

1 **Can a combination of interventions accelerate outcomes to deliver on the**
2 **Sustainable Development Goals for young children? Evidence from a longitudinal**
3 **study in South Africa and Malawi**

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27 sub-Saharan Africa

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31 **What is already known?**

- 32
- Interventions may be effective for improving outcomes for young people.
 - The idea of combined provision of accelerators holds promise, with one study providing
- 33
- some evidence underpinning the accelerator model for older adolescents.
- 34

35 **What are the new findings?**

- 36
- This study provides evidence for accelerator benefits from sub-Saharan Africa in children
- 37
- and younger adolescents.
- 38
- The results suggest a clear add on impact of combined provision of cash grants, food
- 39
- security and living in a safe community on child cognitive, educational and mental health
- 40
- outcomes across more than one sustainable developmental goals.

41 **What do the new findings imply?**

- 42
- Combined provision may accelerate impact and be a cost-effective way for policy and
- 43
- provision planning in resource limited settings where governments can reach multiple
- 44
- sustainable developmental goal outcomes simultaneously.

45

46

Abstract

47

48 **Introduction**

49 Children and adolescents in Africa face several barriers to development and are exposed to
50 multiple vulnerabilities that may hinder future success. This study aimed to identify possible entry
51 points for interventions that can act as accelerators for this group in Southern Africa.

52 **Methods**

53 This study was a secondary data analysis. Data were sourced from the Child Community Care
54 longitudinal study which tracked child wellbeing outcomes among 989 children affected by HIV
55 enrolled in community-based organizations in South Africa and Malawi. Data from participating
56 children (4-13 years) and their caregivers were collected at baseline (2011/2012) and at 12-15-
57 month follow-up. We examined associations between five hypothesised accelerating
58 services/household provisions- measured as access at baseline and follow-up (food security, cash
59 grant, positive parenting, living in a safe community and community acceptance) and twelve child
60 outcomes (including health status, nutrition, education, cognitive development, and mental
61 health) that relate to indicators within the Sustainable Development Goals (SDGs) framework. We
62 calculated the adjusted probabilities of experiencing each SDG aligned outcome conditional on
63 receipt of single, combined or all 3 identified accelerators.

64 **Results**

65 The results show household food security is associated with positive child education and cognitive
66 outcomes. Cash grants were positively associated with nutrition and cognitive outcomes. Living in
67 a safe community was positively associated with all mental health outcomes. Experiencing a
68 combination of two factors was associated with higher probability of positive child outcomes.
69 However, experiencing all three accelerators was associated with better child outcomes, compared
70 to any of the individual factors by themselves with substantial improvements noted in child
71 education outcomes.

72 **Conclusion**

73 Food security, social protection grants, and safe communities are all positively associated with
74 several outcomes across a range of child related SDGs. Combined delivery of interventions or
75 services may yield greater improvements in child outcomes across different developmental
76 domains. It is recommended that multiple support avenues in combination like improving food
77 security and safe communities, as well as social protection grants, should be provided for
78 vulnerable children to maximize the impact.

79 **Word count:** 326 (limit 300)

Introduction

81 Children and young adolescents in Africa continue to face several barriers to development and are
82 exposed to multiple vulnerabilities that hinder their future success [1-3]. Growing up in a context
83 of widespread poverty, high rates of unemployment, rapid urbanization, limited educational
84 opportunities, as well as issues such as migration affecting traditional social and family structures
85 has disadvantaged this vulnerable group [4, 5]. Adolescents in this region require opportunities
86 and skills to engage meaningfully in the social and economic sectors of society and adopt healthy
87 behaviours. In addition to this, optimal child development is key to individual outcomes across the
88 life course [6], as well as economic impacts at the societal level [3, 7]. With the right policies,
89 investments and the engagement of young people in nurturing their own potential, this group can
90 become problem-solvers, creators, entrepreneurs, change agents and leaders for the coming
91 decades [8]. Therefore, there is an urgent need to invest in children, and for policy and research
92 efforts in this area to focus providing children and adolescents with the best opportunity to thrive
93 rather than just survive.

94 The Sustainable Development Goals (SDGs) present a global development agenda to protect the
95 most vulnerable populations including children and adolescents. The UN Development Programme
96 (UNDP) focuses on supporting countries' efforts to achieve the SDGs by identifying 'development
97 accelerators' [9]. These developmental accelerators are defined as services, provisions or policies
98 that lead to progress across multiple SDGs and dimensions of development [10]. The UNDP
99 developed the SDG Accelerator and Bottleneck Assessment tool to further support countries in
100 identifying catalytic policy and/or programme areas or 'accelerators' that can trigger positive
101 multiplier effects across the SDGs and targets [10]. Additionally, UNDP built 60 Accelerator Lab
102 networks across 78 countries globally, aimed at creating and testing solution to SDG challenges
103 with national organisations and partners [11]. Although the Accelerator Lab activities differ from
104 one country to another, the main areas of work include solutions mapping to some of the
105 problems faced by countries, as well as exploring and testing out solutions in the ground with
106 national partners. Overall, the Accelerator Lab network is part of UNDP's broader efforts to
107 accelerate learning, strengthen capabilities of decision-makers, and expand the way the
108 organization invests, thinks about, and delivers services [11].

109 When addressing multiple vulnerabilities, moving away from a vertical/silo approach (one solution
110 to a problem) to a comprehensive approach is essential. Especially now, with the recent emphasis
111 from United Nations and decision-makers in different countries to adopt a comprehensive
112 approach and identify development accelerators that impact several domains. Existing literature
113 highlights successful integrated approaches such as cash grants and food security, or positive
114 parenting, and their impact on child cognitive and adolescent educational outcomes [12, 13].
115 Other successful synergistic approaches adopted in the past include provision of integrated cash
116 plus good care which was associated with a reduction in male and female adolescent HIV-risk

117 behaviours in South Africa compared to a provision of cash grants only [14]. However, there is an
118 urgent need for evidence-based approaches to identify services or provisions that are associated
119 with improvements not just in one, but in multiple domains of development. This is of particular
120 importance for governments operating within resource constrained settings. Identifying relevant
121 development accelerators will provide the opportunity to explore which combination strategies
122 work and are cost-effective as well as scalable for countries. An advantage of such an approach
123 includes the ability to examine and test real-world service provisions as provided by governments
124 or organizations within communities. Emerging data from studies of accelerators in sub-Saharan
125 Africa (SSA) show that development accelerators can have positive impact on several outcomes
126 that include and extend beyond health, as well as mitigate some of the disadvantages children and
127 adolescents in Africa face [15, 16]. Recent findings from Cluver and colleagues also highlight the
128 impact of accelerator synergies of specific combinations, such as access to both parenting support
129 and cash transfers on seven SDG aligned targets and four SDG goals measured for adolescents [9,
130 10]. Additionally, in a study investigating violence prevention accelerators, provision of
131 combinations such as positive parenting and food security, was found to be effective in reducing
132 multiple forms of violence against children and adolescents in South Africa [16]. These insights
133 show promise and there is a need to examine such accelerators in different populations
134 particularly in younger children and using different interventions and outcomes.

135 The COVID-19 pandemic is having a devastating effect on communities and its aftershocks will
136 require governments to deliver services efficiently. Economic constraints together with reduced
137 international aid, may require an urgent understanding of streamlined efficiency for the most
138 effective interventions. With governments needing to make policy decisions and choosing
139 between available interventions, a model is needed to explore combinations of provisions,
140 especially those that have the possibility to accelerate child and adolescent outcomes and to
141 target multiple SDGs. In this era, especially as a consequence of global threats such as HIV,
142 poverty, migration, conflict and most recently COVID-19, an understanding of accelerators and in-
143 depth catalogue of pathways to effect may be vital to address effects of shrinking economies and
144 growing needs of vulnerable populations. Examining the concept of accelerators across different
145 datasets and with different age groups is essential. In this study we aim to identify a combination
146 of provisions that will enhance multiple child outcomes, using a historical database from the Child
147 Community Care (CCC) study which provides a platform for such accelerator analysis. The nature of
148 the data used here will allow us to track the progress of young children on important
149 developmental outcomes like stunting, wasting, cognitive, education, and mental health factors
150 from two countries (South Africa and Malawi), across multiple time points.

