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Developing Hope Among Impoverished Children: Using Child Self-Portraits to Measure Poverty Program Impacts

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Abstract

The role of psychological attributes such as hope in escaping poverty has attracted increasing attention. Crucial questions include the impact of early development of positive psychological attributes on socioeconomic outcomes, and whether interventions to reduce poverty increase such attributes. We examine the impact of international child sponsorship on the psychology of Indonesian children by employing a novel program evaluation technique—a quantified analysis of children's self-portraits. To identify causal effects, we exploit an eligibility rule that established a maximum age for participation. We find that international sponsorship significantly raises sponsored children's levels of happiness (0.42σ), self-efficacy (0.29σ), and hope (0.66σ).

Keywords

Hope; Economic Development; Child Sponsorship; Self-Portraits; Self-Esteem

I. Introduction

International development organizations often highlight how their work "brings hope to the poor." Yet until recently economists have overlooked the importance of psychological factors such as hope and motivation in economic development, focusing instead on the relief of external constraints through interventions such as education, infrastructure, and microcredit. However, new research has begun to emphasize "internal constraints" as both a cause and a consequence of poverty. Examples of this research include Banerjee and Mullainathan (2010), Mani et al. (2013), Beaman et al. (2012), Chiapa, Garrido, and Prina (2012), Bernard et al. (2014), Dalton, Ghosal, and Mani (2015). Lybbert and Wydick (forthcoming) present a theoretical framework based on work in positive psychology in Snyder (1994), in which the three components of hope – aspirations, agency, and pathways – affect development outcomes and the effectiveness of interventions.

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Recent evidence sheds additional light on a more holistic approach to poverty alleviation. Banerjee et al. (2015) report results from a multi-country intervention that simultaneously addressed external and internal constraints. The intervention, which combined a productive asset transfer (donation of a large farm animal) with health interventions and life-skills coaching, had impacts on food security, household income, and health. This and other studies – such as Jensen and Oster (2009) on the impact of cable television on women's aspirations, Beaman et al. (2012) on the effect of female political leadership on girl's aspirations, and Macours and Vakis (2014) on the effects of role-modeling in cash transfer programs – all suggest that internal constraints may be important.

Interventions that have impacts on psychology and emotions may be particularly important to the future outcomes of impoverished children. Internal constraints, often developed in childhood, can result in depression, a diminished sense of self-efficacy, muted aspirations, and a general feeling of hopelessness. Important new work, such as Heckman, Stixrud, and Urzua (2006), Heckman and Kautz (2012), and Heckman, Pinto, and Savelyev (2013), studies the importance of hope, aspirations, and perseverance ("grit") among children living in poverty. Much of this work tries to understand how the changes in early childhood psychology from the Perry Preschool Project helped drive program participants' successful adult outcomes.

Most closely related to our research presented here, Glewwe, Ross and Wydick (2015) find, in data from Kenya and Indonesia, evidence of elevated aspirations among children sponsored through the Compassion International program. Estimates for Kenya show higher educational aspirations, and increased vocational aspirations for a white-collar job, among sponsored children. Estimates for Indonesia find that aspirations for years of schooling are higher and largely significant, but estimated impacts for vocational aspirations are not statistically significant.[1]

This paper adds to this research by using a novel quantitative analysis of 526 children's self-portraits to examine whether poverty reduction programs can affect children's self-efficacy, optimism, aspirations, happiness and hope. Our goal is to measure the degree to which a leading international child sponsorship program fosters measurable increases in these traits among a group of impoverished children living in the slums of Jakarta, Indonesia.

Child sponsorship programs transfer monthly contributions from sponsors in wealthy countries, generally about $30 to $40 per month, to children in poor countries. These funds typically provide access to healthcare, nutritious meals, and school tuition, which the Compassion program also provides. The Compassion approach, however, also places a particularly heavy emphasis on a holistic approach to child development, where the stated aim is "to release children from spiritual, economic, social, and physical poverty." Key to the

[1]Even more compelling is that the increased aspirations found in this research are consistent with the estimated causal impacts of the same child sponsorship program on actual *adult* educational and vocational outcomes for a separate sample of formerly sponsored children Wydick, Glewwe and Rutledge (2013 and forthcoming). This research finds, among formerly sponsored adults in six countries, causal impacts from international child sponsorship on years of schooling, adult employment, and adult income. An important agenda for this research, and with similar work such as Beaman et al. (2012) and Heckman et al. (2013), is to understand how interventions directed at poor children can affect their psychology in a way that increases their long-run economic outcomes and welfare.

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program's work is the incorporation of church and community volunteers who work at child development centers, engaging in tutoring, mentoring, and group activities for children for at least eight hours per week, typically for about ten years of sponsorship. At the end of their sponsorship, Compassion-sponsored children have participated in about 4000 hours of an intensive intervention designed to nurture children in each of these four areas. Thus while the intervention aims to relax traditional economic constraints, a substantial emphasis of the program seeks to address the internal constraints faced by children in poverty.

We present findings on the psychological impacts of Compassion's child sponsorship intervention on the 526 Indonesian children in our sample. We use a novel technique, a coded analysis of children's self-portraits, to measure impacts of Compassion International's intervention on levels of hope, self-efficacy, and happiness. Averaged across several different specifications,[2] we find that it leads to a 0.42 standard deviation increase in happiness, a 0.29 standard deviation increase in self-efficacy and a 0.66 standard deviation increase in hopefulness.

Our fieldwork and empirical strategy are described in Section 2. Our main results are given in Section 3, after which we present a series of robustness and bounds checks in Section 4. We conclude in Section 5.

II. Fieldwork and Empirical Strategy

A. Fieldwork

We carried out fieldwork in four Compassion International project sites in Jakarta. Two of these Compassion projects began in February 2003 and two in February 2007, where we selected projects by year of introduction as part of a strategy to identify causal effects. Each project site provided a list of sponsored and waitlisted children from which our sample was randomly selected. Waitlisted children meet the same criteria for sponsorship by Compassion as did the children who are already sponsored, but must wait to be sponsored until a future date due to resource constraints. The Compassion manual dictates that among all eligible children, more needy children should be chosen first, and then other children are to be added from the waitlist as more sponsorship lines become available. However, based on *t*-tests across the control variables, we find that waitlisted children are not significantly different from sponsored children in our sample. Even so, it is still possible that unobservables could cause selection into treatment even when observed covariates are similar. Therefore, we use household fixed effects and an age-eligibility instrument to check and account for possible selection of either families or children based on unobservable characteristics.

All sponsored and waitlisted children were asked to come to the research site, and to bring one sibling with them.[3] Siblings could be either sponsored, waitlisted, or (most often)

[2]These figures are averages of the eight estimates for each of these psychological traits shown below in Table 4.

[3]In the sessions, 83.4 percent of children brought a proximate sibling in terms of birth order. Due to eligibility rules, in 57.7 percent of cases the sibling was neither a sponsored child nor on the waitlist. In the sample, 96.9 percent of children were 4–17 years old, but 16 children brought siblings over 17 to the session. We decided to include their drawings in our main analysis. Results change very little when drawings from these 16 older siblings are dropped from the sample (see Table A1).

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neither. Our experiment gathered data from 288 sponsored children, 113 non-sponsored siblings of sponsored children, 79 waitlisted children, and 47 children who were siblings of waitlisted children.

