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ARTICLE

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Early transition markers, opportunities, and limitations that define pathways into the labour market from adolescence to adulthood in South Africa

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Abstract

Motivation: The transition from adolescence to adulthood encompasses key social changes. NEET status (**N**ot in **E**ducation, **E**mployment or **T**raining) during this period disrupts this transition and alters an adolescent's life course. This is of particular concern in South Africa, a middle-income country with one of the world's highest rates of youth unemployment.

Purpose: The pathway to becoming NEET emerges over time by accumulating risks in early life and adolescence. Early-life adversities can increase the probability of events associated with becoming NEET. We aim to identify early-life and adolescent predictors of events associated with becoming NEET, as well as predictors of NEET status itself.

Methods and approach: We analyse four rounds of longitudinal data from a sample of 1,174 adolescents growing up in peri-urban KwaZulu-Natal, South Africa. Using a socioecological life-course model, we create two overlapping analytic cohorts and two NEET vulnerability indices to evaluate whether risks for vulnerability in schooling (early outcomes) are similar to those affecting post-schooling education and labour-market outcomes (later outcomes). We use a linear probability model to analyse the relationship between the vulnerability indices and the range of risk factors in the socioecological life-course model.

Findings: A strong predictor of both NEET vulnerability indices includes reporting feeling hopeless about the future. Other significant predictors include behavioural factors (getting pregnant or impregnating someone during adolescence, and drinking alcohol before age 16), family structure (residing with one's biological mother in early adolescence was protective) and demographics (age).

Policy implications: By deepening our understanding of how individual and contextual characteristics shape the transition into productive adulthood through a life-course approach, we can identify possible early intervention points lost once young people become NEET.

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KEYWORDS
cohort study, education, labour market, NEET, school-to-work-transition, South Africa

1 | INTRODUCTION

The transition from adolescence to adulthood is a pivotal phase in the life course, characterized by significant social changes, key among which is graduating from secondary school to tertiary education or stable employment. Reaching these education and labour-market milestones in late adolescence or early adulthood suggests a capacity to obtain "economic stability and self-sufficiency" (Danziger & Ratner, 2010), indicative of a successful social transition to later life productivity. Adolescents and youth (AYA) who do not meet these targets—those who have dropped out of school, who have completed school and have not enrolled in tertiary education, and those who are not in training or employment—are referred to as being not in education, employment, or training (NEET). Becoming NEET can negatively affect employment, financial, and well-being trajectories over the life course (Rahmani & Groot, 2023; Vaccaro et al., 2023). In South Africa, socioeconomic barriers prevent many young people from achieving these social markers, trapping them in a prolonged transition between childhood dependency and economically stable and productive adulthood (Honwana, 2014).

Becoming NEET does not occur without warning, nor is there a single pathway to NEET. While dramatic events in adolescence can elevate the risk of NEEThood, it is more typically the endpoint of an accumulation of complex interrelated risks from early life through early adolescence and into adulthood (Veldman et al., 2024). The process of reaching NEET in early-life stages differs in type and severity from reaching NEET in later stages, with various, sometimes overlapping, risk factors and consequences between stages (Gariépy et al., 2022). NEET status is often only considered from a single time-point or by how long an individual is NEET (persistent vs. temporary), and evidence on early-life determinants of NEET is limited (Veldman et al., 2024). In South Africa, children and youth face multiple concurrent and ongoing risks that compromise their development potential and could set them on the pathway to NEET. High unemployment rates have fuelled pessimism about the labour market, discouraging active job search. Combined with high labour-market churn due to precarious employment, this has created a persistent cycle of vulnerability for many youths in South Africa (Mlatsheni & Ranchhod, 2017). Within this context, NEET is a useful concept for understanding broader vulnerability while acknowledging the need to explore different patterns and pathways to ending up NEET (Veldman et al., 2024).

Most research on NEET, globally and in South Africa, has been cross-sectional; it is rare to have studies that can comprehensively identify potential risks and enablers during adolescence, and rarer still for studies to adopt a life-course approach including both childhood and adolescence (Rahmani & Groot, 2023). Exploring early determinants can help identify root causes, enabling proactive interventions that may prevent youth from ending up NEET. In contrast, exploring later-life determinants focuses on supporting those who may already be NEET in changing their trajectories. By understanding how individual and contextual characteristics shape the transition from adolescence to productive adulthood through a life-course approach, we can identify possible early intervention points lost once young people become NEET.

We use a longitudinal data set from the Asenze Study of over 1,000 adolescents growing up in peri-urban KwaZulu-Natal South Africa to identify potential risk factors as they emerge across childhood and early adolescence, factors which may contribute to becoming NEET in later adolescence. The Asenze Study, described in the methods section, is well-placed to answer such critical but less-understood aspects of NEET within a context of high levels of NEET and socioeconomic barriers. This knowledge has the potential to inform policy responses to prevent NEET, in particular intervention timing.

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The age range within the most recent round of Asenze data allows us to analyse vulnerability-to-NEET at two stages: early on the pathway to NEET (exclusion from the school system) versus later NEET (exclusion from the labour market), through the construction of two overlapping groups of young people assessed with two vulnerabilites to NEET indices. Vulnerability to early risk of NEET is measured for youth who have not completed education (still in school/education or dropped out). Vulnerability to later NEET is measured for youth who are no longer in the education system (completed school and not completed school). This approach seeks to map the pathways to NEET and how these develop over time. It is one of the novel contributions of the Asenze Study design. In so doing, we address a critique of NEET research, which challenges the portrayal of NEET individuals as a homogeneous group (De Lannoy & Mudiriza, 2019).

South Africa is a powerful case study of NEET due to its high prevalence rates, exceeding the rates of youth NEET in sub-Saharan Africa in 2023 at 21.9% (ILO, 2024). In 2023, 33% of the total youth population aged between 15 and 24 were NEET (Mudiriza & De Lannoy, 2023), and evidence indicates that being NEET in South Africa has significant adverse consequences across the life course. During the COVID-19 pandemic, South African youth experienced an 18.9% increase in the probability of being NEET compared to the pre-pandemic period, with the overall national youth NEET rate increasing by nearly 3 percentage points since 2019 (Mudiriza & De Lannoy, 2023).

The South African school system compares poorly to other middle- and low-income countries, with below-average teacher content knowledge, high levels of secondary school dropout, insurmountable learning deficits, inefficient government spending, and persistent inequalities in educational opportunities (Spaull, 2013). While South Africa has good school enrolment and attendance levels, this can mask dropout rates of older children before completing secondary school (Hall, 2024). Multiple barriers affect school progress, emerging at various proximities to the child or young person and at various stages in their development.

