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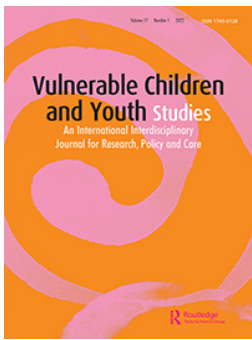
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The relationships between resilience, care environment, and social-psychological factors in orphaned and separated adolescents in Western Kenya

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ABSTRACT

The relationships between care environment, resilience, and social factors in orphaned and separated adolescents and youths (OSAY) in western Kenya are complex and under-studied. Survey responses from OSAY living in Charitable Children's Institutes (CCI) and family-based care settings (FBS) in Uasin Gishu County, Kenya were used to examine the associations between 1) care environment and resilience; 2) care environment and factors thought to promote resilience (e.g. social, family, and peer support); and 3) resilience and these same resilience-promoting factors, using multivariable linear and logistic regressions. This cross-sectional study included 1202 OSAY (50.4% female) aged 10–26 (mean = 16; SD = 3.5). The mean resilience score in CCIs was 71 (95%CI = 69–73) vs. 64 (95%CI = 62–66) in FBS. OSAY in CCIs had higher resilience ($\beta = 7.67$; 95% CI = 5.26–10.09), social support ($\beta = 0.26$; 95%CI = 0.14–0.37), and peer support ($\beta = 0.90$; 95%CI = 0.64–1.17) than those in FBS. OSAY in CCIs were more likely to volunteer than those in FBS (OR = 3.72; 95%CI = 1.80–7.68), except in the male subgroup. Family ($\beta = 0.42$; 95%CI = 0.24–0.60), social ($\beta = 4.19$; 95%CI = 2.53–5.85), and peer ($\beta = 2.13$; 95%CI = 1.44–2.83) relationships were positively associated with resilience in all analyses. Volunteering was positively associated with resilience ($\beta = 5.85$; 95%CI = 1.51–10.19). The factor most strongly related to resilience in both fully adjusted models was peer support. This study found a strong relationship between care environment and resilience. Care environment and resilience each independently demonstrated strong relationships with peer


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 Supplemental data for this article can be accessed [here](#).

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support, social support, and participating in volunteer activities. Resilience also had a strong relationship with familial support. These data suggest that resilience can be developed through strategic supports to this vulnerable population.

Abbreviations: 95%CI - 95% Confidence interval
 AMPATH - Academic Model Providing Access to Healthcare
 CASSS - Child and Adolescent Social Support Scale
 CCI - Charitable Children's Institutes
 CTQ - Childhood Trauma Questionnaire
 FBS - Family-based care setting
 ICAST-CH - ISPCAN Child Abuse Screening Tool for Children at Home
 MSPSS - Multidimensional Scale of Perceived Social Support
 MTRH - Moi Teaching and Referral Hospital
 IMU - Moi University
 OSAY - Orphaned and separated adolescents and youths
 OSCAR - Orphaned and Separated Children's Assessments Related to Their Health and Well-Being
 OR - Odds ratio
 RS14 - Resilience Scale
 SD - Standard deviation
 SDQ - Strengths and Difficulties Questionnaire
 SE - Standard Error
 UG - Uasin Gishu

Introduction

While the exact definition of resilience has been the subject of much debate, it is often considered the ability of a system to adapt to and recover from challenges (Masten, 2018; L. Theron et al., 2020; Ungar, 2019). It is most commonly understood as a capacity for overcoming adversity, emerging from the interaction of complex adaptive systems (Masten, 2018). An individual's resilience develops through interactions with, and the development of, diverse internal and external resources and supports. These include multiple pathways and dynamic systems of individual, relational, family, and community attributes (Masten, 2018; L. Theron et al., 2020).