We asked the children to come on a particular day at a specific time to the research site. Each pair of children was greeted by a graduate student researcher, who asked one of the two children (selected randomly) to sit at a table. We provided the child with a desk, a sheet of white paper, and a full set of 24 colored pencils. We asked the child to "draw a picture of yourself in the rain" because this tends to elicit a child's response to an adverse situation, where a child may illustrate herself as a victim of the rain or as addressing the potential adversity proactively by seeking shelter or holding an umbrella. This is particularly fitting in Jakarta, which averages 130 days of rain per year and has a mean annual rainfall of 176 cm. While the child was given 15 minutes to complete the picture, we administered a short survey to his or her sibling to obtain data on that child's family and living conditions and asked questions related to self-esteem and hopefulness. (The survey instrument is shown in Table A2 of the appendix.) After both children had finished, the siblings switched activities.

B. Children's Self-Portraits

We seek to examine the impact of the Compassion sponsorship program on the psychological characteristics of children that may significantly impact later economic outcomes. Our study employs a novel approach to program impact evaluation: a quantitative analysis of children's self-portraits. A long empirical literature has established correlations between characteristics of children's self-portraits and different facets of psychological health and disorder.[4] Children's drawings often reveal information about mental health that is difficult to obtain from asking direct questions (Koppitz, 1968, 1984). For example, choice of dark over light colors has been consistently been found to be correlated with depression and anxiety (Koppitz, 1968), a tiny figure indicates low self-esteem (Koppitz, 1968, Wadeson, 1971, Furth, 2002), and a monster figure with aggression (Peterson and Hardin, 1997). These empirical correlations are summarized in Table 1.

Children's drawings have been used traditionally in a clinical child counseling context. In contrast, we objectively code 20 characteristics of children's self-portraits. The 20 characteristics were carefully drawn from the children's self-portrait psychology literature, specifically from Koppitz (1968), Wadeson (1971), Klepsch and Logie (1982), Di Leo (1983), Peterson and Hardin (1997), Furth (2002), and Farokhi and Hashemi (2011), as seen in Table 1. We chose these 20 characteristics based on a consensus in this literature of established correlations with psychological health and disorder. All 20 of our characteristics were chosen before our analysis, and the drawings were coded blindly based on the 20 chosen characteristics without knowledge of treatment status. Characteristics were coded by dummy variables: If a given drawing characteristic was manifested in a self-portrait it received a one, otherwise the particular characteristic for that child's drawing received a zero.[5]

[4]See Koppitz (1968, 1984), Wadeson (1971), Klepsch and Logie (1982), Di Leo (1983), Thomas and Silk (1990), Peterson and Hardin (1997), Furth (2002), Skybo, Ryan-Wenger, and Su (2007), Farokhi and Hashemi (2011), and Vass (2012).

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One concern with the use of children's self-portraits is the external validity that such a measurement tool might have across cultures. While the development of children's self-portraits as a diagnostic for psychological disorder and health has been pioneered and utilized primarily in developed countries, there is considerable evidence of consistency in emotional responses, facial expressions, and psychological diagnostics across cultures (e.g. Ekman, and Friesen (1971), Schwartz (1992), McCrae and Terracciano (2005), Bölte et al. (2008)). Even the association with colors and emotion has been shown to be consistent across cultures (Adams and Osgood, 1973). Moreover, an advantage of analyzing children's self-portraits is that it is essentially an observational tool (recorded on paper), rather than a standard question-based method that is dependent on survey questions and responses, where language, translation, context, and culture often give rise to problems in measurement and assessment (Van Widenfelt et al., 2005).

C. Identification

Two facets of Compassion's program are important to statistically identify the causal effects of child sponsorship. First, the number of eligible children exceeds the number able to be sponsored, necessitating the creation of a waiting list. We use siblings of sponsored children, children on a sponsorship waitlist, and the siblings of these waitlisted children as quasi-controls in the sample. Table 2 provides summary statistics of the control variables, which include gender, age, birth order, family size, a family stability index, and a dwelling quality index.[6] We find few observable differences between sponsored and non-sponsored children.[7] The only statistically significant difference is that sponsored children were slightly older ($p = 0.07$). ANOVA and t-tests (Table A5 in our supplementary appendix) show the statistical similarity between households with and without sponsored children over an array of poverty-related indices, such as parental occupation, family structure, and dwelling quality.

The second aspect of Compassion's program that we use to identify causal effects is an age-eligibility rule stipulating that children in Indonesia have to be 9 years old or younger to be eligible for sponsorship. Program administrators adhered closely to this rule: 59.1 percent of the sample children who were 9 years old or younger in the year of program introduction were sponsored, but only 2.5 percent of those over 9. In treated households, that is those with at least one sponsored child, 78.6 percent of children under age 9 in the year of program rollout were sponsored, but only 2.8 percent of those over age 9.[8] The age at program introduction with the highest probability of sponsorship is age 5, declining thereafter, and sharply after 9 years old, as seen in Figure 1. We use this rule to create a

[5]The only exceptions were: 1. The "weather" characteristic, which received a value of 1 for the presence of the sun, −1 for lightning, and zero for neither; and 2. The body language characteristic, which was assigned a 1 if rated as positive, −1 if negative, and zero if neutral.

[6]Indices were created by summing and standardizing a set of variables pertaining to each index. The dwelling quality index was created using a standardized sum of dummy variables indicating indoor plumbing, electrification, and high quality construction for each of the following: floor, roof, and walls. The family stability index was created from a similar set of dummy variables indicating relatively higher paid employment for the mother and for the father, community leadership positions of parents, and a two-parent household.

[7]While the means are similar, one notable difference is in the standard deviation of the age variable; it is much larger for the non-sponsored children since the rule that children more than 9 years old were ineligible implies that almost all of the older children were in the non-sponsored group. To check whether our results are robust to a sample that has children of more similar ages in the two groups, we re-estimated Table 4 using a smaller sample that includes only children who are 7–16 years old. These results are shown in Appendix Table A3, and they are quite similar to those in Table 4. (The descriptive statistics for this smaller sample are in Appendix Table A4; the difference in the standard deviation of age between the two groups is much smaller.)

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vector of instrumental variables marking the age of each child at the time of program introduction in his or her area.[9] Because age at program introduction is strongly correlated with sponsorship status (first-stage *F*-statistics are > 20 for all estimations), and because it should be orthogonal to psychological outcomes after controlling for year of birth and program participation (since the age a child happened to be in the year when the program was introduced in his or her community is effectively random), it satisfies the necessary conditions for instrumental variable estimation. By using a household fixed effect in conjunction with our child-specific instrument, we account for selection into the program based on unobservable household or child variables that could otherwise bias our estimates of program impact on our outcome variables, the psychological characteristics of the children in our sample.

D. Creation of Indices

We use exploratory factor analysis as a data reduction tool to extract latent psychological factors from self-portrait characteristics; these latent factors form our dependent variables. Results of the rotated factor loadings are found in the appendix in Table A8. Along with the 20 self-portrait characteristics, we included five survey questions in our factor analysis to aid in identification of factors. These were agreement or disagreement with the following statements for: 1. Self-esteem ("I feel I do not have much to be proud of", "At times I think I am no good at all"); and 2. Hope ("I believe that the future holds good things for me", "I feel that when I am older, I will have a good job and good income", and "I feel that when I am older my life as an adult will be better for me than it was for my parents"). The questions retained for the factor analysis were those that displayed the highest degrees of independent variation. We apply a varimax rotation in which we obtain three orthogonal factors related to children's psychological well-being which we label Happiness, Optimism/Self-efficacy, and Hopefulness based on their historical correlations with our twenty drawing characteristics.[10]

As a check on our factor analysis results, we also include estimations that use indices developed by Kling, Liebman and Katz (2007) and Anderson (2008). The Kling, Liebman and Katz index orders dependent variables (drawing characteristics) in a single direction of impact on a psychological characteristic, then de-means and normalizes each of the dependent variables in the respective group *j*. The Kling, Liebman and Katz index calculates a simple average of these normalized variables. The Anderson index differs in that it assigns a weight on each impact variable equal to the sum of its row entries across the inverted variance-covariance matrix of the impact variables in the group *j*. These weightings of the Anderson index assign higher weight to drawing characteristics that exhibit lower covariance with other characteristics and hence contain more independent statistical information.