151 Our aim is to inform future efforts to identify and prioritise the most efficient sub-set of
152 interventions for this population.

153

154

Methods

155 ***Study setting and participants***

156 This was a secondary analysis of longitudinal data collected as part of the Child Community Care
157 (2011–2014). In this study we evaluate the association between protective factors/services and
158 multiple child outcomes.

159 The CCC study evaluated the effect of community-based organizations (CBOs) support on child
160 wellbeing in HIV affected countries in Southern Africa (South Africa and Malawi). Children and
161 caregivers who accessed CBOs were recruited into the study. At baseline there were 989 children
162 aged 4–13 years and their caregivers recruited consecutively from 28 CBOs (24 in South Africa, and
163 4 in Malawi). All attenders of CBOs were eligible for inclusion. CBOs were randomly selected from
164 a list of 588 CBOs working within South Africa and/or Malawi, drawn from a list of funded
165 programmes from 11 international funders (World Vision, UNICEF, Bernard van Leer Association,
166 REPSSI, Stop AIDS Now, the AIDS Alliance, The Diana Memorial Fund, Comic Relief, Help Age,
167 Firelight Foundation and Save the Children). Data from participants were collected at baseline
168 (2011/2012) and at 12–15-month follow-up.

169 ***Study procedure***

170 Consecutive child attenders and their primary caregivers accessing CBOs were interviewed by
171 trained data collectors and information on a range of validated tools and study specific questions
172 related to child's health, mental health, nutrition, education, cognition, and socio-demographic
173 was collected. Child data were gathered using a combination of child self-report, child assessment,
174 and caregiver-report. Of note, the younger children (4 and 5 years) were asked a shorter set of
175 questions. Repeated measures were gathered at follow-up to track change over time. Informed
176 consent was obtained from all caregiver participants in the study, together with child assent.
177 Consent forms, study information and questionnaires were translated into Zulu, Xhosa and Chewe.
178 Ethical approvals for the Child Community Care study were obtained from University College
179 London (1478/002) and Stellenbosch University (N10/04/112).

180 ***Patient and public involvement***

181 Due to the nature of the study there was minimal involvement from participants in the design,
182 recruitment or implementation phase.

183 ***Measures***

184 The CCC study was not designed and conducted with accelerators analysis in mind, thus we
185 retrospectively identified appropriate outcomes and accelerators within the dataset. We identified

186 twelve child outcomes aligned with the SDGs (3.4, 2.2, 4.1, 4.7) in the dataset. The twelve
187 outcomes identified were assessed by caregiver and child self-report, and included:

188 **SDG 3.4: Child health status** was reported by caregiver and responses dichotomized as good
189 health (child has been healthy and active, with no fever or diarrhoea in the past month) or poor
190 health (child was ill and less active for few days, or often ill or chronically ill).

191 **SDG 2.2: Nutritional status: Stunting** (*height for age; < -2 z-scores*) and **wasting** (*weight-for-age; <*
192 *-2 z-scores*), were calculated using age, height and weight information collected in the study. This
193 allowed identification of children who (based on the WHO growth standard [17]) were either
194 stunted or wasted.

195 **SDG 4.1: Child educational outcomes** were investigated using selected items from the full Child
196 Status Index tool (CSI) [18]. Caregivers were asked questions relating to their child's school
197 performance and learning outcomes: 1) being in the correct class for age ('Is the child in the
198 correct class for his or her age?' Response categories were 'yes' or 'no'); 2) school performance
199 ('How do teachers report your child is doing in school?' Responses were coded as 'doing as well as
200 or better than most children' or 'he or she struggles at school'); 3) learning progression ('is your
201 child quick to learn when introduced to new chores or things? Responses categories were 'yes' or
202 'no'). In addition to separately examining these outcomes, a composite variable was created
203 reflecting educational risks. This was coded as "1", risk present, if the child or their parent
204 indicated their child was engaging in one or more of the following behaviours: irregular
205 attendance, missing school more than a week per year, being in the incorrect class for age, being
206 rated a slow learner, or struggling in school.

207 **SDGs 4.1 & 4.7: Child cognitive development** was measured using a standardised screening tool
208 (the draw-a-person task), which assesses a child's non-verbal cognitive ability [19, 20]. This task is
209 based on children's ability to draw three human figures—a man, a woman, and him- or herself,
210 and was coded by two researchers using a standardised scoring system. Age standardised scoring
211 was recorded for each drawing and mean scores were generated (range 40-130), with higher
212 scores indicating higher cognitive ability. The recommended cut-off point of ≤ 70 was used to
213 identify those experiencing cognitive delay.

214 **SDG 3.4: Mental health outcomes** were assessed using several measures. Eleven questions from
215 the Child Depression Inventory (CDI) [21], were used to identify children with depression
216 symptoms. Scores ranging from 0 to 11 were generated with higher scores indicating the presence
217 of more depressive symptoms. The recommended cut-off point of ≥ 3 was used to identify those
218 experiencing more severe depressive symptoms. Ten questions from the Trauma Symptom
219 Checklist (for 8-16-year-olds) [22] were used for identifying children exhibiting post-traumatic
220 stress disorder (PTSD) related symptoms. Scores ranging from 0 to 27 were generated and
221 previously used cut-off scores of >3 were used for indicating PTSD symptoms as "present" [23].

222 Suicidal ideation was assessed using an additional self-reported suicidality item (“In the past
223 month did you think about killing yourself?”) from the CDI. Response categories were
224 dichotomized as “yes” or “no”, identifying those reporting suicidal ideation. A secondary variable
225 (good mental health status) was derived using the depression, trauma and suicidal ideation
226 measures. A combined score for the mental health measures was generated to identify those
227 experiencing multiple mental health issues. Children scoring below the cut-off points on each
228 measure were considered as experiencing good mental health.

229 ***Hypothesized accelerators***

230 In this study, we assessed provision of CBO services as well as other protective factors as possible
231 accelerators for child development in a range of domains. We started by investigating which CBO
232 services or interventions were provided to participants in this study which could act as potential
233 accelerators. The dataset was also examined for measures of protective factors and ways to
234 operationalize measures of such factors. The next step included theoretical mapping of potential
235 accelerators to outcomes identified in the dataset and corresponding SDG targets described
236 above.

237 We hypothesized that consistent exposure to accelerators, measured here as access to
238 services/protective factors at both baseline and follow-up would be positively associated with
239 several child outcomes across three or more SDGs. Thus, we identified and evaluated the impact of
240 five potential provisions from variables measured in this study. During data analyses, "0" was
241 coded as no receipt, or receipt at only one timepoint, vs. "1" equivalent to consistent receipt at
242 both time points.

243 **(1) Food security:** This was derived from child and carer reported items drawn from the Food
244 Security Domain of the CSI tool [18]. Caregivers were asked if the child had sufficient food
245 to eat at all times of the year, with four response categories: (i) Child is well fed and eats
246 regularly, ii) child has enough to eat some of the time, depending on season or food supply
247 time, iii) frequently has less food to eat than needed, iv) This child rarely has food to eat
248 and goes to bed hungry most nights. Children were asked if they went to bed hungry last
249 night with responses dichotomised to yes/no. A combination of responses from caregiver
250 and child were computed to generate the food security measure. Food security was
251 defined as the child being well fed and eating regularly, as well as not going to bed hungry
252 last night.

