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Smooth, Staggered or Stopped?

Educational transitions in the South African Youth Panel Study

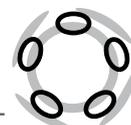
Kathryn Isdale, Vijay Reddy, Lolita Winnaar and Tia Linda Zuze

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ABBREVIATIONS AND ACRONYMS

DBE	Department of Basic Education
DHET	Department of Higher Education and Training
FET	further education and training
NDP	National Development Plan
NEET	not in employment, education or training
NIDS	National Income Dynamics Study
NTC	national technical certificate
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SAYPS	South African Youth Panel Study
TIMSS	Trends in International Mathematics and Science Study
TVET	technical and vocational education and training

PREFACE

The 2009 the South African government administration, informed by a results-focused philosophy, identified 12 priority outcomes for the country. Outcome 5 refers to ‘a skilled and capable workforce to support an inclusive growth path’, and the delivery of this outcome is led by the Minister of Higher Education and Training. Delivery Agreement 5 consists of three parts, with Output 5.1 committing the Department of Higher Education and Training (DHET) to establish a credible mechanism for skills planning, in collaboration with 20 national and provincial ministries. The DHET commissioned the Human Sciences Research Council (HSRC) to support the DHET in establishing a credible institutional mechanism for skills planning (Memorandum of Agreement between the DHET and the HSRC, February 2012). Thus the Labour Market Intelligence Partnership (LMIP) project, with six themes of research, was established.

The objective of one of the research themes is to obtain a better understanding of the pathways and transitions undertaken by young people through the education and training system into the workplace. The key question underpinning this work is: What are the dynamics of access, progression, graduation and labour market destinations along various education, training and labour market trajectories, and how can this knowledge inform skills planning in South Africa? The research therefore collected and analysed data which then provides crucial information on the following:

- Understanding the extent to which **access** is conditioned by socio-economic factors, the quality of primary and secondary schooling, as well as spatial and demographic characteristics. In particular, it is important to know which barriers affect young people who successfully finish their schooling.
- **Pathways** or trajectories through the secondary school and post-school sector refer to the choices that students make in terms of institutions, subjects, degrees and specialisations.
- **Transitions** from and through education and training into the labour market are the final step in the progression sequence. Given the large investments (at both the household and government levels) made in training and higher education, the successful matching of available skills to the demands of the labour market is of significant interest in South Africa.

The post-school education and training landscape in South Africa consists of a diverse range of sectors and institutions. These include: Adult Basic Education and Training (ABET) centres; Technical and Vocational Education and Training (TVET) colleges; workplace training programmes (learnerships and apprenticeships); as well as traditional, comprehensive and universities of technology. All of these components of the post-schooling system are of vital importance to the supply of skills to the labour market and the broader

South African economy, and understanding the issues of access, pathways and transitions will provide valuable information for skills planning.

A number of research studies were conducted within this theme of research. The key questions that each of the studies attempted to answer is reflected in the following topics:

1. What is the progression, graduation and destination of secondary school students?
2. How matric results influence university access, field of study and progression through to university.
3. What are the school-to-work transitions in the National Income Dynamic Study?
4. What are the university graduate destination outcomes: The Eastern Cape study on transitions to the labour market
5. Assessing the usability of graduate destination surveys for the analysis of labour market outcomes.
6. Scoping for a tracer study of the education and training and labour market outcomes of workplace training programmes.
7. What are the pathways of TVET college learners through the TVET colleges and beyond?
8. Who accesses adult education programmes and where do they progress to: An exploratory tracer study on community education and training centres.

EXECUTIVE SUMMARY

Introduction

South African learners perform poorly by both local and international standards (Department of Basic Education 2012; Ross, Saito, Dolata, Hungi & Makuwa 2007). Only a quarter of Grade 9 learners reach the lowest achievement level of international benchmarks in mathematics and science, and just 1% reach the advanced achievement level (Reddy et al. 2015).

