CAMBRIDGE
UNIVERSITY PRESS

Special Issue Article

Resilience in Development: Pathways to Multisystem Integration

Multisystemic supports and adolescent resilience to depression over time: A South African mixed methods study

Linda Theron[1] ●, Jan Höltge[2] ● and Michael Ungar[3] ●

[1]Department of Educational Psychology, University of Pretoria, Pretoria, South Africa, [2]Department of Psychology, University of Hawai'i at Mānoa, Honolulu, HI, USA and [3]Resilience Research Centre, Dalhousie University, Halifax, Canada

Abstract

In sub-Saharan countries, like South Africa, there is scant understanding of adolescent resilience to depression over time; the multisystemic resource combinations that support such resilience; and whether more diverse resource combinations yield better mental health dividends. In response, we conducted a longitudinal concurrent nested mixed methods study with 223 South African adolescents (mean age: 17.16 years, $SD = 1.73$; 64.60% girls; 81.60% Black). Using longitudinal mixture modeling, the quantitative study identified trajectories of depression and associations between trajectory membership and resource diversity. Using a draw-and-write methodology and reflexive thematic analyses, the qualitative study explored the resource diversity associated with each trajectory. Taken together, these studies identified four depression trajectories (Stable Low; Declining; Worsening; Chronic High) with varying resource diversity at baseline and over time. Resource diversity was inclusive of personal, relational, contextual, and culturally valued resources in both the Stable Low and Declining trajectories, with emphasis on relational supports. Personal resources were emphasized in the Worsening and Chronic High trajectories, and culturally valued and contextual resources de-emphasized. In summary, resource constellations characterized by within and across system diversity and cultural responsiveness are more protective and will be key to advancing sub-Saharan adolescent mental health.

Keywords: African adolescents; culturally responsive resilience-enablers; depression trajectories; multisystemic resilience; resource diversity

(Received 24 January 2023; revised 11 April 2023; accepted 13 April 2023; first published online 5 May 2023)

Sub-Saharan youth are a fast-growing population, with some predicting that they will be the world's largest youth population by 2050 (Kariba, 2020; United Nations, 2017). This exponential population growth will worsen the livelihood challenges that are already putting African young people at risk for depression (Sankoh et al., 2018). To date, however, too few studies have focused on the experience of depression among African youth or the factors that contribute to their resilience to depression (Campbell & Osborn, 2021; Kabiru et al., 2013; Theron, 2020). This article redresses that oversight.

We draw on a mixed methods study conducted iteratively with 223 adolescents (i.e., 14–24-year-olds, Sawyer et al., 2018) living in a stressed municipality in South Africa. The study investigated the resource diversity that appeared to differentiate between young people showing more and less positive mental health outcomes. While the science of multisystemic resilience is unequivocal that positive outcomes are the product of protective factors that are distributed across systems found within adolescents and their social, institutional, and ecological environments (Masten & Cicchetti, 2016), it is less clear whether more diverse resource combinations yield better mental health dividends than less diverse ones.

Understanding if and how resource diversity matters for adolescent mental health is a pressing agenda in sub-Saharan Africa. Currently, adolescents constitute almost a quarter of sub-Saharan Africa's population (Sequeira et al., 2022). Moreover, approximately half of the world's young people are predicted to live in sub-Saharan Africa by the start of the 22nd century (Baird et al., 2022). A thriving, mentally and physically healthy sub-Saharan youth population is integral to Africa's economic and social advancement (Nyundo et al., 2020). As noted by US President Joe Biden and others, Africa's progress potentiates positive knock-on effects for the rest of the world (Shalal et al., 2022).

However, like adolescents in other low and middle income (LMIC) countries, South African and other sub-Saharan adolescents face challenges to their well-being from widespread and relentless adversities (Wet et al., 2020). For instance, one in every two sub-Saharan adolescents lives in poverty and about the same number experiences food insecurity. In addition, sub-Saharan adolescents typically have lived experience of armed conflict, communicable disease, displacement, extreme weather events, inequality, limited quality education opportunities, maltreatment, rapid urbanization, and violence (Kabiru et al., 2013; Oppong Asante et al., 2021; Rother et al., 2020). As in other LMIC contexts, COVID-19-related challenges heightened sub-

Corresponding author: Linda Theron, email: Linda.theron@up.ac.za

Check for updates

Saharan adolescent vulnerability to poverty, maltreatment, and education risks (Oppong Asante et al., 2021).

While the adversities that are common to sub-Saharan Africa are known to jeopardize adolescent mental health, young people in LMIC countries like South Africa have little if any access to mental health services (Lu et al., 2018; Stelmach et al., 2022). Furthermore, very few studies have documented the incidence of mental illness among sub-Saharan adolescents (Steel et al., 2022). A narrative review of 37 such studies reported a median point depression prevalence of 26.9% in the general sub-Saharan adolescent population and 29% for sub-Saharan adolescents exposed to various risks (e.g., HIV and AIDS, violence and trauma, poverty, orphanhood, school attrition) (Jörns-Presentati et al., 2021). While this prevalence is comparable to that reported in global prevalence studies (e.g., Shorey et al., 2022), it could be interpreted to mean that many sub-Saharan adolescents do not self-report elevated depression symptoms. This suggests the need for further study given the high degree of exposure to potentially traumatizing experiences among sub-Saharan youth. While reported prevalence levels could be an artifact of the stigma often associated with mental illness in sub-Saharan Africa and related silence (Steel et al., 2022), it is also possible that not reporting elevated symptoms of depression in this heightened risk context suggests resilience.

Adolescent resilience to depression

In the presence of heightened risk, a positive outcome (e.g., mental health) implies resilience to that risk (Masten, 2014). Bonanno's (2004, 2021a) seminal work showed that a positive outcome/development is actually common in contexts of heightened risk (e.g., exposure to trauma or loss). Relatedly, he proposed four typical response trajectories (Bonanno, 2004): resilience (i.e., no/minimal symptoms of distress); recovery (i.e., declining symptoms of distress); delayed (i.e., worsening symptoms of distress); and chronic (i.e., consistent symptoms of elevated distress). Subsequent work (e.g., Galatzer-Levy et al., 2018; Schäfer et al., 2022) confirmed these trajectories. The resilience trajectory is usually the most common (i.e., found in about 60% of a sample, Bonanno, 2021b).

The science of multisystemic resilience holds that a network of protective factors and processes (PFPs) informs positive outcomes among risk-exposed adolescents (Masten & Cicchetti, 2016; Masten et al., 2021; Ungar & Theron, 2020). This network comprises resources from systems that adolescents are directly and indirectly connected to, such as their family or school, and more distally, their parents' workplace or local/national government. PFP networks could include biological resources (e.g., physical health or biological sex); psychological strengths (e.g., agency, self-regulation skills; or hopeful meaning making); relational resources (e.g., caring parents/families or a supportive peer groups); institutional supports (e.g., effective schools or mental health services); and/or resources in the physical ecology (e.g., green spaces, recreational facilities, or access to technology). Hence, resilience as an outcome is not the result of a single resource system (Bonanno, 2021a, 2021b; Infurna & Luthar, 2018). Instead of focusing on one system, studies need to include diversity in the resources they measure and use across many different systems to predict resilience.

Indeed, studies of adolescent depression that are not specific to sub-Saharan Africa report PFPs associated with a variety of systems. For instance, meta-analyses and systematic reviews of readily modifiable protective factors identified biological/physiological PFPs associated with physical health, including healthy diet, proper sleep hygiene and physical activity (Cairns et al., 2014; Dale et al., 2019; Rodriguez-Ayllon et al., 2019). Dale et al. (2019) also found that

physical activity encouraged self-esteem, a psychological strength associated with lower depression. Other psychological strengths associated with lower depression include optimistic/hopeful meaning making, problem solving, self-regulation, and agency (Gillham et al., 2011; Rincon Uribe et al., 2022). Social systems (e.g., families, schools) are also associated with PFPs that support adolescents to avoid elevated depression symptoms. Rueger et al. (2016), for example, conducted a meta-analysis of 341 studies documenting associations between social support and adolescent depression. Support from family had the largest significant protective associations (for adolescents of all ages), followed by support from peers (especially for younger adolescents), teachers, and close friends. Girls and boys benefitted equally from these supports. There is also some evidence (albeit limited) that the physical ecology (i.e., access to green spaces) supports adolescent mental health, including low depression (Vanaken & Danckaerts, 2018).

Multisystemic approaches to resilience are mindful that situational and cultural context shape the PFPs that support at-risk adolescents to achieve positive outcomes (Masten et al., 2021; Ungar & Theron, 2020). For example, religion/spirituality – which is integral to traditional African and African American culture – was associated with lower depression in African American adolescents and Africans exposed to compound adversities (Freeny et al., 2021; Ojagbemi & Gureje, 2020). In contrast, a review of studies with mostly Caucasian adolescents reported ambivalent associations for religion/spirituality and mental health outcomes, including depression (Cotton et al., 2006). It was suggested that negative interpersonal experiences in faith-based communities limited the resilience-enabling value of religion/spirituality. PFP sensitivity to contextual dynamics like this discourage generalization of the PFPs reported in studies conducted in high income countries (HIC) to LMICs like South Africa.

Sub-Saharan adolescent resilience to depression

Two systematic reviews of South African and other sub-Saharan child and youth resilience studies showed that relational resources (typically support from family, peers/friends, and teachers) and psychological strengths (typically agency and adaptive meaning making) are the most prominent PFPs (Theron, 2020; Van Breda & Theron, 2018). There was limited evidence of institutional/structural and ecological PFPs, but both reviews reported faith-based practices as having resilience-enabling value for African adolescents. While these reviews were not specific to depression, the 120 studies included in them reported resilience to stressors that place young people at high risk for depression.

More recently, individual sub-Saharan studies that were specific to depression have repeated the PFPs reported in the reviews by Theron (2020) and Van Breda and Theron (2018). For example, Nyundo et al. (2020) conducted a household-based cross-sectional study with 7,662 adolescents (aged 10–19 years; mean age, 14.4) from six sub-Saharan countries (Burkina Faso; Ethiopia; Ghana; Nigeria; Tanzania; Uganda). Making adaptive meaning of life (i.e., being satisfied) and a supportive home environment were negatively associated with elevated depression symptoms. In addition, and as documented in non-African studies (Salk et al., 2017), Nyundo et al. (2020) found that male adolescents were at lower risk for depression. Similarly, a network analysis showed that adaptive meaning making (e.g., being joyful) and a supportive family were central to the well-being (including low depression) of a sample of Kenyan adolescents ($N = 2194$; average age: 15.21) (Campbell & Osborn, 2021). Family-related resources (specifically higher levels of supervision and warm parenting) were also associated with

lower levels of depression among 926 HIV-infected adolescents (aged 10–19) from a significantly impoverished province in South Africa; over time, improved communication between adolescents and their caregivers resulted in reductions in depression symptoms (Shenderovich et al., 2021). Moderate levels of parental supervision and high levels of parental warmth were also associated with low depression among a sample of 13–24-year-olds ($N = 891$; majority self-identifying as Black) living in resource-constrained municipalities in South Africa (Theron et al., 2022). A study with a similarly challenged sample of South African 14–24-year-olds ($N = 576$, majority self-identifying as Black) identified significantly lower levels of depression for those adolescents who reported high cultural engagement, including embracing spiritual beliefs and participating in organized religion (Theron et al., 2022). These protective effects did not hold for adolescents who reported nominal levels of cultural engagement.

The present study

The multisystemic science of resilience encourages identification and understanding of contextually relevant PFP combinations (Masten et al., 2021; Ungar & Theron, 2020). While there has been some systematic study of the multisystemic PFPs associated with sub-Saharan adolescent resilience (Theron, 2020; Van Breda & Theron, 2018), this is less so when depression is the outcome. Isolated sub-Saharan studies point to the importance of personal psychological and family PFPs (Campbell & Osborn, 2021; Nyundo et al., 2020; Shenderovich et al., 2021; Theron et al., 2022), but do not support understanding of the protective value of other co-occurring systemic resources (e.g., relational resources outside of the family, Rueger et al., 2016; ecological resources, Vanaken & Danckaerts, 2018) among adolescents at risk for depression. Further, barring exceptions like the Shenderovich et al. (2021) longitudinal study, cross-sectional studies have mostly informed insights into the PFPs associated with low depression among sub-Saharan adolescents. Importantly, individuals can show similar depression scores cross-sectionally but different trajectories of depression over time (Bonanno, 2004).