Perseverance, purpose, equanimity, authenticity, and self-reliance comprise the resilience core, which together with coping techniques promote individual-level effective crisis navigation and positive adaptation (The Resilience Center, 2017). Relational and family-based elements include secure attachments with caregivers/parents, peers, and extended social and community groups (Masten, 2018). Activities such as sport, civic, and religious participation may support resilience by increasing engagement with external support systems and strengthening the resilience core (Masten, 2018; Mistry et al., 2009; Ngwenya et al., 2021; L. C. Theron et al., 2013). Connections with cultural traditions, spirituality, and nature have been likewise linked to increased resilience (Ingulli & Lindbloom, 2013; L. C. Theron et al., 2013). The nature and importance of individual systems vary contextually, culturally, and throughout the life-course (Masten, 2018; L. C. Theron et al., 2013). A study seeking to conceptualize Afri-centric youth resilience identified similar systems-based themes to Euro-centric research; however, it emphasized collectivist philosophies and family/community systems over relationships with a single adult or cohesive primary family bonds (L. C. Theron et al., 2013). Understanding the origins of resilience may offer important insight into avenues for mitigating the effects of adverse life events on vulnerable populations including orphaned and separated adolescents and youths (OSAY).

As of 2018, sub-Saharan Africa was home to approximately 50 million OSAY (UNICEF, 2019). More than 90% are cared for by extended family; however, a combination of HIV/AIDS, poverty, and urbanization has left many families unable to provide adequate care for OSAY (Embleton et al., 2014; L. C. Theron et al., 2013). This has led to the emergence of alternate models of care including Charitable Children's Institutions (CCI) (orphanages and rescue centers) and community-based programs of family-based care settings (FBS; Embleton et al., 2014). Negative impacts of institutionalization on child development, strong cultural preferences, and high profile, historic examples of abuse and neglect have led to global recommendations for deinstitutionalization; moving children from CCIs to FBS (Gulaid, 2004; Save the Children UK, 2003; UNICEF, 2004). However, in countries with weak infrastructure, studies have shown greater heterogeneity in wellbeing within care environments than between them and some OSAY in CCIs have demonstrated better outcomes than those in FBS (Atwoli et al., 2014; Braitstein et al., 2013; Embleton et al., 2017; Gayapersad et al., 2019; Jelsma et al., 2011; Whetten et al., 2014, 2009; Williamson et al., 2017). These include a study that found FBS were often less equipped than CCIs to provide for the physical, mental, spiritual, and social needs of OSAY in Kenya (Embleton et al., 2014).

The current study uses Bronfenbrenner's socio-ecological framework to approach understanding the dynamic and complex relationship between OSAY, their environment, social factors, and resilience (Figure 1; Bronfenbrenner, 1979). This model includes five systems of influence: (1) Macrosystem: cultural and social norms, geography, and civil and legal infrastructure (not included in this study due to the geographic homogeneity of all participants); (2) Exosystem: formal and informal settings, care environment; (3) Mesosystem: relationships between Microsystems; (4) Microsystem: interpersonal relationships and interactions with family, caregivers, peers, community, and activities; and 5) Individual: internal characteristics. In this model, the benefits of care in CCIs over FBS (Exosystem-level) may stem in part from some CCIs attempts to emulate a family-like environment including strong bonds with caregivers, peers, and participation in community-building religious, civic, and sport activities (Microsystem-level); factors which may also impact resilience (Individual-level; Gayapersad et al., 2019). Understanding these relationships is important for facilitating safe and effective deinstitutionalization and fostering similar benefits in FBS.

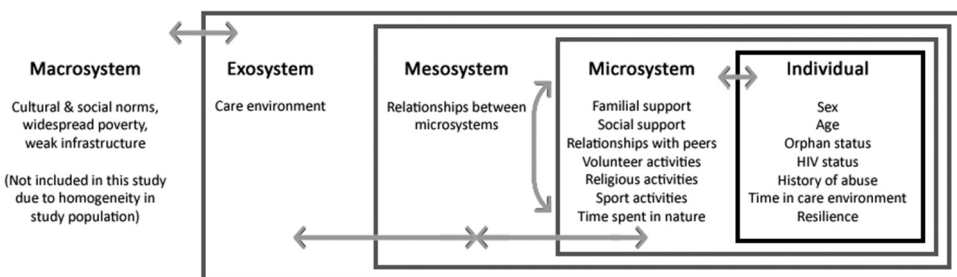


Figure 1. Application of Bronfenbrenner's socio-ecological framework for care environment, social factors, and resilience in OSAY. Bronfenbrenner's socio-ecological framework for the relationships between OSAY, their environment, social factors, and resilience. Arrows denote bidirectional influence (Bronfenbrenner, 1979). Image is property of the author.