[8]Our sample is not a random sample of children above and below the age 9 cutoff, so children above the cutoff may differ from those below it. Appendix Table A6 investigates this for child-ren age 6–13 years old when the program began; age is significantly different, as expected for the two groups of children, but the other five variables are not significantly different even at the 10 percent level. Also, Appendix Figure A1 shows no sharp change in the density function of children's age at program roll-out (ACI) at ACI = 9, neither for the whole sample (panel A) nor for the non-sponsored children (panel B).

[9]Since we use a vector of age dummies we have more instrumental variables than endogenous regressors. Thus, we also report results from a Sargan-Hansen test for over identification (reported columns (1) and (2) at the bottom of Table A7). The result shows that we fail to reject the null that the over-identifying restrictions are valid.

[10]More specifically, the factor loadings generate Happiness, Optimism/Self-efficacy, and Hopelessness, the latter from which we employ the negative, Hopefulness.

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Specifically, each variable i in group j receives a weight of $\bar{s}_{ij} = (1' \Sigma^{-1} 1)^{-1} (1' \Sigma^{-1} y_{ij})$, where **1** is an $m \times 1$ column vector of ones, Σ^{-1} is the $m \times m$ inverted covariance matrix, and y_{ij} is the $m \times 1$ vector of outcomes in group j for individual i.

The difference between the three types of indices are that those created through the factor analysis "let the data speak" as to which drawing characteristics are most strongly correlated with a latent psychological characteristic; the indices created via factor analysis weight these variables most highly. The Kling and Anderson indices, in contrast, consist of a set of characteristics associated with a particular psychological trait *a priori* from theory and from previous empirical correlations established in the psychology literature. These create the same three dependent variables from the j survey questions and drawing characteristics most strongly related in the literature to Happiness ($j = 6$), Optimism/Self-efficacy ($j = 10$), and Hope ($j = 9$).[11] While both measures standardize characteristics and order them in the same direction to create the index, the Kling index gives equal weight to each characteristic in the index while the Anderson Index gives lower weight to characteristics that are highly correlated with other characteristics in the index.

Each of the three offers advantages and disadvantages with regards to whether the indices capture the psychological phenomena that we try to measure. While the factor analysis indices create a composite index of correlations of variables that we collectively identify as one of these latent psychological characteristics, theory and empirical correlations are still used to identify the respective factors. The Kling and Anderson indices are taken more directly from theory and offer the advantage of eliminating certain variables that one could assume *a priori* by theory (and reason) to be unrelated to a given psychological characteristic. We view the collective results from the use of the three indices as the best evidence for establishing a relationship between the intervention and psychological characteristics.

E. Regression Specification

We begin by using ordinary least-squares (OLS) with community or household fixed effects. We use this specification to account for unobservable differences across communities, and then households. More specifically, we estimate:

$$y_{ic} = \alpha_c + \gamma T_{ic} + \boldsymbol{\beta}' \boldsymbol{X}_{ic} + \pi C_{ic} + e_{ic} \quad (1)$$

where T_{ic} is a dummy variable for current sponsorship of individual i, α_c is a community or household fixed effect, $\boldsymbol{X}_{ic}$ is a vector of control variables that includes age, gender and birth order. When using community-level fixed effects, we include family size, a family stability index, a dwelling quality index, and C_{ic}, a dummy variable indicating a household with a sponsored child.

[11] The Hope index is comprised of our three hope survey questions and the following aspects of self-portraits: shading(−), missing mouth(−), missing nose(−), frowning/crying(−), dark colors(−), single color(−), and the weather variable. The Optimism/Self-Efficacy index is comprised of our self-efficacy questions and the following aspects of self-portraits: tiny figure(−), poor integration(−), missing arms/hands(−), missing legs(−), erasures(−), holding umbrella/shelter(+), tiny head(−), and short arms(−). The Happiness index is comprised of: huge figure(−), monster figure(−), long arms(−), smiling(+), cheery colors(+), and positive body language(+).

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For our instrumental variable (IV) estimations, our first-stage equations are

$$T_{ic} = \alpha_c + \boldsymbol{\varphi}' \boldsymbol{X}_{ic} + \boldsymbol{\lambda} \boldsymbol{Z}_{ic} + \delta C_{ic} + u_{ic} \quad (2)$$

and α_c, T_{ic}, $\boldsymbol{X}_{ic}$ and C_{ic} are the same as in equation (1) and $\boldsymbol{Z}_{ic}$ is a vector of dummy variables that indicate a child's age (in years) when the program rolled out in community c. Separate dummy variables exist for each age (in years) for children 9 and younger when the program rolled out, plus one dummy variable for children −3 years and younger (i.e., were born 3 years or more after the program was rolled out) and another for children ten years and older when the program rolled out. First-stage estimations show an F-statistic of 20.5 (see the first column of Table A7), indicating sufficient strength of the instruments.[12] Our second-stage equation is

$$y_{ic} = \alpha_c + \gamma \hat{T}_{ic} + \boldsymbol{\beta}' \boldsymbol{X}_{ic} + \pi C_{ic} + e_{ic}, \quad (3)$$

where y_{ic} is an outcome variable of interest, $\hat{T}_{ic}$ is the instrumented probability of being a sponsored child, and α_c, $\boldsymbol{X}_{ic}$ and C_{ic} are the same as above. Assuming that age at program rollout is orthogonal to y_{ic} after conditioning on program participation, age, sibling order, gender, and other characteristics, the IV estimation in (3) removes bias from endogenous selection among age-eligible children. We use standard errors clustered at the household level.

III. Results

The simple t-tests (with standard errors clustered at the household level) in Table 3 show that 13 of the 20 drawing characteristics display statistically significant differences between sponsored and non-sponsored children. Eleven of these indicate an unequivocally more positive psychological outcome for sponsored children. Moreover, the two variables that could indicate poorer psychological health among sponsored children, "long arms" and "huge figure" are the two most ambiguous characteristics of the 20, where the former has been associated with affection for others as well as emotional neediness, and the latter with higher self-esteem as well as with aggression (Koppitz, 1968). Table 3 also shows t-tests for the three aggregated factors, indicating that sponsored children scored 0.22 standard deviations (standard deviations will henceforth be denoted by σ) higher on the Happiness factor ($p < 0.05$), 0.23σ higher on the Optimism/Self-efficacy factor ($p < 0.01$), and 0.44σ higher in the Hopefulness factor ($p < 0.01$). (The factor loadings for these three aggregated factors are shown in Table A.8)

[12] In response to comments from an anonymous referee, Table A7 shows other specifications to assess the source of the identifying variation. It does not come from variation in ACI (age at program rollout) for ACI < 0 (column 2). Columns 3 and 4 indicate that the identifying variation comes primarily from variation in ACI between 0 and 9 (based on an investigation of the maximum identifying information that can be obtained from a single ACI variable). Finally, columns 5 and 6 show that the identification is robust to adding linear and quadratic ACI terms.

