health interventions in Bangladesh, affiliation of fortified rice with the PFDS appears to have improved the credibility of health claims about this product.

Our results also show some evidence of heterogeneity in the effects of messages based on household composition. We do not see much evidence of heterogeneity based on asset poverty or food insecurity, possibly due to low variability on these dimensions in the sample. Presence of a reproductive aged woman in the respondent's household likewise did not influence either WTP or treatment effects. However, respondents who lived with U-5 children showed higher demand for fortified rice based on information about its health benefits alone, and demonstrated a significantly lower response to the aspirational cue.

In sum, a simple health message is most effective at encouraging the purchase of fortified rice by individuals for whom the benefits are likely to be greatest, specifically households that include U-5 children. Adding aspirational messaging and credibility cues can expand consumer demand beyond this group while also increasing demand among the target population.

6. Conclusion

Results from a field experiment in rural Bangladesh suggest that a message positioning fortified rice as a high-value product and linking it to a government program can increase the proportion of consumers willing to pay a premium equal to the cost of fortification. In contrast to the potential concern that free distribution of a product may lead to an anti-aspirational association that reduces demand, we argue that in a context where public institutions are well-regarded, such an association may help establish the credibility of claims about the product's unobservable benefits.

Our findings are encouraging regarding the potential to expand the consumption of fortified rice in Bangladesh. We note, however, that consumer demand for merit goods, such as safe or nutritious foods, can be overstated by research due to experimenter demand effects

(Hoffmann et al., 2019). Previous studies have shown that the impact of marketing based on health attributes fades over time (Hoffmann et al., 2017). Additional research that builds on this study and assesses consumer demand for fortified rice in a more natural setting over a longer time horizon would provide a clearer picture of the true level consumer demand for this product.

Footnotes

[1] The smallest government adminstrative units

[2] Calculated using the official exchange rate of 1 USD = 82.78 BDT

[3] Experimental scripts are provided in Web Appendix.

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Appendix A: Supplementary figures and tables

Figure A.1: Sample of fortified (marked with F) and regular (marked with R) rice sold in the auction sessions

Table A.1: Knowledge about Horlicks and PFDS rice

	Mean	SD	N
Know Horlicks	0.765	0.424	1,057
Richer households consume Horlicks	0.918	0.274	809
Noticed commercials for Horlicks	0.789	0.407	809
Health benefits of Horlicks recalled:			
Children grow taller	0.583	0.493	647
Children become more intelligent	0.609	0.488	647
Children grow stronger	0.799	0.401	647
Aware of free rice distribution through PFDS	0.858	0.349	1,057
Coarse rice distributed through PFDS	0.938	0.241	907
Does rice distributed through PFDS have special characteristics?			
No	0.458	0.499	907
Do not know	0.502	0.500	907
Positive characteristic mentioned	0.250	0.433	36
Negative characteristic mentioned	0.750	0.433	36

Table A.2. Descriptive statistics and balance tests

	(1) Full Sample Mean	(2) Comparison Group Mean	(3) Difference in Means, T1 - C	(4) Difference in Means, T2 - C	(5) Difference in Means, T3 - C
Demographics:					
Male-headed household	0.99	0.99	0.10	-0.12	-0.08
	(0.11)	(0.11)	(0.23)	(0.20)	(0.22)
Household size	5.40	5.33	0.01	0.00	0.01
	(1.56)	(1.40)	(0.02)	(0.02)	(0.02)
Proportion of members working	0.29	0.29	0.00	0.05	-0.19
	(0.15)	(0.14)	(0.15)	(0.17)	(0.17)
# of reproductive aged females > 0	0.95	0.94	0.04	0.13	0.03
	(0.22)	(0.24)	(0.11)	(0.13)	(0.12)
# of children aged below 5 > 0	0.36	0.38	-0.05	-0.03	-0.03
	(0.48)	(0.49)	(0.04)	(0.03)	(0.04)
Inclusion Criteria (satisfied any 2):					
Purchase rice ≥ 4/12 months	0.98	0.99	-0.22	-0.09	0.16
	(0.14)	(0.12)	(0.17)	(0.17)	(0.25)
Adult woman sells labor	0.05	0.06	-0.04	-0.09	-0.20
	(0.21)	(0.24)	(0.11)	(0.10)	(0.14)
Primary male earner is disabled	0.25	0.26	0.03	-0.03	-0.02
	(0.44)	(0.44)	(0.04)	(0.05)	(0.05)
School-aged child sells labor	0.14	0.14	0.02	-0.05	0.03
	(0.35)	(0.35)	(0.10)	(0.09)	(0.09)
No member with regular salary	0.96	0.96	0.02	0.11	0.06
	(0.19)	(0.21)	(0.11)	(0.15)	(0.14)
Socioeconomic Status:					
No formal education	0.37	0.37	0.05	-0.06	0.00
	(0.48)	(0.48)	(0.05)	(0.06)	(0.05)
Electricity connection	0.97	0.97	0.06	-0.08	0.06
	(0.18)	(0.18)	(0.12)	(0.11)	(0.12)
Own a mobile phone handset	0.98	0.97	-0.09	0.293**	0.03
	(0.15)	(0.16)	(0.12)	(0.13)	(0.11)
Own a television	0.22	0.23	-0.07	0.02	0.00
	(0.41)	(0.42)	(0.06)	(0.06)	(0.07)
Household Food Security					