The aim of this study was to estimate the context-specific associations between care environment, resilience, and social factors in the Kenyan OSAY population. Our primary hypothesis was that care in CCIs would be positively associated with resilience, as CCIs in this context may better meet the complex needs of OSAY including fostering stronger community systems, central to Afri-centric concepts of youth resilience. Our secondary hypothesis was that one or more social factors would be associated with both resilience and care in CCIs.

Methods

Study setting

This study occurred in Uasin Gishu (UG) County, Kenya. In 2019, UG County was home to approximately 1,152,671 individuals from 304,943 households; 36.8% aged ≤ 14 years (Kenya National Bureau of Statistics, 2019, 2020b). In 2016, approximately 36.9% of UG County residents aged < 18 years were living in multidimensional poverty, as defined by UNICEF's Multiple Overlapping Deprivation Analysis (Kenya National Bureau of Statistics, 2020c). In 2019, the capital of UG County, Eldoret, had a population of 475,716 (Kenya National Bureau of Statistics, 2020a). The city is home to Moi University (MU), Moi Teaching and Referral Hospital (MTRH), and the Academic Model Providing Access to Healthcare (AMPATH) program, which is a collaboration between MTRH, MU, and a consortium of universities from North America (Einterz et al., 2007).

Procedures and participants

This study uses data from the Orphaned and Separated Children's Assessments Related to Their Health and Well-Being (OSCAR) (R01HD060478) longitudinal cohort study, described in detail previously (Embleton et al., 2014; Kamanda et al., 2013). Begun in 2010, with near universal inclusion of CCIs and a random representative sample of FBS households, the study used annual surveys including clinical and psychosocial encounters to investigate the effects of care environment on the physical and mental health of OSAY, ≤ 18 years old at baseline, in Uasin Gishu County. Phase II began in 2016 and aims to explain the results of Phase I with a focus on individual and interpersonal factors, such as psychological resilience, that may promote well-being within and between care environments.

This study uses cross-sectional Phase II data from 1202 of 1231 participants. Exclusions included age ($n = 28$), as psychological assessments were not administered to OSAY aged < 10 , and residing in an ineligible environment of self-care at data collection ($n = 1$). Complete data were obtained from 1016 OSAY (incomplete $n = 187$); however, individuals with limited missing data, including 'refuse to answer', were only excluded from analyses using the affected variables. Data cleaning occurred first in the field and discrepancies or missing information were verified with the participant on site (Kamanda et al., 2013).

Human subjects protections

Study protocols for this and the parent OSCAR study were approved by the Research Ethics Board at University of Toronto, the Institutional Research Ethics Committees of Moi University College of Health Sciences and Moi Teaching and Referral Hospital, and Indiana University's Institutional Review Board. In brief, all participants provided written assent, with fingerprints used when individuals could not sign their names. Informed consent was obtained from the heads of each household in cases of FBS and the Director of each CCI. A project psychologist reviewed all psychological assessments for red flags on suicidality, markers of active abuse, or if the participant posed a likely threat to themselves or others. OSCAR study staff followed up on these cases (Kamanda et al., 2013).

Instruments

Resilience was measured using the 14-item Resilience Scale (RS14) with a 7-point response scale as a continuous measure (Wagnild, 2009). Social support was measured with the 12-item Multidimensional Scale of Perceived Social Support (MSPSS) using a 5-point response scale as a continuous measure (Zimet et al., 1988). Family support was measured with the 10-item Parent subscale of the Child and Adolescent Social Support Scale (CASSS) with a 4-point adaptation of the frequency response as a continuous measure (Kerres Malecki & Kilpatrick Demary, 2002). Peer support was measured with the 5-item Peer Problems subscale of the Strengths and Difficulties Questionnaire (SDQ) with a 3-point response as a continuous measure (Escueta et al., 2014). A history of abuse was measured using the ISPCAN Child Abuse Screening Tool for Children at Home (ICAST-CH) for OSAY <18 years of age and the Childhood Trauma Questionnaire (CTQ) for OSAY age ≥18 (Bernstein, 1998; Zolotor et al., 2009). Abuse was treated as binary with any individual scoring 'moderate' or 'severe' in any of the emotional, sexual, or physical abuse subscales considered positive for abuse. Additional instrument information can be found in Supplementary Table S1.