Thus, to better understand the multisystemic resources that protect a sample of sub-Saharan (i.e., South African) adolescents from reporting elevated symptoms of depression over time in a context of chronic risk, we conducted a concurrent nested mixed methods study. This mixed methods design collects quantitative and qualitative data at the same time and integrates them during data analysis/interpretation (Hanson et al., 2005). The purpose of the quantitative study (Study 1) was to investigate if different trajectories of depression are characterized by trajectory-specific combinations of multiple resource systems at baseline and if resource diversity (as an overall indicator for the presence of resources from multiple systems) over time provides further explanation of the various depression trajectories. The purpose of the qualitative study (Study 2) was to better understand the nature of the resource diversity associated with each trajectory identified in Study 1 (i.e., to nest the qualitative findings in the identified trajectories).

Study 1: longitudinal quantitative survey data

In Study 1, we first applied longitudinal mixture modeling to identify distinct developmental trajectories of depression over the course of 2 years (based on three assessments). Based on prior longitudinal resilience studies (e.g., Bonanno, 2004), we expected the identification of four trajectories: a stable low, decreasing,

worsening, and chronic high depression trajectory. We also expected that the stable low trajectory would show the largest group size.

Based on the identified trajectories, we tested two hypotheses. Specifically, we hypothesized that: (1) the stable low depression trajectory shows significantly higher scores in multiple resource systems and resource diversity compared to all other trajectories at baseline, and (2) the stable low depression trajectory shows the highest resource diversity over time.

Study 2: longitudinal qualitative data

In Study 2, we invited participants to use an arts-based method (Draw-and-Write [D&W]; Mitchell et al., 2011) to self-report what they had experienced as resilience-enabling. Following reflexive thematic analysis (RTA) design logic (Braun & Clarke, 2022), and its respect for "participants' contextually situated experiences, perspectives, and behaviors" (Braun & Clarke, 2022, p. 8), we anticipated that participants would report single or multiple resources from single or multiple resource systems. We also anticipated that relational and faith-based resources would be prominent, given the former's prominence in African studies of resilience (Theron, 2020; Van Breda & Theron, 2018) and the latter's significance to the mental health of Africans (Ojagbemi & Gureje, 2020; Tomita & Ramlall, 2018).

Method

The University of Pretoria's Faculty of Health Sciences Research Ethics Committee and Faculty of Education Ethics Committee approved the quantitative and qualitative studies that comprised our concurrent nested mixed methods study (UP17/05/01). These studies replicated the quantitative and qualitative phases of the Resilient Youth in Stressed Environments (RYSE study; Ungar et al., 2021), but implemented them concurrently. As in the RYSE study, participants were invited to participate three times. Starting in March 2020, the baseline iteration was arranged at a participant's convenience and the first and second iterations were each scheduled 6 months later (again, at the participant's convenience). Given that many local families engaged in economic migrancy, the study's advisory committee recommended a 6-month interval period (compared to the 12-month one used in RYSE) to limit participant attrition. Participants were modestly compensated each time (i.e., they received a supermarket voucher roughly equivalent to $5, $7, and then $9).

Contextualization

The study took place in two adjacent communities (an industrialized town and neighboring township) in the resource constrained Metsimaholo Municipality of the Free State Province, South Africa (SA). Environmental degradation, violent crime, aging and inadequate infrastructure (associated with regular power and water cuts), economic insecurity, and poor service delivery are hallmarks of this municipality. In SA, as in much of sub-Saharan Africa, such municipal disadvantage is endemic (Canham, 2018; Fransman & Yu, 2019), and associated with higher incidence of depression (Mungai & Bayat, 2019). As is typical in South Africa (Babatunde et al., 2020), adolescents in this municipality had limited – if any – access to mental health services.

Further, both communities were largely dependent on the petrochemical industry for their livelihood. The economically volatile nature of this industry translated into widespread exposure

to financial uncertainty. Also, the petrochemical industry draws many migrant workers. The ensuing financial and social cohesion stressors are typically associated with poorer family and community functioning, interpersonal conflict, and psychological distress (Ungar et al., 2021).

The temporal context of the study is important too. It commenced just prior to South Africa's first COVID-19 lockdown (March 2020), with most of the data collected during less restrictive lockdown periods (May 2020 to December 2021). The COVID-19 pandemic, and related lockdown challenges in the course of 2020–2021, worsened disadvantage. In particular, it deepened the prepandemic economic vulnerability that characterized resource-constrained municipalities in South Africa (Schotte & Zizzamia, 2022), and placed adolescents in such communities at heightened risk for depression (Haag et al., 2022).

Participants

Using flyers and word-of-mouth (that paraphrased flyer content), study gatekeepers purposefully recruited adolescents who fit the following eligibility criteria: 14–24 years old; resident in either of the two adjacent study communities; direct/indirect experience (negative or positive) of petrochemical industry impacts (e.g., industry-related layoffs of themselves or family members; industry-sponsored community investment programs); and English literate. In addition, the study team placed advertisements about the study (including the inclusion criteria) at local schools and popular shops. Finally, participants were also invited to nominate eligible peers.

In total, $N = 317$ adolescents participated in the study. At baseline, $n = 316$ persons participated, $n = 218$ at the second assessment (attrition rate to baseline: 31.01%), and $n = 183$ at the third assessment (attrition rate to baseline: 42.09%). From this sample, $n = 176$ participated at all three assessments and $n = 223$ participated at least twice. Because the present study focused on development over time, this latter group was chosen for analyses. The total sample and analysis sample did not show significant differences for any of the analyzed variables.

At baseline, 64.60% of the participants who participated at least twice in the study ($n = 223$) were female and the mean age of this sample was 17.16 years ($SD = 1.73$, range $= 15$–23). The self-identified ethnicity was as follows: 81.60% Black, 16.10% White, 1.30% Mixed Race, and .90% Indian. Also, 99.10% were school students and 7.20% had a part-time job. On average, the participants lived in a household with $M = 4.64$ individuals ($SD = 1.58$, range $= 1$–11). Furthermore, the mothers of 87.40% of the sample were alive, 62.80% had a secondary education or higher, and 42.20% were employed. Regarding the fathers, 71.70% were alive, 51.60% had a secondary education or higher, and 48% were employed.

Data collection

Two research assistants (RAs; interns completing a master's degree in research psychology) facilitated the data collection. This was mostly done in person, using interview-style completion processes. In instances when lockdown conditions prohibited meeting with participants in-person, the RAs requested participants to complete the measures online and the qualitative activity virtually. In these instances, participants received a small amount of data for their phones or computers to offset the burden of online data collection.

Quantitative measures

The present analyses are based on the three essential dimensions of resilience research (Ungar, 2019): an outcome to indicate an individual's resilience over time (i.e., depressive symptomatology), three risk indicators (i.e., family adversity, victimization by community, neighborhood/community risk), and six resources (i.e., physical health, peer support, personal strength, caregiver support, contextual support, diversity). Table 1 reports the correlations between the measures as well as their respective means, standard deviations, missingness, and reliability.

Outcome: depressive symptomatology. Depressive symptomatology was indicated via self-report using the *Beck Depression Inventory-II* (BDI-II; Beck et al., 1996). The BDI-II measures 21 different symptoms of depression over the past two weeks. Using symptom-specific 4-point-Likert scales, participants are asked to rate the experience of symptoms such as sadness, guilt, sleep, and appetite. Higher sum-scores indicate higher levels of depressive symptomatology (range: 0–63). The BDI-II is validated for South African youth (i.e., university students, $M_{age} = 21.70$ years, $SD = 13.51$ years; Makhubela & Mashegoane, 2016).

Risk: family adversity. The experience of 10 different types of adversity within the family such as death, divorce/separation of parents, violence, parental mental and physical illness, foster parenting, and parental incarceration was indicated via a shortened form of the *Life Events Questionnaire* (Labella et al., 2017). Originally, the scale asked the parents to answer for their child. In this study, participants reported if they had experienced each of these events via a Yes/No response option. The sum-score ranged from 0 to 10.

Risk: victimization by community. We used the 7-item adaptation of the Victimization by Community subscale of *Exposure to Violence Scale* (Ruchkin et al., 2004) to assess self-reports of experiences of violence in the community, such as having been chased by gangs or individuals, beaten up or mugged, or shot at with a gun. The Likert-scale ranged from 1 (None) to 5 (10+ times). The sum-score ranged from 7 to 35.

Risk: neighborhood/community risk. Participants reported their perception of their community using the 10-item *Perception of Neighborhood Scale* (Ruchkin et al., 2004). Using a 4-point-Likert scale (1 = definitely not true to 4 = definitely true), they rated their sense of social cohesion, safety, ecological degradation, and illegal activity. There are seven positively worded items and three negatively worded items. In order to indicate neighborhood/community risk, the seven positively worded items were recoded and all items were summed to form a total score (range: 10–40).

Resource: physical health. Physical health was indicated via 14 items from the *20-item version of the Medical Outcomes Study questionnaire* (MOS-20; Stewart et al., 1988). These items indicate different aspects of physical health: physical functioning (6 items), role-physical functioning (2 items), current health perceptions (5 items), as well as pain (1 item). First, the items were transformed to have a range from 0 to 100, and then averaged (Ware et al., 1992). Higher scores indicate better physical health (range: 0–100).

Resource: peer support. The *Peer Support Scale* (Lerner et al., 2005) was used to indicate each participant's perceived peer support. It

Table 1. Sample characteristics: correlations, descriptive statistics, and reliabilities

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Sex																
2. Age	.25**															
3. Depression T0	−0.13	−.15*														
4. Depression T1	−.16*	−0.04	.49**													
5. Depression T2	−.21**	−0.04	.44**	.48**												
6. Family adversity	0.05	0.12	.18**	.16*	0.07											
7. Victimization by community	.16*	0.02	0.1	.21**	0.14	.34**										
8. Neighborhood	−0.08	0.12	.15*	.22**	.17*	.22**	.25**									
9. Physical health	−0.14	−.35**	−.22**	−0.11	−0.12	−.14*	−.16*	−.16*								
10. Peer support	−0.09	−.30**	−.16*	−.19**	−0.12	−0.12	−0.12	−.28**	.24**							
11. Personal Strength	0.02	0.03	−.46**	−.31**	−.31**	−0.01	−0.1	−.19**	.18**	.15*						
12. Caregiver support	0.02	0	−.45**	−.43**	−.33**	−.29**	−.20**	−.34**	.18**	.25**	.41**					
13. Contextual support	−0.03	−0.03	−.36**	−.32**	−.17*	−0.11	−0.08	−.37**	0.11	.33**	.51**	.62**				
14. Diversity T0	−0.09	−.28**	−.41**	−.37**	−.29**	−.22**	−.20**	−.37**	.62**	.72**	.53**	.64**	.64**			
15. Diversity T1	0.01	−0.04	−.32**	−.57**	−.36**	−.14*	−.17*	−.29**	.18**	.36**	.40**	.52**	.45**	.53**		
16. Diversity T2	0.02	−.15*	−.26**	−.41**	−.31**	−.18*	−0.07	−.15*	.17*	.19**	.19*	.42**	.33**	.38**	.63**	
Mean	–	17.16	12.82	12.63	11.99	2.25	8.17	24.32	72.92	12.3	17.31	29.26	56.65	1.41	1.42	1.4
SD	–	1.73	10.37	9.99	12.08	1.75	1.77	4.98	22.35	2.79	2.53	4.79	8.29	0.13	0.13	0.17
Percent missing	2.2	1.35	0.77	0.71	0.49	1.3	0.64	0.67	1.6	0.22	0.27	0.26	0.38	–	–	–
Reliability (ω)	–	–	0.91	0.9	0.94	0.53	0.72	0.79	0.91	0.91	0.63	0.75	0.8	–	–	–

Note. $N = 223$ at T0 (Baseline), $N = 216$ at T1, $N = 183$ at T2. *$p < .05$, **$p < .01$. ω = Omega reliability.

consists of four items, such as "My friends care about me", and uses a four-point Likert scale (1 = "Never true" to 4 = "Always true"). The sum-score ranges from 4 to 16 with higher scores indicating higher perceived peer support.

Resources: personal strength, caregiver support, contextual support. The *Child and Youth Resilience Measure* (CYRM-28; Ungar & Liebenberg, 2011) assesses 28 resources of young people aged 11–23 years that have been shown to be relevant for an individual's capacity to show resilience across different risk contexts across cultures. The items are evaluated using a 5-point-Likert scale ranging from 1 (Not at all) to 5 (A lot). The CYRM-28 covers three broad resource systems (based on a factor structure specific to South Africa, see van Rensburg et al., 2019): personal strength (five items covering personal and social skills; range of sum-score: 5–25), caregiver support (seven items covering physical and psychological caregiving; range of sum-score: 7–35), and contextual support (14 items covering spiritual, educational, and cultural/community resources; range of sum-score: 14–70).