Severely food insecure	0.43	0.42	-0.01	0.02	0.01
	(0.50)	(0.50)	(0.05)	(0.05)	(0.06)
Moderately food insecure	0.39	0.36	0.08	0.01	0.02
	(0.49)	(0.48)	(0.05)	(0.05)	(0.06)
Dietary diversity score (out of 12)	6.40	6.42	-0.04	0.01	0.01
	(1.12)	(1.07)	(0.02)	(0.02)	(0.02)
Rice Cultivation and Consumption					
Household cultivates rice	0.30	0.29	-0.02	0.03	0.04
	(0.46)	(0.46)	(0.07)	(0.05)	(0.07)
Purchased rice past month	0.78	0.77	0.04	0.04	-0.01
	(0.42)	(0.43)	(0.06)	(0.06)	(0.06)
Fine rice preferred type	0.41	0.40	0.04	-0.02	0.02
	(0.49)	(0.49)	(0.04)	(0.04)	(0.05)
Would buy for children's health if affordable					
Milk	0.83	0.83	0.01	0.01	0.01
	(0.38)	(0.38)	(0.07)	(0.07)	(0.06)
Eggs	0.81	0.78	0.05	0.04	0.07
	(0.40)	(0.42)	(0.06)	(0.06)	(0.07)
Fruit	0.80	0.81	-0.04	0.02	-0.02
	(0.40)	(0.39)	(0.05)	(0.06)	(0.05)
Knowledge of Horlicks					
Heard of Horlicks	0.76	0.77	0.00	-0.05	0.01
	(0.43)	(0.42)	(0.06)	(0.06)	(0.06)
Ever consumed Horlicks	0.06	0.06	0.03	0.08	0.01
	(0.25)	(0.23)	(0.09)	(0.08)	(0.09)
N	1057	264	528	539	518
F stat (test for joint significance)			0.97	0.66	0.50

Note: Columns 1 and 2 presents the means and standard deviations (in parentheses) of each variable in the full sample and comparison group, respectively. Columns 3 through 5 show differences in means between each of the treatment groups and the comparison group, with standard errors (in parentheses) clustered by auction session, the unit of randomization. *, **, *** denote significant differences between treatments at the 10%, 5%, and 1% confidence level.

Table A.3: Determinants of fortification premium

	(1)	(2)	(3)
T-1: Health Ben. + Asp. Cue	0.39	0.37	0.42
	(1.21)	(1.19)	(1.19)
T-2: Health Benefits + Cred. Cue	1.99	1.97	1.83
	(1.39)	(1.38)	(1.40)
T-3: Health Ben. + Asp. + Cred. Cues	3.64	3.62	3.57
	(1.07)***	(1.04)***	(1.07)***
Food insecurity access score		0.06	0.06
		(0.08)	(0.08)
Dietary diversity score		-0.13	-0.06
		(0.17)	(0.17)
Cultivates rice		0.75	0.99
		(0.55)	(0.69)
Auction weeks		-0.00	0.00
		(0.27)	(0.27)
Additional baseline characteristics	No	No	Yes
Constant	5.31	5.36	1.01
	(0.79)***	(1.74)***	(3.70)
N	1,057	1,057	1,057

Note: The difference in respondents' WTP between unfortified and fortified rice is the dependent variable in all models. Standard errors clustered by auction session, the unit of randomization, are shown in parentheses. *, **, *** denote statistical significance of coefficients at the 10%, 5%, and 1% confidence level. Additional baseline variables included in the models reported in column (3), but not shown in this table, are those in Table A.1.