Such barriers include stunting in childhood (Amusa et al., 2022), food insecurity in adolescence (Belachew et al., 2011; Heflin et al., 2022), and socioeconomic disadvantage across childhood and adolescence (Branson et al., 2019). We emphasize that the accumulation of risks, many of which originate in early life, shapes the pathway to NEET.

There is a strong relationship between educational attainment and labour-market outcomes, as low-quality and incomplete education is a so-called "supply side" driver of youth unemployment (Hall, 2024). Adolescents with incomplete secondary education and limited skills and work-related capabilities experience inferior outcomes in both the labour market and personal spheres, such as more prolonged periods of NEET (Hall, 2024). Among those with incomplete secondary school who find work, their jobs are often precarious and lower paying (Branson et al., 2019; Mlatsheni & Ranchhod, 2017; van der Berg & van Broekhuizen, 2012). However, finishing secondary school does not always protect youth from becoming NEET—approximately half of the NEET youth in 2023 had finished secondary school (Mudiriza & De Lannoy, 2023). Once out of school, South African youth must navigate a challenging labour market, characterized by 60.7% unemployment for youth aged between 15 and 24 in 2023 (Statistics South Africa, 2023), the second-highest in the world (World Bank, 2023). "Demand side" drivers of NEET include insufficient available jobs and limited opportunities for self-employment (Hall, 2024). For South African youth who can find employment, it is usually precarious: they experience high levels of labour-market churn, frequently moving between low-paying jobs (Ingle & Mlatsheni, 2017). Despite this seemingly bleak scenario, most youth in South Africa who are NEET are active and aspiring entrants into the labour market, with most having looked for work unsuccessfully for more than a year (Erdoğan et al., 2017; Mudiriza & De Lannoy, 2023). Without the skills or social capital to compete for scarce jobs, and little chance to gain work experience, newcomers to the labour market face the risk of being chronically unemployed. Vulnerabilities that occur at the time of entry into the labour market intensify along the life cycle and impact not only employment trajectories but also individual well-being (Vaccaro et al., 2023). NEET youth are found to have worse health and behavioural outcomes, including poorer mental health (Branson et al., 2019) and higher rates of substance abuse (Henderson et al., 2017).

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The analysis was done using longitudinal data from the Asenze population-based cohort study, collected in a peri-urban area in KwaZulu-Natal, South Africa. We describe our comprehensive approach to creating analytical cohorts and vulnerability indices in the methodological approach section (Section 2), followed by the reporting of results (Section 3), and a discussion of the implications of these findings for intervention and priority setting (Section 4 and 5).

2 | METHODOLOGICAL APPROACH

This article examines pathways to NEET using data from four rounds of data collection in the Asenze cohort study. The final time-point consists of adolescents at different stages of their development, between the ages of 16 and 20. While many conceptualizations of transitions into the labour market rely on single indicators, which oversimplify the diversity and complexity of this transition, we adopt a non-binary description of a successful transition into the labour market by creating two vulnerability indices. To capture the potential differences in vulnerability to early versus later NEET, we divide the sample into two overlapping cohorts, each assessed with a tailored vulnerability to the NEET index.

2.1 | The Asenze Study

We used longitudinal data from the Asenze population-based cohort study in a peri-urban area in KwaZulu-Natal, South Africa. In 2023, KwaZulu-Natal housed the highest concentration of NEET youth, approximately 22% (Mudiriza & De Lannoy, 2023), highlighting the importance of conducting NEET research with this population. Four waves of data collection have been undertaken: Waves 1 and 2 focused on child neurodevelopment, cognitive function, child behavioural problems, and physical health, while Waves 3 and 4 of the cohort study focused on identifying risk and protective factors for HIV acquisition, risky sexual behaviour, substance use, school dropout, neurocognitive difficulties, and other poor outcomes in adolescence. In 2008, 1,581 children aged 4–6 years, along with their primary caregiver, were enrolled in Wave 1, 90% of whom were enrolled again in 2010 for Wave 2. A full description of the Asenze cohort is given in Desmond et al. (2022). Wave 3 enrolled 1,174 adolescents aged 13–19 and their primary caregivers in 2019. Due to the COVID-19 pandemic, data collection was paused in March 2020 and resumed in September 2020. Wave 4 was conducted telephonically in 2022, enrolling 1,120 adolescents without their caregivers. Given that the children were sampled at varying ages, the final panel data consisted of adolescents between the ages of 16 and 20; some are of school-going age, while others are already at school-leaving age. Twenty young people from Wave 1 and Wave 2 living with severe disability were not included in Wave 3 and Wave 4. It should be noted that in Wave 3, a substantial portion of adolescents were interviewed during the COVID-19 pandemic, which would have aggravated some of the vulnerabilities.

2.2 | Two analytic cohorts

Cohort 1 comprises 885 adolescents who have not completed secondary school, including individuals who (1) are still in school; (2) have dropped out of secondary school; and (3) have dropped out of school and are now pursuing alternative education at a technical and vocational education and training (TVET) college. Cohort 2 contains all 213 adolescents who are no longer in secondary school and includes individuals who have: (1) completed secondary schooling; (2) have dropped out of secondary school; and (3) have dropped out of school

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and are now pursuing alternative education at a TVET college. Given the timing of our survey, Cohort 1 is much larger.

Each cohort is analysed separately (recognizing its overlap) as the outcomes are distinct. A challenge in creating NEET cohorts and vulnerability indices for analyses is the heterogeneity of NEET adolescents. The definition of our two cohorts is based on the timing of NEET, with Cohort 1 capturing earlier stage NEET and Cohort 2 capturing later stage NEET. Individuals who are vulnerable in Cohort 2 would have been vulnerable for a longer period of time and may face larger barriers to re-engaging with the labour market or education sector. Policy recommendations for the two groups could also be different. A more granular approach could potentially have been adopted with a larger data set.

2.3 | The two vulnerability indices

The school vulnerability index (for Cohort 1) includes school-level variables that influence the possibility of education completion, which are not relevant to those who have completed school. The education and labour-market vulnerability index (for Cohort 2) includes employability-related variables that are not relevant to those still in school. Our vulnerability indices incorporate various aspects of transition: transition through the school system, school completion, and post-school activities to reflect the degree of adolescent vulnerability for a successful transition into the labour market and thus productive adulthood. In South Africa, school is compulsory for children aged seven to 15 (South African Government, 2023), with 15 being the legal working age, as stipulated by the Basic Conditions of Employment Act (South African Government, 1997). One option for learners who drop out at 15 is to pursue education in TVET colleges. Adolescents who finish secondary school can further their education with degrees or diplomas from universities or post-secondary institutions.