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Figure 2 gives examples of children's drawings that show variation in the three factors. Panel A illustrates drawings of two boys of roughly the same age ranking in the 17th and 92nd percentiles of Happiness, respectively, principally due to differences in facial expression, body language, and inclusion of a sun. Panel B shows children's drawings ranking in the 8th percentile and 94th percentile in Optimism/Self-Efficacy. Note in B1 the presence of lightning, poor integration of body parts, the use of a single color.[13] These stand in contrast to the smiling face and the inclusion of an umbrella in B2, as well as the presence of a sun above the clouds and the multiple light colors used. Panel C illustrates differences in Hopefulness, where the drawing in C1 (7th percentile) was by a teenage girl and the one in C2 (85th percentile) by a primary school age boy. Note the missing facial features and hidden limbs in the girl's self-portrait on the left, which are correlated with hopelessness and depression. In contrast, the facial expression, full illustration of facial features and limbs, use of the umbrella, and the bright colors used by the boy on the right are features correlated with hopefulness, despite the lower quality of the artwork.

Table 4 shows OLS and IV estimates of program impacts from regressions of the Happiness, Optimism/Self-efficacy, and Hopefulness factors on the international sponsorship treatment plus fixed effects and controls (omitted from the table to reduce clutter). Panel A shows impacts on Happiness; OLS estimates yield significantly positive increases of 0.26 to 0.33σ, and IV estimates are also significant and somewhat higher, ranging from 0.52 to 0.59σ. Panel B shows estimates of program impacts on Optimism/Self-efficacy; strongly significant OLS estimates indicate impacts of 0.35 to 0.38σ, while IV estimates are somewhat smaller (ranging from 0.17 to 0.27σ) and are less precisely estimated. The impact of sponsorship on the Hopefulness factor in Panel C ranges from 0.37 to 0.50σ for the OLS estimates and from 0.70 to 1.14σ for IV estimates, and all are significant to at least $p < 0.05$. While estimates of π implicitly use siblings as a counterfactual, Table 4 also shows joint estimates of $\gamma + \pi$, where waitlisted children and their siblings form the implicit counterfactual in estimates using community fixed effects.[14] Point estimates of $\gamma + \pi$ range from 0.18 to 0.27σ for Happiness (significant in three of four cases), 0.06 to 0.18σ for Optimism/Self-efficacy (not significant), and 0.38 to 0.67σ for Hopefulness (strongly significant).

In Tables 5 and 6 we report results that use the Anderson (2008) and the Kling, Liebman and Katz (2007) indices. Results using the Kling, Liebman and Katz indices in Table 5 are generally similar to those in Table 4 for Happiness, ranging from 0.32 to 0.48σ (all significant to at least $p < 0.05$). They are considerably stronger for Optimism/Self-efficacy, ranging from 0.43 to 1.01σ (all significant to $p < 0.01$). The Kling indices are less strong, but still generally significant, for Hopefulness, ranging from 0.27 to 0.43σ (all but two significant at $p < 0.10$). When using the Anderson indices in Table 6, estimates are lower and less significant than those in Table 4 for Happiness (0.17 to 0.29σ, with only two significant at $p < 0.10$), again higher and more significant for Optimism/Self-efficacy (0.41 to 1.01σ, all significant at $p < 0.01$), and smaller and less significant for Hopefulness (0.20 to 0.48σ, four of eight significant at $p < 0.05$).

[13]Color versions of these children's drawings can be found at http://jhr.uwpress.org/.
[14]Since π is a household-level variable it cannot be estimated when household fixed effects are included in the regression equation.

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A major reason why the relative strength of the coefficients for Hope and Optimism/Self-Efficacy shift toward the latter when using the Kling and Anderson indices is that some drawing characteristics included in Optimism/Self-Efficacy based on an *a priori* theoretical basis that are significantly affected by child sponsorship, such as poor integration of body parts and missing legs, are strongly correlated with the data-driven Hope factor created by the factor analysis. Likewise, some factors correlated with the Optimism/Self Efficacy indices generated by the factor analysis, such as the non-use of dark colors and non-use of a single color, are used in the creation of the Kling and Anderson Hope index. Because sponsorship affects these drawing characteristics, the impacts appear to shift more toward Optimism/Self Efficacy and Happiness in the Kling and Anderson indices. However, our Hope index generated by factor analysis includes many drawing characteristics reflecting self-efficacy, and as such may represent the more aspirational and proactive hope described in Lybbert and Wydick (forthcoming). Thus what we are finding using any of our indices is a strong effect of sponsorship on aspirational and proactive hope that appears to be strongly rooted in higher self-efficacy and its accompanying optimism.

IV. Robustness Checks

We carried out numerous robustness checks on our estimations. Here, we focus on the results in Table 4, which are based on the factor analysis indices. First we check for possible endogenous selection of siblings by restricting the sample to households with one or no siblings. The concern here is that the children asked to select a sibling to bring to the session may not have chosen a random sibling; focusing on children with one or no siblings avoids this type of selection. The results (in Table A9) are broadly similar to those in Table 4, but measured with less precision due to the smaller sample size.

Although drawing quality plays a minor role in the analysis, we also ask whether positive impacts are robust to omitting drawing characteristics that could be affected by drawing experience -- perhaps sponsored children may have had more opportunities to draw. These factor loadings and regression results are presented in Tables A10–A12 (A10 corresponds to Table A8, A11 corresponds to the bottom panel of Table 3, and A12 corresponds to Table 4). Results continue to reveal strong and significant impacts.

Could our results be driven from negative effects of non-sponsorship on non-sponsored siblings? Outcomes for sponsored children's siblings are generally insignificantly different from those of waitlisted children and their siblings (Table A13), but we check anyway by omitting siblings of sponsored children in regressions using community fixed effects, thus using only waitlisted children and their siblings as the implicit counterfactual (Table A14).[15] Our results generally hold, although they are weaker for optimism/self-efficacy.

While our IV results act as a check on potential endogeneity on child selection within a household, they do not address selection of households. Even though our household fixed-effects estimations yield positive results, we cannot control simultaneously for both selection

[15]Household fixed effects cannot be used since the unsponsored siblings have been excluded from the households with sponsored children.

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and spillovers onto unsponsored siblings. Oster (forthcoming) provides a method to assess the extent to which an estimated treatment effect is robust to omitted variable bias. It uses movements in the treatment coefficient and R-squared statistic in specifications with and without control variables to gauge the potential influence of unobservables.[16] Building on Altonji, Elder and Taber (2005), Oster contends that the effect of adding *observable* control variables yields insight into the true impact that one would obtain from a fully specified model that includes all *unobservable* control variables. This can be measured by the relative increase of the model's R-squared statistic and changes in the treatment coefficient after adding observable controls. This exercise provides: 1) the ratio of the influence of unobservables to the influence of observables that would drive the treatment coefficient to zero (Oster's δ); and 2) bounds on the treatment coefficient if this δ ratio is close to one (which Oster shows to be a reasonable approximation).[17]

Table 7 presents the results based on Oster's approach. Column 1 presents the estimate of γ and column 2 the R-squared when estimating equation (1) without controls or fixed effects. There are large and statistically significant differences between sponsored and non-sponsored children, yet the R-squared values are small. Columns 3 and 4 present analogous results that use all controls and fixed effects; these show increases in the sponsorship coefficient in all cases, as well as higher R-squared values, especially in Panel A. Column 5 tests whether the estimates of γ in columns 1 and 3 are equal; in all specifications we cannot reject their equality at the 95 percent significance level. Thus, including the observables does not affect our basic conclusions.