253 **(2) Cash grant:** This was defined as households receiving any form of available state-provided
254 grants (state pension, retirement pension, disability grant, child support grant, or any other
255 cash transfer support). Grant receipt was dichotomised as households receiving any grant
256 versus no grants (yes/no). Data on cash grant receipt was gathered at follow up only,
257 covering the preceding year.

258 **(3) Positive parenting:** The available composite parenting measure was based on ten variables
259 aligned with the literature on parenting. These included six child items (whether they felt

260 they belonged with the people at home, received praise, received treats and whether
261 adults hugged as well as praised them (items drawn from CSI tool) [18] and four parent
262 items around disciplining styles (explaining to the child when they did wrong deeds, taking
263 away privileges as opposed to harsh punishments and/ or beatings), provision of consistent
264 care, and absence of physical or emotional violence towards the child (drawn from items of
265 the Parent-Child Conflict Tactics Scale) [24]. This parenting measure was generated using
266 factor analysis [23] and has been validated previously [23] [12]. The various questions,
267 since they were taken from different measures, consisted of binary (yes/no), three level
268 (yes, somewhat, not at all) or four level response categories (weekly, monthly, less often,
269 never). For consistency in scoring, all items were thus converted into a binary (yes/no)
270 variables. A total score on the 10 items provided for a working definition of positive
271 parenting with 0 being the lowest score and 10 the highest score. Parenting was first used
272 as a continuous variable and then positive parenting was dichotomised to those scoring ≥ 8
273 seen as positive parenting group and those scoring < 8 as not positive parenting.

274 **(4) Safe communities:** This was defined as no exposure to any violence in the community over
275 the past year. This variable was derived from items developed by UNICEF for psychosocial
276 measures of vulnerability and resilience for children in SSA [25]. Children were asked “how
277 often have you been attacked outside your home?” and “how often have you seen
278 someone stabbed, beaten or shot outside your home?” with four possible response
279 categories (weekly, monthly, less often, never). Community violence score (range 0-6) was
280 categorized as no exposure to violence (score 0) vs. yes exposed to violence (scores 1-6).

281 **(5) Community support:** This was derived from ten questions in the UNICEF developed tool
282 [25], asking children about their experiences of stigma, discrimination and social exclusion
283 as well as some additional positive items (questions around fitting into the community,
284 support and help provided from friends and others in their community). Response
285 categories (yes/no) were used to generate a continuous score ranging from 0-9, and > 8 cut-
286 off was used to define good community support.

287 ***Covariates***

288 Control variables included six sociodemographic variables and HIV-related cofactors, all measured
289 at baseline: participating child’s age, gender, HIV status, caregiver’s age, education, employment
290 status and HIV burden in the household (i.e. number of HIV affected members in household).
291 Baseline measures of child health status in the past month (self-reported) and mental health
292 outcomes (depression symptoms, suicidal ideation and overall mental health status) were also
293 included as covariates in all regression models.

294 ***Statistical analyses***

295 A newly developed methodological approach, informed by previous published accelerator analyses
296 [15, 16] was used to investigate factors associated with multiple SDG outcomes in this dataset [26].
297 The analysis was carried out in six steps [26]. In the first step, the baseline characteristics of study

298 participants retained and lost to follow-up were compared and reported using mean and standard
299 deviations (SD) for continuous variables, and frequency percentages for categorical variables. In
300 step 2, tetrachoric correlations between our hypothesized accelerator provisions were calculated.
301 In step 3, univariable associations between hypothesized accelerator provisions, and the SDG
302 aligned child outcomes were reported. In step 4, we investigated the association between
303 accelerator provisions and SDG aligned child outcomes in a path analysis. The model consisted of
304 twelve single-outcome, multivariable logistic regressions, each regressing the outcomes at follow-
305 up on the five hypothesized accelerator provision, controlling for sociodemographic factors and
306 selected baseline outcomes (child physical health, suicidal ideation, depression symptoms and
307 overall mental health status). Of note, inter-correlations between the different outcome variables
308 were investigated prior running the models. In step 5 to account for Type 1 error from hypothesis
309 testing, the Benjamini-Hochberg procedure was used to check for associations between predictors
310 and outcomes for a false-positive rate of 10%. Each accelerator provision was considered as
311 defining a family of tests. In the final step, we calculated adjusted predicted probabilities
312 (Confidence Intervals-CI at 95%) of experiencing each SDG aligned outcome conditional on three
313 scenarios (i) experiencing no accelerator, (ii) experiencing a single accelerator, and (iii)
314 experiencing a combination of two or three accelerators. All adjusted probabilities were estimated
315 at 0 for not experiencing an accelerator and 1 for experiencing the accelerator. Adjusted risk
316 differences and adjusted risk ratios were used to compare the different scenarios described above.
317 All analyses were performed using STATA v.16 (StataCorp LP, College Station, Texas, USA).

318

319

Results

320 At baseline 989 participants were recruited (3% refusal rate). At follow up 12-15 months later, 854
321 (86.3%) participants were retained. Table 1 summarises selected characteristics of participating
322 child and caregiver retained and lost to follow-up (n=135, 13.7%). Overall, baseline characteristics
323 were comparable between the two groups. However, both caregivers and children lost to follow-
324 up were more likely to be younger.

325 Consistent exposure (i.e. at both baseline and follow-up) of the participants to some of the five
326 hypothesised provisions differed in the sample, with 73.1% receiving cash grants, 62.4% living in
327 food secure households, 34.7% reporting to live in a supportive community, 34.5% reporting to live
328 in safe communities and 23.8% reporting positive parenting by caregiver. Selected SDG aligned
329 child outcomes were also investigated at baseline and follow-up. At follow-up, most children
330 (74.7%) were healthy and active based on caregiver's report, 76.4% were not stunted and 93.2%
331 were not wasted. Caregiver reported educational and learning outcomes were positive in this
332 group, with 83.7% reported to have good school performance, 73.1% were able to learn and grasp
333 new tasks/chores quickly and 68.3% were enrolled in the correct class for their age. When
334 cognitive development outcomes were examined, majority (88.0%) of the children did not show
335 signs of cognitive delay. Presence of depression symptomology and suicidal ideation were
336 generally low in this group (8.5% and 2.5% respectively). However, report of trauma symptoms and
337 poor mental health status were high with 58.5 % reporting trauma and 61.5% reporting poor
338 mental health status.

339 ***Insert Table 1 here***

340 Table 2 shows the bivariate correlations between the potential accelerators. Most accelerators
341 show inter-correlations ($p < 0.001$), with community support significantly correlated with all
342 potential accelerators.

343 ***Insert Table 2 here***

344

345 Table 3 shows the results of multivariate path analyses of association between potential
346 accelerator provisions and SDG aligned child outcomes. All five hypothesised accelerators showed
347 positive association with multiple outcomes, however, after testing for false positive rates (set to
348 10%), only three accelerators (cash grant, food security and safe community) were significantly
349 associated with three or more child outcomes.

350 **Food security** was positively associated with school performance (OR: 1.8, p=0.02), learning
351 progression (OR: 1.6, p=0.03), being in the correct class for age (OR: 2.1, p<0.01), as well as no
352 educational risk (OR: 1.9, p<0.01) and no cognitive delay (OR: 2.4, p=0.01). **Receiving cash grants**
353 was positively associated with child being in the correct class for their age (OR: 1.7, p=0.04), not
354 stunted (OR: 2.2, p<0.01) and no cognitive delay (OR: 4.8, p<0.01). However, children living in
355 households receiving cash grants were more likely to have slower school progression (OR: 0.5,
356 p=0.01) and report trauma symptoms (OR: 0.6, p<0.01). **Living in safe communities** was positively
357 associated with a range of mental health outcomes including no depression symptomology (OR:
358 4.4, p<0.01), no trauma symptoms (OR: 1.6, p=0.01) and good mental health status (OR: 1.6,
359 p=0.01).

