Accelerators for achieving the sustainable development goals in Sub-Saharan-African children and young adolescents- a longitudinal study

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Word Count:

7371 (including Abstract, Tables, and References, but excluding Supplementary Materials)

Abstract

Governments are struggling to achieve the targets set in the sustainable development goals (SDGs). An evidence base exploring effective interventions for children and adolescents in Sub-Saharan Africa (SSA) is urgently needed to help governments to protect these groups at particularly high risk for adversity. Pragmatic actions in the form of combinations of protective factors have been proposed to accelerate the achievement of targets across multiple SDGs. The current study utilizes prospective longitudinal data from $n=1848$ children and adolescents (1-1.5- year follow-up: $n=1740$) aged 9-13 years living in South Africa. Seven hypothesized protective factors were explored, targeting 14 outcomes across five SDGs: mental health, substance abuse, schooling, sexual and reproductive health, and violence exposure. Five of the proposed protective factors (food security, caregiver monitoring, caregiver praise, living in a safe community, and access to community-based organisations-CBOs) were each associated with changes on five or more SDG-related outcomes, thus being defined as potential accelerators. Follow-up analyses revealed significant additive effects, where a combined provision of all five accelerators was associated with a higher adjusted probability of achieving nine of the SDG-related outcomes than any single protective factor. These findings add to the growing evidence base showing that combined provisions present an effective policy approach for supporting the achievement of multiple SDGs in sub-Saharan Africa, but extends it to a somewhat younger group of children and adolescents than previously studied. The study also suggests that CBOs could be a valuable vehicle for delivering protective services to those most vulnerable.

Keywords: accelerator; sustainable development goals; community-based organizations; sub-Saharan Africa; South Africa; children; adolescents

Introduction

The sustainable development goals (SDGs) were devised in 2015 to guide international development policies until 2030. They cover a range of social, economic, and environmental outcomes, with central aims of equity and reaching those most vulnerable (United Nations Development Group, 2017). Children and adolescents in sub-Saharan Africa (SSA) are a particularly disadvantaged group, as they tend to be exposed to high levels of inequality, poverty and violence, alongside poor access to services and a limited health and welfare infrastructure (United Nations Development Programme, 2014). However, it has been suggested that these young people could generate an annual dividend of at least 500 billion USD over the coming 30 years if invested in (Gupta et al., 2014). Further research is needed to effectively guide such investments and associated policy decisions.

To improve wordwide achievement of the SDGs, the United Nations Development Group (UNDG) has called for an identification of so-called "accelerators": interventions, services or programatic areas that are evidence-based, scalable and, importantly, target multiple SDGs at once and in more depth than any single provision, thus using limited available resources as efficiently as possible (Cluver et al., 2019). This stands in contrast to the currently prevalent silo designs, where one intervention or standalone programme targets a single outcome (e.g. Adato & Bassett, 2009; Baird et al., 2013). The UNDP SDG Accelerator and Bottleneck Assessment (UNDP, 2017) further elaborates on this, distinguishing between accelerators as development policies and/or programme areas that directly influence SDG outcomes (e.g. real-world protective factors such as food security, high-quality education and good parenting) and interventions (such as feeding programs, free schooling, parenting interventions) that can drive progress on these accelerators. With few prospective studies available, analysis of already existing datasets – while potentially limited in their generalizability – allows deriving initial knowledege on what combined provisions of

protective factors could yield the strongest improvements in child and adolescent outcomes, with a key next step being to identify effective interventions and policies that change access to these accelerating factors.

In accordance with the above-outlined theoretical considerations, research using siloed approaches provides a range of evidence for single factors that could positively influence SDG-related outcomes, including cash transfers, food security, positive parenting, and safety from violence (Bastagli et al., 2016; Devlin, Wight, & Fenton, 2018; Fowler et al., 2009; Shankar, Chung, & Frank, 2017; Wright, Austin, Booth, & Kliewer, 2017). However, supporting the accelerator concept, recent studies have highlighted the beneficial effects of being exposed to multiple protective factors in parallel on child and adolescent development. For instance, combined exposure to cash grant provisions and positive parenting was associated with a lower HIV risk in adolescents aged 10-18 years (Cluver et al., 2014) and better cognitive and educational outcomes in children and adolescents aged 4-13 years (Sherr et al., 2017) than cash grant provisions alone. A prioneering analysis tested the idea of accelerators more broadly in a sample of South African adolescents aged 10-19 years. The authors identified three protective factors that were associated with improvements on three or more of the 11 studied SDG-related outcomes, thus being defined as "accelerators": parenting support, government cash transfers and psychosocial support (Cluver et al., 2019). For five out of the 11 targets, the accelerators also showed additive effects, i.e. their combinations exerted larger effects than each factor on its own. Similarly promising findings come from a study identifying positive parenting, parental monitoring and food security as potential accelerators for violence prevention (Cluver et al., 2020s). This growing body of research now needs further evidence to extend our understanding of potential protective factors across different contexts and populations to reliably guide policy decisions. The need to exploit additive effects may also be particularly urgent given the proposed long-term social and economic effects of the COVID-19 pandemic, which may further

limit budgets and resources available, while increasing the support needs of those most vulnerable.

The current study widens the scope of the existing accelerator research in two main ways: firstly, it focuses on children and adolescents aged 9-13 years, and thus a somewhat younger age group than previous studies. Early adolescence has been proposed to be a key point of biological, social, and emotional change (McGuire et al., 2019); thus, it may be particularly important to understand what protective factors support positive development during this period. Secondly, one of the potential protective factors investigated in the current study is attendance of community-based organisations (CBOs). CBOs are often under-studied, but have been shown to be a delivery platform that is able to reach the most vulnerable children and their families (Sherr et al., 2016), by offering services such as parenting programmes, physical and mental health care and support with accessing social provisions (e.g. cash grants). They thus could pose key vehicles for supporting the achievement of the SDGs.

The current analyses combine longitudinal data from two linked South African studies with baseline data collected between 2009 and 2011 and a 12-18 month follow up. The aim was to investigate 1) which of seven potentially protective factors (caregiver praise, caregiver monitoring, CBO access, healthcare access, receipt of a social grant, food security, living in a safe community) may be linked to outcomes across three or more of 14 SDG-related outcomes, thereby acting as accelerators; and 2) whether combinations of these factors show additive effects, thus exceeding the positive impacts of any single factor alone.

Methods

Sample and Procedure

We pooled data from two prospective longitudinal studies (see Figure 1), which were designed in close collaboration and made use of similar measures:
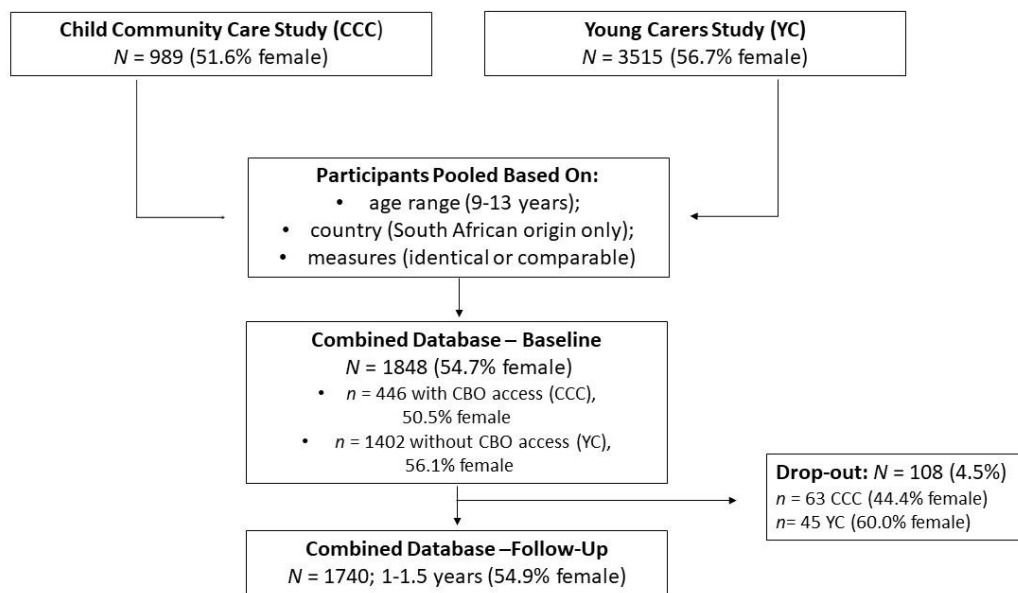
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┌────────────────────────────┐    ┌────────────────────────────┐
│ Child Community Care Study │    │   Young Carers Study (YC)  │
│           (CCC)            │    │   N = 3515 (56.7% female)  │
│   N = 989 (51.6% female)   │    │                            │
└────────────────────────────┘    └────────────────────────────┘

            ┌──────────────────────────────────────┐
            │      Participants Pooled Based On:    │
            │   •  age range (9-13 years);          │
            │   •  country (South African origin    │
            │      only);                           │
            │   •  measures (identical or           │
            │      comparable)                      │
            └──────────────────────────────────────┘

            ┌──────────────────────────────────────┐
            │      Combined Database – Baseline     │
            │        N = 1848 (54.7% female)        │
            │   •  n = 446 with CBO access (CCC),   │
            │         50.5% female                  │
            │   •  n = 1402 without CBO access (YC),│
            │         56.1% female                  │
            └──────────────────────────────────────┘
                                          ┌──────────────────────────────┐
                                          │ Drop-out: N = 108 (4.5%)     │
                                          │ n = 63 CCC (44.4% female)    │
                                          │ n = 45 YC (60.0% female)     │
                                          └──────────────────────────────┘
            ┌──────────────────────────────────────┐
            │    Combined Database –Follow-Up       │
            │ N = 1740; 1-1.5 years (54.9% female)  │
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Figure 1. Pooling of the Child Community Care and Young Carers databases for the current study. Comparable measures assess similar constructs on validated scales, with measures standardized to enable comparability where necessary.