Resource: resource diversity. To indicate a person's resource diversity (i.e., how many different resource systems and resources a participant is reporting and how they are distributed), we adapted one of the most common diversity indices from biodiversity, namely *Shannon's Diversity Index* (Hagerty et al., 2020; Morris et al., 2014). In biodiversity research, Shannon's Diversity Index reflects the richness of different species (i.e., the respective number of different plants or animals) as well as their evenness (i.e., how evenly plants or animals are distributed) within defined communities or spaces. Translating this approach to resilience research means that the resource diversity index is a combination of an individual's available resources from different systems (resource richness) as well as a measure of the extent to which these resources are evenly distributed across systems (resource evenness).

The biodiversity index is based on equally sized communities. For example, if each community has room for a total of 1000 plants, the researcher measures how many different species are available, how many plants per species are available, and if the species are evenly distributed within each community. However, in social resilience research that takes place in natural settings, it would be challenging to select *a priori* individuals with an equal number of resources. In the language of biodiversity, participants will not necessarily have "equal size" communities. For instance, Person A might have a total of 10 resources from three different resource systems and Person B might have a total of 20 resources from the same three systems. Therefore, in the present study, applying Shannon's Diversity Index in its original form would result in an individualized resource diversity index which biases results. Hence, the diversity index was adapted so that each individual's diversity index was based on the maximum number of potentially available resources defined by the number of resources assessed by the study.

Thus, the applied resource diversity index was based on the five resource systems enumerated in the preceding sections (i.e., physical health, peer support, personal strengths, caregiver support, contextual support). To calculate the resource diversity index: (1) all items were recoded to have a range from 0 to 100; (2) a mean score was calculated for each respective resource system based on the recoded items leading to a possible range of 0–100 where 100 indicates that all resources of a respective system are available, and resulting in a maximum number of potentially available resources

of 500; and (3) the diversity index was calculated. Higher scores indicate higher resource diversity.

Covariates. The participants' age (in years) and sex (female, male) were included as control variables.

Qualitative methods

Draw-&-Write (D&W). Following the methodological advice of Mitchell et al. (2011), we invited participants to draw any resource/s that they had experienced as resilience-enabling and to provide a written explanation of their drawing. Specifically, we asked participants to reflect on what had helped them to "do well/be okay" when life is hard, draw whatever that was, and then explain what they had drawn in a couple of sentences. The benefit of this broad prompt was that it did not bias participant response to any particular resource/s. Further, by explaining what their drawing meant, participants helped the research team to "marry up" (Angell et al., 2015, p. 25) the visual and narrative content, thereby managing researcher bias in our interpretation of the data.

The two RAs facilitated each D&W activity in person (lockdown conditions permitting) or virtually. They prefaced the activity by reminding participants that the research team was interested in the content of the drawing and its explanation, rather than the quality of the drawing. In instances when lockdown conditions prohibited meeting with participants in-person, the RAs requested participants to make the drawing on any available paper using any available medium. Participants scanned or photographed their drawing and explanation and shared these with the RAs via email, short message service (SMS), or WhatsApp.

Data analysis

Quantitative data analysis

Because data on the item level was not missing completely at random (Little's MCAR test: $p < .05$ for all three assessments), data was imputed for all missing item scores. This was done using a nonparametric multiple imputation method via random forest during the data preparation using *missForest* (Stekhoven & Bühlmann, 2012) in *R* version 4.2.1 in *RStudio* 2022.07.2 (R Core Team, 2022), except for age, sex, and family adversity and when a participant had more than 30% missing items for a scale (see Table 1 for an overview of the missingness before imputation). Item-level data imputation was only done when a participant had completed an assessment. Because $n = 176$ completed all three assessments and $n = 223$ completed at least two, potential missing data for $n = 47$ participants was imputed at only two assessments. During model estimation procedures, full information maximum likelihood was used so that individuals with missing total scores at an assessment or who only participated twice did not need to be excluded from the analyses.

Given the research question of this study, a stepwise, three-stage approach was used. First, the adequate number of depression trajectories was estimated using common longitudinal latent growth modeling (LGM), and the final trajectory membership of each participant was determined by longitudinal data partitioning based on the shape of each participant's trajectory. Second, we applied multivariate non-parametric testing to identify significant differences between the estimated trajectories in the presented risks and resources at baseline. Third, we applied multilevel longitudinal modeling to test if the identified trajectories of depression differ in how a participant's resource diversity develops over time.

Identifying trajectories of depression. A two-step procedure was used to identify potentially different trajectories of depression over the course of the study. First, established LGM via M*plus* version 8 (Muthén & Muthén, 2017) was used to estimate the correct model specifications (fixed/random intercept and/or slope) and the adequate number of trajectories. In latent growth modeling, different numbers of trajectories are tested and compared using model fit criteria to select the best fitting model to the data. Each estimated trajectory indicates a distinct developmental pattern for depression over time that is shared by a significant proportion of individuals in the study's sample. Following the approach by van der Nest et al. (2020), we started with the most constrained model, i.e., a group-based trajectory model (GBTM). In a GBTM, depression at baseline (i.e., the intercept) and the rate of change in depression over time (i.e., the slope) are only allowed to vary between the trajectories and not between the individuals of each trajectory (fixed intercept and slope); error variance was the same across time and trajectories. The selection of the best-fitting model was based on each model's Bayesian Information Criterion (BIC; the lower the better; the preferred criterion according to Nylund et al., 2007), the bootstrap likelihood ratio test (BLRT; tests if a model with an additional trajectory is a better fit to the data; Nylund et al., 2007; van der Nest et al., 2020), and model parsimony and theory (Bauer & Curran, 2003; Geiser, 2013). Next, we tested in a stepwise manner if models with fewer constraints would fit the data better: a latent class growth model (LGCM; no within-trajectory and only between-trajectory variability in the intercept and slope), and a growth mixture model (GMM; random effects on the intercept and slope within each trajectory) based on the BIC (van der Nest et al., 2020). We tested models with a range of 2–5 potential trajectories.

The approach of LGM is based on the distance between the scores of all individuals at each timepoint: certain individuals are grouped into the same trajectory if they show local similarities (Genolini et al., 2016). Thus, LGM focuses more on the moment than the actual pattern or shape of the outcome of interest over time. This can result in the separation of two identical trajectories into distinct clusters because they shifted over time. Hence, in a second step, we applied longitudinal data clustering based on the shape of each individual's depression trajectory over time to re-group the participants into the identified number of trajectories from the first step (Genolini et al., 2016). Shape-based longitudinal data clustering (SB-LDC) is based on the shape of an individual's trajectory over time: individuals whose developmental trajectory of depression shows a similar shape over time are put into the same group even though the occurrence of their individual shapes shifts in time. This analysis results in a grouping variable that indicates the most likely trajectory membership of each individual. This analysis was done using the *R*-package *kmlShape* (Genolini et al., 2016).

Differences between trajectories at baseline. To decide if a parametric or non-parametric test should be used to test for differences between the identified trajectories in risks and resources at baseline, we tested the following assumptions of parametric testing: normal distribution of residuals (via Kolmogorov-Smirnov test) and homogeneity of covariance matrices (via Box test; Field, 2018). Both assumptions were violated (see results section). Hence, we applied a multivariate non-parametric test, i.e., the Extended Multivariate Kruskal–Wallis test (EM-KS; He et al., 2017) as a global test of significant differences between the

identified trajectories, via the *R*-package *ULT* (Maugoust, 2022). In the case of a significant EM-KS, univariate Kruskal–Wallis tests with stepwise step-down procedure were conducted as posthoc tests to get insight into how the groups differed on each variable (Field, 2018; He et al., 2017).

Predicting trajectory membership via longitudinal patterns of diversity

Finally, we tested if the trajectories showed significant differences in how their resource diversity developed over time by applying multilevel longitudinal modeling (MLLM) via the *R*-package *nlme* (Pinheiro et al., 2022). In general, MLLM takes potential nesting of individuals into account (Field, 2018): based on an outcome variable, in our case depression over time, it indicates if individuals show distinct patterns of depression over time. First, we estimated the best fitting model to the data: model 1 included only fixed effects (i.e., depression levels at baseline do not vary across individuals and individuals show the same developmental pattern over time); model 2 included a random intercept and fixed slope (i.e., depression levels at baseline vary across individuals, but individuals show the same development in depression over time); and model 3 included a random intercept and slope (i.e., individuals vary in their baseline depression scores as well as development over time). Hence, this first step in MLLM can be seen as a validation of the LGM and SB-LDC approach. However, MLLM does not cluster individuals into groups of similar trajectories. Model selection was based on the log-likelihood ratio test. The best-fitting model was extended by taking complex error structures into account, i.e., autocorrelation and heteroscedasticity, and tested if these extensions led to an increased model fit. Finally, we included all risk and resource variables from the baseline, the grouping variable that indicated each person's depression trajectory, a variable for each participant's resource diversity at all three assessments, and an interaction term between these two variables to test if an individual's depression trajectory over time could be explained by its respective temporal pattern of resource diversity. For a more in-depth look, we also used univariate Kruskal–Wallis tests with the stepwise step-down procedure as posthoc tests to indicate significant differences between the resource diversity scores of the trajectories at each time point.

Qualitative and nested analyses

Using ATLAS.ti software, and Braun and Clarke's (2022) RTA approach, the first author analyzed 10% of the data. This involved labelling any part of the visual/narrative data that denoted any resilience-enabling resource (e.g., personal resources like physical health, positive meaning-making, self-regulation, agency, problem solving, etc.; relational resources like family or peer support, etc.; contextual resources like opportunity for education, mental health services, spaces to exercise or relax, access to technology, etc.; and cultural resources like faith-based beliefs, organized religion, or traditional rites of passage). For instance, a drawing of a cellular phone was labelled "access to technology" and the related explanation about YouTube music "taking the focus off stress and pain" was labelled "cellphone-supported music eases distress". Next, the first author grouped similar codes and assigned thematic labels to them (e.g., all codes relating to participants being constructively supported to shift their focus away from what was distressing them were themed "keeping busy/positively distracted").

The two RAs who facilitated the D&W activity then used the thematic labels to code the remaining data. Thereafter, they compared their coding; to resolve the limited number of differences,
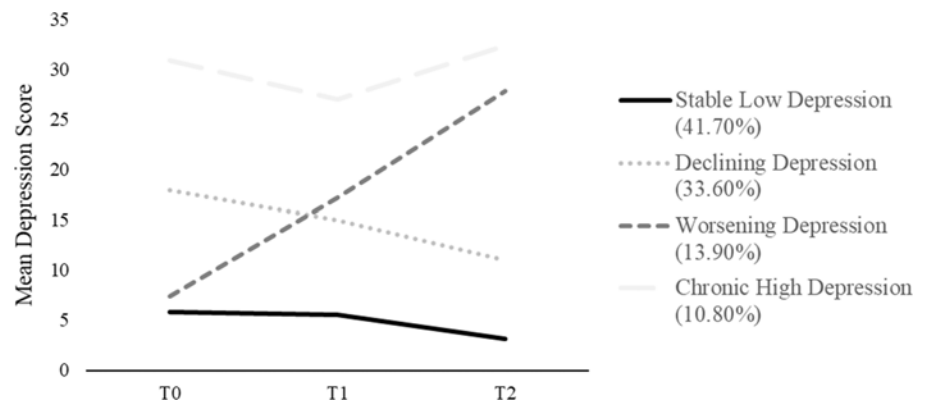
Figure 1. Mean scores of the identified depression trajectories.

they engaged in consensus discussions (Saldana, 2009). They shared the coded data with the first author. After she had considered it, she held further consensus discussions with the RAs to resolve the isolated instances where she questioned their coding decisions. Using the lens of multisystemic resilience (Masten et al., 2021; Ungar & Theron, 2020), she then grouped the thematic codes into three code groups with subthemes: Personal resources (i.e., constructive cognition, enabling agency, self-soothing behaviors, future orientation); relational resources (i.e., supportive family, friends, others); and ecological resources (i.e., opportunities for constructive downtime; institutional/service supports; faith-based supports; enabling opportunities for employment/education; enabling physical spaces).

Finally, following Hanson et al. (2005), integration was required to complete the qualitative data analysis. We used the four depression trajectories (identified in the quantitative study) to structure the qualitative findings. To that end, we grouped the analyzed qualitative data according to participants' trajectory membership and considered which, if any, code groups and subthemes were common across trajectories. We also considered whether any code groups were unique to a given trajectory, or if they manifested differently in a given trajectory. This shed light on the nature of the resource diversity associated with each trajectory.

Results/findings

Trajectories of depression

According to the BIC, the GBTM with the best fit to the data was the model with four trajectories (two trajectories = 4628.84, three trajectories = 4595.18, four trajectories = 4571.74, five trajectories = 4573.12). The BLRT was significant for all consecutive model comparisons ($p < .01$). The additional fifth trajectory of the five-trajectory solution was an extreme case of an already present trajectory of the four-trajectory solution, with only two participants included, and thus, based on model parsimony, theory, and the BIC, the four-trajectory solution was chosen. Next, a four-trajectory LCGA was tested to see if it fit the data better; this was not the case (BIC = 4578.20).