We identify specific indicators within each cohort that make adolescents vulnerable to not achieving these milestones. A vulnerability index is then created for each adolescent by summing these indicators. There are various ways of creating indices, none faultless. In this analysis, the indicators are of equal weight. The vulnerability indices were created using adolescent outcomes from Wave 4 of the Asenze Study.

The school vulnerability index for Cohort 1 focuses on school outcomes and indicators include: (1a) repeating at least one grade in secondary school; (1b) being absent for an entire year of primary or secondary school; and (1c) dropping out of school altogether. The education and labour-market vulnerability index for Cohort 2 focuses on both the labour market and the educational outcomes (similar to NEET), and the indicators include: (2a) not completing secondary school, and if the adolescent is not in training, whether they are either (2b) precariously employed or (2c) unemployed (these are detailed in Table A1 in the Appendix).

The NEET vulnerability indices had to be created from the available data. Given that it was developed by the researchers, there is a lack of theoretical or empirical evidence indicating that any one variable would predict vulnerability more strongly than another. As a result, the decision was made to weigh each component of the vulnerability index equally. This equal weighting provides a balanced approach without making subjective assumptions about the relative importance of index components. It further increases the adaptability of our approach to further studies.

2.4 | Socioecological life-course framework and early markers of risk

To capture the influence of different environmental levels, we draw on Bronfenbrenner's (1979) theory of development. To capture how the accumulation of experiences throughout childhood and early adolescence is associated with outcomes in later adolescence and young adulthood, we overlay this socioecological model with a life-course perspective. This hybrid model allows us to understand the dovetailing influence of individual

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and contextual characteristics with changes over time when determining the vulnerabilities of the transition to productive adulthood. It is well suited to the South African context because it accounts for the accumulated exposure to multiple risk factors that characterize it.

Our model will test for covariates within this socioecological life-course framework, outlined in Table A2 in the Appendix. The vertical axis captures the model's levels of influence by proximity to the individual, starting with the system closest to the individual, the microsystem. The horizontal axis captures the life-course approach by reflecting the data collection point and the life-course stage.

We identified risk factors in the Asenze dataset that fit the socioecological model at different periods (measured in waves) of the adolescent's life course. The indicators included in our vulnerability indices are based on empirical evidence from South Africa on the predictors of higher lifetime earnings and financial independence. This approach allows us to unpack the influential factors that increase or decrease vulnerability-to-NEET at different stages of adolescence and transition into adulthood, allowing for a more nuanced understanding of factors that contribute to vulnerability throughout the life course. To our knowledge, disaggregation at the stages of youth progress has not previously been explored in South African literature.

2.5 | Estimation strategy

To analyse the relationship between the two vulnerability indices and the range of risk factors, a linear probability model (LPM) is used. Even though the outcome is an ordinal variable (with both indices having a value between 0 and 3), the LPM is chosen for its simplicity and interpretability. The variance inflation factor was calculated to ensure the robustness of the results and to address potential multi-collinearity among the covariates. Covariates with a high variance inflation factor (VIF) were scrutinized and reconsidered accordingly.

We adopt a staggered reduced-form approach with our analysis. Initially, we regress the vulnerability indices onto the set of demographic characteristics (regression 1). This is followed by systematically including the variable representing the micro (regression 2), meso (regression 3), meso (regression 4), macro (regression 5) and chrono (regression 6) components of the conceptual framework. The systematic addition allows us to test the robustness of relationships as other factors are controlled. Stata 16 was used to perform the analysis (Statacorp, 2019).

3 | RESULTS

A summary of the index component values is shown in Table A3 in the Appendix. The final sample of adolescents included in the schooling vulnerability index (Cohort 1) is 885, and the education and labour-market vulnerability index (Cohort 2) is 213. The table shows that a major contributor to vulnerability among Cohort 1 adolescents is the repeating of grades in secondary school, with approximately 43% of the sample reporting that they repeated a grade. Among Cohort 2 adolescents (no longer in secondary school), unemployment is a major contributor to vulnerability, with 60% reporting not being in any training, education, or employment.

A summary of the final index values and risk factors is described in Table A4 in the Appendix. These summary statistics are provided separately for Cohort 1 and Cohort 2. As expected, the average age (18.5 95% CI 18.43–18.57) of Cohort 2 is slightly higher than the average age in Cohort 1 (17.8 95% CI 17.75–17.85), as these are adolescents who are often already engaging with the labour market.

The results from the reduced-form approach to estimating the factors positively and negatively related to vulnerability in Cohort 1 are shown in Table A5 in the Appendix. The table shows that, for the school outcome vulnerability index, being a girl is negatively associated with vulnerability. In addition, the r-squared reveals that a large part of the variation in vulnerability scores is explained by age and sex. Factors in the microsystem

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(the immediate environments in which adolescents will engage in direct interactions) that are significantly associated with vulnerability include whether individuals report getting pregnant in adolescence or ever impregnating a girl. A micro factor negatively associated with vulnerability is residing with your biological mother. However, this factor is only negatively associated with vulnerability when the biological mother was in the household in Wave 3 (later adolescence) as opposed to Wave 1 (childhood). Macrosystem factors (the social structures within which the microsystems, mesosystems, and exosystems operate), such as hopelessness, are positively and statistically significantly correlated with vulnerability. Adolescents who scored higher in Wave 3 on the scale of feeling hopeless about the future were also likely to score higher on the school outcomes vulnerability index, as captured in Wave 4.

Secondly, we estimate the relationship between demographic, microsystem, mesosystem, exosystem, and macrosystem factors and the school and labour-market vulnerability index among Cohort 2 adolescents (results displayed in Table A6 in the Appendix), and here age is negatively associated with vulnerability. Health behaviours in the microsystem are positively and statistically significantly correlated with vulnerability. This includes a girl getting pregnant during adolescence or a boy ever impregnating a girl, as well as self-reporting drinking alcohol before the age of 16.

As observed in Cohort 1, there is a positive relationship between those who reported a sense of hopelessness for the future in Wave 3 and those at risk for poor school and labour-market outcomes in Wave 4. This is included as a macrosystem determinant, as it reflects the general disposition of the adolescents within their environment and can act as a proxy for the overarching social environment. Compared to the r-squared of schooling outcomes, the r-squared for this vulnerability index increases significantly when our covariates from the conceptual framework are included.

3.1 | Limitations

Our data are observational, and our approach does not allow for the attribution of causality to vulnerabilities on the pathway to becoming NEET and later life productivity. Future research may want to use the occurrence of natural experiments to elicit the causal impact of certain early transition markets on the pathway to becoming NEET. Alternatively, randomized controlled trials which measure the impact of interventions addressing vulnerable markers on NEET and later life productivity can also be used for causal analysis.