The Child Community Care (CCC) study ($N = 989$) evaluated the effects of CBO service provisions on outcomes in HIV/AIDs affected children aged 4-13 across three Southern African countries. To create a representative sample, 24 CBOs were randomly selected from a list of all projects funded by 11 organizations, stratified by funder and location. Consecutive attenders, up to a maximum of 40 children, were selected from each CBO. Data were collected at two time-points, during a baseline assessment in 2011/12 (uptake: 99%) and at a follow-up 12-15 months later (retention: 86%). Interviews were conducted by trained data collectors either in English or in relevant local languages, including Zulu, Xhosa and Chewa, and then translated back to English for analyses.

The "Young Carers" (YC) study ($N=3515$) investigated well-being in children and adolescents in South Africa. Participants for this study stemmed from two urban and two rural districts in two provinces strongly affected by HIV/AIDS (>30%). For each district, census

enumeration areas were randomly selected. Then, all households in these areas were visited, and one child aged 9-17 was randomly chosen from each household to participate. Baseline data (T1) were collected in 2009/2010 (uptake: 97.5%), with a follow-up (T2) one year later (retention: 96.8%). Interviews were about 1 hour long, and were completed in the participant's language of choice, including Xhosa, Zulu, Sotho, and Shangaan.

For the current analyses, a subset of children and adolescents in the overlapping age range between both studies (9-13 years) and living in South Africa only were selected to enable comparability of sub-samples (see Figure 1). The sub-samples excluded from analyses did not differ in terms of sex and province of origin; further meaningful comparisons are difficult given age differences for the included and excluded groups which may drive any differences found (excluded: children aged 4-8 years for the CCC, adolescents aged 14-17 years for the YC study). To control for CBO provision, only those children/adolescents without any CBO attendance at both time-points were included from the YC study. A total of 446 children and adolescents from the CCC study and 1402 from the YC study met inclusion criteria (baseline: N=1848; follow-up: N=1740 – 92.4%). For both studies, children and their current caretakers provided informed consent and did not receive any incentives for participation, except for snacks and certificates of participation. In cases of emergency (reports of rape, abuse, suicidality or any other indication of harm), protocols were in place and participants were referred to specialized services for support.

Ethical approvals were obtained from the Universities of Oxford (SSD/CUREC2/11-40) and Cape Town (Ref: CSSR 389/2009), respective provincial Health and Education Departments, University College London (1478/002), Stellenbosch University (N10/04/112), and CBO funding agencies. Data access is available upon application to the senior authors, given the sensitive nature of the data

Measures

Full details on coding decisions and measures used are presented in Supplementary Materials 1 and 2.

SDG-Related Outcome Measures. An interrogation of the measures available resulted in 14 outcomes being identified that aligned with five SDGs (see Supplementary Material 1 for definitions, measures and cut-offs used): no major depression (MDD), no post-traumatic stress disorder (PTSD) and no suicidality, as well as overall good mental health (combined score of all three previous measures), no peer problems, high prosocial behaviour (all SDG 3.4); no substance abuse (SDG 3.5); school enrolment, school attendance, being in the right grade for age, being able to concentrate at school (all SDG 4.1/ 4.4); no sexual debut (given that the target population was relatively young) (SDG 5.6); no delinquent behaviours, and no exposure to physical and emotional abuse by the caregiver (SDG 16.1 and 16.2). Measures taken at follow-up were chosen as the primary outcome variables. However, we controlled for baseline scores, to account for potential pre-existing differences between the two sub-samples. Exceptions were the SDQ subscales and sexual debut, for which measures were only available at T2.

Accelerating protective factors. Seven potential protective factors that may influence SDG-related outcomes were identified (see below). Since previous evidence has suggested that sustained and predictable access is required for protective factors to be effective (Cluver et al., 2019), provisions had to be received across both baseline and follow-up to be counted as "present". The exception was cash grant receipt, for which a measure was only available at follow-up. The hypothesized protective factors comprised: 1) *food security*, coded as present if the child had not gone to bed hungry recently, 2) receipt of at least one of five government-provided *cash grants* over the past year in the household the child lived in, 3) living in a *safe community*, with children not witnessing or directly being exposed to community violence, 4) consistent *access to healthcare* when needed, 5) regular *caregiver praise*, 6) *caregiver monitoring* of child activities and 7) *access to CBOs*, with the YC sub-sample specifically chosen to not have access to CBOs at any time-point, thus posing a comparison group.

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Covariates. Covariates were measured at baseline and comprised three sociodemographic factors (child age and sex, and whether the child lived in formal versus informal housing; all items taken from the South African Census in 2001; Statistics South Africa, 2001), two caretaker-related variables (maternal/paternal death and caregiver self-reported HIV status; Statistics South Africa, 2001), and two items indicating child caregiving responsibilities (Snider & Dawes, 2006). The latter two items were included since previous analyses found significant differences in levels of caregiving between the YC and CCC samples (Yakubovich et al., 2016).

Analyses

Analyses were conducted in Stata SE v.16 (StataCorp., 2019) and comprised seven steps, following a standardized approach used in previous papers (Rudgard et al., 2020): First, we determined frequency distributions for all SDG-related outcomes, hypothesized protective factors and covariates at baseline and follow-up. We also investigated potential differences between the sub-sample that had dropped out by follow-up and participants retained across both time-points using χ^2 and t-tests as appropriate. Second, we calculated tetrachoric correlations between the seven hypothesized protective factors to gain a better understanding of their associations with each other. Third, we calculated univariate associations between the hypothesized protective factors and all outcome variables to gain an initial impression of their inter-relationships. Fourth, we conducted path analyses, consisting of separate multivariable logistic regressions, with each of the 14 outcome variables being simultaneously regressed on all hypothesized protective factors and covariates. Fifth, to account for the risk of type 1 error resulting from multiple hypothesis testing, we adjusted the p-values through a Benjamini-Hochberg correction with a false discovery rate of .1. Since the seven hypothesized protective factors were included as predictors in all regression models, each was defined as comprising one family of tests. Sixth, hypothesized protective factors that were significantly associated with three or more outcomes following corrections were defined as potential "accelerators". In

a final step, adjusted probabilities and probability ratios for experiencing each outcome were calculated for three scenarios: 1) not being exposed to any of the potential accelerators determined in step 6, 2) being exposed to one of the accelerators and 3) experiencing all five accelerators in combination (Cluver et al., 2019). Of note, inter-correlations between the different outcome variables were found to be low to medium-sized (<.3-.4 for most), suggesting that analyses should be sufficiently reliable without accounting for inter-correlation of outcomes (Teixeira-Pinto & Normand, 2009).

Results

Descriptive Information

Frequency distributions for all SDG-related outcomes, proposed protective factors and control variables at baseline and follow-up are provided in Table 1. Those lost to follow-up ($n = 108$) were on average younger, more likely to have had at least one parent die, and to be a caretaker of younger children at baseline (see Table 1). They were also more likely to have been able to access healthcare when needed. No other group differences were found. Of the sample retained, 54.9% were female, with an average age of 11.5 years at baseline and 12.7 years at follow-up (for details, see Table 2). Missing data were overall low (<=2% for all variables), except for measures of sexual debut at T2, with $n=222$ missing (12.8%), potentially due to this being a sensitive question, or the young age of the group. Presence of SDG-related outcomes at follow-up ranged from 32.9% for "no peer problems" to 98.3% for "being enrolled in school". Protective factor access rates across both T1 and T2 lay at 22.0% ($n=383$) for being enrolled in a CBO, 38.2% ($n=663$) for consistent caregiver monitoring, 53.9% ($n=930$) for living in a safe community, 56.1% ($n=971$) for parental praise, 71.9% ($n=1246$) for food security, 77.9% ($n=1351$) for healthcare access, and 81.1% ($n=1410$) for cash grants. A more detailed analysis of similarities and differences between the YC and CCC subsamples on key demographic and control variables can be found in Supplementary Materials 3.

Table 1

Frequency distribution of control variables, hypothesized protective factors and outcome variables at baseline and follow-up

	Baseline (*N* = 1848)			Follow-Up (*N*= 1740)
	Retained	Not retained	p-value	
Sociodemographic Characteristics				
Child Age (M, SD)	11.47 (1.19)	11.23 (1.25)	.046*	12.71 (1.32)
Child Sex (female)	956 (54.9%)	55 (50.9%)	.416	956 (54.9%)
Informal Housing	453 (26.0%)	32 (29.6%)	.410	304 (17.5%)
Parental Death	520 (30.0%)	44 (41.1%)	.016*	539 (31.2%)
Caregiver HIV Positive	360 (20.7%)	19 (17.6%)	.439	219 (12.6%)[+]
Child Caretaker of Younger Children	438 (25.2%)	39 (36.1%)	.012*	474 (27.4%)
Child Caretaker of Adults in HH	502 (28.9%)	35 (32.4%)	.436	445 (25.8%)
Hypothesized Protective Factors				
Food security	1446 (83.1%)	88 (81.5%)	.663	1438 (83.0 %)
Any grant (T2 only)	-	-	-	1410 (81.1%)
Safe Community	1039 (59.8%)	73 (67.6%)	.106	1050 (60.8%)
Healthcare Access	1533 (88.1%)	106 (98.2%)	.001*	1523 (87.8%)
Caregiver Praise	1379 (79.3%)	85 (78.7%)	.882	1180 (68.1%)
Caregiver Monitoring	1011 (58.6%)	71 (65.7%)	.118	1022 (58.9%)
CBO Access	446 (24.1%)	63 (58.3%)	<.001*	383 (22.0%)
SDG-Outcomes				
No Depression	1483 (85.2%)	89 (82.4%)	.425	1488 (85.9%)
No Suicidal Ideation	1672 (96.1%)	105 (97.2%)	.553	1665 (96.1%)
No PTSD	1635 (94.2%)	104 (96.3%)	.358	1627 (93.9%)
No Mental Health Problems	1394 (80.3%)	84 (77.8%)	.524	1379 (80.0%)
No Peer Problems	-	-	-	568 (32.9%)
Prosocial Behaviour	-	-	-	867 (50.1%)
No Substance Abuse	1382 (79.5%)	91 (84.3%)	.230	1637 (94.5%)
School enrolment	1729 (99.4%)	107 (99.1%)	.712	1697 (98.3%)
School attendance	1418 (82.4%)	92 (86.0%)	.336	1663 (97.2%)
Right Grade for Age	999 (58.7%)	59 (55.7%)	.538	957 (56.0%)
Ability to Concentrate	1374 (80.0%)	80 (75.5%)	.263	1473 (84.8%)
No Early Sexual Debut	-	-	-	1438 (94.7%)
No Violence Perpetration	926 (53.4%)	59 (54.6%)	.799	856 (49.3%)
No Caregiver Abuse	754 (43.4%)	42 (38.9%)	.360	851 (48.9%)

Notes. Access to grants, sexual debut, prosocial score, and peer problems were assessed at follow-up only. Varying values due to missing data. HH = household, [+] drop in numbers may be due to changes in caregiver between BL and FU (*n* = 401, 23.0%).