Based on the existence of four trajectories, we applied shape-based longitudinal data clustering to group the participants according to the shape of their depression trajectory. The final trajectories are presented in Figure 1. The trajectory that was shown by most participants was the *Stable Low* depression trajectory ($n = 93$, 41.70% of the sample [in the LGM model: 55.60%]); it was characterized by the lowest score of depression across all timepoints. The trajectory that was shown by the second largest number

of participants was the *Declining* depression trajectory ($n = 75$, 33.60% [in the LGM model: 31.00%]); it was characterized by a gradual decline of depression scores over time. The trajectory that was shown by the second smallest number of participants was the *Worsening* depression trajectory ($n = 31$, 13.90% [in the LGM model: 9.00%]); it was characterized by an increase of depression over time. The trajectory that was shown by the least participants was the *Chronic High* depression trajectory ($n = 24$, 10.80% [in the LGM model: 4.40%]); it was characterized by the highest depression scores at all assessments.

The Stable Low trajectory showed a significant decline in its depression score ($F = 11.91$, $p < .01$) between T0 ($M = 5.83$) and T2 ($M = 3.15$), but T1 ($M = 5.59$) did not significantly differ from T0. The same pattern was estimated for the Declining trajectory ($F = 11.67$, $p < .01$), i.e., depression at T0 ($M = 17.94$) differed significantly from depression at T2 ($M = 11.03$), but T1 ($M = 15.01$) did not significantly differ from T0. The Worsening trajectory showed significant differences ($F = 22.98$, $p < .01$) in its depression scores between T0 ($M = 7.37$) and T1 ($M = 17.19$) as well as T0 and T2 ($M = 27.90$). No significant differences were found for the Chronic High trajectory over time. See Supplemental Table 1 for all mean scores and standard deviations.

Differences between trajectories at baseline

The residuals of all variables except perception of neighborhood did not show a normal distribution ($p < .05$) and the covariance matrices of the trajectories were not equal ($Box\ M = 175.52$, $p < .01$). Hence, the Extended Multivariate Kruskal–Wallis test was used to test for significant differences between the identified four profiles in the risk and resource variables at baseline. This test was significant: $\chi^2 = 251.57$, $df = 39.79$, $p < .01$. The univariate Kruskal–Wallis tests showed no significant differences ($p > .05$) between the trajectories for age, peer support, and perception of neighborhood. With respect to significant differences between the trajectories (see Table 2), the Stable Low trajectory showed no significant differences from the Worsening trajectory in most analyzed variables at baseline except for caregiver support. Furthermore, the Stable Low trajectory showed significant differences from the Declining and Chronic High trajectories in most variables except family adversity. However, the family adversity score of the Declining trajectory was lower than that of the Chronic High trajectory. Thus, the nonsignificant difference between the Stable Low and Chronic High trajectory might be due to the different sample sizes of both groups. Otherwise, the Stable Low trajectory always showed significantly higher scores

Table 2. Posthoc tests for significant differences between the identified trajectories in risks and resources at baseline

	A. Stable low depression	B. Decreasing depression	C. Worsening depression	D. Chronic high depression
Physical health	78.25 [B,D]	68.70 [A]	73.46	64.75 [A]
Personal strengths	18.24 [B,D]	16.79 [A,D]	17.42 [D]	15.29 [A,B,C]
Caregiver support	31.73 [B,C,D]	27.75 [A,D]	29.06 [A,D]	24.67 [A,B,C]
Contextual support	67.46 [B,D]	60.62 [A,C]	66.01 [B,D]	58.70 [A,C]
Family adversity	1.88 [B]	2.57 [A,C]	1.97 [B]	2.78
Resource diversity	1.46 [B,D]	1.37 [A,C,D]	1.41 [B,D]	1.30 [A,B,C]

Note. Superscripted letters indicate significant differences between trajectories at $p < .01$.
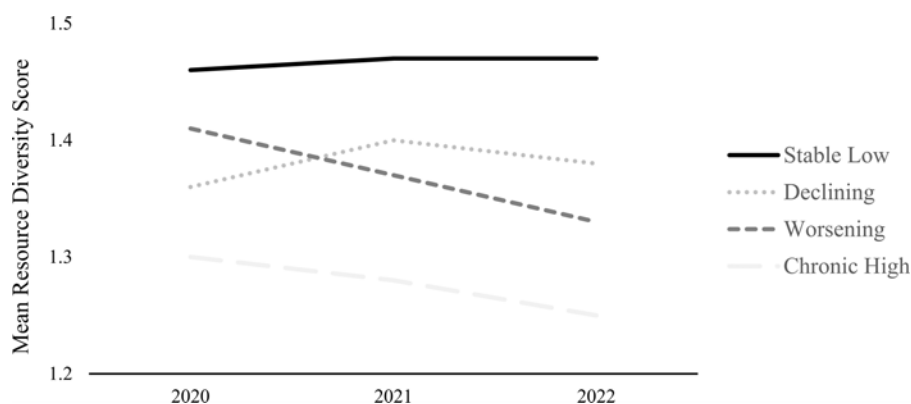
Figure 2. Longitudinal patterns of resource diversity for each trajectory of depression.

in the resources. Furthermore, the Declining trajectory differed from the Chronic High trajectory by showing significantly higher scores in personal strength, caregiver support, and resource diversity. Hence, the Chronic High trajectory showed the lowest scores in most variables.

Longitudinal patterns of resource diversity

First, model fit was estimated for three unconditional models: a fixed effect model (i.e., individuals do not differ in their baseline depression score and developmental patterns), a random-intercept-fixed-slope model (i.e., individuals differ in their baseline depression scores, but not in their developmental patterns), and a random-intercept-random-slope model (i.e., individuals vary in their baseline depression scores as well as development over time). While the random-intercept-fixed-slope model did not significantly differ from the fixed effect model ($L.Ratio = .85, p > .05$), the random-intercept-random-slope model showed the significantly best fit to the data (compared to the fixed effect model: $L.Ratio = 8.18, p < .05$). Furthermore a random-intercept-random-slope model that accounted for heteroscedasticity and autocorrelation over time improved model fit ($L.Ratio = 4.05, p < .05$). Hence, this model was used to estimate if the trajectories of depression differ in their longitudinal patterns of resource diversity. The Stable Low trajectory was the reference trajectory for comparisons. The only significant difference in longitudinal patterns of resource diversity was estimated between the Stable Low and Worsening trajectory ($b = -20.20, t = -2.77, p < .01$). Figure 2 shows that while the first trajectory showed a relatively stable resource diversity over time, the latter trajectory showed a decrease in resource diversity. Posthoc tests confirmed this result. While the resource diversity score of these two trajectories did not differ significantly

at baseline (mean of Stable Low trajectory = 1.46, mean of Worsening trajectory = 1.41), they differed significantly at T1 (mean of Stable Low trajectory = 1.47, mean of Worsening trajectory = 1.37, $p < .01$) and T2 (mean of Stable Low trajectory = 1.47, mean of Worsening trajectory = 1.33, $p < .01$). While the Declining and Chronic High depression trajectories did not differ significantly in their longitudinal patterns of resource diversity from the Stable Low depression trajectory, the cross-sectional resource diversity scores of the Declining and Chronic High depression trajectories were significantly lower compared to the Stable Low depression trajectory at each timepoint ($p < .05$).

Qualitative insights into resource diversity: commonalities and differences across trajectories

Nesting the qualitative findings in the trajectories allowed us to identify resource diversity as common across all trajectories, albeit less present in the Worsening and the Chronically High trajectories. We also identified two key differences: standalone personal resources were more prominently reported by participants in the Worsening and the Chronically High trajectories, whereas participants in the Stable Low and Declining trajectories emphasized relational resources. We detail these themes in what follows.

Multisystemic diversity is common across all trajectories

In all four trajectories, at least half of the participants reported multisystemic resource combinations at a single point in time or over time, including personal, relational, and/or ecological resources. Variation in these resources over time implied participant flexibility to make use of a range of resources and/or their social and physical ecology's capacity to provide a range of resources. Further, taken together over time, participant reports of what they
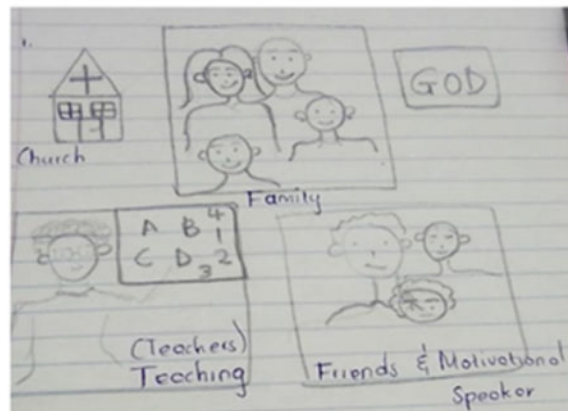
Figure 3. Participant 260's resources over time.

had experienced as resilience-enabling often pointed to multiple resources from a variety of systems. Among these, there was frequent mention of personal resources (mostly psychological strengths such as hopeful/adaptive meaning making or future-oriented agency); relational resources associated with family, peer, and school systems; developmentally appropriate resources associated with contextual systems and the physical ecology (e.g., music, social media, school- or community-based sports facilities); and culturally valued supports (e.g., faith-based beliefs and practices).

While these resources were ubiquitous across the trajectories, there was within and across group heterogeneity that reflected participants' personal circumstances, experiences and/or preferences. For example, Participant 260 (a Black, female 18-year-old in the Declining Depression trajectory) identified multiple relational, school- and faith-related resources and added personal strengths (e.g., the capacity to self-regulate) in her explanations. This resource combination remained constant over time (see Figure 3). Like Participant 260, participants in the Declining trajectory often included faith-related resources and were inclined to repeat them over time. In comparison, participants in the Worsening trajectory were even more likely to include faith-related resources, but these seldom recurred over time. Participant 108 (a Black, female 20-year-old in the Worsening Depression trajectory) was one of the exceptions; she reported a variety of resources over time with some recurring resources (including faith-based beliefs/practices):

> At baseline: I believe in God and he is able. I am left with my sisters, but we are separated . . . I live with my friends' aunty. I believe that one day, when God is ready, I'll meet my sisters and we will have a proper home like other people; at Time 1: attending church and listening to music and reading the bible and also my cellphone helped me to get through all the tough times I have experienced; I find peace when I'm with my friends and enjoyment. They are the best that has ever happened to me; at Time 2: I don't know what I could have done without them. I also like playing Facebook and WhatsApp to ease my mind. I like going on ice-cream and pizza dates; that's where I find peace.

Still, even though multisystemic resource combinations trumped reports of single resources, participants in the Declining Depression and Stable Low Depression trajectories reported broader, richer resource combinations compared to participants in the higher/worsening depression trajectories. In particular, participants reporting lower or lessening depression symptoms were more likely to include resources from the built or natural environment systems (e.g., libraries or parks) in resource combinations and to be robustly future orientated. Participant 94's (a Black, female 17-year-old in the Stable Low Depression trajectory) resource combinations in the explanations of her drawings at Baseline, Time 1, and Time 2 illustrate this rich diversity:

> This drawing shows my family . . . when times are hard my family will always be there for me and they support me a lot . . . motivate me and advise me and now I know what I want in life. What I like about myself is that I'm a hard worker and a goal getter because one day I want to see myself successful. Mostly I want to see myself being an example to other youths. So, in the hard times I know what I want, and I always believe that I will make it one day (Baseline); what I like is that my parents always advise me with important things so that one day I can be able to stand by myself . . . me and my friend, we love to go to the park when we don't have homework or jobs to do at home. We go there to have some fun. Every Sunday we always go to church. I am so happy because I have people who always guide me in my life. I am a student who is looking forward to her future and I'm having some big dreams (Time 1); my lovely friend who is always on my side; she helps me a lot through tough times. We help each other. When life gets hard on us, we never think of giving up at all. What comes to our mind is to stand up and focus more on our future because we have a bright future in front of us. We always put our studies first because that is what we are capable of. After school we go to the library to study there because it is very peaceful there . . . I am a student who knows what she wants, and I will always pray to God for everything in my life (Time 2)

Further, participants in the Worsening and Chronic High Depression trajectories were more likely to report multiple resources at baseline followed by single resources at Times 1 and 2 than participants in the other trajectories. For example, Participant 0-084 (a Black, female 15-year-old in the Worsening Depression trajectory) drew a building at Baseline and explained:

> School made me feel like the most alive human being ever and has made me somehow feel like I'm going somewhere in life and has made me see things differently. Being at school helped me to deal with anxiety and the pressure that I got at home. My teachers at school made me feel like I'm valuable and important . . . it has been a place of love and kindness.