Column 6 calculates Oster's δ. While one might expect correlated unobservables to confound treatment effect estimation, one may also expect the inclusion of *observables* to push the treatment coefficient toward zero. Yet in our case adding controls and fixed effects moves the coefficient on sponsorship *away* from zero. Thus our estimated δ is always negative, and strongly negative if household fixed effects are included. This suggests that any bias in the estimated sponsorship coefficient due to omitted variables would have to be not only very large, but in the *opposite* direction of the bias generated by omitting observable variables.

A final check uses Oster's bias-adjustment calculation on estimated γ values to check whether this changes the interpretation of the results.[18] Column 7 shows that these values all lie within one standard error of the column 3 values. Thus, this bias adjustment does not change our interpretation of the results in columns 1 and 3.

Overall, the results in Table 7 indicate that if selection on observables and village or household fixed effects exists in our data, it is negative, so that failing to include these in our regressions would bias our estimated impact of sponsorship *downward*.[19]

[16]Similar to Altonji, Elder and Taber (2005), Oster divides potential controls into observable and unobservable variables.
[17]Oster's delta value is a function of the coefficient and R-squared values in columns 1–4 of Table 7.
[18]We use Oster's recommended assumptions for this value: (1) the ratio of the movement in the coefficient equals the ratio of the movement in the R-squared with and without controls ($\delta = 1$); and (2) including unobservables would increase the R-squared to 1.3 times the R-squared of the results that include the controls (1.3 times the R-squared value in column 4).
[19]Thus the estimated impact in column 1 serves as a lower bound on the impact of sponsorship on these psychological traits.

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But the fact that including controls and fixed effects increases rather than decreases the magnitude of the coefficient on sponsorship can be explained by Compassion's selection guidelines. Compassion's official directive for program selection prioritizes the neediest children in communities, including encouraging parents to select the neediest child among their age-eligible children to be sponsored. As a result, if the waitlist of children was created in accordance with the organization's protocol, children on the waitlist would be from slightly *less* needy households, or from less needy children within a household, than those with sponsored children. Much of this difference should be accounted for by observable variables, but some may be unaccounted for in the data, and thus any omitted variable bias should bias our results downward.

V. Conclusion

The growing emphasis on early childhood psychological development suggests a need for rigorous instruments to measure the negative impacts of poverty—and other phenomena such as civil conflict and natural disasters—along with the positive impacts of programmed interventions to reverse these effects. While children's drawings have traditionally been used more subjectively in clinical practice, objectively coding and analyzing large samples of children's drawings offers a new type of data with widespread application for rigorous evaluations of the impact of an array of interventions on the psychological welfare of children, including post-conflict and post-disaster relief, health interventions, and education programs. The use of scanning technology in conjunction with the development of intelligent drawing-characteristic recognition software would allow for the processing of large data sets taken from a population of children to measure aggregate psychological impacts stemming from armed conflict, post-traumatic stress, dislocation, refugee status, or natural disasters.

Our empirical findings also have important implications for development interventions. We present results demonstrating the potential for a development intervention to significantly increase happiness, optimism, self-efficacy, and hope among a population of impoverished children. Our findings also develop a link between the improved psychological health of internationally sponsored children and the significantly better economic outcomes found among internationally sponsored children in adulthood (Wydick, Glewwe and Rutledge, 2013, and forthcoming). Indeed it may be holistic interventions such as child sponsorship that operate on multiple fronts – on the spiritual, psychological, and social development of young children – that are more likely to have longer-term effects than programs focused only on relieving purely economic constraints, such as cash transfers. For example, Araujo, Bosch and Schady (2016) find, using a discontinuity in income-eligibility, that the long-term effects of six years of cash transfers on secondary-school completion in Ecuador are actually quite small, between 1 and 2 percentage points from a counterfactual secondary-school completion rate of 75 percent. In contrast Wydick, Glewwe and Rutledge (2013) find, using an age-eligibility rule at the time of program rollout similar to that used in this paper, that the impact of the Compassion sponsorship program on secondary school completion was 12–18 percentage points higher over a baseline completion rate of 45 percent measured across six countries that include Bolivia and Guatemala in Latin America.

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Clearly more work is needed to better understand the impacts on children of holistically-oriented development interventions. But if further work can solidify a causal link between the holistic nurture of impoverished children and subsequent adult outcomes, it would have significant implications for the design of more effective poverty interventions, favoring those that simultaneously address both the internal and external constraints of the poor over those that focus only on external constraints.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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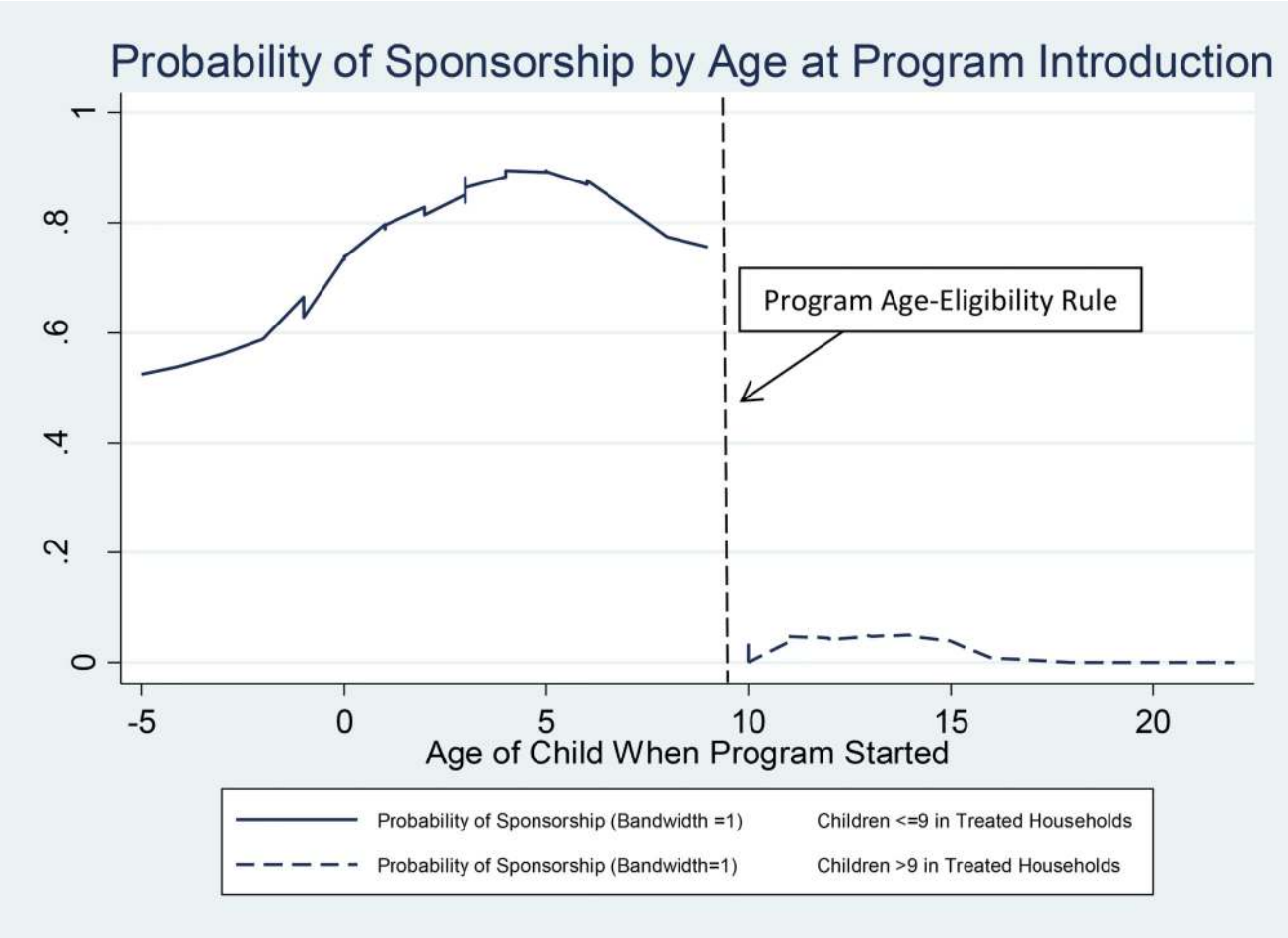