Correlations between hypothesized protective factors

As shown in Table 2, most hypothesized protective factors showed small inter-correlations (<.30), suggesting no multi-collinearity. However, CBO access was significantly associated with receipt of all other protective factors. This included positive associations with food security, cash grant receipt, access to healthcare and caregiver monitoring, and negative associations with caregiver praise and living in a safe community. Supplementary Material 4 presents the availability of the proposed protective factors depending on our demographic control variables as a first step for investigating drivers of accelerator access.

Table 2

Tetrachoric correlations between proposed protective factors

	1.	**2.**	**3.**	**4.**	**5.**	**6.**
1. Food security	1.00					
2. Any Grant	<.01	1.00				
3. Safe Community	.14*	-.10*	1.00			
4. Healthcare Access	.06	-.08	-.16**	1.00		
5. Caregiver Praise	.10*	-.03	.14**	-.08	1.00	
6. Caregiver Monitoring	.33**	.02	.20**	-.03	.08*	1.00
7. CBO access	.30 **	.21**	-.39**	.25**	-.20**	.54**

Note: * $p<.05$, **$p <.001$. Protective factor were defined as "present" if they were accessed across both baseline and follow-up.

Associations between the proposed protective factors and SDG outcomes

Each hypothesized protective factor was positively associated with at least two or more outcomes individually, though two negative associations were found between CBO access and not missing school and no caregiver abuse respectively. For the multivariable model (Table 4;

for effects of single accelerators: see Supplementary Materials 5), school enrolment was dropped as an outcome, since it had a base frequency of 98.3%, and this close-to-ceiling effect resulted in too many sparsely populated cells, which prevented model fit. Furthermore, baseline scores for "school enrolment" and "right grade for age" were not controlled for, due to little variation between the time-points. Analyses indicated that after Benjamini-Hochberg corrections, five out of the seven investigated protective factors had accelerating qualities, meaning they were positively associated with three or more SDG outcomes.

Together, these five proposed accelerators predicted 12 outcomes overall: <u>food security</u> was associated with experiencing no depression (OR = 1.5, p = .002; for confidence intervals, see Table 3), good mental health (OR = 1.41, p = .017), no peer problems (OR = 1.47, p = .005), being in the right grade for age (OR = 1.33; p = .015), being able to concentrate at school (OR = 2.06, p <.001); and experiencing no caregiver abuse (OR =1.61, p <.001). <u>Living in a safe community</u> was associated with experiencing no depression (OR = 2.45, p <.001), good mental health (OR = 2.18, p<.001), no peer problems (OR = 1.90, p <.001), higher prosocial behaviour (OR = 1.30, p = .017), no substance abuse (OR = 1.68, p = .031), being able to concentrate at school (OR = 1.71, p <.001), no early sexual debut (OR = 2.06, p = .006) and no caregiver abuse (OR = 1.31, p = .012). <u>Receiving praise from a caregiver</u> was associated with experiencing no depression (OR = 1.69, p = .001), no suicidal ideation (OR = 2.54, p = .001), no post-traumatic stress symptoms (OR = 2.14, p <.001), no peer problems (OR = 1.49, p = .001), prosocial behaviour (OR = 1.55, p <.001), no substance abuse (OR = 1.95, p = .003), no early sexual debut (OR = 1.96, p = .006), and no violence perpetration (OR = 1.45, p <.001). <u>Consistent monitoring by a caregiver</u> was associated with experiencing no peer problems (OR = 1.64, p <.001), no early sexual debut (OR = 2.43, p = .016), no violence perpetration (OR = 1.30, p = .022) and no caregiver abuse (OR = 1.34, p = .011). However, it was also linked to a lower chance of not suffering from post-traumatic stress symptoms (OR = .53, p = .007). Finally, <u>CBO access</u> was associated with experiencing no depression (OR = 3.08, p <.001), good mental

health ($OR = 2.49$, $p <.001$), no peer problems ($OR = 4.38$, $p <.001$), higher prosocial behaviour ($OR = 3.76$, $p <.001$) and no violence perpetration ($OR = 1.45$, $p = .018$). However, it was also associated with a lower probability of experiencing no caregiver abuse ($OR =.53$, $p <.001$).

For each significant association, Figure 2 presents a graphic representation of changes in adjusted probabilities for having achieved each SDG outcome if each of the protective factors was present, as compared to no protective factors being present.

Additive effects (see Figure 3) were found for no depression (adjusted risk difference (ARD) for all 5 accelerators being present, as compared to none: + 32.4% points), no suicidality (ARD: +10.3% points), good mental health (ARD: +36.0% points), no peer problems (ARD: +66.5% points), prosocial behaviour (ARD: +52.4% points), substance use (ARD: +4.5% points), no concentration problems at school (ARD: +24.5% points), no early sexual debut (+8.7% points), and no violence perpetration (ARD: +26.4% points). Improvements for caregiver abuse were not larger than for food security as a single accelerator; however, when CBO access was excluded due to its strong negative association with caregiver abuse (see Table 3), a combination of the other four accelerators lead to improvements on this outcome by 26.7% points. For a full table of adjusted probabilities and probability differences for all outcomes, including non-significant effects, see Supplementary Materials 6.

Table 3

Multivariable associations between the hypothesized protective factors and outcome variables (Odds Ratios, 95% confidence intervals and p-

values)

	SDG-Related Outcomes												
	3.4 No MDD	**3.4 No Suicidal Ideation**	**3.4 No PTSD**	**3.4 Good Mental Health**	**3.4 No Peer Prob-lems**	**3.4 Prosoc. Behav.**	**3.5 No Subst. Abuse**	**4.1 Not Missed School**	**4.4: Right Grade for Age**	**4.4. Able to con-centrate**	**5.6 No early sexual debut**	**16.1 No violence perpetra-tion**	**16.2 No abuse**
Food Security	1.64 [1.20; 2.25], p =.002*	1.54 [.90; 2.64], p = .115	1.10 [.69; 1.77], p = .679	1.41 [1.06; 1.87], p = .017*	1.47 [1.12; 1.93], p = .005*	1.20 [.95; 1.52], p =.119	.67 [.40; 1.12], p = .130	.81 [.38; 1.72], p = .589	1.33 [1.06; 1.68], p = .015*	2.06 [1.52; 2.79], p<.001*	.88 [.52; 1.47], p = .621	1.02 [.82; 1.29], p = .814	1.61 [1.27; 2.03], p <.001*
Any Grants	1.30 [.91; 1.86], p = .144	1.15 [.62; 2.15], p = .650	1.43 [.87; 2.34], p = .156	1.39 [1.02 1.90], p = .037	.92 [.70; 1.22], p = .567	.88 [.68; 1.14], p = .337	1.50 [.91; 2.48], p = .109	1.24 [.58; 2.63], p =.584	.95 [.74; 1.23], p = .709	1.00 [.69; 1.43], p = .989	1.78 [1.04; 3.06], p = .035	.86 [.67; 1.11], p = .241	.84 [.66; 1.09], p = .190
Safe Commu-nities	2.45 [1.79; 3.37]; p <.001*	1.54 [.89; 2.64], p = .115	1.53 [.98; 1.96], p = .061	2.18 [1.66; 2.87], p<.001*	1.90 [1.48; 2.43], p <.001*	1.30 [1.04; 1.62], p = .017*	1.68 [1.05; 2.69], p = .031*	1.06 [.55; 2.03], p = .863	.92 [.74; 1.14], p = .455	1.71 [1.27; 2.30], p<.001*	2.06 [1.23; 3.45], p = .006*	1.10 [.89; 1.36], p = .385	1.31 [.1.06; 1.62], p = .012*
CBO Access	3.08 [1.78; 5.37], p <.001*	2.34 [.90; 6.02], p = .079	1.04 [.56; 1.96], p = .892	2.49 [1.60; 3.89], p<.001*	4.38 [3.14; 6.11], p<.001*	3.76 [2.71; 5.21], p <.001*	1.74 [.84; 3.60], p = .136	.46 [.19; 1.08], p = .075	.85 [.63; 1.16], p = .316	1.12 [.70; 1.77], p = .640	1.62 [.52; 5.02], p =.403	1.45 [1.07; 1.98], p = .018*	.53 [.39; .73], p<.001*
Health-care Access	.91 [.63; 1,33], p = .635	1.39 [.79; 2.46], p = .256	1.11[.68; 1.83], p = .674	1.02 [.75; 1.40], p = .886	.83 [.64; 1.09], p = .182	.70 [.55; .90], p = .005*	1.00 [.59; 1.69], p = .995	1.54 [.78; 3.05], p = .216	1.21 [.95; 1.55], p =.120	.80 [.55; 1.15], p = .220	1.09 [.60; 1.96], p = .771	1.01 [.80; 1.29], p = .911	1.12 [.88; 1.43], p = .363
Care-giver Praise	1.69 [1.26; 2.27], p = .001*	2.54 [1.49; 4.30], p = .001*	2.14 [1.40; 3.27], p < .001*	1.79 [1.39; 2.32], p <.001*	1.49 [1.19; 1.88], p = .001*	1.55 [1.26; 1.91], p <.001*	.1.95 [1.26; 3.01], p = .003*	1.44 [.78; 2.65], p = .242	.89 [.73; 1.09], p = .262	1.27[.96; 1.68], p = .100	1.96 [1.21; 3.17], p = .006*	1.45 [1.19; 1.77], p <.001*	1.09 [.89; 1.34], p = .386
Care-giver Monito-ring	1.28 [.89; 1.85], p =.183	1.31 [.71; 2.42], p = .389	.53 [.33; .84], p =.007*	1.05 [.78; 1.42], p = .751	1.64 [1.29; 2.07], p <.001*	1.21 [.97; 1.52], p = .092	.77 [.47; 1.27], p = .309	1.12 [.57; 2.19], p = .745	1.03 [.82; 1.30], p = .771	1.41[1.00; 1.99], p = .048	2.43 [1.18; 5.02], p = .016*	1.30 [1.04; 1.62], p = .022*	1.34 [1.07; 1.68], p = .011*