At Time 1 and 2, however, she drew a single resource: a book labelled 'Bible'. The explanation was specific to the helpfulness of

Figure 4. Participant 53's drawing accentuates a self-focus.

faith-based practices: "The Bible has helped me a lot and guided me so much … it helped me learn that you have to invite God into everything; it helped me to learn about the power of prayer" (Time 2). Similarly, Participant 53 (a White, female 15-year-old) drew multiple resources at Baseline and wrote: "The tree symbolizes freedom and to grow into what you want to be … the earphone thread leads to family, hope, friends, happiness, respect and music … music makes you dance and feel much better". At Time 1 she drew a hand holding a baby's foot and explained: "The hand of a mother, because how would you have survived without your mother … together you are just better and can do anything". At Time 2, the only resource was herself. She drew a single figure (Figure 4) and wrote: "In this difficult time that the world is going through now, it is important to focus only yourself … be free and be strong … a perseverer wins".

No participant included physical health per se as a resource at any point in time, but some participants in the Stable Low and Declining trajectories did report multisystemic resource combinations that included healthy food or physical exercise. Participants in the Worsening and Chronic High trajectories made almost no mention of healthy food or physical exercise. When food or exercise were included by participants in the Stable Low and Declining trajectories, they enumerated their mental (rather than physical health) benefits. For example, Participant 133 (a Black, female

21-year-old in the Stable Low trajectory) included 'healthy lifestyle' in the resource combination she identified at Baseline and explained, 'My diet matters … it helps me think clearly and it gives me energy. I do well in school when my diet is good'. Similarly, Participant 130 (a Black, male 19-year-old in the Declining trajectory) included sport (basketball) in his resource blend and specified that it "keeps my mind at ease".

Interestingly, participants in the Declining trajectory were most likely to include resources that supported constructive downtime that was essentially active (e.g., playing sport; exercising; working out in a gym). References to physical activity (in tandem with multiple other resources) were also often sustained over time. For example, Participant 28 (a Black, male 16-year-old in the Declining Depression trajectory) explained his baseline, Time 1 and Time 2 drawings as follows:

> I feel like I can express how I'm feeling through the pain when I'm running on the track. The cross [in drawing] symbolizes God for me – I pray to him when I need to get through a rough time; he is my strength. And, my bros – I love them more than anything. They are always there for me … they helped me get through my depression. My sport life on the track and rugby field just helps me release all my pressure … and my friends are always there supporting me (Baseline); so, basically God drives me to do big things … I run in athletics because he gives me the strength, along with all the people I love and who love me. I'm a very active person – running and playing sport is my escape from the real world (Time 1); the cross represents where all my strength comes from: God! … track represents my passion for running – running takes my mind off the stressors in life. My family and friends keep me rooted (Time 2)

Self-reliance characterizes worsening and chronic high depression trajectories

Personal strengths (e.g., the capacity to take action, make hopeful/adaptive meaning, self-soothe, or regulate behavior) were reported by participants across all trajectories, both implicitly and explicitly. Still, many participants in the Worsening Depression and Chronic High Depression trajectories reported only personal strengths or emphasized their own role in coping with hardship. Sometimes, they linked this to loss (e.g., death) or having experienced destructive or unreliable relationships. For example, the accounts of Participant 203 (a Black, male 19-year-old in the Chronic High Depression trajectory) denoted that loss and subsequent isolation meant he had to be his own default resource over time:

> My mom died a long time ago. I try to do as many things as I can to make her happy. So, when life is hard, I think about her and realize that nothing can stop me from achieving and making my mom happy (Baseline); after the death of my mother, everything changed. I had to face life alone. No one was there to help me with anything (Time 1); I try to not think of anything stupid, like killing myself or doing illegal things (Time 2)

Participant 13 (a White, female 16-year-old in the Chronic High Depression trajectory) was similarly isolated. Over time, she reported an attenuated combination of resources that repeatedly implied human relationships are hurtful:

> Whenever I feel down, I listen to music like 21 Pilots because I identify with them (Baseline); I listen to music a lot of the time. It's easier to find music to relate to rather than people. I also have a huge love for dogs. They are amazing animals and always make me feel safe (Time 1); That [drawing] is a dog, cat, and book … they keep me grounded. When I feel like everything is bad, I can always count on animals. They never change and they don't judge you. They just be there for you … books give me an escape from all the bad around. Unlike life, the monsters in the books aren't real and that gives me comfort (Time 2)

Figure 5. Participant O-085's drawing emphasizes self-reliance and personal agency.

In other instances, participants reporting worsening or constantly elevated depression symptoms did not explain the genesis of their self-reliance. They simply accentuated the importance and/or feasibility of self-reliance. For instance, Participant O-085 (a Black, male 17-year-old in the Chronic High Depression trajectory) drew a picture (Figure 5) that celebrated personal agency and personal mastery, and explained it as follows: "I drew this picture because I want people to see that they can be their own company in life. You don't have to have anyone in life to get to where you want".

Also, when participants in the Worsening Depression and Chronic High Depression trajectories included tangible resources, they typically made solitary use of them or used them to avoid human interaction. Use of the pronoun 'I' and a sense of personal responsibility for their wellbeing was emphasized in how participants explained these tangible resources. For example, Participant O-095 (a Black, female 18-year-old in the Chronic High Depression trajectory) drew a green space and a journal at all three time points; her explanations pointed to her taking solo action to soothe herself (e.g., "The sound of running water helped me to be calm … I put all my thoughts and pain on paper"). Similarly, Participant 155 (a Black, female 18-year-old in the Worsening Depression trajectory) repeatedly reported solo activity. At baseline she said, "My cellphone helps me to feel better because it makes me avoid a lot of people; music is a soul healer", and at Time 1, "My cell phone has helped me a lot in destressing. I listen to music just to get peace. I eat fast food to make myself feel better. I eat ice cream while sitting on my bed."

Relational resources recur in stable low and declining depression trajectories

Participants in the Stable Low and Declining Depression trajectories reported relational resources more often – and more consistently – than participants in the Worsening Depression and Chronic High Depression trajectories. Their chief source of relational support was from their family, immediate (including siblings) and extended (mostly grandmothers). In addition, they referred to support from friends and a range of others (elders, community members, and teachers). References to friends included mention of strong, prosocial relational bonds (e.g., "My friends are my family; they inspire me to do better", Participant O-042, a white, male 17-year-old). Participants in these trajectories were also inclined to emphasize a relational connection to spiritual figures (rather than just the comforting value of faith-based practices). There was scant reference to helping relationships with mental health professionals.

Typically, these relational resources co-facilitated personal strengths (e.g., making adaptive meaning; being future oriented). For example, Participant 92 (a Black, female 16-year-old in the Stable Low Depression trajectory) consistently identified supportive people in her faith-based community. At Time 1 she reported that "The people in church have become like a family to me … they gave me courage and hope … I have a purpose to fulfil". Similarly, Participant 29 (a Black, male 17-year-old in the Declining Depression group) referred to his capacity to make meaning and solve problems in the context of multiple, mostly informal relational supports. He explained:

So, music plays a huge role in my life because I know it's never going to turn its back on me – I have [music] artists that get me through my situations. I mostly enjoy music with my friends . . . when I'm with them, I forget about my problems and just enjoy their company. My mom is my everything. With her on my side, I can get through anything. Her prayers got me pushing – I love that woman! My brother is my go-to person. Whenever I need him, I know that he is there for me. I look up to that oke! . . . Then there is my human diary, my psychologist (she's actually a social worker) . . . she got me releasing things that got me down in the past.

In comparison, participants in the Worsening and Chronic High trajectories made more frequent mention of support from friends than from family. Their references to family were mostly to their immediate family, with mothers being the only source of family-related support identified by participants in the Chronic High trajectory. While mothers were specifically and repeatedly mentioned by participants in the other three trajectories too, family-related supports in those trajectories were not confined to mothers only. Further, participants in the Worsening and Chronic High trajectories made almost no mention of support from community members or teachers. As in the other trajectories, there was scant mention of support from mental health professionals.

When participants in trajectories showing worsening or consistently high depression symptoms reported relational resources, they emphasized the regulatory and/or comfort value these relationships afforded them. For example, Participant 73 (a Black, female 15-year-old in the Chronic High trajectory) drew her mother at all three time points. Her explanations emphasized her emotional reliance on her mother (e.g., "My mom is someone really important to me, no matter what she says (negative) . . . When I think of committing suicide, she is the first person to occupy my mind and I will immediately stop"). Similarly, Participant O-006 (a Mixed Race, female 16-year-old in the Worsening trajectory) also repeatedly identified her mother as a comforting resource (e.g., "My mom . . . my shoulder to cry on").

While the comfort value of relational resources was also acknowledged by participants in the Declining and Stable Low Depression trajectories, they were more likely to also report being inspired by relational connections. For example, Participant 131 (a Black, female 19-year-old in the Declining Depression trajectory) credited her mother for her future-oriented agency and self-efficacy: "My mother is my root, my foundation. She planted the seed that I base my life on and that is the belief that the ability to succeed starts in your mind". Likewise, Participant 71 (a Black, female 16-year-old in the Stable Low Depression trajectory) drew human figures at Time 1. She identified them as "my grandparents" and explained that they raised her as her biological mother was a high school student who needed to complete her education. Her grandparents' stoicism inspired her:

They motivate me by the way they grew up. There was poor education for Black people in their time, but they never gave up. They avoided nasty things like substance abuse, prostitution, crime, etc. They had to be patient and have perseverance so that they can live their longest healthy life even when it was tough. That makes me feel like everything is possible. I can pursue my dreams . . . our generation has many more opportunities than Apartheid time . . . now education is free, there is financial assistance like bursaries, etc. (Time 1)

Aligned with traditional African culture and youth socialization to contribute generatively to their families and communities, this young woman was not only motivated to improve her own circumstances but that of her family as well. At Time 2, she again drew a human figure and identified it as her biological mother. She explained: "Seeing her struggling as a single parent makes me to push harder in my studies so that I can help her in future; I want her to live like a queen one day".

Discussion

The current study used a concurrent nested mixed methods design to identify and better understand the multisystemic supports that protected a sample of sub-Saharan (i.e., South African) adolescents from reporting elevated symptoms of depression over time in a context of chronic risk. This included longitudinal mixture modeling to identify distinct developmental trajectories of depression and participant-generated arts-based accounts of the resources that were personally meaningful to how they navigated challenges. In so doing, our study signifies a departure from the more typical cross-sectional attention to depression found in studies of sub-Saharan adolescents and the related tendency to homogenize and simplify accounts of what protects sub-Saharan adolescents from reporting elevated depression symptoms.

As presaged by Bonanno (2004), adolescent participants clustered into four depression trajectories: Stable Low, Declining, Worsening, and Chronic High. It was unsurprising that most participants belonged to the Stable Low and Declining trajectories given understandings that adaptive trajectories are common (Bonanno, 2021a, 2021b). The total percentage (i.e., 24.7%) of the sample that fit into the less adaptive trajectories [i.e., Worsening (13.90%) and Chronic High depression trajectories (10.80%)] also fit current sub-Saharan adolescent depression point prevalence estimates (26.9% generally; 29% among at-risk adolescents; Jörns-Presentati et al., 2021). However, this percentage is much higher than what was reported for lifetime prevalence of depression among a nationally representative sample of South African 15–17-year-olds: 2.05% among adolescents not reporting abuse and 6.34% among adolescents reporting abuse (Ward et al., 2018). The higher age range of our sample could perhaps explain this difference (i.e., older adolescents in a highly challenged environment might have had more exposure to risks associated with depression), as could the fact that our study was conducted during the COVID-19 pandemic. As in other parts of the world, adolescent depression rates in South Africa rose during this period (Haag et al., 2022).

What distinguished these four trajectories? As anticipated, the Chronic High trajectory was characterized by limited resources at baseline and over time. While measured resources showed multisystemic diversity, young people's own accounts attested to an attenuated resource combination that emphasized personal strengths, solitary use of contextual resources (e.g., listening to music alone, praying alone), and friend-/mother-facilitated relational supports. As theorized by Cotton et al. (2006), the self-emphasis and narrow range of relational supports could point to negative interpersonal experiences. Alternatively, sustained higher levels of depression could have blunted awareness of social, institutional, or ecological supports and/or stunted agency to use them (Shorey et al., 2022). Whatever the reason, the emphasis on the self in the narrow resource combination of those reporting higher levels of depression symptoms challenges long-held assumptions about the protective value of personal strengths as vulnerability to depression increases in a chronically challenged sub-Saharan context.