360 ***Insert Table 3 here***

361 Table 4A and 4B show the adjusted probability of achieving each SDG aligned child outcome under
362 the three specified conditions, i) experiencing no accelerator, (ii) experiencing a single accelerator,
363 and (iii) experiencing a combination of two or three accelerators.

364 ***Insert Tables 4A and 4B here***

365 **Food security** was associated with higher probability of experiencing better educational outcomes
366 like child's school performance (Adjusted Risk Difference (ARD): 6.3% points; confidence intervals
367 are provided in Table 4A), learning progression (ARD: 7.2% points), child being in the correct class
368 for age (ARD: 14.2% points), no educational risk (ARD: 14.8% points) and no cognitive delay (ARD:
369 12.7% points). While receiving **cash grants** was associated with higher probability of experiencing
370 better nutrition (not stunted- ARD:16.8% points), education (being in the correct class for age-
371 ARD:10.5% points.) and cognitive outcomes (no cognitive delay ARD:18.7% points). **Living in a safe**
372 **community** was associated with higher probability of positive mental health outcomes (no
373 depression symptoms- ARD:9.6% points, no trauma symptoms- ARD:10.4 % points and good
374 mental health status- ARD:10.8 % points).

375 Experiencing a combination of two accelerators was associated with even higher probability of
376 positive child outcomes (Table 4B, Figure 2). The results show that a combination of **receiving cash**
377 **grants plus living in safe communities** was associated with better nutrition (ARD: 12.7% points),
378 education (child in the correct class for their age- ARD:16.3% points), cognitive (ARD: 17.0%
379 points), and mental health (no depression- ARD:9.7% points) outcomes. **Food security plus**

380 **receiving cash grants** was associated with better nutrition (not stunted- ARD:19.4% points & not
381 wasted- ARD:8.6% points), education (no educational risk- ARD:12.6% points & correct class for
382 age- ARD:23.5% points) and cognitive (ARD:22.8% points) outcomes. **Living in safe communities**
383 **plus food security** was positively associated with a range of educational (no educational risk- ARD:
384 20.7% points, learning progression- ARD:11.0% points & correct class for age- ARD:19.9% points)
385 and mental health outcomes (no depression symptoms- ARD:10.2% points, no trauma symptoms-
386 ARD: 15.1% points and good mental health status- ARD: 17.6% points).

387 The **combination of all three accelerators** was associated with the highest probability of positive
388 child outcomes, especially for educational outcomes (Figures 1 and 3). With all three accelerators
389 present, the adjusted risk difference of children not experiencing cognitive delay was 21.9% points,
390 educational risks 18.6% points, child being in the correct class for their age 28.4% points, not
391 stunted 15.7% points and child not experiencing depression symptomology 10.4% points.

392 *Insert Figures 1, 2 and 3 here*

393

Discussion

394 The results of this study highlight the importance of combined service/intervention provisions for
395 vulnerable children to accelerate their development in resource limited settings. Our findings build
396 on existing evidence [15, 16] and provide compelling evidence on the importance of combined
397 provisions in mitigating risk and enhancing future achievements for children in SSA. There were
398 three potential accelerator provisions that had an impact on nine different outcomes across three
399 SDG aligned targets for this study group- living in food secure households, receiving cash grants
400 and living in safe communities. Cash grants were positively associated with three outcomes (no
401 stunting, child being in the correct class for age and no cognitive delay). Living in a safe community
402 had a positive impact on child mental health outcomes. Food security was found to be positively
403 associated with child educational and cognitive outcomes. The effect of providing a combination of
404 **two** accelerators on several outcomes was also explored. Receiving cash grants plus living in safe
405 communities improved four (nutritional, educational, cognitive, and mental health) outcomes,
406 whereas living in food secure households plus receiving cash grants improved five outcomes
407 relating to nutrition, education and cognitive development. Living in a food secure household as
408 well as a safe community improved six outcomes across education and mental health. Finally,
409 there was even greater improvement in the different domains measured (nutritional, educational,
410 cognitive and mental health outcomes) observed when **all three accelerators** were experienced.

411 This study, alongside other recent findings [15] [16], provides further evidence on the importance
412 of combined provisions in mitigating undesirable outcomes and enhancing future achievements
413 for children in SSA. Ensuring food security in households together with improving safety in
414 communities has the potential to make a huge impact on child educational outcomes, which are in
415 turn associated with good health, economic growth, and fewer social conflicts [27]. These

416 performance-based indicators are also important for future achievements especially as these
417 children are entering and navigating their adolescent years. Of importance, the improvements
418 noted in the educational outcome are in the presence of mostly free schooling in South Africa and
419 Malawi. This is an important consideration for governments and policy makers as accelerators
420 appear to work more efficiently with existing policies like free schools. Furthermore, an
421 educational outcome-being in the incorrect class (in terms of age) which was treated as a negative
422 outcome may be a protective factor and not a risk for child development. Falling behind a year
423 could provide a chance for children to catch up and eventually improve their school progression
424 and performance [28, 29].

425 The study has a number of strengths and limitations. This is the third study that investigate the
426 new UN accelerator approach using the accelerator methodology and the first on a large existing
427 dataset of younger children in SSA. Previous studies were concentrated on adolescent recipients
428 [15, 16]. In addition to this, a range of measures tracking a number of different outcomes were
429 used in this study, allowing us to explore several developmental or performance-based indicators
430 for this vulnerable group. However, the use of secondary data not designed with such analyses in
431 mind was a limitation in itself as our findings are limited by the variables measured. For example,
432 accelerator cash grant was only assessed at follow-up, limiting our ability to observe effects of the
433 provision of this construct over a prolonged time, which may be necessary to verify accelerating
434 effects. Additionally, some constructs may have been highly correlated, and a more detailed
435 prospective study design may help to identify which accelerator is driving the impact on an
436 outcome. For example, the accelerators food security and cash grants showed high correlation
437 with the rest of the hypothesized accelerators. Although some provisions (such as positive
438 parenting) did show univariate associations with several child outcomes, they did not hold after
439 running the path models. The absence of associations between accelerators and suicidal ideation
440 could be due to low prevalence of this outcome in the sample. Generally, there was low inter-
441 correlation observed between our twelve outcomes of interest (<0.05 for most). However, future
442 analyses should be conducted using procedures that allow inter-correlated outcomes [30]. It is also
443 important to consider the number of individuals that should be experiencing a given outcome
444 before it is considered an outcome of interest in such analysis to avoid small cell sizes.

445 Despite the limitations, these findings emphasise the importance of safe communities, food
446 security and cash grant provisions on supporting children in low income settings. There is evidence
447 in the literature that show the effectiveness of each accelerator provision investigated here,
448 through existing programmes in Southern Africa. The results here suggest combined delivery of
449 these provisions may yield greater improvements in child outcomes across different
450 developmental domains. These findings support the importance of providing multiple support
451 avenues in combination to maximize the impact. They also show that the effects of a combination
452 approach might be superior to the individual components. Further research interrogating different

453 development accelerators in different settings is needed for further evidence to inform policies
454 and programmes designed to improve the health and wellbeing of youth in Africa.