Table A.4: Heterogenous effects by food security status and education level

	Food Security Status			**Respondents Education**		
	Severely Food Insecure (1)	Moderately Food Insecure (2)	Mildly Food Insecure (3)	No Formal Education (3)	Some Primary Education (4)	High School and Higher Education (5)
T-1: Aspirational cue	0.01	0.09	-0.12	0.06	0.05	-0.06
	(0.09)	(0.07)	(0.10)	(0.09)	(0.09)	(0.08)
T-2: Credibility cue	0.05	0.07	0.17	0.08	0.07	0.10
	(0.10)	(0.10)	(0.11)	(0.09)	(0.10)	(0.09)
T-3: Aspirational + credibility	**0.15**	**0.19**	**0.18**	**0.16**	**0.20**	**0.15**
	(0.08)*	**(0.08)****	**(0.09)***	**(0.08)****	**(0.08)****	**(0.08)***
Auction weeks	0.01	0.03	0.01	0.02	0.02	0.3
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)*
Baseline characteristics	No	No	No	No	No	No
Constant	0.68	0.60	0.61	0.63	0.62	0.65
	(0.08)***	(0.08)***	(0.09)***	(0.07)***	(0.08)***	(0.06)***
N	454	411	192	387	405	265

Note: Willingness to pay a premium at least as high as the fortification cost is the dependent variable in the models. Standard errors clustered by auction session, the unit of randomization, are shown in parentheses. *, **, *** denote statistical significance of coefficients at the 10%, 5%, and 1% confidence level.

Table A.5: Effect of the combined message by target group

Linear Combination Test	Coefficient (S.E)	T-value	P-vale	95% Confidence Interval
Combined Message + Combined Message × U-5 Child in Household	0.12 (0.07)	1.74	0.09	[-0.02, 0.25]
Combined Message + Combined Message × Reproductive Aged Female in Household	0.18 (0.07)	2.62	0.01	[0.04, 0.31]
Combined Message + Combined Message × HFIAS Above Median	0.17 (0.07)	2.36	0.02	[0.02, 0.31]
Combined Message + Combined Message × Asset Holding Score Bellow Median	0.18 (0.07)	2.63	0.01	[0.04, 0.32]
Combined Message + Combined Message × Respondent with High School and Above Education	0.15 (0.07)	2.00	0.05	[-0.001, 0.30]

Web Appendix

Experimental scripts

Compensation statement

The money you will be given is compensation for your participation in this study. You may use this for whatever you wish. Later today you will have an opportunity to exchange this cash for 1 kg of rice, but you are in no way obligated to do so.

Basic Information on Attributes and Health Benefits of Fortified Rice

(read to all study groups)

Anemia is a common health condition in our country. This is the condition when human body lacks enough healthy red blood cells. The red blood cells pass the oxygen from our lungs to all the parts of our body. If we do not have good red blood cells, then our body parts will not get enough oxygen to perform. The symptoms of anemia include fatigue, headache, pale skin, leg ramps, rapid heartbeat, etc. Around 50% of children younger than 5 years old and 50 percent of women aged 15-45 suffer from anemia. Anemia among young children can cause permanent cognitive damage, reduced attention span, and shortened memory. Anemia during pregnancy can lead to the mother's or infant's death and is a leading cause of maternal mortality and infant mortality in Bangladesh. Anemia is caused mostly due to the lack of iron and vitamin B12 in our body.

In addition to anemia, many people in our country also suffer from Zinc deficiency. Around 45% of children under 5 and 66% of women aged 15-45 suffer from zinc deficiency in our country. Zinc helps the body fight disease, heal wounds, and growth during pregnancy and

childhood. Since the human body cannot store zinc, we need to make sure that we get enough zinc from our daily food intake.

One solution to anemia and zinc deficiency is to mix different micronutrients including vitamin A, vitamin B1, vitamin B12, folic acid, iron and zinc with rice. Such rice is called fortified rice. Regular consumption of fortified rice ensures a good supply of vitamins, zinc, and other necessary minerals to our body. As a result, our body's ability to fight disease will increase; women will face fewer complications during their pregnancy; and children will have better physical growth and be more intelligent. Fortification of rice does not change the taste of the original rice.

Treatment-Specific Messages

Treatment 1: Analogy to an Aspirational Brand

There are some other products that provide similar health benefits as the fortified rice. Some of these products are heavily promoted in television, radio, and other media. For example, the nutrition drink mix Horlicks provide similar health benefits. If you remember from the TV and radio commercials, these nutritional drinks and powdered milk brands claim that your children will be taller and stronger and become more intelligent if they consume these products. These nutritional drink mixes and milk powders are fortified with similar minerals and vitamins as fortified rice.

Treatment 2: Information about Free Distribution of Fortified Rice Through PFDS

The government provides fortified rice to poor and vulnerable households in Kurigram and Kishorganj districts through the Public Food Distribution System, but it is not generally

available for purchase in Bangladesh. However, you will have a chance to buy some of this rice today.