In comparison to the Chronic High trajectory, and contrary to our first hypothesis, most measured resources (i.e., physical health, personal strengths, contextual supports) were comparably high for the Stable Low and Worsening trajectories at baseline. The exception was caregiver support, with the Stable Low trajectory showing

a significantly higher score. Similarly, the qualitative findings showed relational resource prominence among participants in the Stable Low trajectory, with emphasis on family (i.e., parental/caregiver) supports. In other words, while multisystemic resources were more or less equally common to both the Stable Low and Worsening trajectories at baseline, the Stable Low resource combination was distinguished by caregiver supports that appeared to provide a protective edge. This would certainly align with the emphasis on family supports in Rueger et al. (2016) meta-analysis of adolescent social supports that protect against depression and the protective recurrence of caregiver support in cross-sectional sub-Saharan studies of adolescent resilience (Campbell & Osborn, 2021; Nyundo et al., 2020; Theron et al., 2022) and over time (Shenderovich et al., 2021). Caregiver supports were similarly prominent in systematic reviews of PFPs that support adolescent resilience in sub-Saharan Africa (Theron, 2020; Van Breda & Theron, 2018). Nevertheless, while it may be tempting to credit caregiver support for the sustained low depression outcome of most participants, it is important to remember that caregiver supports worked in combination with physical health, personal strengths, peer support, and contextual supports (spiritual, educational, and cultural/community resources) creating a dense matrix of co-occurring resources.

Compared to the Stable Low, the Declining trajectory was characterized by significantly lower resource levels of all measured resources. Without the qualitative insights, it would therefore have been difficult to explain the decline in depression levels. Contextual PFPs that supported active and constructive downtimes distinguished the resource combinations of young people in the Declining trajectory. They were most inclined to be active in sports or to seek out opportunities to be physically active. While physical activity is strongly associated with lower levels of depression (Dale et al., 2019; Rodriguez-Ayllon et al., 2019), it was interesting that participants in the Declining trajectory often reported physical activity together with friends or appreciated how their friends cheered them on when they were involved in sports. In addition, like the Stable Low group, young people in the Declining trajectory reported a mix of relational resources from their immediate and extended family and community.

Although resource diversity at baseline did not distinguish between the Stable Low and Worsening trajectory, their respective longitudinal patterns of resource diversity were important: the Stable Low trajectory showed a relatively stable resource diversity over time, but the resource diversity of the Worsening trajectory decreased over time, thereby partially confirming our second hypothesis. In comparison, the longitudinal pattern of resource diversity of the Declining and Chronic High trajectory was not significantly different from that of the Stable Low trajectory, but their timepoint-specific scores were always significantly lower compared to the resource diversity scores of the stable low trajectory (hence confirming our second hypothesis).

A closer read of the qualitative findings highlights the culturally congruent nature of the resource diversity of the Stable Low and Declining trajectories. While all trajectories included organized religion and spiritual beliefs which are valued in traditional African culture (Ojagbemi & Gureje, 2020), these were reported least in the Chronic High trajectory. In the Worsening trajectory, faith-based resources were prominent but seldom recurred in the resource-combinations reported over time. In contrast, they were regularly included in the Stable Low and Declining resource-combinations, also over time. Similarly, the relational resource diversity

(i.e., immediate family, extended family, friends, and a variety of community members) reported in the Stable Low and Declining trajectories parallels traditional African valuing of a family-community network that transcends relational silos (family; community) and biological connections. In a family-community, friends/community members are regarded as kin and take on family-like responsibilities (e.g., providing emotional or material support; co-regulating behavior), as do extended relatives (Theron & Van Breda, 2021). Family-community connections might well have compensated for the significantly higher family adversity score of the Declining trajectory at baseline. Further, young people in these healthier trajectories sometimes reported future aspirations that would benefit their families/future generations (i.e., as valorized in traditional African culture, they wanted to be productive, generous contributors to the greater collective; Mhlongo, 2019).

Taken together, and as prefaced by understandings that the capacity for resilience is rooted in "ordinary" resources (Masten, 2014) that are distributed across multiple systems (Masten & Cicchetti, 2016; Masten et al., 2021; Ungar & Theron, 2020), our results and findings confirm that better mental health outcomes – also over time – are rooted in a multisystemic constellation of everyday resources that co-facilitate positive adaptation. What our study adds is that constellations characterized by within and across system diversity and cultural responsiveness are more protective. While narrower (i.e., limited mention of resources that support physical health and of school/cultural resources) and relationship-restricted (typically friends and mothers) resource-combinations characterized Chronic High and Worsening depression trajectories, the opposite was true for Declining and Stable Low depression. These trajectories showed resource diversity within a single system (i.e., a range of relational resources within the family system) and across systems (i.e., a range of personal, social, contextual, and ecological resources). Diversity over time implied participant flexibility to make use of a range of resources and/or their social and physical ecology's capacity to provide a range of resources (i.e., they could well have been connected to resilient systems). Further, the healthier trajectories included a resource mix that aligned better with traditional African culture's valuing of interdependent and enabling mutuality (as expressed in family-community connections, sustained spirituality, and commitment to the collective).

Limitations

We recruited young people from the general (not clinical) population and invited them to self-report depression symptoms. Further, we restricted this general population to two disadvantaged communities in a resource-constrained municipality. Our decision was informed by the strong association between depression and socioeconomic disadvantage in South Africa (Mungai & Bayat, 2019), and limited access to mental health services (Babatunde et al., 2020; Lu et al., 2018; Stelmach et al., 2022). Still, this strategy could not guarantee high numbers of participants with elevated depression symptoms.

Our choice of arts-based methodology (D&W) was informed by its popularity in South Africa, both with researchers and adolescents (Mitchell et al., 2011). It is not only associated with rich data sets, but also with low demands on adolescent capacity to express themselves verbally (and candidly) to adult researchers. Creating

conditions to help adolescents express themselves more freely has proven challenging in sub-Saharan contexts and stymied data generation (Theron, 2016). While interviews in participants' mother tongue might have produced an even richer data set, we considered the data collected in English rich enough for a concurrent nested mixed methods design in which the quantitative data were weighted.

Even though our quantitative study was novel in the sub-Saharan context, it was not without its own limitations. First, we used a common data- and theory-driven approach to identify trajectories of depression and were able to replicate the four common trajectories found in resilience research (Bonanno, 2004; Galatzer-Levy et al., 2018), but only the most restrictive model fit our data best. This has been criticized in the past, with concerns about a related overemphasis of the stable low trajectory (Infurna & Luthar, 2018). While the identified stable low trajectory was the largest, the size of this group was lower than in other longitudinal studies (Bonanno, 2021a). This could reflect the application of shape-based clustering. Also, the number of participants varied significantly across the trajectories and the Chronic High trajectory was especially small. Even though we applied a nonparametric analysis to account for this and other issues with the data, some results were still unexpected (e.g., the nonsignificant difference between the Chronic High and other trajectories for family adversity). Hence, future studies should strive for a larger sample size to have sufficiently large subgroup (trajectory) sizes for more robust analyses. Furthermore, the combination of having consecutive assessments six months apart and measuring depression as the outcome with an instrument that investigates depressive symptoms within the last two weeks (Beck et al., 1996) could have led to the nonidentification of important trajectories. Depression might be a fast-evolving psychopathology (Höltge et al., 2021; Lunansky et al., 2020). If so, it could have fluctuated more in 6 months than captured by our study's design. Hence, future studies are needed with shorter intervals between assessments that at least match the timeframe of the outcome. Additionally, all included risks and resources were self-reported and thus based only on the perspective of the individual adolescent. Finally, except for the BDI-II, all applied measures lack psychometric studies with regards to their reliability and validity in the context of South African youth at risk. Even though this study showed sufficient reliability for the applied measures, their validity in the studied context warrants future investigation.

Implications for research and practice

Despite its limitations, our study offers useful implications for future studies of the multisystemic PFPs that could protect sub-Saharan adolescents from reporting worsening or elevated symptoms of depression. A particularly significant resource in the context of multisystemic resilience might be flexibility (Bonanno, 2021b). Although an individual might have a diverse set of resources available, if the individual is not sufficiently flexible in using the right resources at the right time and place, then resource diversity might not be able to predict resilience. While this flexibility was implicit in young people's arts-based accounts of PFPs that they had found meaningful, it would be useful to measure flexibility in future studies and to explore young people's capacity for flexibility more explicitly in qualitative work. Further, to be consistent with the science of multisystemic resilience, future studies should include a diverse range of resource systems and objective measures

of these (e.g., internal resources such as biological markers of stress and resilience, Boyce & Ellis, 2005; Geographic Information Systems (GIS) data, Ungar et al., 2021). Similarly, it will be necessary to investigate the resilience of the systems adolescents are connected to, and within/across system impacts when system resilience increases or declines. Given the prominence of caregiver/family supports in sub-Saharan adolescent resilience (Theron, 2020; Van Breda & Theron, 2018), and understanding that caregiver resilience is associated with adolescent resilience (Bruno et al., 2023), future studies of African adolescent resilience ideally need to investigate their caregivers' resilience and factors associated with that resilience. Further, because adolescents also impact the systems they are connected to (Masten et al., 2021), it will be important to investigate how changes in adolescent resilience trajectories impact the systems that support them. As suggested by Ungar (2021), all this will require a multidisciplinary team with the capacity and will to work together in the interests of advancing multisystemic resilience science.

Moreover, while our study showed that a more diverse/richer resource combination was associated with greater mental health, it did not suggest an optimal number of multisystemic resources. Research investigating the usefulness of the United Nations Development Program's concept of accelerators (PFPs that accelerate the realization of a sustainable development goal) has prompted interest in an optimal number of resources (Sherr et al., 2023). In South Africa, for example, the probability of no depression in a sample of adolescents from resource-constrained communities in the Eastern Cape increased from 65.5% to 83.9% with access to a single PFP (community-based services). However, when this PFP was combined with living in a safe community and parental praise, the probability rose to 93.1% and 97.9% respectively. When further accelerators were added, improvements were relatively small. Given dwindling public resources, especially in Africa and other LMIC contexts, future studies should explore the possibility of optimal resource diversity for adolescent resilience to depression and the number of systems and resources associated with that.

Regarding practice, our study shows that time-point specific scores as well as patterns over time are important to explain why some adolescents show mental health resilience and others do not. Mental health practitioners should preferably not rely on single timepoint measurements. More importantly, our study is a timely reminder to practitioners to avoid interventions that are narrowly focused on building/sustaining psychological strengths. Instead, practitioners need to partner with adolescent clients and fundamental systems (e.g., family, peer group, school community) to build and modify resource networks that are characterised by within/across system diversity and situational/cultural relevance. Greater mental health benefits will likely accrue from supporting young people to access and make use of contextually responsive resource combinations (Ungar & Theron, 2020).

Our study also encourages questioning of culturally biased developmental myths (e.g., adolescents prefer non-family supports) and how these might shape the resources adolescents can access. Specifically, the salience of family supports in our study suggests more appreciation is needed for the continued importance of parents, siblings, and relatives during adolescence, especially when conducting studies in LMIC contexts. While a growing number of studies show this continued importance (Rueger et al., 2016), many practitioners and communities anticipate that adolescents no longer require/benefit from family supports. Further, our study

prompted appreciation of contextually relevant interpretations of family, including the family-community (Theron & Van Breda, 2021). Relatedly, in sub-Saharan Africa with its very limited number of mental health practitioners (Babatunde et al., 2020; Lu et al., 2018; Stelmach et al., 2022), it will be important to involve the family and community in supporting adolescents to manage mental health challenges and build resilience. Task-sharing is one way of doing this (Karyotaki et al., 2022). The Youth Friendship Bench, which was developed in Zimbabwe (Broström et al., 2021), is a particularly promising intervention that signals that the family-community includes youth capable of task-sharing. Training youth to support their peers' mental health in an informal, friendly conversational way is consistent with traditional African culture. To fit with the science of multisystemic resilience, however, it will be important to support these youth to understand the multisystemic roots of mental health and to avoid an over-emphasis on personal strengths.

Conclusion

Our study afforded rare insight into the multisystemic PFPs that supported the mental health of a sample of sub-Saharan (i.e., South African) adolescents over time. In the face of relentless adversity, young people in our study typically reported Declining or Stable Low depression trajectories; these adaptive responses were characterized by systemically diverse and contextually responsive combinations of resilience-enabling resources. The emphasis on family-community and faith-based supports in these resource combinations matched traditional African valuing of interdependence and spirituality. Taken together, these results dampen enthusiasm for accounts of African adolescent mental health resilience that are culturally neutral, valorize Western values or individual ruggedness, and/or accentuate maladaptive outcomes to the significant risks that abound in Africa (Kabiru et al., 2013; Ratele, 2019; Theron, 2020). Going forward, access to culturally meaningful and multisystemic resource combinations will be key to protecting the mental health of vulnerable young people in sub-Saharan Africa, as will the message that their resilience is not their personal responsibility but a collective one.