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457

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471 **Competing interests**

472 The authors declare that they have no competing interests.

473 **Contributions**

474 All authors were involved in the interpretation of the analysis, and manuscript writing and
475 reviewing. Professors Lorraine Sherr, Mark Tomlinson and Lucie Cluver conceptualized the work.
476 Dr. Helen Mebrahtu run the formal-analysis and drafted the paper. Professor Mark Orkin, Dr.
477 William E. Rudgard, and Dr. Yulia Shenderovich developed the methodology used in this study.
478 Katharina Haag, Kathryn Roberts, Stefani Du Toit, Sarah Gordon, and Dr. Sarah Skeen were
479 involved in results interpretation and manuscript writing. The database draws on the previous
480 child community care study which was led by Professors Mark Tomlinson and Lorraine Sherr and
481 the entire project operationalizing was managed by Dr. Sarah Skeen.

482 **Data sharing**

483 Due to the sensitive nature of the data within this study regarding HIV status and vulnerable
484 children, data from the child community care study are only available upon written request,
485 subject to utilisation criteria. All data enquiries should be directed to the principal investigators
486 (Lorraine Sherr, Mark Tomlinson and Lucie Cluver).

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508 [and-curious-our-story-so-far-2019-UNDP-accelerator-labs-annual-report.html](https://acceleratorlabs.undp.org/content/acceleratorlabs/en/home/library/fast-and-curious-our-story-so-far-2019-UNDP-accelerator-labs-annual-report.html).
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552 Table 1: Descriptive table of study participants and potential accelerators at baseline and follow-up

	Baseline (n=989)			Follow-up (n=854)
	Retained (n=854)	Not retained (n=135)	P value	Retained
Sociodemographic characteristics				
Age (years), mean (SD)	8.9 (2.8)	8.4 (3.1)	0.07	10.2 (2.8)
Sex, n (%) ⁺				
Female	438 (87.1)	65 (12.9)	0.59	446 (52.2)
Male	409 (85.9)	67 (14.1)		407 (47.7)
HIV status- positive, n (%)	117 (13.7)	18 (13.3)	0.90	115 (13.4)
Caregiver age (years), mean (SD)	44.4 (14.9)	39.3 (14.6)	0.0002	45.7 (15.4)
Caregiver education level, n (%) [^]				
None	-	156 (18.3)	-	156 (18.3)
Some form of education (primary, secondary, tertiary)	-	698 (81.7)	-	698 (81.7)
Household employment status, n (%)				
Yes- employed	454 (86.3)	72 (13.7)	0.84	307 (39.5)
HIV present in household, n (%)				
Yes	291 (34.1)	41 (30.4)	0.39	288 (33.7)
Potential accelerators, n (%)				
Food security at home	614 (71.9)	109 (80.7)	0.03	533 (62.4) *
Receiving cash grants [^]	624 (73.1)	-	-	624 (73.1) *
Good parenting, n=779	332 (39.5)	47 (36.2)	0.47	185 (23.8) *
Living in safe communities, n=832	483 (57.4)	76 (58.5)	0.06	287 (34.5) *
Community support, n=804	476 (55.7)	58 (42.9)	0.01	279 (34.7) *
SDG aligned target indicators				
3.4: Good physical health (healthy and active), n (%)	683 (79.9)	104 (77.0)	0.43	638 (74.7)
2.2: Not stunted, n (%)	571 (68.7)	83 (65.9)	0.52	635 (76.4)
2.2: Not wasted, n (%)	806 (96.6)	125 (98.4)	0.28	777 (93.2)
4.1: Good school performance, n (%)	690 (84.0)	96 (78.7)	0.14	705 (83.7)
4.1: Quick learner, n (%)	604 (73.0)	91 (72.8)	0.96	607 (73.1)
4.1: In the correct class for their age, n (%)	584 (70.6)	91 (72.8)	0.62	575 (68.3)
4.1: No educational risk, n (%)	437 (51.2)	64 (47.4)	0.42	445 (53.6)

4.1 & 4.7: No cognitive delay, n (%)	708 (82.9)	115 (85.2)	0.51	736 (88.0)
3.4: No depression symptomology, n (%)	756 (89.5)	109 (82.6)	0.02	778 (91.5)
3.4: No Suicidal ideation, n (%)	827 (97.9)	130 (98.5)	0.64	829 (97.5)
3.4: No trauma symptoms, n (%)	467 (55.6)	68 (51.9)	0.43	360 (41.5)
3.4: Good mental health status, n (%)	394 (46.7)	51 (38.9)	0.09	327 (38.5)

553 + Discrepancies in gender information provided for 10 children | ^ information on caregiver educational
554 background and cash grant provision was only available at follow-up | *Access to hypothesized accelerator
555 at both baseline and follow-up

556

557 Table 2: Correlation metrics checking for association between the potential accelerators

	Food security	Community support	Safe Community	Cash grants	Good Parenting
Food security	-				
Community support	0.350 P<0.01	-			
Safe Community	0.107 p=0.07	0.214 p<0.01	-		
Cash grants	0.558 p<0.01	0.4398 p<0.01	0.102 p=0.10	-	
Good Parenting	0.2927 p<0.01	0.180 p<0.01	0.065 P=0.33	0.114 P=0.09	-

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560 Table 3: Multivariate path analysis of association between accelerator provisions and SDG aligned
 561 child outcomes

SDG aligned child outcomes	Food security	Receiving cash grants	Good parenting	Safe communities	Community support
	Odds Ratio (95% CI), p value				
SDG 3.4 Good physical health n=638 (75%)	1.4 (0.92 to 2.09), p=0.12	0.7 (0.43 to 1.16), p=0.17	1.3 (0.84 to 2.06), p=0.23	1.2 (0.79 to 1.76), p=0.41	1.4 (0.92 to 2.12), p=0.12
SDG 2.2 Not stunted n=635 (76%)	1.3 (0.89 to 2.20), p=0.15	2.2 (1.38 to 3.57), p<0.01*	1.2 (0.73 to 1.91), p=0.49	0.8 (0.52 to 1.21), p=0.29	1.1 (0.72 to 1.76), p=0.62
SDG 2.2 Not Wasted n=777 (93%)	1.8 (0.86 to 3.76), p=0.12	1.9 (0.89 to 4.32), p=0.09	1.5 (0.64 to 3.56), p=0.35	0.9 (0.48 to 1.93), p=0.92	1.1 (0.52 to 2.51), p=0.73
SDG 4.1 Does well at school n=705 (83%)	1.8 (1.09 to 2.84), p=0.02*	0.6 (0.35 to 1.14), p=0.13	1.4 (0.80 to 2.41), p=0.23	1.0 (0.64 to 1.66), p=0.89	1.7 (1.01 to 2.78), p=0.04
SDG 4.1 Quick learner n=607 (73%)	1.6 (1.04 to 2.35), p=0.03*	0.5 (0.32 to 0.87), p=0.01*	1.2 (0.76 to 1.80), p=0.48	1.3 (0.89 to 2.00), p=0.16	1.5 (1.01 to 2.31), p=0.04
SDG 4.1 In the correct class for their age n=575 (68%)	2.1 (1.37 to 3.18), p<0.01*	1.7 (1.02 to 2.68), p=0.04*	0.9 (0.59 to 1.46), p=0.77	1.4 (0.89 to 2.06), p=0.15	1.6 (1.02 to 2.39), p=0.03
SDG 4.1 No educational risk n=445 (54%)	1.9 (1.35 to 2.95), p<0.01*	0.9 (0.57 to 1.40), p=0.62	1.0 (0.69 to 1.57), p=0.82	1.3 (0.91 to 1.91), p=0.14	1.7 (1.19 to 2.55), p=0.01
SDG 4.1 & 4.7 No cognitive delay n=736 (88%)	2.4 (1.19 to 4.76), p=0.01*	4.8 (2.41 to 9.72), p<0.01*	1.8 (0.78 to 3.97), p=0.17	0.8 (0.42 to 1.45), p=0.44	1.3 (0.59 to 2.69), p=0.56
SDG 3.4 No depression symptomology n=778 (91%)	1.3 (0.65 to 2.41), p=0.49	1.1 (0.51 to 2.15), p=0.89	3.2 (1.21 to 8.22), p=0.02	4.4 (1.82 to 10.64), p<0.01*	1.3 (0.65 to 2.63), p=0.45
SDG 3.4 No Suicidal ideation n=829 (98%)	1.3 (0.39 to 4.03), p=0.70	0.7 (0.17 to 2.76), p=0.60	4.4 (0.56 to 34.08), p=0.16	9.2 (1.18 to 71.27), p=0.03	1.7 (0.44 to 6.49), p=0.44
SDG 3.4 No trauma symptoms n=360 (41%)	1.0 (0.67 to 1.34), p=0.78	0.6 (0.41 to 0.84), p<0.01*	1.4 (1.01 to 2.02), p=0.04	1.6 (1.13 to 2.12), p=0.01*	1.4 (0.99 to 1.94), p=0.05
SDG 3.4 Good mental health status (<i>no depression, suicidal ideation, trauma</i>), n=327 (38%)	1.3 (0.90 to 1.94), p=0.15	0.7 (0.45 to 1.06), p=0.09	1.5 (1.02 to 2.18), p=0.04	1.6 (1.13 to 2.26), p=0.01*	1.4 (0.99 to 2.05), p=0.05