Our sample is limited to youth living in a specific area that, while facing what are arguably widespread daily challenges, cannot be generalized to the whole of South Africa without qualification. The data rely on self-reporting which could be subject to recall bias and social desirability bias.

Outcome measure data were collected during the COVID-19 pandemic when the South African Department of Basic Education adopted more lenient assessments and grade promotion policies to support students impacted by pandemic-related school closures and disruptions. As a result, lower rates of school dropout were observed during this period nationally and in this cohort as well (Department of Basic Education, 2023). This may have influenced the insignificant findings on some risk factors. These factors may have provided temporary reprieve from dropping out, but this would obscure individuals' underlying risk and postpone their vulnerability-to-NEET. Return to normal after the pandemic may result in a delayed wave of NEET.

As the final round of longitudinal data analysed here is in early adulthood, we do not yet have data to test the implications of NEET for this cohort on later-life productivity beyond what we can know from the literature. While we have employed robustness and sensitivity checks to strengthen our analyses, there remains a need for future research with broader samples and longer-term follow-up to further validate our findings.

A final limitation is the use of an LPM as our estimator. While the LPM was chosen for simplicity and to facilitate interpretation, it has some limitations when applied to an ordinal outcome. Most notably, it assumes a linear relationship between risk factors and our vulnerability indices, which may oversimplify the threshold

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distinctions between ordinal categories. However, the LPM does well in predicting the direction and relative magnitude of the associations. Our choice of estimator prioritizes simplicity and clarity over the detailed probabilities structure that an ordered model could provide.

4 | DISCUSSION

We considered the timing of transitions to NEET, combined with the socioecological life-course model, to provide a detailed picture of how vulnerability emerges over time. This model integrates individual, family, and broader societal factors across different life stages. We created two cohorts and two vulnerability-to-NEET indices to evaluate whether the factors affecting vulnerability in schooling are similar to those affecting education and labour-market outcomes post-schooling. This approach allows us to capture the dynamic nature of NEET vulnerability at different life stages.

Although our vulnerability-to-NEET indices were collected in a select area in South Africa, their components are fairly representative of national indicators. In our Cohort 2 sample, 60% of respondents reported being unemployed, which corresponds well to the 60.7% unemployment for youth aged between 15 and 24 in South Africa in 2023 (Statistics South Africa, 2023). However, we might observe an elevated risk of educational challenges. Among Cohort 1 adolescents, approximately 43% of the sample reported that they repeated a grade in secondary school. Estimates using general household surveys estimate that the average repetition rates between 2014 and 2018 in South Africa were around 21% for grade 10 and 18% for grade 11 (van der Berg et al., 2019).

Within the microsystem of the everyday environment, we observe vulnerability to early trajectory to NEET differs from later trajectory to NEET. For Cohort 1 (earlier pathway to NEET), being a girl is protective of school outcomes, in keeping with findings that South African girls outperform boys on average in all subjects and grades, including the final secondary schooling exam in grade 12 and school retention (Spaull & Makaluza, 2019). However, this advantage disappears when we observe education and labour-market outcomes in Cohort 2, suggesting that girls are unable to transmute this early educational advantage into labour-market gains. This is in line with NEET trends in sub-Saharan Africa in 2023, where 27% of young women were NEET compared to 16.9% of young men (ILO, 2024). Several factors affect an adolescent girl's successful transition into employment, including familial and cultural norms such as gender norms around labour-market participation and the valuation of care work (Desmond et al., 2024). However, certain structural and systemic characteristics of the labour market, such as gender discrimination and gendered expectations in career paths, may also result in this poor transition. This highlights the need for a consideration of gender in combination with life stage when intervening to prevent NEET.

Similarly, for earlier NEET pathways, living with their biological mother in later adolescence, but not early childhood, was protective of vulnerability-to-NEET; this was not true for later NEET. This suggests that maternal cohabitation during adolescence may be crucial in supporting adolescents in their quest to attain "economic stability and self-sufficiency" (Danziger & Ratner, 2010), be it via emotional and academic support, guidance, role modelling, or monitoring that may be required to persevere in their education and navigate the transition to higher education or the workplace. These findings highlight the benefits of "looking beyond outcomes in a single life stage," and instead, "taking a life course perspective when priority setting," especially "in contexts with multiple constraints on development" (Desmond et al., 2023).

Among both cohorts, getting pregnant or getting someone pregnant during adolescence is a significant predictor of vulnerability in NEET outcomes. South African research has shown that pregnancy is a common reason given by girls for dropping out of school (Grant & Hallman, 2006; Gustafsson, 2011; Ranchhod et al., 2011); our findings point to educational implications for boys who become adolescent fathers. Our analysis does not account for the many unobservable factors that affect young people's ability to complete school, enrol in

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education, or find non-precarious employment. For instance, in their analysis, Grant and Hallman (2006) find that girls in South Africa who dropped out of school for pregnancy were already behind in their education. This uncertainty is evidenced within Cohort 2, where the consumption of alcohol at an early age is significantly associated with post-secondary education and labour-market vulnerability. Still, we cannot say whether early drinking is the cause of such vulnerability or whether such vulnerability leads to early drinking.

Changes in caregivers across waves did not appear to increase vulnerability-to-NEET. This may be attributed to the typology of households in South Africa. Many households, especially those in rural areas, comprise of large and extended families that often share caregiving responsibilities (Naicker et al., 2018; Statistics South Africa, 2020). The change in the primary caregiver may, therefore, be a reflection of changes in the employment status (and availability) of the mother and may not necessarily reflect a disruption in the stability of care provided.

Within the overarching social structures of the macrosystem, a feeling of hopelessness in early adolescence emerges as a predictor of vulnerability for both cohorts. One complex aspect of our data is that some of the observations for Wave 3 were captured before and during the COVID-19 pandemic. To control for this, we ran regressions where hopelessness interacted with the timing of the interview but found that the strong effect on vulnerability persisted regardless of the timing of the interview. The discouragement that arises from long periods of job search can lead to labour-market pessimism, which further demotivates job search efforts, perpetuating cycles of poverty and exclusion (Mlatsheni & Ranchhod, 2017). This sense of disillusionment is compounded by the socioeconomic challenges present in South Africa and is likely to affect overall future orientation. Within the South African context, hopelessness was found to increase the probability of engaging in risky behaviours (Desmond et al., 2019; Magut et al., 2024; Ngwenya et al., 2021). Evidence from the United States has shown that personal agency and a more positive future outlook are associated with better school and labour-market performance during emerging adolescence and young adulthood (Berzin, 2010). Hope is also seen as a buffer against mental health problems (Laranjeira & Querido, 2022), which has been shown to predict NEET status (Gariépy et al., 2021).