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T1 Outcome	1.85 [1.29; 2.64], p=.001*	2.20 [.93; 5.21]; p = .072	2.49 [1.31; 4.74], p = .006*	1.82 [1.35; 2.45], p <.001*	-	-	2.14 [1.31; 3.48], p =.002*	1.33 [.58; 3.08], p = .503	-	1.57[1.13; 2.18], p = .007*	-	1.51 [1.24; 1.84], p<.001*	1.80 [1.47; 2.21], p<.001*
Sex (Female)	1.03 [.77; 1.39], p = .844	.53 [.30; .91], p = .021*	.53 [.34; .82], p = .004*	.84 [.65; 1.09], p = .193	.89 [.71; 1.11], p = .293	1.10 [.90; 1.34], p = .358	1.68 [1.09; 2.59], p = .020*	1.59 [.87; 2.92], p = .132	1.89 [1.55; 2.31], p <.001*	1.12 [.84; 1.49], p = .435	1.41 [.87; 2.29], p = .159	1.08 [.88; 1.31], p = .468	1.03 [84; 1.26], p = .790
Age	1.11 [.97; 1.26], p = .119	.94 [.75; 1.18], p = .592	1.01 [.84; 1.20], p = .935	1.07 [.96; 1.20], p = .211	1.13 [1.03; 1.25], p =.011*	1.00 [.92; 1.10], p = .917	.73 [.60; .89], p = .002*	.87 [.66; 1.12], p = .283	.90 [.82; .98], p = .015*	1.00 [.89; 1.13], p = .949	.46 [.35; .60], p <.001*	.92 [.84; 1.00], p = .043*	1.00 [.92; 1.09], p = .986
Parental Death	.88 [.61 1.25], p =.470	1.11 [.60; 2.06], p = .738	1.00 [.61; 1.62], p = .972	1.01 [.74; 1.38], p = .953	.88 [.68; 1.14], p = .328	1.03 [.81; 1.31], p = .788	.67 [.41; 1.08], p = .100	1.00 [.51; 1.97], p = .992	.72 [.57; .90], p = .005*	1.08 [.77 1.53], p = .647	1.31 [.73; 2.37], p = .365	1.09 [.86; 1.38], p = .464	1.07 [.84; 1.36], p = .573
Care-giver HIV	.71 [.49; 1.93], p = .070	.70 [.39; 1.27], p = .242	.72 [.44; 1.18], p = .193	.71 [.52; .98], p = .037*	.85 [.63; 1.13], p = .255	1.09 [.84; 1.38], p = .530	.93 [.54; 1.61], p = .805	.94 [.44; 2.01], p = .877	.86 [.66; 1.11], p = .252	.60 [.43; .85], p = .003*	.57 [.32; 1.02], p = .060	.94 [.72; 1.21], p = .614	.84 [.64; 1.09], p = .183
Carer Kids	.79 [.55; 1.13], p = .193	.75 [.42; 1.34], p = .327	1.03 [.63; 1.69], p =.908	.87 [.64; 1.19], p =.394	1.29 [.99; 1.68], p = .056	1.10 [,86; 1.41], p = .444	.1.29 [.73; 2.26], p = .382	1.12 [.54; 2.32], p = .758	.95 [.75; 1.22], p = .702	1.28 [.89; 1.84], p = .185	1.13 [.60; 2.12], p = .712	.67 [.52; .85], p = .001*	.89 [.69; 1.13], p = .329
Carer Adults	1.31 [.89; 1.91], p = .166	.68 [,38; 1.22], p = .194	.73 [.46; 1.17], p =.193	1.06 [.77; 1.45], p = .729	1.05 [.82; 1.36], p = .684	.94 [.74; 1.20], p = .642	.65 [.40; 1.07], p = .091	.74 [.38; 1.46], p = .384	1.32 [1.04; 1.67], p = .024*	1.14 [.81; 1.61], p = .465	1.50 [.80; 2.78], p = .203	1.00 [.79; 1.27], p = .996	1.02 [.81; 1.30], p = .847
Informal Housing	.52 [.38; .71], p <.001*	1.19 [.66;2.13], p = .566	.67 [.42; 1.08], p = .131	.60 [.46; .80], p <.001*	.79 [.59; 1.05], p =.108	.97 [.76; 1.24], p = .822	1.10 [.65; 1.84], p = .728	1.61 [.68; 3.81], p = .280	.85 [.67; 1.09], p = .200	.81 [.59; 1.11], p = .192	.66 [.39; 1.10], p = .110	1.75[1.38; 2.23], p <.001*	1.50 [1.17; 1.91], p = .001*

Notes. SDG = Sustainable Development Goal. * indicates a significant association following Benjamini-Hochberg corrections for multiple testing for each proposed accelerator. Empty cells indicate that baseline data were not included due to missing data or insufficient variation between baseline and follow-up measures.
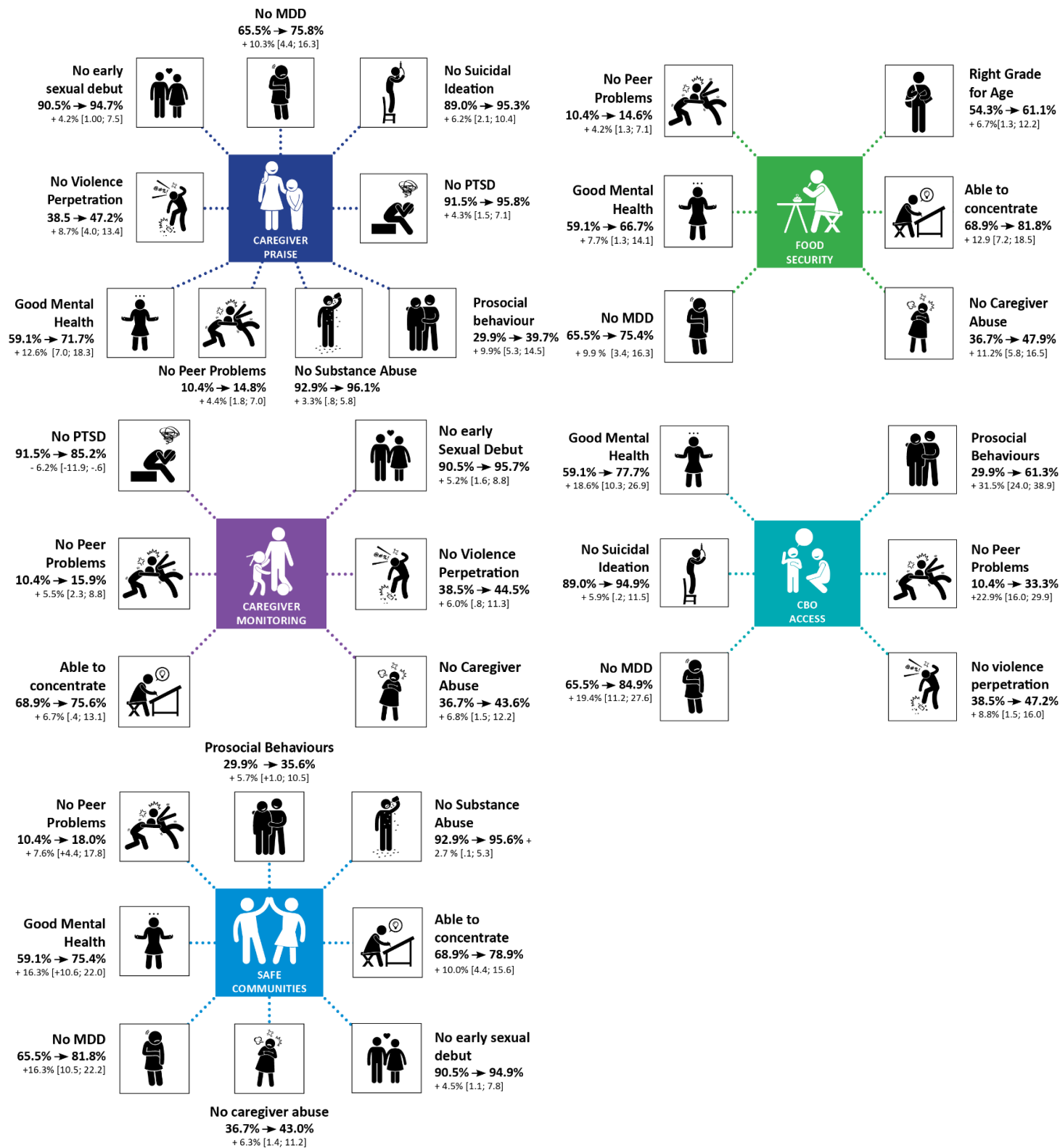
CAREGIVER PRAISE

No MDD
65.5% → 75.8%
+ 10.3% [4.4; 16.3]

No early sexual debut
90.5% → 94.7%
+ 4.2% [1.00; 7.5]

No Suicidal Ideation
89.0% → 95.3%
+ 6.2% [2.1; 10.4]

No Violence Perpetration
38.5 → 47.2%
+ 8.7% [4.0; 13.4]

No PTSD
91.5% → 95.8%
+ 4.3% [1.5; 7.1]

Good Mental Health
59.1% → 71.7%
+ 12.6% [7.0; 18.3]

No Peer Problems
10.4% → 14.8%
+ 4.4% [1.8; 7.0]

No Substance Abuse
92.9% → 96.1%
+ 3.3% [.8; 5.8]

Prosocial behaviour
29.9% → 39.7%
+ 9.9% [5.3; 14.5]

FOOD SECURITY

No Peer Problems
10.4% → 14.6%
+ 4.2% [1.3; 7.1]

Right Grade for Age
54.3% → 61.1%
+ 6.7% [1.3; 12.2]

Good Mental Health
59.1% → 66.7%
+ 7.7% [1.3; 14.1]

Able to concentrate
68.9% → 81.8%
+ 12.9 [7.2; 18.5]

No MDD
65.5% → 75.4%
+ 9.9 % [3.4; 16.3]