Variables

Analysis 1: The independent variable was care environment (CCI vs. FBS). Dependent variables were resilience, social support, family support, and peer relationships (continuous), involvement in religious, sport, and volunteer activities (yes/no), and time in nature (<2/≥2 hours/week). Potential confounding variables included age (continuous), sex (female/male), orphaned/separated status (maternal/paternal/double/non-orphan), HIV status (positive/negative), history of abuse (yes/no), and time in care environment at data collection (<6 months/6-24 months/2-5 years/>5 years). Sub-group analysis variables included age (<18/≥18 years), sex, and reason for time in nature (pleasure/work).

Analysis 2: The independent variables included social support, family support, and peer relationships (continuous), involvement in religious, sport, and volunteer activities (yes/no), and time in nature (<2/≥2 hours/week). The dependent variable was resilience (continuous). Potential confounding and sub-group analysis variables remained unchanged from analysis 1.

Data on involvement in sport, volunteer, and religious activities, and time spent in nature were only available for individuals age <18.

Statistical analysis

Following descriptive analyses, bivariable and multivariable (with adjustments listed above) linear and logistic regression models were fitted to independently explore the relationships between care environment, resilience, and each social variable. Interaction terms were fitted to detect subgroup differences. All models were fitted using generalized estimating equations to allow for any clustering effects on standard errors of households or institutes (248 clusters: 15 CCI & 233 FBS). False discovery rate was controlled at 5% to account for multiple comparisons in hypothesis testing. All analyses used two-tailed tests and were conducted using SAS 9.1 (SAS Institute Inc, 2002).

Table 1. Sample description

Variable	Age <18 years	Age ≥18 years	Total	Missing /Unknown
	# (%); Mean (SD)	# (%); Mean (SD)	# (%); Mean (SD)	
Total	786 (65)	416 (35)	1202	
Sex				
Female	387 (49)	219 (53)	606 (50)	0
Male	399 (51)	197 (47)	596 (50)	0
Care environment				
CCI	293 (37)**	109 (26)**	402 (33)	0
FBS	493 (63)**	307 (74)**	800 (67)	0
Sport activities (yes)	725 (96)	–	–	28
Volunteer activities (yes)	654 (89)	–	–	55
Religious activities (yes)	611 (81)	–	–	36
Time in nature (≥2 hours/week)	321 (45)	–	–	
Reason: pleasure	110 (34)	–	–	68
Orphan status (orphan)	669 (86)	374 (90)	1046 (87)	4
HIV+	24 (5)	5 (2)	29 (4)	421
Time in care environment (>5 years)	736 (94)	394 (95)	1130 (94)	5
Abuse (yes)	362 (47)	149 (37)	511 (44)	30
RS14 ^b (resilience)	65 (19)	69 (19)	66 (19)	187
12-item MSPSS ^c (social support)	4.2 (0.8)	4.4 (0.8)	4.3 (0.8)	177
CASSS ^d (family support)	27 (7)	28 (8)	27 (8)	63
SDQ ^e (peer problems)	12 (2)	12 (2)	12 (2)	79

^aCategories are 'yes' (vs. 'no') for Sport activities, Volunteer activities, Religious activities, Abuse, ≥2 hours/week (vs. <2 hours/week) for Time in nature, orphan (any of maternal/paternal/double) (vs. non-orphan) for Orphan status, >5 years (vs. <5 years) for Time in care environment, and pleasure (vs. work) for Reason.

^b14-item Resilience Scale.

^c12-item Multidimensional Scale of Perceived Social Support.

^dChild and Adolescent Social Support Scale.

^eStrengths and Difficulties Questionnaire.

^f% refers to percent of known values.