562 Models adjusted for child age, gender, HIV in household, caregiver employment status, caregiver education,
 563 age and selected baseline controls (child health, and mental health variables) | Number of educational risks
 564 was dichotomized into binary categories (any educational risk vs. no educational risk) during analysis | Data

565 are adjusted odds ratio (95% CI, p value) | * p-values found significant after applying the Benjamini-
566 Hochberg Procedure specified with a false discovery rate of 10%.

Table 4A: Association of individual accelerators and combined accelerator provisions with SDG aligned child outcomes

	No accelerator experience	Receiving cash grants			Food security			Safe communities			Experienced all 3 accelerators		
SDG aligned child outcomes	Adjusted probability % (95% CIs)	Adjusted probability % (95% CIs)	Adjusted risk difference (95% CIs)	Adjusted risk ratio (95% CIs)	Adjusted probability % (95% CIs)	Adjusted risk difference (95% CIs)	Adjusted risk ratio (95% CIs)	Adjusted probability % (95% CIs)	Adjusted risk difference (95% CIs)	Adjusted risk ratio (95% CIs)	Adjusted probability % (95% CIs)	Adjusted risk difference (95% CIs)	Adjusted risk ratio (95% CIs)
SDG 2.2 Not stunted n=635 (76%)	64.7 (55.51 to 73.81)	81.1 (75.56 to 87.41)	16.8 (7.84 to 25.78), p<0.01	1.3 (1.09 to 1.43)	68.6 (59.24 to 77.89)	3.9 (-5.39 to 13.19), p=0.41	1.0 (0.91 to 1.20)	58.8 (47.28 to 70.30)	-5.8 (-15.22 to 3.47), p=0.22	0.9 (0.76 to 1.05)	80.3 (74.36 to 86.26)	15.7 (2.75 to 28.54), p=0.02	1.2 (1.01 to 1.47)
SDG 2.2 Not Wasted n=777 (93%)	87.4 (80.29 to 94.58)	93.0 (89.01 to 97.08)	5.6 (-1.59 to 12.81), p=0.13	1.1 (0.98 to 1.15)	92.6 (87.30 to 97.84)	5.1 (-1.35 to 11.61), p=0.12	1.1 (0.98 to 1.13)	87.1 (78.39 to 95.75)	-0.36 (-7.89 to 7.16), p=0.93	0.9 (0.90 to 1.08)	95.9 (93.08 to 98.69)	8.4 (-0.39 to 17.28), p=0.06	1.1 (0.99 to 1.20)
SDG 4.1 Does well at school n=705 (83%)	43.6 (34.44 to 52.78)	41.2 (33.61 to 49.24)	-2.2 (-11.86 to 7.49), p=0.66	0.9 (0.734 to 1.16)	58.4 (48.98 to 67.84)	14.8 (6.27 to 23.31), p<0.01	1.3 (1.10 to 1.57)	49.8 (39.08 to 60.49)	6.1 (-1.97 to 14.31), p=0.14	1.14 (0.95 to 1.33)	62.2 (55.15 to 69.32)	18.6 (5.03 to 32.20), p=0.01	1.4 (1.03 to 1.81)
SDG 4.1 Quick learner n=607 (73%)	83.1 (76.43 to 89.84)	76.5 (69.37 to 83.68)	-6.6 (-15.29 to 2.06), p=0.14	0.9 (0.82 to 1.02)	89.4 (84.09 to 94.70)	6.3 (0.82 to 11.70), p=0.02	1.1 (1.01 to 1.14)	83.6 (75.52 to 91.62)	0.4 (-5.84 to 6.70), p=0.89	1.0 (0.93 to 1.08)	85.1 (79.65 to 90.56)	1.9 (-8.06 to 12.00), p=0.70	1.02 (0.90 to 1.15)
SDG 4.1 In the correct class for their age	74.9 (66.81 to 82.93)	61.8 (53.49 to 70.02)	-13.1 (-23.06 to -3.17), p=0.01	0.8 (0.70 to 0.94)	82.2 (75.11 to 89.13)	7.2 (0.67 to 13.82), p=0.03	1.0 (1.00 to 1.19)	79.8 (71.40 to 88.17)	4.9 (-1.69 to 11.51), p=0.15	1.1 (0.97 to 1.156)	76.6 (70.19 to 83.05)	1.7 (-10.12 to 13.60), p=0.77	1.0 (0.86 to 1.18)

n=575 (68%)													
SDG 4.1 No educational risk n=445 (54%)	48.9 (39.86 to 57.91)	59.3 (51.81 to 66.73)	10.4 (0.71 to 20.05), p=0.03	1.2 (0.98 to 1.44)	63.1 (54.12 to 72.06)	14.2 (5.82 to 22.58), p<0.01	1.3 (1.09 to 1.49)	55.1 (44.58 to 65.49)	6.2 (-2.17 to 14.63), p=0.14	1.12 (0.95 to 1.30)	77.3 (71.32 to 83.33)	28.4 (15.69 to 41.19), p<0.01	1.6 (1.22 to 1.94)
SDG 4.1 & 4.7 No cognitive delay n=736 (88%)	74.1 (63.99 to 84.12)	92.8 (88.77 to 96.89)	18.7 (9.05 to 28.50), p<0.01	1.3 (1.09 to 1.42)	86.7 (79.35 to 94.07)	12.7 (2.54 to 22.77), p=0.01	1.2 (1.02 to 1.33)	69.4 (55.57 to 83.23)	-4.6 (-16.58 to 7.28), p=0.45	0.9 (0.78 to 1.09)	95.9 (93.47 to 98.50)	21.9 (10.45 to 33.41), p<0.01	1.3 (1.10 to 1.49)
SDG 3.4 No depression symptomology n=778 (91%)	87.0 (80.49 to 93.57)	87.6 (81.54 to 93.58)	0.5 (7.13 to 8.18), p=0.89	1.0 (0.92 to 1.09)	89.3 (82.86 to 95.72)	2.3 (-4.20 to 8.72), p=0.49	1.0 (0.95 to 1.10)	96.6 (93.42 to 99.79)	9.6 (3.78 to 15.36), p<0.01	1.1 (1.03 to 1.18)	97.4 (95.19 to 99.59)	10.4 (2.89 to 17.84), p=0.01	1.1 (1.02 to 1.21)
SDG 3.4 No Suicidal ideation n=829 (98%)	40.3 (31.19 to 49.39)	30.8 (23.51 to 38.17)	-9.5 (-18.79 to -0.11), p=0.05	0.7 (0.57 to 0.96)	44.9 (35.06 to 54.69)	4.5 (-4.36 to 13.52), p=0.32	1.1 (0.88 to 1.347)	50.7 (39.89 to 61.57)	10.4 (2.20 to 18.67), p=0.01	1.3 (1.03 to 1.48)	45.1 (37.71 to 52.49)	4.8 (-9.00 to 18.61), p=0.49	1.1 (0.75 to 1.48)
SDG 3.4 No trauma symptoms n=360 (41%)	36.1 (27.24 to 44.90)	28.4 (21.31 to 35.49)	-7.6 (-16.67 to 1.33), p=0.09	0.8 (0.56 to 1.00)	42.5 (32.73 to 52.24)	6.4 (-2.39 to 15.23), p=0.15	1.2 (0.91 to 1.44)	46.9 (36.06 to 57.75)	10.8 (2.62 to 19.05), p=0.01	1.3 (1.05 to 1.55)	44.9 (37.45 to 52.31)	8.8 (-4.83 to 22.45), p=0.21	1.2 (0.81 to 1.68)