Figure 1.
Probability of Sponsorship by Age of Child at Program Introduction

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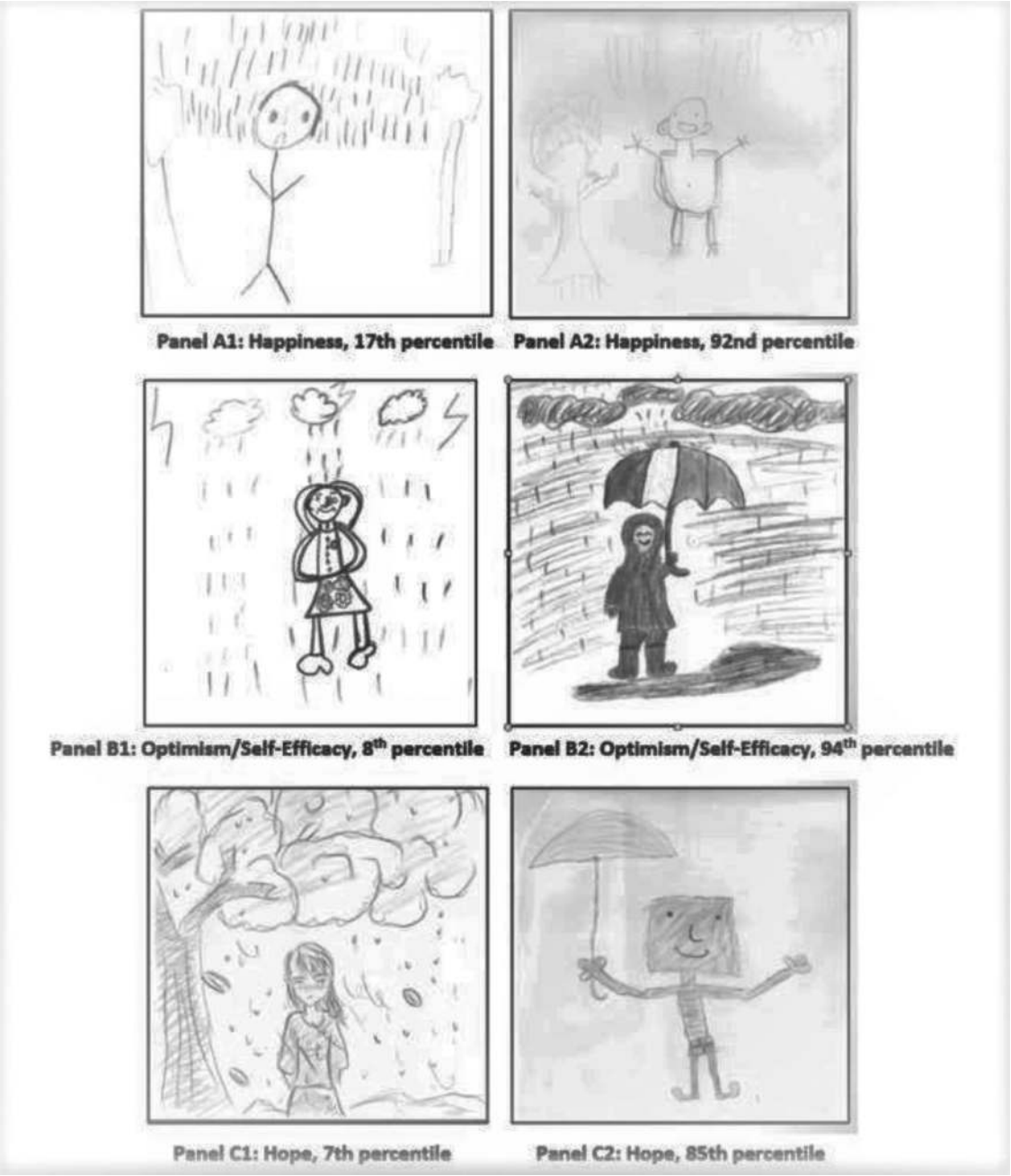

Figure 2.
Children's Drawings

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Table 1

Psychological Interpretation of 20 Characteristics of Children's Drawings

Characteristics of Self-Portraits:	Possible Indication:	Category	Reference:
Huge figure (> 15cm)	Aggressive or Higher Self-Esteem	HA	Farokhi and Hashemi (2011), Koppitz (1968)
Monster, Grotesque, Genitals	Aggressive	HA	Peterson and Hardin (1997), Koppitz (1968)
Long arms or Hands	Aggressive or Wants to Reach Out	HA	Farokhi and Hashemi (2011), di Leo (1983), Koppitz (1968)
Shading of face or body	Anxiety, Insecurity, Depression	AX	Farokhi and Hashemi (2011), Klepsch & Logie (1982), Koppitz (1968)
Missing nose or mouth	Anxiety, Insecurity, Depression	AX	Klepsch & Logie (1982), di Leo (1983)
Frowning or Crying	Anxiety, Insecurity, Depression	AX	Furth (2002)
Drawn in Dark Colors	Anxiety, Insecurity, Depression	AX	Wadeson (1971)
Drawn in Single Color	Anxiety, Insecurity, Depression	AX	Wadeson (1971)
Thunder or Lightning (−1) Sun or Rainbow (+1)	Anxiety, Insecurity, Depression	AX	Farokhi and Hashemi (2011), Klepsch & Logie (1982)
Smiling	Low Anxiety, Happy	HA	Furth (2002)
Drawn in Light or Cheery Colors	Low Anxiety, Happy	HA	Wadeson (1971)
Tiny figure (< 5 cm)	Shy, Timid, Low Self-Esteem	SE	Farokhi and Hashemi (2011), di Leo (1983), Koppitz (1968)
Poor Integration of Body Parts	Shy, Timid, Low Self-Esteem	SE	Koppitz (1968), Berazaín
Missing arms or hands	Shy, Timid, Low Self-Esteem	SE	Furth (2002), Klepsch & Logie (1982)
Missing legs	Shy, Timid, Low Self-Esteem	SE	Furth (2002), Koppitz (1968), di Leo (1983)
Significant erasure marks, scribble outs	Shy, Timid, Low Self-Esteem	SE	di Leo (1983), Klepsch & Logie (1982)
Carry Umbrella or successfully found rain shelter	High Self-Efficacy	SE	Farokhi and Hashemi (2011), Klepsch & Logie (1982)
Body Language (Pos. =1, Neutral = 0, Neg. = −1)	High Self-Efficacy	HA	Farokhi and Hashemi (2011), Klepsch & Logie (1982)
Tiny Head	Low Self-Efficacy	SE	Koppitz (1968), di Leo (1983)
Short arms	Low Self-Efficacy	SE	Koppitz (1968)

The "category" column indicates whether the characteristic relates most closely to Happiness (HA), Anxiety/Hopelessness (AX) or Self-Efficacy (SE).