* $p < .05$; ** $p < .01$; *** $p < .001$ on test of difference in percentages.

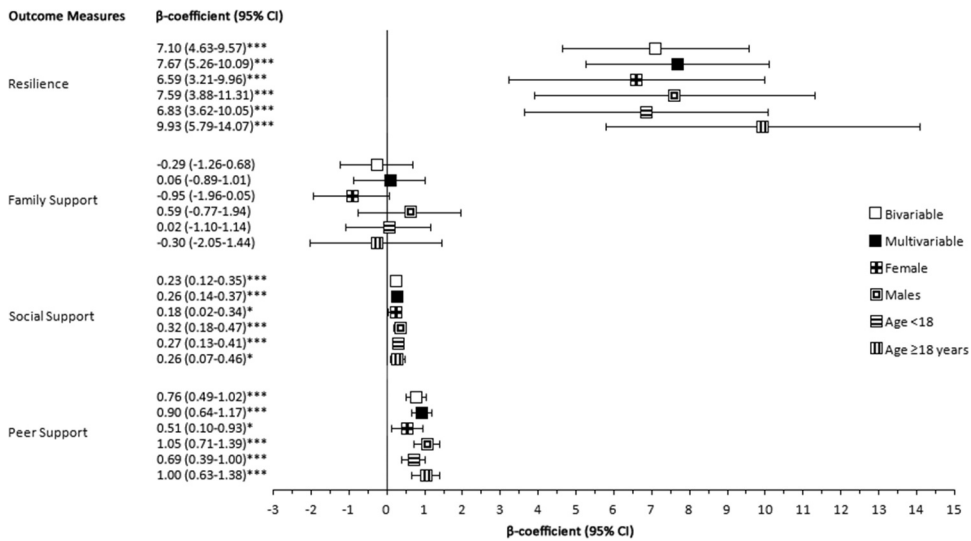
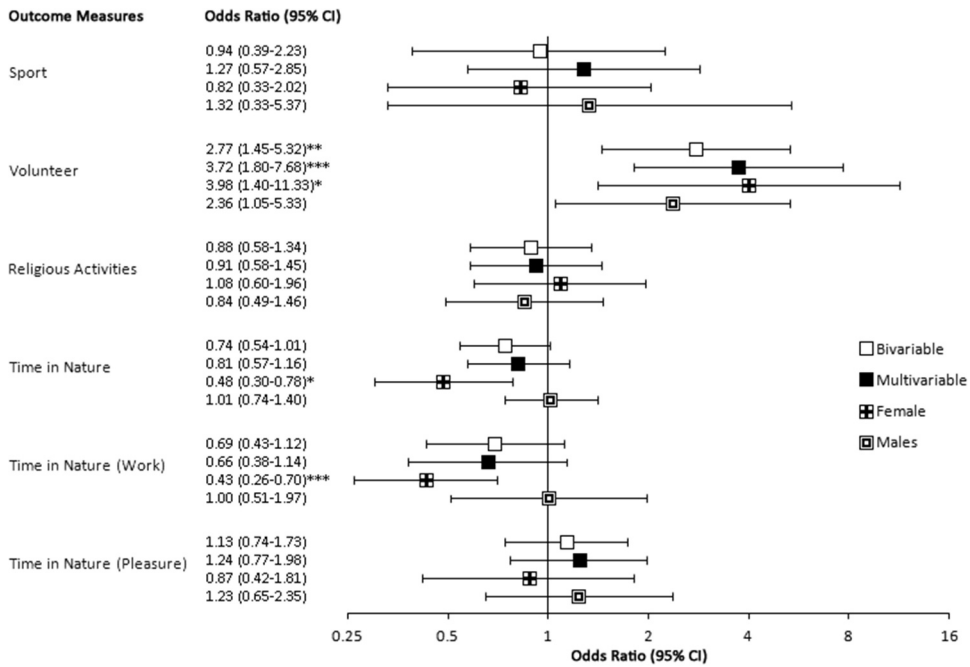