No Caregiver Abuse
36.7% → 47.9%
+ 11.2% [5.8; 16.5]

CAREGIVER MONITORING

No PTSD
91.5% → 85.2%
- 6.2% [-11.9; -.6]

No early Sexual Debut
90.5% → 95.7%
+ 5.2% [1.6; 8.8]

No Peer Problems
10.4% → 15.9%
+ 5.5% [2.3; 8.8]

No Violence Perpetration
38.5% → 44.5%
+ 6.0% [.8; 11.3]

Able to concentrate
68.9% → 75.6%
+ 6.7% [.4; 13.1]

No Caregiver Abuse
36.7% → 43.6%
+ 6.8% [1.5; 12.2]

CBO ACCESS

Good Mental Health
59.1% → 77.7%
+ 18.6% [10.3; 26.9]

Prosocial Behaviours
29.9% → 61.3%
+ 31.5% [24.0; 38.9]

No Suicidal Ideation
89.0% → 94.9%
+ 5.9% [.2; 11.5]

No Peer Problems
10.4% → 33.3%
+22.9% [16.0; 29.9]

No MDD
65.5% → 84.9%
+ 19.4% [11.2; 27.6]

No violence perpetration
38.5% → 47.2%
+ 8.8% [1.5; 16.0]

SAFE COMMUNITIES

Prosocial Behaviours
29.9% → 35.6%
+ 5.7% [+1.0; 10.5]

No Peer Problems
10.4% → 18.0%
+ 7.6% [+4.4; 17.8]

No Substance Abuse
92.9% → 95.6% +
2.7 % [.1; 5.3]

Good Mental Health
59.1% → 75.4%
+ 16.3% [+10.6; 22.0]

Able to concentrate
68.9% → 78.9%
+ 10.0% [4.4; 15.6]

No MDD
65.5% → 81.8%
+16.3% [10.5; 22.2]

No caregiver abuse
36.7% → 43.0%
+ 6.3% [1.4; 11.2]

No early sexual debut
90.5% → 94.9%
+ 4.5% [1.1; 7.8]

Figure 2. *Adjusted probability differences in % points for achieving the SDG-related outcomes under the presence of single protective factors, as compared to no protective factors being present*
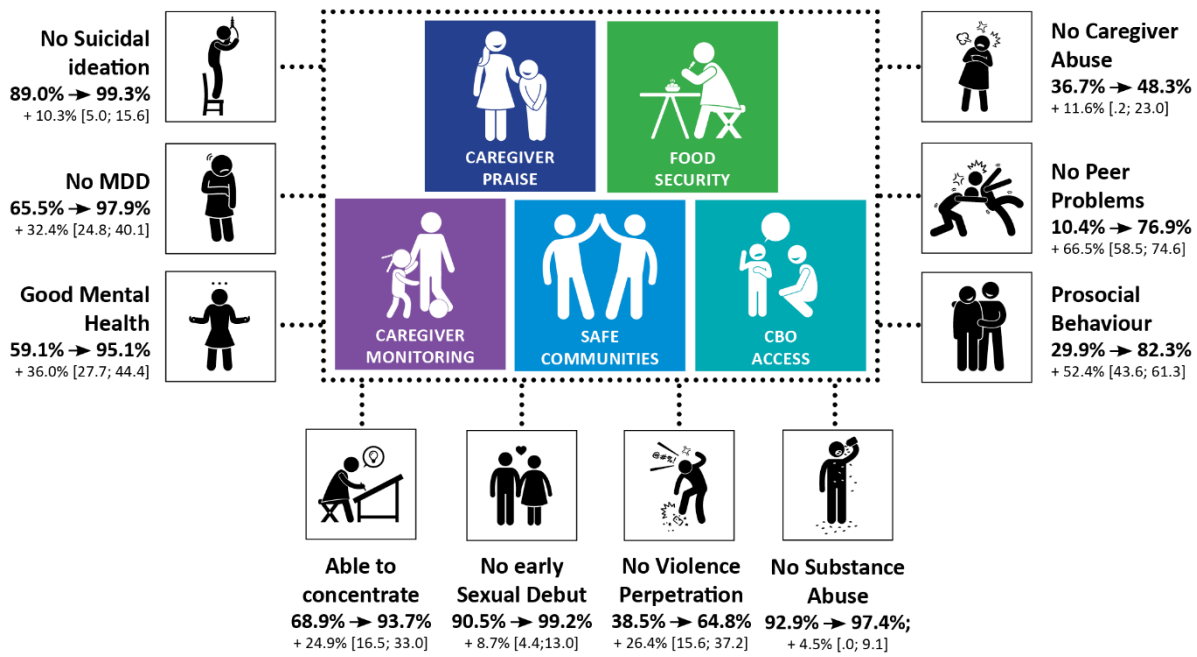
No Suicidal ideation
89.0% ➤ 99.3%
+ 10.3% [5.0; 15.6]

No MDD
65.5% ➤ 97.9%
+ 32.4% [24.8; 40.1]

Good Mental Health
59.1% ➤ 95.1%
+ 36.0% [27.7; 44.4]

No Caregiver Abuse
36.7% ➤ 48.3%
+ 11.6% [.2; 23.0]

No Peer Problems
10.4% ➤ 76.9%
+ 66.5% [58.5; 74.6]

Prosocial Behaviour
29.9% ➤ 82.3%
+ 52.4% [43.6; 61.3]

CAREGIVER PRAISE

FOOD SECURITY

CAREGIVER MONITORING

SAFE COMMUNITIES

CBO ACCESS

Able to concentrate
68.9% ➤ 93.7%
+ 24.9% [16.5; 33.0]

No early Sexual Debut
90.5% ➤ 99.2%
+ 8.7% [4.4;13.0]

No Violence Perpetration
38.5% ➤ 64.8%
+ 26.4% [15.6; 37.2]

No Substance Abuse
92.9% ➤ 97.4%;
+ 4.5% [.0; 9.1]

Figure 3. *Adjusted probability differences in % points for achieving the SDG-related outcomes under the presence of all five protective factors, as compared to no protective factors being present*

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Discussion

The current study adds to an emerging evidence base on potential accelerators for achieving the SDGs in an African context (Cluver et al., 2019; Desmond, Sherr, & Cluver, 2020; Sherr et al., 2020). In a somewhat younger population than previously studied, consisting of children and adolescents aged 9-13 years living in South Africa, we identified 5 accelerators that positively predicted three or more SDG-related outcomes: food security, living in a safe community, caregiver praise, consistent caregiver monitoring and having access to a CBO. We also found evidence for possible additive effects for nine out of the fourteen investigated SDQ outcomes, where the simultaneous presence of all accelerators had a stronger positive impact than any accelerator on its own. This indicates that a combined application of protective factors may yield additional benefits.

Of note, possible additive effects were present for five out of the six mental health outcomes investigated. The only exception was PTSD, a condition that may be strongly determined by trauma characteristics and specific post-trauma reactions (Ehlers & Clark, 2000; Marsac et al., 2014). This suggests that applying a combination of the present accelerators may pose a good investment for reducing the mental health burden in children and adolescents living in sub-Saharan Africa. Additive effects were also found for the outcomes of no violence perpetration, no substance abuse and no early sexual debut, and thus across a range of SDG-related outcomes. In contrast, associations with school-related outcomes were limited. Free compulsory education available in South Africa likely led to high rates of school enrolment and attendance, with little room for improvement. This is in line with previous findings showing free schooling may promote attainment, as well as secondary outcomes (mental health, HIV risk) (Keats, 2018; Meinck, Orkin, & Cluver, 2019; UNICEF, 2009) and suggests that school access as a government provision could be important in settings with limited resources. Substantial additive effects were found however for the ability to concentrate at school, which may determine how well a child ultimately performs. Of note, while this factor has been

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previously linked with mental health difficulties (Humensky et al, 2010), inter-correlations in the current study were low to moderate. Future studies may investigate a wider range of school performance outcomes and directly school-related protective factors, such as safe school environments (Cluver et al., 2019).

Similar to the current findings, previous studies exploring potential protective factors (e.g. Cluver et al., 2016; Cluver et al., in press; Na et al., 2019) also highlighted advantageous effects of food security, parental monitoring and positive parenting. However, this study was the first to establish that living in a safe community and CBO access may act as additional accelerators. Key next steps will be to determine what drives access to these protective factors, including socio-demographic variables, and how availability can be altered through interventions (UNDP, 2017). There are a range of evidence-based interventions available that target parenting and food security which could be prioritised for inclusion and scale up (e.g. Cluver et al., 2018; Devereux, 2016; Devries et al., 2015; Shendorovich et al., 2021), though for some, evidence for scaled delivery is still lacking, which is a key area for future research. Our findings also indicate that measures to improve community safety (e.g. efforts to decrease youth membership in gangs, Higginson et al., 2015) and funding directed to CBOs could effectively support improved outcomes in those most at risk. Of note, the current study used observational data, and followed an exploratory analysis approach. Such an approach is valuable for guiding future research into development accelerators but cannot demonstrate causality. Caution should therefore be taken in interpreting null findings for cash grants and healthcare access, as such results may be related to limited statistical power or unaccounted confounding factors.

Community-based organizations have been shown to play key roles in supporting vulnerable children and their families by offering a range of different services (Sherr et al., 2016). In our study, young people attending CBOs were more likely to experience food security, receive social grants and have access to healthcare. This could indicate that CBO provisions

improve access to other accelerators, and/or participants' resourcefulness. Lower rates of caregiver praise and community safety found in CBO attendants, on the other hand, may reflect the fact that CBOs often target the most vulnerable families (Sherr et al., 2016). Overall, while those attending and not attending CBOs came from two different sub-samples that could have differed on unmeasured dimensions, the current findings controlling for a range of demographic factors suggest that CBOs may be well placed as a delivery platform of accelerating services (Yakobvitch et al., 2016) and require further attention. An important next step will be to investigate the role of quality of service delivery as a factor that could influence whether or not SDG outcomes are improved (Carman, 2007; Carnochan, Samples, Myers, & Austin, 2013). Our study was not powered to examine such effects, but well-established findings indicate the importance of factors such as staff versus volunteer providers, resource availability, frequency of attendance and nature of provisions (Desmond, Gow, Loening-Voysey, Wilson, & Sterling, 2002; Tomlinson et al., 2017).