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Table 2

Summary Statistics for Indonesian Data

	(1) Sponsored Children (std. dev.)	(2) Non-Sponsored Children (std. dev.)	(3) Difference in Means (std. error)	(4) Standardized Difference in Means (*t*-statistic)
Male	0.45 (0.499)	0.47 (0.500)	−0.016 (0.042)	−0.033 (−0.384)
Age	11.04 (2.54)	10.50 (4.24)	0.545* (0.303)	0.159* (1.797)
Birth Order	2.18 (1.28)	2.27 (1.202)	−0.090 (0.116)	−0.072 (−0.800)
Family Size	3.489 (1.34)	3.557 (1.29)	−0.084 (0.116)	−0.064 (−0.725)
Family Stability Index	−0.060 (0.947)	0.073 (1.05)	−0.133 (0.096)	−0.133 (−1.385)
Dwelling Quality index	−0.056 (0.992)	0.067 (1.007)	−0.123 (0.096)	−0.123 (−1.287)
Observations	*288*	*238*	*526*	*526*

Full sample = 526: 288 sponsored, 79 waitlisted, 112 sibling of sponsored child, 47 sibling of waitlisted child. Means are presented, with standard deviations in parentheses, for columns 1 and 2. Column 3 presents the differences between the means in columns 1 and 2, with robust standard errors clustered at the household level in parentheses: *** $p<0.01$,

** $p<0.05$,

* $p<0.1$. Column 4 presents standardized differences in means, that is the difference in the two means divided by the standard deviation of the corresponding variable; *t*-statistics, which are simply the difference in the means in column 3 divided by the standard error in column 3, are shown in parentheses in column 4. For birth order, 1=oldest. Family size is the number of children, including the surveyed child, within the household. The dwelling quality index was created using a standardized sum of dummy variables indicating indoor plumbing, electrification, and high quality construction for each of the following: floor, roof, and walls. The family stability index was created from a similar set of dummy variables indicating relatively higher paid employment for the mother and for the father, community leadership positions of parents, and a two-parent household.

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Table 3

Drawing Analysis of Psychological Factors Summary Statistics

	Mean, All	Mean, Sponsored	Mean, Non-Sponsored	Difference
Positive Drawing Characteristics				
Cheery Colors	0.477	0.531	0.412	0.119***
Weather (1 if sun, −1 if lightning,)	0.072	0.066	0.080	−0.014
Umbrella/Sought Shelter	0.317	0.358	0.269	0.089**
Body Language (1 if pos., −1 if neg.)	0.141	0.219	0.046	0.173**
Smiling	0.679	0.733	0.613	0.120***
Huge Figure^	0.036	0.049	0.021	0.028*
Long Arms^^	0.203	0.240	0.160	0.080**
Negative Drawing Characteristics				
Tiny Figure	0.276	0.215	0.349	−0.133***
Monster Figure	0.074	0.045	0.109	−0.064***
Poor Integration of Body Parts	0.099	0.059	0.147	−0.088***
Missing Arms or Hands	0.477	0.490	0.462	0.027
Short Arms	0.219	0.191	0.252	−0.061
Missing Legs	0.112	0.073	0.160	−0.087***
Erasure Marks or Scribble Outs	0.078	0.066	0.092	−0.026
Tiny Head	0.015	0.010	0.021	−0.011
Shading	0.253	0.250	0.256	−0.006
Missing Mouth or Nose	0.266	0.229	0.311	−0.082**
Frowning or Crying	0.165	0.156	0.176	−0.020
Single Color	0.160	0.135	0.189	−0.054*
Dark Colors	0.477	0.424	0.542	−0.118***
Latent Factors:	Mean All (std. dev.)	Mean Sponsored (std. dev.)	Mean Non-Spons. (std. dev.)	Difference *t*-test (std. error)
Happiness	0.000 (1.000)	0.099 (0.974)	−0.120 (1.019)	0.220** (0.088)
Optimism/Self-Efficacy	0.000 (1.000)	0.104 (0.991)	−0.126 (0.997)	0.231*** (0.088)
Hopefulness	0.000 (1.000)	0.200 (0.861)	−0.242 (0.997)	0.443*** (0.085)

Full sample = 526: 288 sponsored, 79 waitlist, 112 sibling of sponsored, 47 sibling of waitlist, *** $p<0.01$,

** $p<0.05$,

* $p<0.1$. All standard errors clustered at household level.

^ Huge figure can symbolize either high self-esteem or a tendency toward aggression.

^^ Long arms can be a positive indicator (reaching out to care for others) or negative indicator (extending arms because of neediness).

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Table 4

Regression Estimations for Indonesia Drawings (Factor Analysis Indices)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ordinary Least Squares				Instrumental Variables			
	Community Fixed Effects		Household Fixed Effects		Community Fixed Effects		Household Fixed Effects	
Demographic Controls?	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**
	Panel A: Happiness Factor							
Sponsored (γ)	0.260** (0.113)	0.275** (0.114)	0.305* (0.177)	0.328* (0.179)	0.549*** (0.210)	0.592*** (0.214)	0.523** (0.213)	0.547** (0.212)
Sponsored Household (π)	−0.068 (0.134)	−0.093 (0.141)	--	--	−0.274 (0.180)	−0.329* (0.187)	--	--
γ + π	0.193* (0.111)	0.183 (0.113)	--	--	0.274** (0.124)	0.263** (0.125)	--	--
Observations	526	525	396	396	526	525	520	520
	Panel B: Optimism/Self-Efficacy Factor							
Sponsored (γ)	0.384*** (0.106)	0.351*** (0.106)	0.368** (0.174)	0.368** (0.178)	0.266 (0.191)	0.165 (0.190)	0.236 (0.185)	0.187 (0.190)
Sponsored Household (π)	−0.295** (0.128)	−0.169 (0.132)	--	--	−0.211 (0.170)	−0.030 (0.176)	--	--
γ + π	0.089 (0.110)	0.182 (0.111)	--	--	0.055 (0.118)	0.135 (0.116)	--	--
Observations	526	525	396	396	526	525	520	520
	Panel C: Hope Factor							
Sponsored (γ)	0.432*** (0.108)	0.504*** (0.107)	0.371** (0.161)	0.411** (0.163)	0.853*** (0.191)	1.141*** (0.180)	0.701*** (0.185)	0.845*** (0.175)
Sponsored Household (π)	0.117 (0.137)	−0.127 (0.135)	--	--	−0.184 (0.174)	−0.603*** (0.173)	--	--
γ + π	0.549*** (0.110)	0.377*** (0.104)	--	--	0.668*** (0.120)	0.539*** (0.110)	--	--
Observations	526	525	396	396	526	525	520	520

*** $p<0.01$,

** $p<0.05$,

* $p<0.1$, Robust standard errors clustered at the household level in parentheses. Demographic controls include age, gender, and birth order. Community fixed effects estimations also control for family size, parental characteristics, a family stability index, and a dwelling quality index. The dependent variable in each panel is measured in standard deviations. Excluded instruments for sponsorship in first stage of instrumental variables (two stage least squares) estimations are a vector of 13 dummy variables for age at sponsorship program introduction. *F*-statistics for the identifying (excluded) instruments from first stage estimation are 25.2, 20.5, 44.9, and 28.5 for columns 5, 6, 7 and 8, respectively. Note that the CSP (child sponsorship program) variable does not vary within non-sponsored households, so these households are dropped for OLS household fixed effects estimates; in contrast, IV estimates are based on *predicted* CSP, which does vary within households and so non-sponsored households are included in the IV household fixed effect estimates.