It is also important to note that risk factors from Waves 3 and 4 may have been influenced by the pandemic. Movement during the pandemic was curbed, which could have impacted family structure and adolescents' sexual behaviour and substance use. A multi-country study across Malawi, South Africa, Uganda, and Zimbabwe found that during the pandemic, sexual frequency and alcohol use decreased significantly among adolescent girls and young women relative to other groups (Mancuso et al., 2023). Future orientation and feelings of hopelessness would also have been exacerbated. The pandemic would have caused stress and uncertainty about school and future career opportunities and the ability to become financially independent.

The socioecological approach shows how there are factors beyond the individual that influence their well-being, and we can intervene in systems closer or further from the individual depending on our aims. It is essential to consider that many of our outcomes are often determined by a broader, systemic context, one which is difficult to control for in this type of analysis. For instance, the quality of an adolescent's education, over which the adolescent and caregiver have little control, is likely to affect their school outcomes. The education system itself may not prioritize learner outcomes; researchers have detected a culture of "weeding" in South African schools, whereby poor-performing students are encouraged to drop out of school or repeat grades 10 and 11 to ensure that they do not fail grade 12 and bring down national pass rate targets (Branson et al., 2014).

An important structural determinant of vulnerability is socioeconomic status. Branson et al. (2014) use South African panel data to observe the progress of adolescents through the schooling system. Although they find that falling behind in school is a key predictor of dropping out of secondary school, adolescents who attend higher-quality schools are partially protected from this effect (Branson et al., 2014). Extensive qualitative evidence in South Africa has shown that adolescents have high educational aspirations after secondary school; however, there is a lack of knowledge about the options and how to access them. Undeniably, poor access to financing options for post-secondary education also limits access (Baldry et al., 2019). While we include social grant

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recipience as a potential predictor of NEET vulnerability, it is not significant in any of our estimations. One possible explanation for this is the lack of variation when it comes to grant recipience, with more than 79% of both cohorts receiving grants at some point during their childhood and adolescence.

Our research overlaps with various branches of study. For instance, there is quite an extensive literature exploring adverse childhood experiences (ACEs) with a range of adolescent or adult outcomes. This research tranche has focused specifically on the contribution of ACEs to health and behavioural outcomes. Using Wave 1 and Wave 2 of the Asenze data, Nazareth et al. (2022) measured the contribution of ACEs to child behaviour outcomes. The authors created a composite ACE exposure measure which measured whether at least one parent was deceased, at least one parent had abandoned the child, food insecurity, whether the child had experienced a major accident or medical illness, the caregiver is HIV+, reported risky drinking, depression, or any interpersonal violence.

There is also extensive literature on the impact of "accelerators", or protective factors, that jointly contribute to adolescents achieving the Sustainable Development Goals (SDGs). Haag et al. (20021) calculated the associations between numerous protective factors and combinations of protective factors with 13 SDG goals among younger adolescents (aged nine to 13) in South Africa. Like the factors measured in our analysis, these factors include food security, caregiver monitoring and praise, community safety, and access to community-based organizations. However, they found few associations between these protective factors and school-related SDGs (Haag et al., 2021).

While poor quality education and structural problems in the South African labour market contribute significantly to adolescents' vulnerability during their transition into adulthood, our research also points to the importance of life-course factors, family, and behaviour in shaping vulnerability. Overlaying the socioecological and life-course approaches helps us identify when young people are vulnerable and possible points of entry for intervention in their ecosystems. For example, understanding that young girls are at risk of not finding employment despite good educational outcomes points to the need for labour-market interventions. Conversely, boys are vulnerable within school but perform better in the labour market. Although government-level policies addressing education and labour-market quality and structure are key, we argue that these policies should be accommodated with social policies that address life-course factors during childhood and early adolescence. NEET individuals are not a homogeneous group, and nor are the vulnerability risks to NEEThood. Some risks, such as pregnancy and lack of hope, have a more prolonged influence on NEET. However, others vary according to entry points into NEEThood. The family system is important in preventing early NEEThood, particularly the presence of the mother. While we found no direct associations at the microsystem and mesosystem levels, family can play a key role in combatting both adolescent risk behaviours and developing agency and strategic thinking (Branson et al., 2019).

5 | CONCLUSION

Various individual, family, and broader societal factors during early-life and adolescence are potential predictors of NEET status during adolescence. These include feeling hopeless about the future, getting pregnant or impregnating someone during adolescence, drinking alcohol before age 16, family structure (residing with one's biological mother in early adolescence was protective) and demographics (age). By deepening our understanding of how individual and contextual characteristics shape the transition into productive adulthood through a life-course approach, we can identify emerging risk markers and intervention points that, if addressed early, can make a child or adolescent less vulnerable to becoming NEET later in life. For example, addressing school disengagement in early adolescence might prevent school dropout in late adolescence or modifying school life orientation classes to incorporate aspects of goal setting, strategic thinking, and self-efficacy. Many of these risks can only be mitigated in the life period in which they occur. Once risks occur in

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childhood, they can increase the likelihood of risk of NEET occurring in adolescence. Missing the opportunity to intervene early limits the impact we can have on preventing NEET later. The life-course approach allows us to consider the complexity and heterogeneity of adolescents with NEET. The differences in vulnerability at different moments in life and their implications for later life give us insight into how we could tailor interventions to address their specific needs. This nuanced understanding advances beyond static models of NEET vulnerability, offering a more comprehensive framework for both research and intervention design.

AUTHOR CONTRIBUTIONS

LR: Conceptual underpinnings, framework or research design/methodology of the given publication, analysis and interpretation of the data, writing of substantial sections of the paper.

KGW: Data collection and processing, writing of substantial sections of the paper or substantively and substantially revising and rewriting it for rigour and coherence.

FT: Data collection and processing, writing of substantial sections of the paper or substantively and substantially revising and rewriting it for rigour and coherence.

LD: Substantively and substantially revising the paper for rigour, coherence, and other important intellectual contributions.

CD: Data collection and processing, substantively and substantially reviewing the paper for rigour, coherence, and other important intellectual contributions.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICS STATEMENT

This paper reports analysis of primary sources. Ethical clearance was obtained from the University of KwaZulu-Natal Biomedical Research Ethics Committee (reference number BF 036/07 for Waves 1 and 2 and BE608/18 for Waves 3 and 4) and the Columbia University of New York Institutional Review Board (reference number AAAC2559 for all four Waves).

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APPENDIX A

TABLE A1 Rationale for components of the vulnerability-to-NEET indices.