Figure 2. (a). Associations between care environment (independent variable) and social-psychological factors (dependent variables) estimated through linear regression analyses (b). Associations between care environment (independent variable) and social-psychological factors (dependent variables) estimated through logistic regression analyses. β -coefficients and 95% confidence intervals (CI) are depicted. Estimates are for 'CCIs' compared to 'FBS' care environment. Coefficients for linear regression models are unstandardized. * $p < .05$; ** $p < .01$; *** $p < .001$ (false discovery rate-corrected). Image is property of the author. Odds ratio and 95% confidence intervals (CI) are depicted. Estimates are for 'CCIs' compared to 'FBS' care environment. Estimates are for 'yes' (vs. 'no') for Sport activities, Volunteer activities, and Religious activities, and ≥ 2 hours/week (vs. < 2 hours/week) for Time in nature. * $p < .05$; ** $p < .01$; *** $p < .001$ (false discovery rate-corrected). Image is property of the author.

Results

The sample comprised 1202 OSAY; 606 females and 596 males. Ages ranged from 10 to 26 years (mean = 16.4; SD = 3.5), with most (65%) under 18 years old. Two-thirds lived in FBS, one-third in CCIs (Table 1). Distribution of sex did not vary by age. A higher proportion aged < 18 lived in CCIs compared to older participants (37% vs. 26%).

Resilience scores ranged from 14 to 98 with a mean score of 66 (SD = 19), considered moderately resilient (Wagnild, 2009). Social support scores ranged from 1 to 5 with a mean score of 4.3 (SD = 0.8), considered moderate (Zimet, 2016). Family support scores ranged from 10 to 40 with a mean score of 27.4 (SD = 7.6). Peer support scores ranged from 6 to 15 with a mean score of 12.4 (SD = 2.0), considered within the normal range (Escueta et al., 2014). None of resilience, social, family, or peer support varied significantly by sex. Individuals ≥ 18 years of age demonstrated higher levels of resilience (mean = 69 vs. 65) than younger OSAY. Older individuals also demonstrated statistically significant, though likely clinically non-significant, increased levels of social support (mean = 4.4 vs. 4.2) and family support (mean = 28 vs. 27) as compared to younger individuals. Peer support did not vary by age (Table 1).



All β -coefficients and odds ratios (OR) were estimated in multivariable analyses of all participants unless specified. Reference categories are defined in Figures 2(a,b) and 3. OSAY in CCIs had greater resilience ($\beta = 7.67$; 95%CI = 5.26–10.09), social support ($\beta = 0.26$; 95%CI = 0.14–0.37), and peer support ($\beta = 0.90$; 95%CI = 0.64–1.17) than their peers living in FBS in all analyses. OSAY age <18 in CCIs were more likely than those in FBS to volunteer in their communities (OR = 3.72; 95%CI = 1.80–7.68). Females in CCIs were less likely than those in FBS to spend ≥ 2 hours per week in nature (OR = 0.48; 95%CI = 0.30–0.78; care environment*sex $\beta = -0.76$; 95%CI = -1.32–(-0.19)). No relationship was found between care environment and time spent in nature in the full sample (OR = 0.81; 95%CI = 0.57–1.16) or in males (OR = 1.01; 95%CI = 0.74–1.40). No statistically significant relationship was found between care environment and family support ($\beta = 0.06$; 95%CI = -0.89–1.01), involvement in sports (OR = 1.27; 95%CI = 0.57–2.85), or religious activities (OR = 0.91; 95%CI = 0.58–1.45) in any analysis (Figure 2(a,b)). Additional information is available in Supplementary Tables 2 and Supplementary Figure S1(a,b).

Resilience was positively associated with family support ($\beta = 0.42$; 95%CI = 0.24–0.60), social support ($\beta = 4.19$; 95%CI = 2.53–5.85), and peer support ($\beta = 2.13$; 95%CI = 1.44–2.83) in all unadjusted, adjusted, and sub-analyses. Participating in volunteer activities was positively associated with resilience in individuals <18 years of age ($\beta = 5.85$; 95%CI = 1.51–10.19), though the relationship was not statistically significant when divided by sex (female: $\beta = 6.72$; 95%CI = 0.62–12.83; male: $\beta = 4.61$; -0.69–9.91). No statistically significant relationship existed between resilience and involvement in sports ($\beta = -0.23$; 95%CI = -4.15–3.69), religious activities ($\beta = -0.23$; 95%CI = -4.15–3.69), or spending time in nature ($\beta = 3.11$; 0.29–5.92) (Figure 3). Additional information is available in Supplementary Table S3 and Supplementary Figure S1(a).