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Table 5

Regression Estimations for Indonesia Drawings (Kling Indices)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ordinary Least Squares				Instrumental Variables			
	Community Fixed Effects		Household Fixed Effects		Community Fixed Effects		Household Fixed Effects	
Demographic Controls?	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**
Panel A: Happiness Factor								
Sponsored (γ)	0.332*** (0.109)	0.318*** (0.112)	0.343** (0.172)	0.360** (0.173)	0.471** (0.200)	0.438** (0.205)	0.479** (0.209)	0.460** (0.215)
Sponsored Household (π)	−0.148 (0.133)	−0.098 (0.139)	--	--	−0.248 (0.179)	−0.187 (0.190)	--	--
γ + π	0.184* (0.109)	0.220** (0.111)	--	--	0.223* (0.118)	0.250** (0.118)	--	--
Observations	526	525	396	396	526	525	520	520
Panel B: Optimism/Self-Efficacy Factor								
Sponsored (γ)	0.430*** (0.113)	0.504*** (0.109)	0.508*** (0.170)	0.553*** (0.166)	0.735*** (0.196)	1.010*** (0.182)	0.777*** (0.204)	0.934*** (0.180)
Sponsored Household (π)	0.069 (0.131)	−0.198 (0.128)	--	--	−0.150 (0.175)	−0.575*** (0.170)	--	--
γ + π	0.499*** (0.103)	0.307*** (0.099)	--	--	0.585*** (0.112)	0.435*** (0.104)	--	--
Observations	526	525	396	396	526	525	520	520
Panel C: Hope Factor								
Sponsored (γ)	0.294*** (0.098)	0.310*** (0.099)	0.270* (0.158)	0.289* (0.159)	0.397** (0.190)	0.429** (0.196)	0.285 (0.185)	0.283 (0.192)
Sponsored Household (π)	−0.084 (0.127)	−0.083 (0.131)	--	--	−0.159 (0.161)	−0.172 (0.172)	--	--
γ + π	0.209* (0.114)	0.227* (0.114)	--	--	0.239* (0.128)	0.258** (0.126)	--	--
Observations	526	525	396	396	526	525	520	520

*** $p<0.01$,

** $p<0.05$,

* $p<0.1$, Robust standard errors clustered at the household level in parentheses.

All notes at the bottom of Table 4 also apply to this table.

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Table 6

Regression Estimations for Indonesia Drawings (Anderson Indices)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ordinary Least Squares				Instrumental Variables			
	Community Fixed Effects		Household Fixed Effects		Community Fixed Effects		Household Fixed Effects	
Demographic Controls?	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**
				Panel A: Happiness Factor				
Sponsored (γ)	0.200* (0.110)	0.192* (0.109)	0.165 (0.182)	0.185 (0.184)	0.286 (0.187)	0.284 (0.194)	0.276 (0.194)	0.280 (0.205)
Sponsored Household (π)	−0.073 (0.135)	−0.052 (0.137)	--	--	−0.135 (0.173)	−0.121 (0.187)	--	--
γ + π	0.127 (0.111)	0.139 (0.115)	--	--	0.152 (0.118)	0.163 (0.117)	--	--
Observations	526	525	396	396	526	525	520	520
				Panel B: Optimism/Self-Efficacy Factor				
Sponsored (γ)	0.414*** (0.110)	0.483*** (0.109)	0.478*** (0.162)	0.514*** (0.162)	0.764*** (0.198)	1.010*** (0.189)	0.792*** (0.195)	0.918*** (0.178)
Sponsored Household (π)	0.090 (0.140)	−0.158 (0.140)	--	--	−0.161 (0.192)	−0.551*** (0.190)	--	--
γ + π	0.504*** (0.108)	0.325*** (0.105)	--	--	0.603*** (0.112)	0.459*** (0.107)	--	--
Observations	526	525	396	396	526	525	520	520
				Panel C: Hope Factor				
Sponsored (γ)	0.224** (0.096)	0.261*** (0.095)	0.199 (0.156)	0.220 (0.158)	0.390** (0.198)	0.479** (0.208)	0.245 (0.189)	0.267 (0.195)
Sponsored Household (π)	0.022 (0.134)	−0.032 (0.132)	--	--	−0.097 (0.167)	−0.195 (0.178)	--	--
γ + π	0.246** (0.123)	0.228* (0.124)	--	--	0.293** (0.140)	0.284* (0.137)	--	--
Observations	526	525	396	396	526	525	520	520

*** $p<0.01$,

** $p<0.05$,

* $p<0.1$, Robust standard errors clustered at the household level in parentheses.

All notes at the bottom of Table 4 also apply to this table.

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Table 7

Coefficient Stability and Selection on Observables and Unobservables

Outcome Variable	(1) No Controls, No FE	(2)	(3) Controls + FE	(4)	(5)	(6) Oster Bounds	(7)
	γ	R^2	γ	R^2	$\gamma_{col1} - \gamma_{col3}$	δ	Bias-Adj. γ
Panel A: Treated Households Only, Household Fixed Effects							
Happiness	0.255** (0.112)	0.013	0.328* (0.179)	0.588	−0.073 (0.075)	−4.745	0.351
Optimism/Self-Efficacy	0.367*** (0.107)	0.028	0.368** (0.178)	0.595	−0.001 (0.079)	−392.879	0.369
Hope	0.359*** (0.106)	0.030	0.411** (0.163)	0.621	−0.052 (0.080)	−7.724	0.427
Panel B: Treated and Waitlist Households, Community Fixed Effects							
Happiness	0.220** (0.088)	0.012	0.275** (0.114)	0.041	−0.055 (0.075)	−0.074	0.299
Optimism/Self-Efficacy	0.232*** (0.088)	0.013	0.351*** (0.106)	0.084	−0.120* (0.072)	−0.103	0.394
Hope	0.443*** (0.085)	0.049	0.504*** (0.107)	0.218	−0.061 (0.085)	−1.125	0.527

Note: In columns 1, 3, and 5 robust standard errors clustered at the household level are presented in parentheses where * p<.1,

** p<.05,

*** p<.01. Column 5 presents results testing for the difference in γ in columns 1 and from a seemingly unrelated regression estimate. Oster's delta and bias-adjusted gamma use the methods described in Oster (forthcoming) to estimate the impact of the bias on γ due to omitted variables. Oster's δ is calculated using an Rmax = 1 for a null of $\gamma = 0$. Bias-adjusted γ calculated using an Rmax = 1.3 * R-squared from regression with all controls (column 4) and a $\delta = 1$. Controls include: age, gender, and birth order in Panel A. Additionally controls for family size, a family stability index, a dwelling quality index, and a dummy for if the household has a sponsored child in Panel B.

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