	Cohort 1	Cohort 2
1a Grade repetition in secondary school. In nationally representative South African household surveys, learners self-report failing grades as one of the main factors contributing to their dropping out of school (Gustafsson, 2011; Spaull, 2015), even after controlling for differences in socioeconomic status and schooling quality (Branson et al., 2014).	x	
1b Being absent for an entire year of primary or secondary school. Chronic absenteeism from school is associated with poor learning outcomes and longer-term economic consequences such as lower adult income (Liu et al., 2021). These data were collected during COVID-19 when South African education authorities adopted lenient assessments and promotion policies due to pandemic disruptions, which may affect outcomes.	x	
1c and 2a: Not completing secondary school or dropping out. Branson et al. (2019) in their longitudinal analysis of nationally representative South African data, found that individuals who did not complete secondary schooling are less connected to the labour market and are likely to remain unemployed for longer periods. Similarly, Mlatsheni and Ranchhod (2017) find that among adolescents transitioning into the labour market, those who completed secondary schooling are approximately 9% more likely to become employed within two years than those who did not complete secondary schooling.	x	x
Not being in any form of training or education and being (2b) precariously employed or (2c) unemployed. Van der Berg and van Broekhuizen (2012) show that unemployment rates among university degree graduates in South Africa are low. Estimations of the return to education in South Africa show a convex relationship and, in particular, that there is a very sharp increase in the returns at 12 years of schooling or more (Vaccaro et al., 2023). A recent panel data analysis of precarious work and future employment using panel data in South Africa found that among South African youth with precarious employment only 15% move to stable employment in the next two years. More than 50% of the youth stayed in precarious employment over the same time frame, while 31% of precarious working youth became unemployed. The authors define precarious employment as either being without a permanent contract earning below the minimum wage or being self-employed while still earning below the minimum wage (Doyle et al., 2023). In our sample, because there is no data on the wage level, someone is classified as precariously employed if they are not in any form of training and self-report being in casual employment. One of the key features of unemployment in South Africa is its chronic nature (Mlatsheni & Ranchhod, 2017). There are also health and behavioural consequences for unemployed youth. Summary evidence, mostly from high-income countries, found that unemployed individuals are more likely to suffer from anxiety and mood disorders and commit suicide (Virgolino et al., 2022). Among graduates, unemployment can contribute to feelings of insignificance in their career narrative, leading to distress (van Lill & Bakker, 2022).		x

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TABLE A2 The socioecological life-course approach.

WAVE 1 (Children aged 4–6 & primary caregiver)	WAVE 2 (Children aged 6–8 & primary caregiver)	WAVE 3 (Adolescents aged 13–19 & primary caregiver)	WAVE 4 (Adolescents aged 16–20)
MICROSYSTEM: The immediate environments in which adolescents will engage in direct interactions, which might affect the vulnerability index. These are the adolescents' immediate relationships with themselves and those around them, including interactions with their family, school, or peers.			
Stunted: Defined as (height for age < −2 SD). A binary variable. **HIV positive**: Child reported being HIV positive in the first wave of Asenze. A binary variable. **Biological mother resides in the household**: Binary variable to capture whether biological mother resides in the same household during childhood.		**Ever had sex:** Binary variable to reflect if adolescents reported having sex by this age. **Exposure to community violence**: Adolescents reported the frequency of hearing/seeing violence in their neighbourhood and home. **Biological mother resides in the household**: Binary variable to capture whether an adolescent resided with their biological mother in the same household during childhood and adolescence.	**Girl reports ever being pregnant/boy reports ever impregnating girl:** A binary variable to reflect whether an adolescent has had to engage with pregnancy. This includes when a girl reports ever being pregnant or when a boy reports ever impregnating a girl. This variable does not account for whether the pregnancy resulted in a live birth. **Had first drink before age 16**: To account for whether adolescents engaged in substance use, a binary variable equal to one was created and set equal to one if an adolescent self-reported drinking alcohol before the age of 16.
MESOSYSTEM: The mesosystem explores the interactions between elements in the microsystem.			
Mother's education: Mother's education is captured as a categorical variable ranging from none to post-secondary education. Parental education can affect a child or adolescent's experience in the school system, which should determine their school and labour-market outcomes.		**Adolescent is food secure:** Caregiver reporting on household food security. Food security is considered part of the mesosystem as it encapsulates how socioeconomic status and the food environment of the adolescent's community interact to influence an adolescent's health and vulnerability.	
EXOSYSTEM: The exosystem consists of social structures within the larger societal structures that impact individuals, albeit indirectly.			
Child received a grant: Binary variable which indicates whether the child is the beneficiary of any social grant. This variable is considered part of the exosystem, as it captures the child's access and interaction with the South African welfare state as a social structure.		**Adolescent received a grant**: Binary variable indicates whether the adolescent is the beneficiary of any social grant.	

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TABLE A2 (Continued)

WAVE 1 (Children aged 4–6 & primary caregiver)	WAVE 2 (Children aged 6–8 & primary caregiver)	WAVE 3 (Adolescents aged 13–19 & primary caregiver)	WAVE 4 (Adolescents aged 16–20)
MACROSYSTEM: These are the social structures within which the micro-, meso-, and exosystems operate and can be presented by overarching cultural, social, or economic systems. These systems are key to shaping contexts that determine the earlier systems.			
		Feeling Hopeless: Adolescent reported on strength of their hope (or feelings of hopelessness) and future orientation. This is included as a macrosystem determinant, as it reflects general disposition of the adolescents within their environment and can act as a proxy for the overarching social environment.	
CHRONOSYSTEM: This dimension focuses on changes over the lifespan of the adolescent, specifically transitions across waves of data.			
Changed caregiver between Wave 1 and Wave 2: Binary variable, indicating if the child had a different caregiver in Wave 1 than in Wave 2. The change can be positive (the child might have shifted to a more attentive caregiver) or negative (i.e. due to a death).	**Changed caregiver between Wave 2 and Wave 3:** Captured using a binary variable, this variable is equal to one if the adolescent had a different caregiver in Wave 2 than in Wave 3. The change can be positive (the adolescent might have shifted to a more attentive caregiver) or negative (i.e. due to a death).	**Changed caregiver between Wave 3 and Wave 4**: Binary variable, indicating if the adolescent had a different caregiver in Wave 3 than in Wave 4. The change can be positive (the adolescent might have shifted to a more attentive caregiver) or negative (i.e. due to a death).	

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TABLE A3 Summary of the index components.

	Cohort 1: Schooling Vulnerability Index	Cohort 2: Education and Labour-Market Vulnerability Index
Grade repeated in secondary school	0.43	
	(377)	
Missed an entire year of school	0.08	
	(68)	
Dropped out of school	0.09	0.37
	(78)	(78)
Precariously employed		0.01
		(3)
Unemployed		0.60
		(127)
Observations	885	213

Note: mean coefficients; sum in parentheses.