The strengths of the current study include a focus on early adolescence as an important period of transition, the investigation of a broad range of SDG-related outcomes, as well as an identification of protective factors that may be relevant across different contexts. It furthermore examines the effects of access to community-based organizations, which are currently understudied. However, it also has several limitations. Firstly, methodologically, some measures of relevant constructs differed slightly between the YC and CCC sub-samples-. Secondly, although secondary data analysis using existing data bases allows for detailed insight, there may be some limitations with measures such as depth and range, time of measurement, and missing data. There is thus a need for more robust longitudinal studies that are designed specifically for investigating accelerators, and that also make more extensive use of linkage opportunities (e.g. health registers, school or administrative data) to deepen research in this field. Third, some odds-ratios in the path analyses showed relatively large confidence intervals, potentially due to small cell sizes on rare outcomes, indicating high uncertainty, and inter-

correlations between some of the protective factors were moderate. Future studies would be strengthened in their causal claim if they were to evaluate the association between within person change in a protective factor and within person change in multiple outcomes (Curran & Bauer, 2011). It will also be key to model whether having access to some accelerators predicts future access to others; and whether combinations of accelerators may show interactive effects, in order to determine the most effective points of intervention. In the current study, we did not find strong evidence of mediation, with the odds-ratios of the accelerator effects not changing substantially through the co-inclusion of all accelerators into the same model; however, this may differ across accelerators and samples. Fourth, a time frame of 1-1.5 years may be considered relatively short for observing change processes. However, factors such as mental health, school performance and peer relations may still be altered substantially over this period of time in children and young adolescents. Longer exposure to protective factors and its effect on SDG outcomes should be investigated in future studies. Finally, the current sample includes a substantial proportion of families affected by HIV, who pose a particularly vulnerable population and may respond differently to accelerators than the general population. However, HIV infection is common in SSA, making our findings more generalizable across this setting. Furthermore, many of the factors identified in the current analyses (e.g. food security, good parenting) have been shown to be effective in improving child and adolescent outcomes across the globe, highlighting they are likely universally beneficial.

Despite such limitations, the current study adds to the growing body of evidence identifying accelerators which lead to an effective way of achieving improvements across multiple SDGs in vulnerable populations. This model allows planners to assess conditions (such as food security and education access) and interventions (such as parenting, cash grants or CBO provision) that should be prioritised for comprehensive provision. Utilizing synergy effects may allow governments and policy donors to maximize impacts of interventions, which could be especially relevant in a post-Covid-19 world. As part of this, it will be important to explore

added benefits of each accelerator, and whether there is an optimum number in terms of cost-effectiveness. Overall, the SDGs pose an ambitious approach for improving outcomes across social, economic, and environmental domains. The identification of accelerators may enhance effective use of available funding to target policies and interventions to allow children and adolescents across sub-Saharan Africa to reach their full potential.

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Supplementary Materials 1

Table S1

SDG-related outcomes: definitions, measures and coding across the Young Carers and Child Community Care databases

Sustainable Development Goal	Operationalization in the current study	Measurement scales
3.4 Promote Mental Health and Wellbeing	**No PTSD** • YC: PTSD = at least 1 symptom of reexperiencing, 3 symptoms of avoidance and maladaptive mood/cognitions and 2 symptoms of hyperarousal present "2 = *most of the time*" or "3 = *all of the time*" over the past month (28 items) • CCC: PTSD = at least 3 symptoms (of 10 assessed) present "2 = *lots of the time*" or "3 = *all of the time*"	Child PTSD Checklist (Amaya-Jackson et al., 1995; Boyes et al., 2012) (current α=.67)- cut offs based on Cluver et al., (2009), criteria updated based on DSM-V (American Psychiatric Association, 2013) Trauma Symptom Checklist for Children (Briere, 1996) (current α=.74).
	No Depression- MDD defined as sum scores of 3 over more over the past 2 weeks	Child Depression Inventory (Short Form) (Kovacs, 1992) (α=.67)
	No suicidality- presence (= 0) vs. absence (= 1) over the past 2 weeks	YC: Mini International Neuropsychiatric Interview for Children and Adolescents (Sheehan et al.,, 2004) CCC: Child Depression Inventory- Suicidality Question (Kovacs, 1992)
	Good mental health- composite score: no depression, no PTSD & no suicidality as per the criteria defined above	See individual measures above
	No peer problems - score of 0 on the 5-item peer problems subscale; assessed over the past 6 months (YC: child report, CCC: carer-report)	Strengths and Difficulties Questionnaire (SDQ)- Peer problems subscale[1] (Goodman, 1997)
	Prosocial behaviour present- score of 0 on the reverse-coded 5-item prosocial behaviour scale; assessed over the past 6 months (YC: child report, CCC: carer-report)	SDQ- Prosocial behaviour subscale (Goodman, 1997)
3.5 Strengthen the prevention and treatment of substance abuse	**No substance abuse** • YC: Child has not taken drugs to get high or been drunk in the past month • CCC: Child has never been drunk or high from use of alcoholic beverages or drugs during the past six months	Child Behaviour Checklist (CBCL; Achenbach, 1992) UNICEF items for sub-Saharan Africa (Snider & Dawes, 2006)- Domain 7

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[1] The full SDQ scale was administered, but only the two scales described here were established as outcomes of interest.

4.1 Complete school education /4.4. Increase relevant skills for employment	**School Enrolment** – child self-reports being enrolled in a school. Corrobated using school registers in YC and caregiver report in CCC.	-
	School Attendance • YC: child did not miss school for more than a week over the past year • CCC: child did not miss school in the past year to attend to household duties	YC: Self-report item developed with South African National Department of Basic Education CCC: UNICEF items for sub-Saharan Africa (Snider & Dawes, 2006) - Domain 5
	Right grade for age (y/n)- Determined based on indications of the child's current grade & knowledge of the age at which South African children commonly complete each school year.	-
	Able to Concentrate in School • YC: child "never" has problems concentrating at school because of worrying about something (compared to sometimes, often) • CCC: carer indicated child "never" or "almost never" had problems paying attention in class in the past month (compared to sometimes, often, very often)	YC: Self-report item developed by Adolescent Advisory Group and adapted from the CBCL (Achenbach, 1992) Pediatric Quality of Life Inventory: School Functioning (Parent Report) (Varni et al., 2001)
5.6 Ensure universal access to sexual and reproductive health (including informed decisions regarding sexual relations)	**No sexual debut** - Answer "no" to the question: "Have you had sex?"	Screening Item - National survey of HIV and risk behaviour amongst young South Africans (Pettifor et al., 2005)
16.1a: Significantly reduce all forms of violence and related death rates	**No Violence Perpetration/Delinquency** • YC: no indication of delinquent behaviours over the past six months • CCC: no parent-reported conduct problems and no child-reported problem behaviours (arrest, threatening/beating someone up, bullying) over the past 6 months	CBCL - Delinquency Scale (Achenbach, 1992) SDQ conduct subscale (Goodman, 1997) & UNICEF items for sub-Saharan Africa (Snider & Dawes, 2006)- Domain 5
16.2 End abuse, exploitation, trafficking and all forms of violence against and torture of children	**No Emotional or Physical Abuse-** no experience of physical abuse (caregiver used stick or belt to hit child, slapped/punched the child) and emotional abuse (caregiver insulted child, threatened to harm them, to call ghosts on them or send them away) during the past year	UNICEF items for sub-Saharan Africa (Snider & Dawes, 2006).

Note. All measures are based on child self-report, unless otherwise stated. Where no time frames are indicated, questions were asked without reference to a specific period of time.

Table S2

SDG-related outcomes: definition, measures and coding across the Young Carers and Child Community Care databases

Accelerator	Coding	Measures
Food security	YC: Child did not go to bed hungry during the past week. CCC: Child did not go to bed hungry the previous night.	South African National Food Consumption Survey (Labadarios et al., 2005) Child Status Index (O'Donnell et al, 2009)
Cash grants	Household receipt of at least one of five government-provided cash grants over the past year (pension grant, disability grant, child support grant, foster care grant, dependency grant)	Items based on Noble et al. (2007)
Living in a safe community	Child never saw someone being attacked outside of their home, and/ or was never hit or attacked themselves.	Adapted version of the Child Exposure to Community Violence Checklist (Cluver et al., 2007)
Access to healthcare	YC: Child indicated they had been able to access a range of health services over the past year if needed (clinic, doctor, healer etc) or had not needed any health support. CCC: Caregiver indicated the child had received all or almost all necessary health care treatments, including preventative treatments, and that the child had been able to see a doctor or nurse when ill.	Based on 8 items from the REACH study (Schneider, et al., 2012) Child Status Index (O'Donnell et al., 2009)
Caregiver praise	YC: Child indicated for each of 4 items that their parents praised them at least sometimes (versus never or almost never) CCC: Child indicated adults at home praised them if they did something well and that they were given treats at least monthly (versus less often, never)	Alabama Parenting Questionnaire (APQ) (Elgar, et al., 2007) Items based on Mueller et al., 2011
Caregiver monitoring	YC: Children indicated on three items that parents engaged in poor monitoring practices never or almost never (as compared to sometimes, often, always). CCC: Child had at least one caregiver over age 18 who provided consistent care, attention and support and their current caregivers confirmed they knew the child was safe from abuse, neglect, or exploitation at all times.	APQ (Elgar et al., 2007) CSI (O'Donnell et al., 2009)
CBO access	Only present in the CCC sub-sample- YC subsample was specifically chosen to include only those without any direct or indirect CBO access at any time-point, creating a comparison.	-

Supplementary Materials 3

Differences between the YC and CCC samples

While it was attempted to make the two sub-samples as comparable as possible by restricting them to the same age range and country of origin, it is important to describe any differences found between them. As such, a higher percentage of the YC sample was female (56.1% vs. 50.5%, Chi^2 = 4.30, p = .04), and participants in this sample were somewhat older (M = 11.6 vs. M = 10.9 years, t(1846) = 10.71, p <.001). Furthermore, while the YC sample stemmed from two South African provinces only (n = 721, 51.4% from the Western Cape, n = 681, 48.6% from Mpumalanga), the CCC sample originated from seven different provinces (n = 23, 5.2% from Limpopo, n = 19, 4.26% from the Eastern Cape, n = 29, 6.5% from the Free State, n = 98, 22.0% from Gauteng, n = 94, 21.1% from Mpumalanga, n = 36, 8.1% from the Western Cape, n = 147, 33.0% from KwaZulu Natal).