Data are adjusted probabilities, adjusted risk differences and risk ratios (95% CI) for experiencing SDG aligned child outcomes using three scenarios; (i) if no accelerator was experienced, ii) if a single accelerator was experienced, and iii) if a combination of the three accelerators were experienced

Table 4B: Association of combined accelerator provision with SDG aligned child outcomes

SDG aligned child outcomes	No accelerator experienced	Receiving cash grants + safe Community			Food security + receiving cash grants			Safe community + food security		
	Adjusted probability (95% CIs)	Adjusted probability % (95% CIs)	Adjusted risk difference (95% CIs)	Adjusted risk ratio (95% CIs)	Adjusted probability % (95% CIs)	Adjusted risk difference (95% CIs)	Adjusted risk ratio (95% CIs)	Adjusted probability % (95% CIs)	Adjusted risk difference (95% CIs)	Adjusted risk ratio (95% CIs)
SDG 2.2 Not stunted n=635 (76%)	64.7 (55.51 to 73.81)	77.3 (69.52 to 85.17)	12.7 (1.01 to 24.36), p=0.03	1.2 (0.99 to 1.39)	84.0 (79.72 to 88.34)	19.4 (8.65 to 30.09), p<0.01	1.2 (1.09 to 1.50)	62.9 (51.43 to 74.47)	-1.7 (-14.83 to 11.40), p=0.79	0.9 (0.77 to 1.17)
SDG 2.2 Not Wasted n=777 (93%)	87.4 (80.29 to 94.58)	92.8 (87.94 to 97.72)	5.4 (-3.56 to 14.33), p=0.24	1.1 (0.96 to 1.17)	96.0 (93.71 to 98.32)	8.6 (0.65 to 16.50), p=0.03	1.1 (0.99 to 1.19)	92.3 (86.21 to 98.47)	4.9 (-3.65 to 13.45), p=0.26	1.1 (0.95 to 1.16)
SDG 4.1 Does well at school n=705 (83%)	43.6 (34.44 to 52.78)	47.5 (38.34 to 56.77)	3.9 (-8.48 to 16.37), p=0.53	1.1 (0.79 to 1.38)	56.2 (50.45 to 61.99)	12.6 (1.12 to 24.09), p=0.03	1.3 (0.97 to 1.61)	64.3 (54.07 to 74.57)	20.7 (9.34 to 32.07), p<0.01	1.5 (1.15 to 1.79)
SDG 4.1 Quick learner n=607 (73%)	83.1 (76.43 to 89.84)	77.1 (68.56 to 85.58)	-6.1 (-16.99 to 4.86), p=0.28	0.9 (0.79 to 1.05)	84.7 (80.29 to 89.12)	1.6 (-7.04 to 10.18), p=0.72	1.0 (0.91 to 1.12)	89.7 (83.68 to 95.72)	6.6 (-0.57 to 13.68), p=0.07	1.1 (0.99 to 1.17)
SDG 4.1 In the correct class for their age n=575 (68%)	74.9 (66.81 to 82.93)	68.1 (58.93 to 77.21)	-6.8 (-18.80 to 5.19), p=0.27	0.9 (0.76 to 1.06)	71.2 (65.66 to 76.80)	-3.6 (-14.11 to 6.83), p=0.49	0.9 (0.82 to 1.09)	85.9 (79.11 to 92.71)	11.0 (2.80 to 19.27), p=0.01	1.1 (1.03 to 1.27)
SDG 4.1 No educational risk n=445 (54%)	48.9 (39.86 to 57.91)	65.2 (56.69 to 73.72)	16.3 (4.09 to 28.55), p=0.01	1.3 (1.04 to 1.63)	72.4 (67.26 to 77.58)	23.5 (12.33 to 34.74), p<0.01	1.5 (1.17 to 1.79)	68.8 (59.05 to 78.56)	19.9 (8.68 to 31.16), p<0.01	1.4 (1.13 to 1.69)
SDG 4.1 & 4.7 No cognitive delay n=736 (88%)	74.1 (63.99 to 84.12)	91.1 (85.48 to 96.65)	17.0 (5.45 to 28.59), p<0.01	1.2 (1.05 to 1.41)	96.8 (94.93 to 98.71)	22.8 (12.14 to 33.39), p<0.01	1.3 (1.122 to 1.49)	83.8 (74.05 to 93.47)	9.7 (-3.76 to 23.18), p=0.16	1.1 (0.94 to 1.32)

SDG 3.4 No depression symptomology n=778 (91%)	87.0 (80.49 to 93.57)	96.8 (93.78 to 99.74)	9.7 (2.55 to 16.91), p=0.01	1.1 (1.02 to 1.20)	89.7 (85.88 to 93.60)	2.7 (-5.64 to 11.06), p=0.53	1.0 (0.93 to 1.13)	97.3 (94.54 to 99.98)	10.2 (3.66 to 16.81), p<0.01	1.1 (1.03 to 1.20)
SDG 3.4 No Suicidal ideation n=829 (98%)	40.3 (31.19 to 49.39)	40.5 (31.26 to 49.75)	0.2 (-12.07 to 12.49), p=0.97	1.0 (0.69 to 1.31)	34.9 (29.28 to 40.69)	-5.3 (-16.63 to 6.02), p=0.36	0.8 (0.61 to 1.12)	55.4 (44.36 to 66.44)	15.1 (3.08 to 27.12), p=0.01	1.4 (1.02 to 1.72)
SDG 3.4 No trauma symptoms n=360 (41%)	36.1 (27.24 to 44.90)	38.3 (29.21 to 47.47)	2.27 (-9.76 to 14.30), p=0.71	1.1 (0.72 to 1.40)	34.2 (28.51 to 39.89)	-1.9 (-12.93 to 9.19), p=0.74	0.9 (0.65 to 1.24)	53.6 (42.48 to 64.78)	17.6 (5.52 to 29.59), p<0.01	1.5 (1.08 to 1.89)

Data are adjusted probabilities, adjusted risk differences and risk ratios (95% CI) for experiencing SDG aligned child outcomes using two scenarios; (i) if no accelerator was experienced, and ii) if a different combination of two accelerators were experienced

Figure 1: Adjusted probabilities and adjusted risk differences (% points) of experiencing SDG aligned child outcomes with **single accelerators** provision