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TABLE A4 Descriptive statistics.

		Cohort 1 sample [Schooling Vulnerability Index analysis]		Cohort 2 sample [Education and Labour-Market Vulnerability Index analysis]	
		Proportion [95% CI]	Count	Proportion [95% CI]	Count
	Vulnerability index SCTI (range 0–3)	0.59 [0.55–0.63]	885		
	Vulnerability index LTI (range 0–3)			0.98 [0.89–1.07]	213
Demographic	Age (Mean)	17.8 [17.75–17.85]	885	18.5 [18.43–18.57]	213
	Female	0.49 [0.46–0.52]	437	0.66 [0.6–0.72]	141
Micro	W4: Girl reports ever being pregnant/ boy reports ever impregnating girl	0.09 [0.07–0.11]	80	0.17 [0.12–0.22]	36
	W3: Ever had sex	0.25 [0.22–0.28]	217	0.31 [0.25–0.37]	67
	W4: Had first drink before age 16	0.2 [0.17–0.23]	174	0.13 [0.08–0.18]	28
	W1: Stunted in Wave 1	0.14 [0.12–0.16]	122	0.12 [0.08–0.16]	26
	W1: Child is HIV positive	0.035 [0.02–0.05]	31	0.0094 [0–0.02]	2
	W3: CVC quartile 1 (lowest)	0.28 [0.25–0.31]	250	0.31 [0.25–0.37]	66
	W3: Quartile 2	0.16 [0.14–0.18]	143	0.15 [0.1–0.2]	32
	W3: Quartile 3	0.25 [0.22–0.28]	222	0.25 [0.19–0.31]	53
	W3: CVC quartile 4 (highest)	0.19 [0.16–0.22]	164	0.22 [0.16–0.28]	46
	W3: CVC missing	0.12 [0.1–0.14]	106	0.075 [0.04–0.11]	16
	W1: Biological mother is in the household	0.78 [0.75–0.81]	692	0.79 [0.73–0.85]	168
	W3: Biological mother is in the household	0.71 [0.68–0.74]	627	0.73 [0.67–0.79]	155

(Continues)

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TABLE A4 (Continued)

		Cohort 1 sample [Schooling Vulnerability Index analysis]		Cohort 2 sample [Education and Labour-Market Vulnerability Index analysis]	
Meso	W1: Mother's education: none	0.046 [0.03–0.06]	41	0.042 [0.02–0.07]	9
	W1: Mother's education: attended primary school	0.15 [0.13–0.17]	136	0.1 [0.06–0.14]	22
	W1: Mother's education: attended high school	0.44 [0.41–0.47]	389	0.44 [0.37–0.51]	94
	W1: Mother's education: completed grade 12 (matric)	0.22 [0.19–0.25]	198	0.28 [0.22–0.34]	60
	W1: Mother's education: college	0.052 [0.04–0.07]	46	0.028 [0.01–0.05]	6
	W1: Mother's education: unknown	0.085 [0.07–0.1]	75	0.1 [0.06–0.14]	22
	W3: Adolescent is food secure	0.82 [0.79–0.85]	730	0.8 [0.75–0.85]	170
Exo	W1: Adolescent received a grant	0.88 [0.86–0.9]	778	0.89 [0.85–0.93]	190
	W3: Adolescent received a grant	0.85 [0.83–0.87]	755	0.79 [0.73–0.85]	168
Macro	W3: Feeling hopeless (Index ranging from 0 to 10, with a higher value indicating less hope for the future)	2.28 [2.18–2.38]	2015	2.25 [2.04–2.46]	479
Chrono	Changed caregiver between Wave 1 and Wave 2	0.17 [0.15–0.19]	149	0.13 [0.08–0.18]	28
	Changed caregiver between Wave 2 and Wave 3	0.4 [0.37–0.43]	354	0.33 [0.27–0.39]	70
	Changed caregiver between Wave 3 and Wave 4	0.08 [0.06–0.1]	71	0.11 [0.07–0.15]	23
Observations		885		213	

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TABLE A5 Vulnerability to the schooling outcome of cohort 1.

		(1)	(2)	(3)	(4)	(5)	(6)
Demographic	Age	0.361***	0.339***	0.335***	0.337***	0.329***	0.330***
		(0.0288)	(0.0288)	(0.0293)	(0.0294)	(0.0293)	(0.0294)
	Female	−0.138***	−0.159***	−0.161***	−0.160***	−0.148***	−0.147***
		(0.0395)	(0.0415)	(0.0418)	(0.0419)	(0.0418)	(0.0418)
Micro	W4: Girl reports being pregnant/boy reports ever impregnating girl		0.306***	0.307***	0.302***	0.298***	0.297***
			(0.0727)	(0.0730)	(0.0732)	(0.0728)	(0.0728)
	W3: Ever had sex		0.0671	0.0683	0.0720	0.0658	0.0693
			(0.0488)	(0.0490)	(0.0491)	(0.0489)	(0.0490)
	W4: Had first drink before age 16		0.0775	0.0739	0.0710	0.0726	0.0703
			(0.0502)	(0.0504)	(0.0505)	(0.0502)	(0.0503)
	W1: Stunted in Wave 1		−0.0636	−0.0637	−0.0597	−0.0550	−0.0586
			(0.0569)	(0.0574)	(0.0576)	(0.0573)	(0.0576)
	W1: Child is HIV positive		−0.0569	−0.0557	−0.0631	−0.0502	−0.0469
			(0.106)	(0.107)	(0.107)	(0.106)	(0.107)
	W3: Quartile 2 (reference quartile 1 - lowest)		−0.0178	−0.0231	−0.0212	−0.0189	−0.0214
			(0.0609)	(0.0613)	(0.0613)	(0.0610)	(0.0611)
	W3: Quartile 3		−0.0308	−0.0384	−0.0379	−0.0436	−0.0447
			(0.0535)	(0.0538)	(0.0538)	(0.0535)	(0.0536)
	W3: CVC quartile 4 (highest)		0.0986*	0.0888	0.0913	0.0809	0.0761
			(0.0595)	(0.0603)	(0.0604)	(0.0601)	(0.0603)
	W3: CVC missing		−0.00370	−0.0100	−0.00195	0.0389	0.0389
			(0.0674)	(0.0677)	(0.0682)	(0.0688)	(0.0689)
	W1: Biological mother is in the household		−0.0172	−0.00426	−0.0120	−0.0213	−0.0178

(Continues)

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TABLE A5 (Continued)