Furthermore, at baseline, young people in the CCC sample were significantly more likely to have had a parent die (61.4% vs. 21.0%; χ^2= 255.93; p <.001). At the same time, they were less likely to currently have a HIV positive caretaker (15.0% vs. 22.2%, χ^2 = 10.85, p = .001). CCC participants were also more likely to have caretaking responsibilities for younger children (47.3% vs 19.0%; χ^2 = 141.25, p <.001) and/or sick family members (37.7% vs. 26.4%, χ^2 = 20.90, p <.001). Children in YC were more likely to experience adults in their home hitting each other (5.4% vs. .7%, χ^2 = 18.59; p <.001) and to live in informal housing (30.3% vs. 13.5%, χ^2 = 49.69, p <.001), but also more likely to have someone living in their house who had a job (76.3% vs. 55.8%, χ^2 = 69.38, p <.001). By including child age, sex, caretaking responsibilities, carer HIV status and type of housing as control variables, it was attempted to control for some of these sample differences.

Supplementary Materials 4

Table S4

Access to the proposed protective factors according to demographic variables

	Food Security	**Any Grants**	**Safe Community**	**CBO Access**	**Healthcare Access**	**Caregiver Praise**	**Caregiver Monitoring**
Sex: male	570 (73.1%)	638 (81.5%)	392 (50.5%)	221 (26.4%)	614 (78.4%)	307 (39.3%)	432 (55.4%)
Sex: female	676 (70.9%)	772 (80.8%)	538 (56.6%)	225 (22.3%)	737 (77.5%)	356 (37.3%)	539 (56.7%)
Chi2, p	*.97, p=.323*	*.15; p=.700*	*6.57, p=.010*	*4.30, p=.038*	*.21, p=.646*	*.69, p=.407*	*.29, p=.59*
No Parental Death	842 (69.6%)	965 (79.6%)	674 (55.8%)	169 (13.2%)	953 (78.8%)	408 (33.8%)	694 (57.4%)
Parental Death	398 (77.13%)	439 (84.6%)	253 (49.1%)	269 (47.7%)	391 (75.5%)	253 (48.7%)	274 (53.2%)
Chi2, p	*10.18. p=.001*	*5.99, p=.014*	*5.89, p=.015*	*255.93, p<.001*	*2.35, p=.125*	*34.22, p<.001*	*2.59, p=.108*
Carer HIV negative	1036 (75.3%)	1106 (80.2%)	732 (53.4%)	379 (25.8%)	1085 (78.9%)	536 (39.0%)	774 (56.3%)
Carer HIV positive	210 (58.8%)	304 (84.4%)	198 (55.8%)	67 (17.7%)	266 (74.3%)	127 (35.3%)	197 (55.5%)
Chi2, p	*38.04, p<.001*	*3.35, p=.067*	*.67, p=.415*	*10.85, p<.001*	*3.42 p=.065*	*1.63, p=.201*	*.07, p=.798*
Formal Housing	987 (77.1%)	1035 (80.4%)	750 (58.8%)	386 (28.3%)	971 (75.7%)	568 (44.2%)	748 (58.4%)
Informal Housing	259 (57.2%)	375 (83.0%)	180 (39.8%)	60 (12.4%)	380 (84.3%)	95 (21.1%)	223 (49.6%)
Chi2, p	*65.8, p<.001*	*1.41, p=.235*	*48.48, p<.001*	*49.69, p<.001*	*14.26, p<.001*	*75.07, p<.001*	*10.56, p=.001*
No Carer for Younger Children	919 (71.0%)	1027 (79.1%)	707 (54.7%)	235 (17.2%)	1023 (79.1%)	462 (35.7%)	744 (57.6%)
Carer for Younger Children	325 (74.7%)	380 (87.0%)	220 (50.9%)	211 (44.2%)	325 (74.4%)	201 (46.0%)	225 (51.6%)
Chi2, p	*2.26, p=.132*	*13.27, p<.001*	*1.88, p=.171*	*141.25, p<.001*	*4.16, p=.041*	*14.81, p<.001*	*4.73, p=.030*
No Carer for Sick Person	879 (71.5%)	976 (79.0%)	651 (53.1%)	278 (21.3%)	1000 (81.4%)	400 (35.7%)	678 (55.3%)

Carer for Sick Person	365 (72.9%)	431 (86.0%)	277 (55.6%)	168 (31.3%)	348 (69.3%)	223 (44.4%)	291 (59.1%)
Chi2, p	*.31, p=.576*	*11.39, p<.001*	*.91, p=.341*	*28.90, p<.001*	*30.01, p<.001*	*11.37, p=.001*	*1.15, p=.283*
Age Accelerator Absent Group	11.54 (1.21)	11.49 (1.22)	11.44 (1.24)	11.62 (1.13)	11.65 (1.14)	11.56 (1.18)	11.45 (1.22)
Age Accelerator Present Group	11.45 (1.18)	11.46 (1.18)	11.50 (1.14)	10.94 (1.26)	11.42 (1.20	11.38 (1.20)	11.48 (1.17)
T, p	*1.54, p=.124*	*.52, p=-601*	*1.09, p=.276*	*10.71, p<.001*	*3.35, p<.001*	*4.21, p<.001*	*.60, p=.551*

Table S5

Associations between the hypothesized protective factors and outcome variables (Odds Ratios, 95% confidence intervals and p-values) without inclusion of the other protective factors into the same model, but under inclusion of the control variables

	SDG-Related Outcomes												
	3.4 No MDD	**3.4 No Suicidal Ideation**	**3.4 No PTSD**	**3.4 Good Mental Health**	**3.4 No Peer Problems**	**3.4 Prosoc. Behav.**	**3.5 No Subst. Abuse**	**4.1 Not Missed School**	**4.4: Right Grade for Age**	**4.4. Able to concentrate**	**5.6 No early sexual debut**	**16.1 No violence perpetra-tion**	**16.2 No abuse**
Food Security	1.92 [1.42; 2.59], p<.001	1.92 [1.14; 3.23], p=.014	1.11 [.70; 1.74], p=.666	1.61 [1.23; 2.11], p <.001	1.90 [1.47; 2.45], p <.001	1.38 [1.10; 1.72], p=.004	.76 [.46; 1.25], p=.273	.88 [.37; 1.62], p=.495	1.35 [1.08; 1.69], p=.009	2.23 [1.67; 2.99], p <.001	1.16 [.70; 1.91], p=.561	1.14 [.91; 1.42], p=.254	1.61 [1.29; 2.02], p <.001
Any Grants	1.23 [,87; 1.74], p=.240	1.16 [.63; 2.15], p=.628	1.48 [.92; 2.38], p=.109	.30 [.00; .60], . p =050	.99 [.76; 1.29], p=.941	.96 [.75; 1.22], p=.725	1.49 [.91; 2.44], p=.114	1.24 [.60; 2.55], p=.557	.95 [.74; 1.22], p=.694	.94 [.66; 1.35], p=.753	1.64 [.97; 2.79], p=.065	.87 [.68; 1.11], p=.257	.81 [.63; 1.03], p=.088
Safe Communities	2.30 [1.71; 3.10] p <.001	1.48 [.88; 2.46], p=.131	1.42 [.94; 2.16], p=.091	1.97 [1.53; 2.54], p <.001	1.46 [1.18; 1.81], p=.001	1.11 [.91; 1.35], p=.303	1.46 [.94; 2.27], p=.096	1.22 [.66; 2.22], p=.527	.94 [.77; 1.15], p=.524	1.77 [1.34; 2.35], p <.001	2.12 [1.29; 3.49], p=.003	1.08 [.89; 1.32], p=.436	1.54 [1.26; 1.88], p <.001
CBO Access	2.09 [1.30; 3.31]; p=.003	1.96 [.85; 4.56], p=.116	.67 [.38; 1.16], p=.150	1.71 [1.16; 2.53], p=.007	3.64 [2.74; 4.82], p <.001	3.22 [2.41; 4.30], p <.001	1.15 [.60; 2.19], p= .678	.46 [.22; .98], p = 043	1.03 [.79; 1.35], p=.856	1.11 [.74; 1.66], p=.623	1.54 [.57; 4.13], p=.391	1.46 [1.11; 1.92], p=.006	.58 [.44; .76], p <.001
Healthcare Access	.93 [.65; 1.32], p=.678	1.37 [.79; 2.37], p=.268	1.01[.63; 1.65], p=.951	1.02 [.75; 1.38], p=.905	1.00 [.78; 1.28], p=.992	.82 [.65; 1.04], p=.103	.96 [.57; 1.60], p=.868	1.37 [.72; 2.63], p=.338	1.23 [.97; 1.56], p=.091	.79 [.55; 1.12], p=.181	.94 [.53; 1.67], p=.839	1.05 [.83; 1.33], p=.684	1.02 [.80; 1.29], p=.880
Caregiver Praise	1.63 [1.22; 2.17], p=.001	2.48 [1.47; 4.20], p=.001	2.10 [1.39; 3.18], p <.001	1.71 [1.33; 2.20], p <.001	1.38 [1.11; 1.71], p=.003	1.43 [1.18; 1.74], p<.001	1.86 [1.21; 2.86], p=.005	1.60 [.88; 2.90], p=.122	.90 [.73; 1.10], p=.300	1.34 [1.02; 1.77], p=.033	1.94 [1.21; 3.12], p=.006	1.43 [1.18; 1.75], p = <.001	1.19 [.98; 1.45], p=.081

Caregiver Monitoring	1.84 [1.32; 2.59], $p < .001$	1.78 [1.00; 3.19], $p = .049$	.59 [.30; .91], $p = .017$	1.45 [1.09; 1.89], $p = .010$	2.37 [1.91; 2.95], $p < .001$	1.67 [1.36; 2.06], $p < .001$	.93 [.58; 1.48], $p = .754$	.95 [.52; 1.78], $p = .895$	1.02 [.83; 1.26], $p = .852$	1.67 [1.22; 2.27], $p = .001$	3.08 [1.55; 6.14], $p = .001$	1.47 [1.19; 1.81], $p < .001$	1.29 [1.04; 1.57], $p = .020$