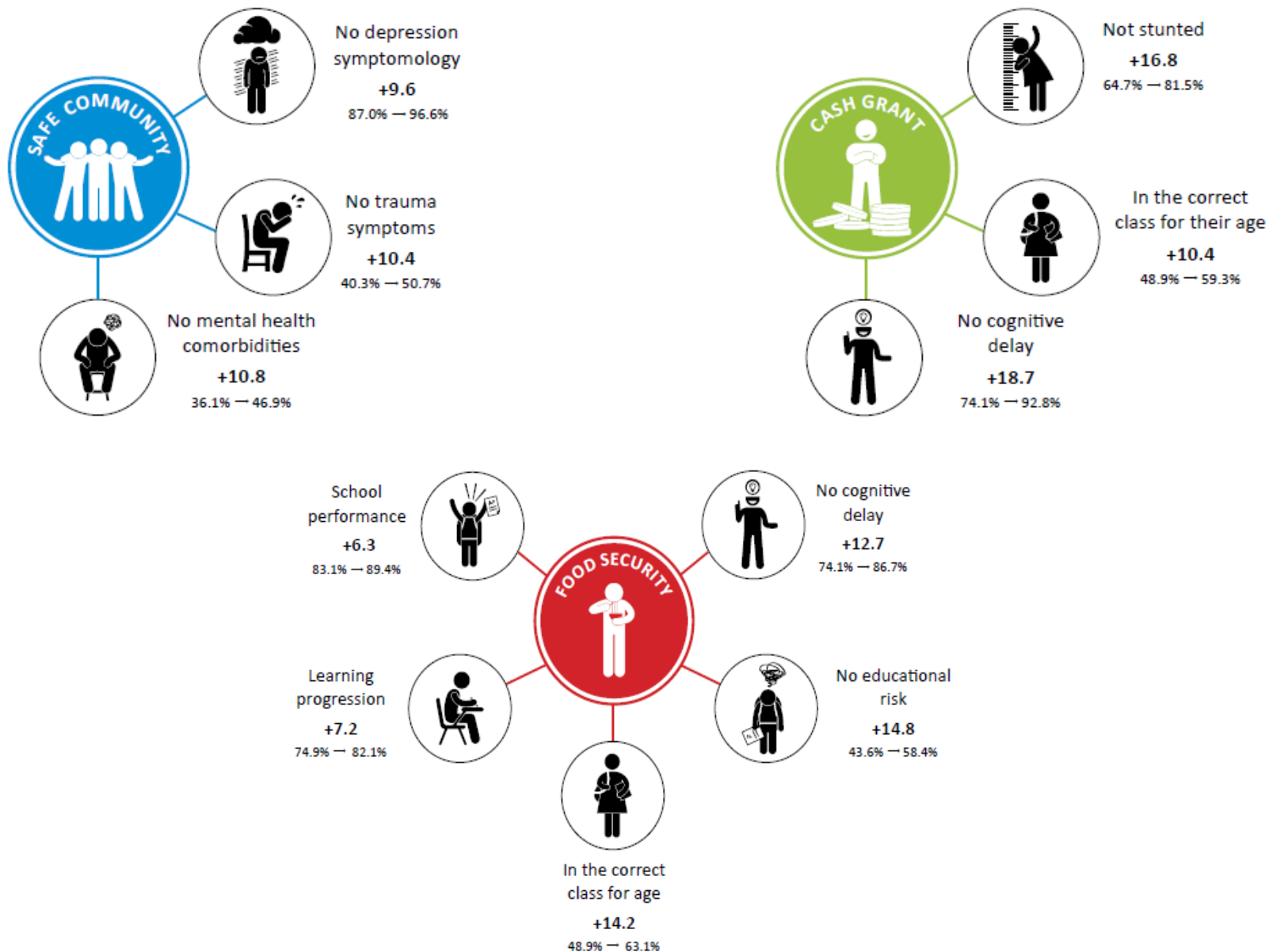


Figure 2: Adjusted probabilities and adjusted risk differences (% points) of experiencing SDG aligned child outcomes with each of **two combined accelerators** provision

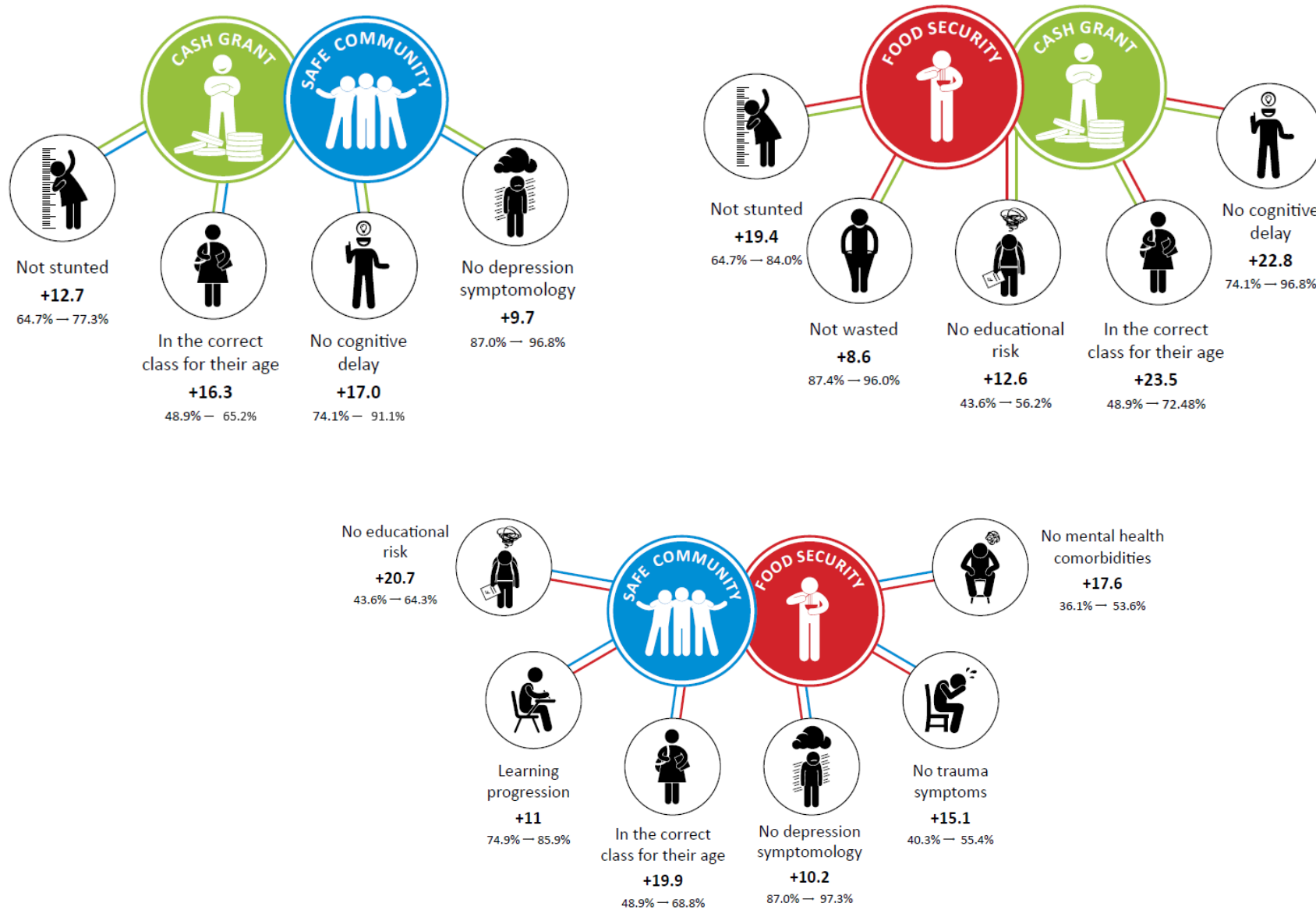


Figure 3 : Adjusted probabilities and adjusted risk differences (% points) of experiencing SDG aligned child outcomes with all **three combined** accelerators provision