Ethical approval. This article does not contain any studies with animals performed by any of the authors. The study received ethical clearance for work with human participants from the Faculty of Health Sciences Research Ethics Committee and Faculty of Education Ethics Committee, University of Pretoria (clearance number: UP17/05/01). All participants (and parents/legal guardians for <18 participants) provided consent prior to participation. Because some participants contributed telephonically/virtually, written or verbal consent procedures were permitted. If participants could not provide written consent (e.g., they had no access to a device that facilitated completion of the consent form in writing), trained research assistants (RAs) read all items in the consent form to them and audio-recorded their responses. The recordings were uploaded to a password-protected repository.

References

Angell, C., Alexander, J., & Hunt, J. A. (2015). Draw, write and tell: A literature review and methodological development on the draw and write research method. *Journal of Early Childhood Research*, *13*(1), 17–28. https://doi.org/10.1177/1476718X14538592

Babatunde, G. B., Bhana, A., & Petersen, I. (2020). Planning for child and adolescent mental health interventions in a rural district of South Africa: A situational analysis. *Journal of Child & Adolescent Mental Health*, *32*(1), 45–65. https://doi.org/10.2989/17280583.2020.1765787

Baird, S., Ezeh, A., Azzopardi, P., Choonara, S., Kleinert, S., Sawyer, S., Patton, G., & Viner, R. (2022). Realising transformative change in adolescent health and wellbeing: A second Lancet Commission. *The Lancet*, *400*(10352), 545–547. https://doi.org/10.1016/s0140-6736(22)01529-x

Bauer, D. J., & Curran, P. J. (2003). Distributional assumptions of growth mixture models: Implications for over-extraction of latent classes. *Psychological Methods*, *8*(3), 338–363. https://doi.org/10.1037/1082-989X.8.3.338

Beck, A. T., Steer, R. A., & Brown, G. (1996). *Manual for the Beck Depression Inventory-II*. Psychological Corporation.

Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, *59*(1), 20–28. https://doi.org/10.1037/0003-066x.59.1.20

Bonanno, G. A. (2021a). The resilience paradox. *European Journal of Psychotraumatology*, *12*(1), 1942642. https://doi.org/10.1080/20008198.2021.1942642

Bonanno, G. A. (2021b). *The end of trauma: How the new science of resilience is changing how we think about PTSD*. Basic Books.

Boyce, W. T., & Ellis, B. J. (2005). Biological sensitivity to context: I. An evolutionary-developmental theory of the origins and functions of stress reactivity. *Development and Psychopathology*, *17*(02), 271–301. https://doi.org/10.1017/s0954579405050145

Braun, V., & Clarke, V. (2022). Conceptual and design thinking for thematic analysis. *Qualitative Psychology*, *9*(1), 3–26. https://doi.org/10.1037/qup0000196

Broström, S., Johansson, B. A., Verhey, R., & Landgren, K. (2021). Seeing a brighter future"–experiences of adolescents with common mental disorders receiving the problem-solving therapy "youth friendship bench, in Zimbabwe. *Issues in Mental Health Nursing*, *42*(11), 1019–1029. https://doi.org/10.1080/01612840.2021.1924323

Bruno, W., Dehnel, R., & Al-Delaimy, W. (2023). The impact of family income and parental factors on children's resilience and mental well-being. *Journal of Community Psychology*. https://onlinelibrary.wiley.com/doi/full/10.1002/jcop.22995

Cairns, K. E., Yap, M. B. H., Pilkington, P. D., & Jorm, A. F. (2014). Risk and protective factors for depression that adolescents can modify: A systematic review and meta-analysis of longitudinal studies. *Journal of Affective Disorders*, *169*, 61–75. https://doi.org/10.1016/j.jad.2014.08.006

Campbell, S., & Osborn, T. L. (2021). Adolescent psychopathology and psychological wellbeing: A network analysis approach. *BMC Psychiatry*, *21*(1), 1–13. https://doi.org/10.1186/s12888-021-03331-x

Canham, H. (2018). Theorising community rage for decolonial action. *South African Journal of Psychology*, *48*(3), 319–330. https://doi.org/10.1177/0081246318787682

Cotton, S., Zebracki, K., Rosenthal, S. L., Tsevat, J., & Drotar, D. (2006). Religion/spirituality and adolescent health outcomes: A review. *Journal of Adolescent Health*, *38*(4), 472–480. https://doi.org/10.1016/j.jadohealth.2005.10.005

Dale, L. P., Vanderloo, L., Moore, S., & Faulkner, G. (2019). Physical activity and depression, anxiety, and self-esteem in children and youth: An umbrella systematic review. *Mental Health & Physical Activity*, *16*, 66–79. https://doi.org/10.1016/j.mhpa.2018.12.001

Field, A. (2018). *Discovering statistics using IBM SPSS statistics*. Sage.

Fransman, T., & Yu, D. (2019). Multidimensional poverty in South Africa in 2001-16. *Development Southern Africa*, 36(1), 66–79. https://doi.org/10.1080/0376835X.2018.1469971

Freeny, J., Peskin, M., Schick, V., Cuccaro, P., Addy, R., Morgan, R., Lopez, K. K., & Johnson-Baker, K. (2021). Adverse childhood experiences, depression, resilience, & spirituality in African-American adolescents. *Journal of Child & Adolescent Trauma*, 14(2), 209–221. https://doi.org/10.1007/s40653-020-00335-9

Galatzer-Levy, I. R., Huang, S. H., & Bonanno, G. A. (2018). Trajectories of resilience and dysfunction following potential trauma: A review and statistical evaluation. *Clinical Psychology Review*, 63, 41–55. https://doi.org/10.1016/j.cpr.2018.05.008

Geiser, C. (2013). *Data analysis with Mplus*. Guilford.

Genolini, C., Ecochard, R., Benghezal, M., Driss, T., Andrieu, S., & Subtil, F. (2016). kmlShape: An efficient method to cluster longitudinal data (time-series) according to their shapes. *PLoS ONE*, 11(6), e0150738. https://doi.org/10.1371/journal.pone.0150738

Gillham, J., Adams-Deutsch, Z., Werner, J., Reivich, K., Coulter-Heindl, V., Linkins, M., Windwer, B., Peterson, C., Park, N., Abenavoli, R., Contero, A., Seligman, M. E. (2011). Character strengths predict subjective well-being during adolescence. *The Journal of Positive Psychology*, 6(1), 31–44. https://doi.org/10.1080/17439760.2010.536773

Haag, K., Du Toit, S., Skeen, S., Steventon Roberts, K., Chideya, Y., Notholi, V., Sambudla, A., Gordon, S., Sherr, L., Tomlinson, M. (2022). Predictors of COVID-related changes in mental health in a South African sample of adolescents and young adults. *Psychology, Health & Medicine*, 27, 239–255. https://doi.org/10.1080/13548506.2022.2108087

Hagerty, S. L., Hutchison, K. E., Lowry, C. A., & Bryan, A. D. (2020). An empirically derived method for measuring human gut microbiome alpha diversity: Demonstrated utility in predicting health-related outcomes among a human clinical sample. *PLoS One*, 15(3), e0229204. https://doi.org/10.1371/journal.pone.0229204

Hanson, W. E., Creswell, J. W., Clark, V. L. P., Petska, K. S., & Creswell, J. D. (2005). Mixed methods research designs in counseling psychology. *Journal of Counseling Psychology*, 52(2), 224–234. https://doi.org/10.1037/0022-0167.52.2.224

He, F., Mazumdar, S., Tang, G., Bhatia, T., Anderson, S. J., Dew, M. A., Krafty, R., Nimgaonkar, V., Deshpande, S., Hall, M., Reynolds III, C. F. (2017). Non-parametric MANOVA approaches for non-normal multivariate outcomes with missing values. *Communications in Statistics-Theory and Methods*, 46(14), 7188–7200. https://doi.org/10.1080/03610926.2016.1146767

Höltge, J., Theron, L., & Ungar, M. (2021). A multisystemic perspective on the temporal interplay between adolescent depression and resilience-supporting individual and social resources. *Journal of Affective Disorders*, 297, 225–232. https://doi.org/10.1016/j.jad.2021.10.030

Infurna, F. J., & Luthar, S. S. (2018). Re-evaluating the notion that resilience is commonplace: A review and distillation of directions for future research, practice, and policy. *Clinical Psychology Review*, 65, 43–56. https://doi.org/10.1016/j.cpr.2018.07.003

Jörns-Presentati, A., Napp, A. K., Dessauvagie, A. S., Stein, D. J., Jonker, D., Breet, E., Charles, W., Swart, R. L., Lahti, M., Suliman, S., Jansen, R., van den Heuvel, L. L., Seedat, S., Groen, G. (2021). The prevalence of mental health problems in sub-Saharan adolescents: A systematic review. *PLoS ONE*, 16(5), e0251689. https://doi.org/10.1371/journal.pone.0251689

Kabiru, C. W., Izugbara, C. O., & Beguy, D. (2013). The health and wellbeing of young people in sub-Saharan Africa: An under-researched area? *BMC International Health and Human Rights*, 13(1), 1–7. https://doi.org/10.1186/1472-698x-13-11

Kariba, F. (2020, July 30). The burgeoning Africa youth population: Potential or challenge? *CitiesAlliance*. https://www.citiesalliance.org/newsroom/news/cities-alliance-news/%C2%A0burgeoning-africa-youth-population-potential-or-challenge%C2%A0

Karyotaki, E., Araya, R., Kessler, R. C., Waqas, A., Bhana, A., Rahman, A., Matsuzaka, C. T., Miguel, C., Lund, C., Garman, E. C., Nakimuli-Mpungu, E., Petersen, I., Naslund, J. A., Schneider, M., Sikander, S., Jordans, M. J. D., Abas, M., Slade, P., Walters, S., . . . Patel, V. (2022).

Association of task-shared psychological interventions with depression outcomes in low-and middle-income countries: A systematic review and individual patient data meta-analysis. *JAMA Psychiatry*, 79(5), 430. https://doi.org/10.1001/jamapsychiatry.2022.0301

Labella, M. H., Narayan, A. J., McCormick, C. M., Desjardins, C. D., & Masten, A. S. (2017). Risk and adversity, parenting quality, and children's social-emotional adjustment in families experiencing homelessness. *Child Development*, 90(1), 227–244. https://doi.org/10.1111/cdev.12894

Lerner, R. M., Lerner, J. V., Almerigi, J. B., Theokas, C., Phelps, E., Gestsdottir, S., Naudeau, S., Jelicic, H., Alberts, A., Ma, L., Smith, L. M., Bobek, D. L., Richman-Raphael, D., Simpson, I., Christiansen, E. D., von Eye, A. (2005). Positive youth development, participation in community youth development programs, and community contributions of fifth-grade adolescents: Findings from the first wave of the 4-H study of positive youth development. *The Journal of Early Adolescence*, 25(1), 17–71. https://doi.org/10.1177/0272431604272461

Lu, C., Li, Z., & Patel, V. (2018). Global child and adolescent mental health: The orphan of development assistance for health. *PLoS Medicine*, 15(3), e1002524. https://doi.org/10.1371/journal.pmed.1002524

Lunansky, G., van Borkulo, C., & Borsboom, D. (2020). Personality, resilience, and psychopathology: A model for the interaction between slow and fast network processes in the context of mental health. *European Journal of Personality*, 34(6), 969–987. https://doi.org/10.1002/per.2263

Makhubela, M. S., & Mashegoane, S. (2016). Validation of the Beck Depression Inventory-II in South Africa: Factorial validity and longitudinal measurement invariance in university students. *South African Journal of Psychology*, 46(2), 203–217. https://doi.org/10.1177/0081246315611016

Masten, A. S. (2014). *Ordinary magic: Resilience in development*. Guilford Publications.

Masten, A. S., & Cicchetti, D. (2016). Resilience in development: Progress and transformation. In D. Cicchetti (Ed.), *Developmental psychopathology: Risk, resilience, and intervention* (pp. 271–333). John Wiley & Sons, Inc. https://doi.org/10.1002/9781119125556.devpsy406

Masten, A. S., Lucke, C. M., Nelson, K. M., & Stallworthy, I. C. (2021). Resilience in development and psychopathology: Multisystem perspectives. *Annual Review of Clinical Psychology*, 17(1), 521–549. https://doi.org/10.1146/annurev-clinpsy-081219-120307

Maugoust, J. (2022). *ULT: Useful little things*. R package version 1.5. https://github.com/jacobmaugoust/ULT/

Mhlongo, N. (Ed.). (2019). *Black tax: Burden or ubuntu?* Jonathan Ball Publishers.

Mitchell, C., Theron, L. C., Stuart, J., Smith, A., & Campbell, Z. (2011). Drawings as research method. In L. C. Theron, C. Mitchell, J. Stuart, & A. Smith (Eds.), *Picturing research: Drawings as visual methodology* (pp. 19–36). Sense Publishers.