Table S6

Adjusted probabilities, probability ratios and probability differences for each SDG-related outcome, given the presence of no, single or all accelerators in combination

Outcomes/Protective Factors	Adjusted Probability (%)	Probability Difference to BL (95% CIs)	Probability Ratio (95% CIs)
No MDD (SDG 3.4) - No Accelerators	65.50		
Food Security	75.36	+ 9.86 [3.42; 16.29]	1.15 [1.04; 1.26]
Safe Communities	81.82	+16.32 [10.47; 22.18]	1.25 [1.14; 1.36]
Caregiver Praise	75.84	+10.34 [4.38; 16.30]	1.16 [1.06; 1.26]
Caregiver Monitoring	70.65	+ 5.15 [-2.21; 12.53]	1.07 [.96; 1.19]
CBO Access	84.90	+ 19.40 [11.18; 27.62]	1.30 [1.15; 1.44]
All hypothesized accelerators	97.94	+ 32.44 [24.80; 40.09]	1.50 [1.33; 1.66]
No Suicidal Ideation (SDG 3.4) - No Accelerators	89.04		
Food Security	92.52	+ 3.48 [-1.04; 8.01]	1.04 [.99; 1.09]
Safe Communities	92.53	+ 3.49 [-.93; 7.90]	1.04 [.99; 1.09]
Caregiver Praise	95.28	+ 6.24 [2.12; 10.36]	1.07 [1.02; 1.11]
Caregiver Monitoring	91.35	+ 2.31 [-2.61; 7.22]	1.03 [.97; 1.08]
CBO Access	94.90	+ 5.86 [.20; 11.52]	1.07 [1.00; 1.13]
All hypothesized accelerators	99.32	+ 10.28 [4.96; 15.60]	1.12 [1.05; 1.18]
No PTSD (SDG 3.4) - No Accelerators	91.45		
Food Security	92.18	+ .73 [-2.76; 4.22]	1.01 [.97; 1.05]
Safe Communities	94.18	+ 2.73 [-.23; 5.70]	1.03 [1.00; 1.06]
Caregiver Praise	95.75	+ 4.30 [1.51; 7.10]	1.05 [1.01; 1.08]
Caregiver Monitoring	85.22	-6.23 [-11.88; -.58]	.93 [.87; .99]
CBO Access	91.77	+ .32 [-4.33; 4.98]	1.00 [.95; 1.05]

All hypothesized accelerators	95.46	+ 4.01 [-1.68; 9.71]	1.04 [.98; 1.11]
Good Mental Health (SDG 3.4) - No Accelerators	59.07		
Food Security	66.74	+ 7.67 [1.29; 14.07]	1.13 [1.01; 1.25]
Safe Communities	75.37	+ 16.30 [10.59; 22.01]	1.28 [1.16; 1.40]
Caregiver Praise	71.69	+ 12.62 [6.95; 18.29]	1.21 [1.10; 1.33]
Caregiver Monitoring	60.20	+ 1.13 [-5.83; 8.09]	1.02 [.90; 1.14]
CBO Access	77.66	+ 18.59 [10.32; 26.87]	1.31 [1.15; 1.48]
All hypothesized accelerators	95.11	+ 36.04 [27.72; 44.35]	1.61 [1.40; 1.82]
No Peer Problems (SDG 3.4) - No Accelerators	10.39		
Food Security	14.56	+ 4.17 [1.26; 7.07]	1.40 [1.06; 1.73]
Safe Communities	17.96	+ 7.57 [4.40; 10.75]	1.72 [1.36; 2.10]
Caregiver Praise	14.76	+ 4.37 [1.77; 6.97]	1.42 [1.14; 1.70]
Caregiver Monitoring	15.91	+ 5.52 [2.28; 8.76]	1.53 [1.23; 1.84]
CBO Access	33.33	+ 22.94 [16.02; 29.85]	3.20 [2.39; 4.03]
All hypothesized accelerators	76.93	+ 66.54 [58.47; 74.62]	7.41 [4.91; 9.90]
Prosocial Behaviour (SDG 3.4) - No Accelerators	29.85		
Food Security	33.83	+ 3.98 [-.99; 8.94]	1.13 [.95; 1.31]
Safe Communities	35.59	+ 5.74 [1.01; 10.48]	1.19 [1.02; 1.37]
Caregiver Praise	39.72	+ 9.87 [5.27; 14.47]	1.33 [1.15; 1.51]
Caregiver Monitoring	34.01	+ 4.16 [-.82; 9.14]	1.14 [.97; 1.31]
CBO Access	61.31	+ 31.46 [23.98; 38.94]	2.05 [1.71; 2.40]
All hypothesized accelerators	82.28	+ 52.43 [43.55; 61.32]	2.76 [2.16; 3.35]
No Substance Abuse (SDG 3.5) - No Accelerators	92.86		
Food Security	89.86	- 3.00 [-6.83; 3.91]	.97 [.93; 1.01]
Safe Communities	95.57	+ 2.71 [.09; 5.31]	1.02 [1.00; 1.05]

Caregiver Praise	96.14	+ 3.28 [.80; 5.75]	1.04 [1.01;1.06]
Caregiver Monitoring	91.03	-1.83 [-5.69; 2.03]	.98 [.94; 1.02]
CBO Access	95.71	+2.85 [-.58; 6.27]	1.03 [.99; 1.06]
All hypothesized accelerators	97.40	+4.54 [.01; 9.07]	1.04 [1.00; 1.10]
School attendance (SDG 4.1/4.4) - No Accelerators	97.57		
Food Security	97.03	-.54 [-2.47; 1.39]	.99 [.97; 1.01]
Safe Communities	97.70	+.13 [-1.38; 1.64]	1.00 [.99; 1.02]
Caregiver Praise	98.30	+.73 [-.60; 2.06]	1.01 [.99; 1.02]
Caregiver Monitoring	97.82	+ .25 [-1.21; 1.71]	1.00 [.99; 1.02]
CBO Access	94.84	-2.73 [-6.70; 1.23]	.98 [.93; 1.01]
All hypothesized accelerators	96.21	-1.36 [-6.00; 3.28]	.99 [.94; 1.03]
In Right Grade for Age (SDG 4.4) - No Accelerators	54.34		
Food Security	61.08	+ 6.74 [1.32; 12.17]	1.12 [1.02; 1.23]
Safe Communities	52.39	-1.95 [-7.06; 3.16]	.96 [.87; 1.06]
Caregiver Praise	51.55	-2.79 [-7.65; 2.07]	.95 [.86; 1.04]
Caregiver Monitoring	55.14	+ .80 [-4.58; 6.18]	1.01 [.92; 1.11]
CBO Access	51.54	-3.80 [-11.23; 3.64]	.93 [.80; 1.06]
All hypothesized accelerators	53.50	-.84 [-12.47; 10.79]	.98 [.77; 1.20]
Able to concentrate at school (SDG 4.1/4.4) - No Acc.	68.92		
Food Security	81.78	+12.86 [7.18; 18.54]	1.19 [1.09; 1.28]
Safe Communities	78.90	+ 9.98 [4.39; 15.57]	1.14 [1.05; 1.23]
Caregiver Praise	73.64	+ 4.72 [-.94; 10.39]	1.07 [.98; 1.15]
Caregiver Monitoring	75.64	+ 6.72 [.39; 13.05]	1.09 [1.00; 1.19]
CBO Access	71.16	+ 2.24 [-7.04; 11.53]	1.03 [.90; 1.17]
All hypothesized accelerators	93.78	+ 24.86 [16.52; 33.02]	1.36 [1.20; 1.51]

No early sexual debut (SDG 5.6) - No Accelerators	90.46		
Food Security	89.37	-1.09 [-5.41; 3.22]	.99 [.94; 1.04]
Safe Communities	94.92	+ 4.46 [1.13; 7.79]	1.04 [1.01; 1.09]
Caregiver Praise	94.69	+ 4.23 [.97; 7.48]	1.05 [1.01; 1.08]
Caregiver Monitoring	95.65	+5.19 [1.58; 8.79]	1.06 [1.02; 1.10]
CBO Access	93.70	+ 3.24 [-3.31; 9.81]	1.04 [.96; 1.11]
All hypothesized accelerators	99.19	+8.73 [4.43; 13.02]	1.09 [1.04; 1.15]
No violence perpetration (SDG 16.1) - No Accelerators	38.49		
Food Security	39.12	+ .63 [-4.61; 5.87]	1.02 [.88; 1.15]
Safe Communities	40.64	+ 2.15 [-2.70; 7.00]	1.06 [.93; 1.19]
Caregiver Praise	47.20	+ 8.71 [4.01; 13.40]	1.23 [1.09; 1.36]
Caregiver Monitoring	44.53	+ 6.04 [.80; 11.28]	1.16 [1.01; 1.30]
CBO Access	47.24	+ 8.75 [1.50; 16.00]	1.23 [1.03; 1.43]
All hypothesized accelerators	64.84	+ 26.35 [15.55; 37.15]	1.68 [1.31; 2.05]
No caregiver abuse (SDG 16.2) - No Accelerators	36.74		
Food Security	47.89	+ 11.15 [5.76; 16.53]	1.30 [1.13; 1.48]
Safe Communities	43.01	+ 6.27 [1.36; 11.17]	1.17 [1.03; 1.32]
Caregiver Praise	38.78	+ 2.04 [-2.56; 6.64]	1.06 [.93; 1.18]
Caregiver Monitoring	43.57	+ 6.83 [1.49; 12.18]	1.19 [1.04; 1.34]
CBO Access	23.85	-12.89 [-18.95; -6.84]	.64 [.50; .80]
All hypothesized accelerators	48.33	+ 11.59 [.18; 23.01]	1.32 [.96; 1.67]

Notes. This table describes the effects of the hypothesized accelerating protective factors on SDG-related outcomes in three combinations: 1) when no accelerator is present, 2) when single accelerators are present only, and 3) when all five accelerators are present. Adjusted probabilities (%) for achieving each SDG-related outcome and probability differences between conditions 2) and 3) and the baseline outcome of "no accelerator present" are provided. Finally, probability ratios are presented that indicate effect sizes accounting for baseline frequencies.