An additional analysis showed that in a model containing all social variables, peer support demonstrated the strongest relationship with resilience in both age groups (data not shown).

Discussion

This study suggests a strong relationship between care environment and resilience and identifies factors that may facilitate this relationship. The mean resilience score was 66, considered moderately-low to moderate. Consistent with most previous studies, resilience did not vary by sex and increased with age (Bonanno et al., 2007; Damásio et al., 2011; Losoi et al., 2013).

Care environment was strongly associated with resilience, with OSAY in CCIs demonstrating significantly higher resilience than FBS. OSAY in CCIs also had higher levels of several social factors which themselves had strong relationships with resilience. This is consistent with the socio-ecological framework in which resilient individuals are able to draw upon resources from multiple levels in order to support healthy functioning

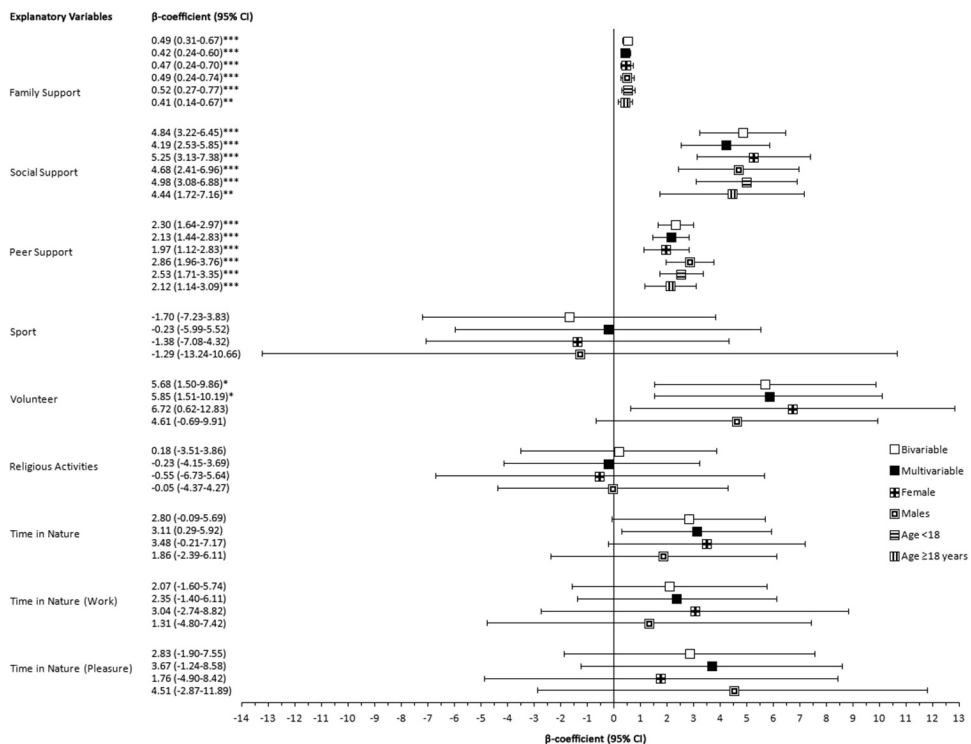


Figure 3. Associations between social-psychological factors (independent variables) and resilience (dependent variable) estimated through linear regression analyses. β -coefficients and 95% confidence intervals (CI) are depicted. Estimates are for ‘CCIs’ compared to ‘FBS’ care environment. Estimates are for ‘yes’ (vs. ‘no’) for Sport activities, Volunteer activities, and Religious activities, and ≥ 2 hours/week (vs. < 2 hours/week) for Time in nature. Coefficients for linear regression models are unstandardized. * $p < .05$; ** $p < .01$; *** $p < .001$ (false discovery rate-corrected). Image is property of the author.

when confronted with stressors (Bronfenbrenner, 1979; L. Theron et al., 2020). In this model, CCIs may encourage positive social factors, such as peer support, social support, and volunteering, and both care environment and social factors may have a role in building resilience. This is supported by a 2019 study of OSAY in Kenya that found that some CCIs purposefully model the care environment after a village or single family and that engaging in family-related activities within institutionalized care environments can lead to the development of novel, non-consanguineous family identities in which OSAY feel supported and cared for – factors central to resilience (Gayapersad et al., 2019).