Treatment 3: Combined Messages

There are some other products that provide similar health benefits as the fortified rice. Some of these products are heavily promoted in television, radio, and other media. For example, the nutrition drink mix Horlicks provide similar health benefits. If you remember from the TV and radio commercials, these nutritional drinks and powdered milk brands claim that your children will be taller and stronger and become more intelligent if they consume these products. These nutritional drink mixes and milk powders are fortified with similar minerals and vitamins as fortified rice.

The government provides fortified rice to poor and vulnerable households through the Public Food Distribution System, but it is not generally available for purchase in Bangladesh. However, you will have a chance to buy some of this rice today.

Bidding script

In our research we are interested to find out how much you would pay for the fortified rice. We will ask you to tell us the maximum price you are willing to pay for 1 kg of fortified rice. Please do not share your price with others. We will come to you and write down your price in our article. I will then randomly choose a price by drawing a chit from a bag. The bag contains some chits with different prices written on them. If your price is higher than the price I choose, you will give me the amount of money I have chosen, and I will give you 1 kg of fortified rice. If the price I choose is higher than the maximum you are willing to pay, you will keep all the money I have given you and I will keep the rice.

Under this procedure, it is in your best interest to tell me exactly the maximum you are willing to pay; no more and no less. If you tell me a price that is higher than the maximum you actually want to pay, you will be forced to pay this price if I draw a price lower than your price. If the price you tell me is lower than the maximum you would actually pay, then if I draw a higher price you will not be allowed to buy the fortified rice even if you want to.

First, we will do a trial using two different brands of biscuit packets so that you can understand well how this works.

Facilitator: Show the sample biscuit packages to the participants

The prices at which you can buy the biscuits from us will be determined by drawing a chit from a bag. Before I draw the chit, I will ask each of you to tell me the maximum price that you would like to pay for one packet of each of these brands of biscuit packet. If you do not like these biscuits at all, you could think about how much you would be willing to pay for it in case you want to buy it for your family members. Note that though we want to know your price for both brands of biscuits, we will sell only one of these brands today. To decide on which brand to sell today, we will draw a chit from the bag and sell whichever brand gets chosen.

Similarly, to decide on the price at which we will sell the chosen brand of biscuit, I will draw a chit from the bag with my eyes closed. The number that appears on the chit drawn from the bag will be the price of the biscuit packet. If your price is higher than the price I drew, you will have to buy the biscuit packet at the drawn price. For example, suppose that Mr. XX wanted to pay BDT. 6 for the biscuit packet. The price that I drew from the bag is BDT. 8. In this case, Mr. XX will not have to buy the biscuit. Now suppose Mr. YY wanted to pay BDT. 12 for the biscuit, which is higher than the price I drew (i.e. BDT. 8). In this case, Mr. YY will buy the biscuit packet at BDT. 8.

So, the main message is - you can purchase the biscuit packet only if the price drawn from the bag is less than or equal to the price that you are willing to pay. Then, you will pay the price that is drawn from the bag not the price that you were willing to pay.

Facilitator: Keep a record of the prices the participants are willing to pay. Draw two chits; one to decide which brand of biscuit to sell and the other to decide on the selling price. Keep your eyes closed while drawing the chit and let the participants see you when you do it. Sell the biscuit packet to those whose prices were equal to or higher than the randomly drawn price).

Now we will practice the auction process one more time. This time we will do it for 2 brands of soap bars; brand KKK and LLL. This time, I want you to keep your price secret and not to share with others. I request you to write down your price on the paper you are given. My colleagues will go to you and note down your price.

Facilitator: Show the sample soap bar to the participants. Keep a record of the prices the participants are willing to pay. Draw two chits; one to decide which brand of biscuit to sell and the other to decide on the selling price. Keep your eyes closed while drawing the chit and let the participants see you when you do it. Sell the soap bars to those whose prices were equal to or higher than the randomly drawn price).

Now we will repeat the same auction process for fortified rice. Before we move on, please let me know if you have any question or confusion about the process. We will move on with the rice auction, only if everyone understands the process.

Facilitator: Address any questions asked by the participants. Make sure that everyone understands the process.

If you have any question about the fortified rice, please feel free to ask me. We will begin the auction after you have had a chance to inspect the rice, and after answering your questions. If you want to see the rice again, come forward and see the rice. Please think carefully before you mention your price. Mention the price you actually would like to pay. Note that this auction is not about wining or loosing. This is just about knowing how much you would actually want to pay for the rice if you wanted to buy it for your household consumption.

Again, I want you to keep your price secret and not to share with others. I request you to write down your price on the paper you are given. My colleagues will go to you and note down your price.