Morris, E. K., Caruso, T., Buscot, F., Fischer, M., Hancock, C., Maier, T. S., & Rillig, M. C. (2014). Choosing and using diversity indices: Insights for ecological applications from the German Biodiversity Exploratories. *Ecology and Evolution*, 4(18), 3514–3524. https://doi.org/10.1002/ece3.1155

Mungai, K., & Bayat, A. (2019). An overview of trends in depressive symptoms in South Africa. *South African Journal of Psychology*, 49(4), 518–535. https://doi.org/10.1177/0081246318823580

Muthén, L. K., & Muthén, B. O. (2017). *Mplus user's guide* (8th ed.). Muthén & Muthén.

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling*, 14(4), 535–569. https://doi.org/10.1080/10705510701575396

Nyundo, A., Manu, A., Regan, M., Ismail, A., Chukwu, A., Dessie, Y., Njau, T., Kaaya, S. F., & Smith Fawzi, M. C. (2020). Factors associated with depressive symptoms and suicidal ideation and behaviours amongst sub-Saharan African adolescents aged 10-19 years: Cross-sectional study. *Tropical Medicine & International Health*, 25(1), 54–69. https://doi.org/10.1111/tmi.13336

Ojagbemi, A., & Gureje, O. (2020). The importance of faith-based mental healthcare in African urbanized sites. *Current Opinion in Psychiatry*, 33(3), 271–277. https://doi.org/10.1097/YCO.0000000000000590

Oppong Asante, K., Quarshie, E. N.-B., & Andoh-Arthur, J. (2021). COVID-19 school closure and adolescent mental health in sub-Saharan Africa. *International Journal of Social Psychiatry*, 67(7), 958–960. https://doi.org/10.1177/0020764020973684

Pinheiro, J., Bates, D., & R Core Team (2022). *nlme: Linear and nonlinear mixed effects models*. R package version 3.1-161. https://CRAN.R-project.org/package=nlme

Ratele, K. (2019). *The world looks like this from here: Thoughts on African psychology*. Wits University Press.

R Core Team (2022). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Rincon Uribe, F. A., Neira Espejo, C. A., & Pedroso, J. D. S. (2022). The role of optimism in adolescent mental health: A systematic review. *Journal of Happiness Studies*, 23(2), 815–845. https://doi.org/10.1007/s10902-021-00425-x

Rodriguez-Ayllon, M., Cadenas-Sánchez, C., Estévez-López, F., Muñoz, N. E., Mora-Gonzalez, J., Migueles, J. H., Molina-Garcia, P., Henriksson, H., Mena-Molina, A., Martínez-Vizcaino, V., Catena, A., Löf, M., Erikson, K. I., Lubans, D. R., Ortega, F. B., & Esteban-Cornejo, I. (2019). Role of physical activity and sedentary behavior in the mental health of preschoolers, children and adolescents: A systematic review and meta-analysis. *Sports Medicine*, 49(9), 1383–1410. https://doi.org/10.1007/s40279-019-01099-5

Rother, H. A., Etzel, R. A., Shelton, M., Paulson, J. A., Hayward, R. A., & Theron, L. C. (2020). Impact of extreme weather events on sub-Saharan African child and adolescent mental health: A protocol for a systematic review. *Atmosphere*, 11(5), 493. https://doi.org/10.3390/atmos11050493

Ruchkin, V., Schwab-Stone, M., & Vermeiren, R. (2004). *Social and Health Assessment (SAHA): Psychometric development summary*. Yale University.

Rueger, S. Y., Malecki, C. K., Pyun, Y., Aycock, C., & Coyle, S. (2016). A meta-analytic review of the association between perceived social support and depression in childhood and adolescence. *Psychological Bulletin*, 142(10), 1017–1067. https://doi.org/10.1037/bul0000058

Saldana, J. (2009). *The coding manual for qualitative researchers*. Sage.

Salk, R. H., Hyde, J. S., & Abramson, L. Y. (2017). Gender differences in depression in representative national samples: Meta-analyses of diagnoses and symptoms. *Psychological Bulletin*, 143(8), 783–822. https://doi.org/10.1037/bul0000102

Sankoh, O., Sevalie, S., & Weston, M. (2018). Mental health in Africa. *The Lancet Global Health*, 6(9), e954–e955. https://doi.org/10.1016/S2214-109X(18)30303-6

Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *The Lancet Child & Adolescent Health*, 2(3), 223–238. https://doi.org/10.1016/S2352-4642(18)30022-1

Schäfer, S. K., Kunzler, A. M., Kalisch, R., Tüscher, O., & Lieb, K. (2022). Trajectories of resilience and mental distress to global major disruptions. *Trends in Cognitive Sciences*, 26(12), 1171–1189. https://doi.org/10.1016/j.tics.2022.09.017

Schotte, S., & Zizzamia, R. (2022). The livelihood impacts of COVID-19 in urban South Africa: A view from below. *Social Indicators Research*, 165(1), 1–30. https://doi.org/10.1007/s11205-022-02978-7

Sequeira, M., Singh, S., Fernandes, L., Gaikwad, L., Gupta, D., Chibanda, D., & Nadkarni, A. (2022). Adolescent Health Series: The status of adolescent mental health research, practice and policy in sub-Saharan Africa: A narrative review. *Tropical Medicine & International Health*, 27(9), 758–766. https://doi.org/10.1111/tmi.13802

Shalal, A., Psaledakis, D., & Martina, M. (2022, December 15). Biden says U.S. is 'all in' on Africa's future. *Reuters*. https://www.reuters.com/world/china-an-unspoken-focus-biden-woos-african-leaders-2022-12-14/

Shenderovich, Y., Boyes, M., Esposti, M. D., Casale, M., Toska, E., Roberts, K. J., & Cluver, L. (2021). Relationships with caregivers and mental health outcomes among adolescents living with HIV: A prospective cohort study in South Africa. *BMC Public Health*, 21(1), 1–11.

Sherr, L., Haag, K., Tomlinson, M., Rudgard, W. E., Skeen, S., Meinck, F., Du Toit, S. M., Roberts, S., Gordon, S. L., Desmond, C., & Cluver, L. (2023). Understanding accelerators to improve SDG-related outcomes for adolescents–an investigation into the nature and quantum of additive effects of protective factors to guide policy making. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0278020

Shorey, S., Ng, E. D., & Wong, C. H. (2022). Global prevalence of depression and elevated depressive symptoms among adolescents: A systematic review and meta-analysis. *British Journal of Clinical Psychology*, 61(2), 287–305. https://doi.org/10.1111/bjc.12333

Steel, J., Twagira, F., Seekles, M. L., & Obasi, A. I. (2022). Promotive, preventive, and treatment interventions for adolescent mental health in sub-Saharan Africa: A protocol for two scoping reviews including systematic analyses of intervention effectiveness. *PloS ONE*, 17(12), e0279424. https://doi.org/10.1371/journal.pone.0279424

Stekhoven, D. J., & Bühlmann, P. (2012). MissForest—non-parametric missing value imputation for mixed-type data. *Bioinformatics*, 28(1), 112–118. https://doi.org/10.1093/bioinformatics/btr597

Stelmach, R., Kocher, E. L., Kataria, I., Jackson-Morris, A. M., Saxena, S., & Nugent, R. (2022). The global return on investment from preventing and treating adolescent mental disorders and suicide: A modelling study. *BMJ Global Health*, 7(6), e007759. https://doi.org/10.1136/bmjgh-2021-007759

Stewart, A. L., Hays, R. D., & Ware, J. E. Jr. (1988). The MOS short-form general health survey: Reliability and validity in a patient population. *Medical Care*, 26(7), 724–735. https://www.jstor.org/stable/3765494

Theron, L., Rothmann, S., Höltge, J., & Ungar, M. (2022). Differential adaptation to adversity: A latent profile analysis of youth engagement with resilience-enabling cultural resources and mental health outcomes in a stressed Canadian and South African community. *Journal of Cross-Cultural Psychology*, 53(3-4), 403–425. https://doi.org/10.1177/00220221221077353

Theron, L., Rothmann, S., Makhnach, A., & Ungar, M. (2022). Adolescent mental health resilience and combinations of caregiver monitoring and warmth: A person-centred perspective. *Journal of Child and Family Studies*, 31(10), 2860–2870. https://doi.org/10.1007/s10826-022-02287-0

Theron, L. C. (2016). Researching resilience: Lessons learned from working with rural, Sesotho-speaking South African young people. *Qualitative Research*, 16(6), 720–737. https://journals.sagepub.com/doi/10.1177/1468794116652451

Theron, L. C. (2020). Resilience of sub-Saharan children and adolescents: A scoping review. *Transcultural Psychiatry*. https://doi.org/10.1177/1363461520938916

Theron, L. C., & Van Breda, A. (2021). Multisystemic enablers of sub-Saharan child and youth resilience to maltreatment. *Child Abuse & Neglect*, 119(2), 1–11. https://doi.org/10.1016/j.chiabu.2021.105083

Tomita, A., & Ramlall, S. (2018). A nationwide panel study on religious involvement and depression in South Africa: Evidence from the South African National Income Dynamics Study. *Journal of Religion and Health*, 57(6), 2279–2289. https://doi.org/10.1007/s10943-017-0551-5

Ungar, M. (2019). Designing resilience research: Using multiple methods to investigate risk exposure, promotive and protective processes, and contextually relevant outcomes for children and youth. *Child Abuse & Neglect*, 96, 104098. https://doi.org/10.1016/j.chiabu.2019.104098

Ungar, M. (Ed.). (2021). *Multisystemic resilience: Adaptation and transformation in contexts of change*. Oxford University Press, https://doi.org/10.1093/oso/9780190095888.001.0001,

Ungar, M., & Liebenberg, L. (2011). Assessing resilience across cultures using mixed methods: Construction of the Child and Youth Resilience Measure. *Journal of Mixed Methods Research*, 5(2), 126–149. https://doi.org/10.1177/1558689811400607

Ungar, M., & Theron, L. (2020). Resilience and mental health: How multisystemic processes contribute to positive outcomes. *Lancet Psychiatry*, 7(5), 441–448. https://doi.org/10.1016/s2215-0366(19)30434-1

Ungar, M., Theron, L., Murphy, K., & Jefferies, P. (2021). Researching multisystemic resilience: A sample methodology. *Frontiers in Psychology*, 11. https://doi.org/10.3389/fpsyg.2020.607994

United Nations, Department of Economic and Social Affairs, Population Division (2017). *World population prospects: The 2017 revision, key findings and advance tables. Working Paper No. ESA/P/WP/248*. https://population.un.org/wpp/publications/files/wpp2017_keyfindings.pdf

Van Breda, A. D., & Theron, L. C. (2018). A critical review of South African child and youth resilience studies, 2009-2017. *Child and Youth*

Services Review, *91*, 237–247. https://doi.org/10.1016/j.childyouth.2018.06.022

van der Nest, G., Passos, V. L., Candel, M. J., & van Breukelen, G. J. (2020). An overview of mixture modelling for latent evolutions in longitudinal data: Modelling approaches, fit statistics and software. *Advances in Life Course Research*, *43*, 100323. https://doi.org/10.1016/j.alcr.2019.100323

Van Rensburg, A. C., Theron, L. C., & Ungar, M. (2019). Using the CYRM-28 with South African young people: A factor structure analysis. *Research on Social Work Practice*, *29*(1), 93–102. https://doi.org/10.1177/1049731517710326

Vanaken, G.-J., & Danckaerts, M. (2018). Impact of green space exposure on children's and adolescents' mental health: A systematic review. *International Journal of Environmental Research and Public Health*, *15*(12), 2668. https://doi.org/10.3390/ijerph15122668

Ward, C. L., Artz, L., Leoschut, L., Kassanjee, R., & Burton, P. (2018). Sexual violence against children in South Africa: A nationally representative cross-sectional study of prevalence and correlates. *The Lancet Global Health*, *6*(4), e460–e468. https://doi.org/10.1016/s2214-109x(18)30060-3

Ware, J. E., Sherbourne, C. D., & Davies, A. R. (1992). Developing and testing the MOS 20-item short-form health survey: A general population application. In A. L. Stewart, & J. E. Ware (Eds.), *Measuring functioning and well-being: The Medical Outcomes Study approach* (pp. 277–290). Duke University Press.

Wet, N. D., Mabetha, K., & Mataboge, P. (2020). Adolescent boys and girls in Africa: Their demography, behavioural outcomes, determinants and consequences. In C. O. Odimegwu (Ed.), *Family demography and post-2015 development agenda in Africa* (pp. 171–198). Cham: Springer. https://doi.org/10.1007/978-3-030-14887-4_9