In this study, family, peer, and social support were all positively related to resilience. Social and peer support have previously been found to foster recovery from trauma (Bonanno et al., 2007). A British study found social support from peers, mentors, and family to be instrumental to one's resilience and ability to withstand and thrive in high pressure situations (Sarkar & Fletcher, 2014). Another study found that individuals with medium social support were 30% less likely to be resilient than those with high levels (Bonanno et al., 2007). Through thematic analysis of interviews with rural adolescents, a South African study also found familial, peer, and social relationships to be closely related to hope; a central component of resilience (Ngwenya et al., 2021). As OSAY in CCIs had higher levels of social and peer support than those in FBS, the positive relationship between CCIs and resilience may be partly because CCIs facilitate positive social and peer relationships. This may suggest targets to promote resilience in FBS.

Volunteering was also strongly related to resilience, consistent with studies from the United States and China that demonstrated a positive relationship between volunteering or involvement in extracurricular activities and building resilience in vulnerable populations (Klinedinst & Resnick, 2014; Zhao et al., 2014). However, we did not find a significant relationship of resilience with several other variables identified in previous studies including feelings of connectedness with nature, time spent in nature, and religiosity (Ingulli & Lindbloom, 2013; Mizuno et al., 2018; Puffer et al., 2012). We also were not able to replicate the relationship with sports, perhaps because the high level of participation, 96%, resulted in low statistical power (Zhao et al., 2014).

The study has several strengths. The large sample size provides good statistical power to detect most true relationships of interest. The sampling frame, with a representative sample of FBS households and near universal inclusion of CCIs, minimizes the potential for selection bias. OSAY studies have traditionally focused on CCIs without an FBS comparison group, which we included. This study provides unprecedentedly detailed information on care environment, day to day activities, and psychological variables.

The inability of cross-sectional analyses to determine causality is our primary limitation. While associations can be demonstrated, the direction of the causal relationship cannot be determined and reverse-causation may occur. Central relationships were examined separately in OSAY age 10–17 and ≥ 18 . Within sub-group heterogeneity was not examined due to sample size limitations. Future longitudinal analyses will help produce further evidence on causality and explore age-related heterogeneity.

Tools measuring psychological traits innately introduce error and difference between actual measurements and theoretical constructs. To minimize associated risks, English-language tools validated in the OSCAR or similar samples were used with minor

modifications (Supplementary Table S1) (Hoosen et al., 2018; Sutherland et al., 2020). The same tools were used in FBS and CCI settings, minimizing potential measurement variance.

Missing data may be non-random, for example, due to non-response to sensitive questions or loss to follow-up at Phase II, affecting internal and external validity. To minimize bias due to missing data and improve sensitive information accuracy, questionnaires were self-administered and confidentiality was assured. Completeness was checked on site with immediate follow-up on incomplete questions. Levels of missing data were low. All variables with >5% missingness were investigated; no factors predictive of missingness were found.

This study is the first to examine the relationships between care environment, social factors, and resilience in the Kenyan OSAY population. It demonstrates strong positive relationships between CCIs and psychological resilience and identifies family support, social support, peer relationships, and volunteer activities as factors that may facilitate the development of resilience through adolescence and early adulthood and serve as potential targets, individually or through strategic social and community-building activities, for initiatives seeking to improve resilience in this vulnerable population. By better understanding this complex issue, policy makers may support evidence based, cost-effective programming that encourages the health, wellbeing, and the social and economic potential of OSAY in any care environment, while reproducing the contextual strengths of institutionalized care within the preferred FBS, facilitating safe and effective deinstitutionalization.

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