		(1)	(2)	(3)	(4)	(5)	(6)
			(0.0520)	(0.0545)	(0.0549)	(0.0547)	(0.0548)
	W3: Biological mother is in the household		−0.0957**	−0.0936**	−0.0940**	−0.0930**	−0.0915*
			(0.0471)	(0.0473)	(0.0473)	(0.0470)	(0.0497)
Meso	W1: Mother's education: attended primary school (reference: none)			0.0302	0.0330	0.0203	0.0287
				(0.103)	(0.104)	(0.103)	(0.104)
	W1: Mother's education: attended high school			0.0814	0.0816	0.0892	0.0971
				(0.0955)	(0.0955)	(0.0950)	(0.0956)
	W1: Mother's education: completed grade 12 (matric)			0.0622	0.0627	0.0842	0.0936
				(0.100)	(0.100)	(0.0998)	(0.100)
	W1: Mother's education: college			0.0136	0.0233	0.0364	0.0438
				(0.126)	(0.127)	(0.126)	(0.126)
	W1: Mother's education: unknown			0.130	0.132	0.133	0.145
				(0.116)	(0.117)	(0.116)	(0.117)
	W3: Adolescent is food secure			−0.0127	−0.0148	−0.0166	−0.0135
				(0.0522)	(0.0522)	(0.0519)	(0.0520)
Exo	W1: Adolescent received a grant				0.0499	0.0426	0.0455
					(0.0638)	(0.0635)	(0.0636)
	W3: Adolescent received a grant				0.0380	0.0318	0.0347
					(0.0587)	(0.0583)	(0.0587)
Macro	W3: Feeling hopeless (Index ranging from 0 to 10, with a higher value indicating less hope for the future)					0.0439***	0.0430***
						(0.0128)	(0.0129)

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TABLE A5 (Continued)

		(1)	(2)	(3)	(4)	(5)	(6)
Chrono	Changed caregiver between Wave 1 and Wave 2						−0.0696
							(0.0544)
	Changed caregiver between Wave 2 and Wave 3						0.0263
							(0.0435)
	Changed caregiver between Wave 3 and Wave 4						0.00172
							(0.0725)
Observations		885	885	885	885	885	885
R-squared		0.164	0.204	0.206	0.208	0.218	0.220

Note: mean coefficients; standard errors in parentheses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

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TABLE A6 Cohort 2 Labour market and schooling vulnerability.

		(1)	(2)	(3)	(4)	(5)	(6)
Demographic	Age	−0.239***	−0.252***	−0.223***	−0.216**	−0.190**	−0.193**
		(0.0863)	(0.0830)	(0.0852)	(0.0891)	(0.0884)	(0.0881)
	Female	−0.0933	−0.0723	−0.0542	−0.0506	−0.0511	−0.0725
		(0.0916)	(0.0980)	(0.0979)	(0.1000)	(0.0985)	(0.0987)
Micro	W4: Girl reports ever being regnant/ boy reports ever impregnating girl		0.394***	0.386***	0.387***	0.386***	0.383***
			(0.122)	(0.123)	(0.123)	(0.122)	(0.121)
	W3: Ever had sex		0.179*	0.171*	0.172*	0.145	0.141
			(0.0982)	(0.0977)	(0.0985)	(0.0975)	(0.0974)
	W4: Had first drink before age 16		0.282**	0.298**	0.298**	0.260**	0.255**
			(0.124)	(0.126)	(0.128)	(0.127)	(0.126)
	W1: Stunted in Wave 1		0.00867	0.00779	0.00398	−0.0290	−0.0206
			(0.127)	(0.127)	(0.128)	(0.127)	(0.128)
	W1: Child is HIV positive		−0.726*	−0.812*	−0.773*	−0.715	−0.771*
			(0.436)	(0.438)	(0.456)	(0.450)	(0.452)
	W3: Quartile 2 (reference quartile 1 - lowest)		−0.150	−0.127	−0.128	−0.122	−0.109
			(0.131)	(0.132)	(0.133)	(0.131)	(0.131)
	W3: Quartile 3		−0.00703	−0.0259	−0.0279	−0.0481	−0.0459
			(0.111)	(0.111)	(0.112)	(0.111)	(0.112)
	W3: CVC quartile 4 (highest)		0.0844	0.0704	0.0751	0.0499	0.0467
			(0.119)	(0.119)	(0.121)	(0.120)	(0.121)
	W3: CVC missing		0.0245	0.00679	0.0252	0.116	0.0860
			(0.167)	(0.168)	(0.178)	(0.178)	(0.179)
	W1: Biological mother is in the household		−0.0514	−0.179	−0.171	−0.179	−0.198
			(0.114)	(0.121)	(0.125)	(0.123)	(0.125)

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TABLE A6 (Continued)

		(1)	(2)	(3)	(4)	(5)	(6)
	W3: Biological mother is in the household		−0.168	−0.145	−0.148	−0.129	−0.0807
			(0.106)	(0.107)	(0.108)	(0.107)	(0.115)
Meso	W1: Mother's education: attended primary school (reference: none)			0.175	0.170	0.136	0.142
				(0.245)	(0.247)	(0.243)	(0.242)
	W1: Mother's education: attended high school			0.0825	0.0822	0.140	0.135
				(0.212)	(0.213)	(0.211)	(0.212)
	W1: Mother's education: completed grade 12 (matric)			−0.0668	−0.0705	−0.00265	−0.0143
				(0.221)	(0.222)	(0.220)	(0.221)
	W1: Mother's education: college			0.108	0.0980	0.129	0.174
				(0.324)	(0.327)	(0.322)	(0.324)
	W1: Mother's education: unknown			−0.341	−0.334	−0.310	−0.302
				(0.252)	(0.254)	(0.251)	(0.251)
	W3: Adolescent is food secure			0.0399	0.0426	0.0587	0.0707
				(0.106)	(0.107)	(0.106)	(0.106)
Exo	W1: Adolescent received a grant				−0.0299	−0.0177	−0.000179
					(0.141)	(0.139)	(0.139)
	W3: Adolescent received a grant				0.0398	0.0321	0.0542
					(0.116)	(0.114)	(0.114)
Macro	W3: Feeling hopeless (Index ranging from 0 to 10, with a higher value indicating less hope for the future)					0.0749***	0.0694**
						(0.0287)	(0.0288)

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TABLE A6 (Continued)

		(1)	(2)	(3)	(4)	(5)	(6)
Chrono	Changed caregiver between Wave 1 and Wave 2						−0.172
							(0.129)
	Changed caregiver between Wave 2 and Wave 3						0.140
							(0.0974)
	Changed caregiver between Wave 3 and Wave 4						0.140
							(0.136)
Observations		213	213	213	213	213	213
R-squared		0.038	0.196	0.238	0.239	0.265	0.283

Note: mean coefficients; standard errors in parentheses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

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