At a country level, a high proportion of young people exit the school system prematurely, but the considerable grade repetition within the education system itself further exacerbates both low average levels of schooling and high educational inequalities (Branson & Lam 2010; Branson & Zuze 2012). Understanding educational transitions is vital in order to address basic skills shortages and improve the life chances of all South African learners. Efforts in this respect have, however, been hampered by a lack of high-quality longitudinal data.

This report uses the South African Youth Panel Study (SAYPS) – a longitudinal panel study – to follow Grade 9 learners who participated in the Trends in International Mathematics and Science Study (TIMSS) in order to explore the educational transitions of young people. The SAYPS provides the first national longitudinal data to be collected annually on young people in South Africa, making it possible to study the detail of individual transitions over a consecutive four-year period.

Specifically, the report starts by examining what the main activity choices of young people are over time and how learners move through the education

system. We identify four distinct educational pathways followed by learners, namely:

1. **Smooth:** Neat, year-on-year grade progression through school;
2. **Staggered:**
 - Learners in school for all waves who make some grade progress but have at least one episode of grade repetition or a move to a further education and training (FET) college; and
 - Individuals who return to school in Wave 4 but are out of education (i.e. are either working or are not in employment, education or training (NEET)) for at least one wave;
3. **Stuck:** Learners in school for all waves, but stuck in Grade 9 or 10 for three or more periods; and
4. **Stopped:** Individuals who leave school before Wave 4 and do not return.

From these data, it can be seen that just less than half of the sample (46.9%) achieves the smooth, desired rate of progress over the four-year period examined. A further 39.4% of learners have a staggered journey through the post-compulsory period, with 6.9% stuck in the school system and 6.8% leaving altogether.

Our analyses then explore the different characteristics of learners following these distinct pathways through school and how individual characteristics, family background and school factors predict membership of the different transition groups.

A note on methodology

The strength of the SAYPS lies in its rich and detailed data on individuals collected over four consecutive years. Its weakness, however, is that there are high levels of missing data: by Wave 4, just 30% of the initial sample remained part of the study. Analysis of the patterns of missing data shows that those who exit the survey are more likely to be male; to come from more disadvantaged

households; to attend poorer schools; and to have lower scores in both TIMSS mathematics and science.

Our methodological approach, however, is to use the richest data available in order to address the research questions put forward, and so we focus on the core sample of 3 616 learners present in all four waves, while acknowledging the upward bias inherent in this reduced sample.

Key findings

Something old, something new ...

Our findings are broadly twofold. Firstly, we observe patterns of educational transitions that confirm much of the existing literature, a confirmatory story in which:

- Achievement begets achievement: learners with smooth transitions have higher scores in the TIMSS achievements tests in mathematics and science; and
- Educational transitions are socially graded: learners with smooth transitions come from households with higher average parental education and attend higher-quintile-ranked schools (i.e. more resourced schools).

However, our results also help tell a new story regarding the importance of individual attitudes and expectations over and above family background, and succeeding despite the odds:

- Learners with smooth transitions in school are more likely to have positive attitudes and beliefs about mathematics, as well as higher educational expectations for themselves; and
- While social advantage is clearly in play, learners from the least well-off schools are also achieving well: 57% of the smooth-transition group come from fee-paying or independent schools, with 43% coming from Quintile 1 to 3 non-fee-paying schools.

Young people's educational transitions: How do learners move through school?

- Transition matrices confirm findings from other research in terms of high levels of grade repetition, but also show complex patterns of continuity and discontinuity that cannot be captured by simple definitions;
- Less than half of the sample (46.9%) has a smooth, desired rate of grade progression through post-compulsory school (comparable data from the National Income Dynamics Study, which contains a less biased, more nationally representative figure, suggest that this 'smooth' group is actually more like a third of learners);
- Girls are more likely to have smooth educational transitions than boys and are less likely to have prematurely stopped pathways;
- Learners with smooth transitions have higher average achievement in mathematics and science than those with staggered, stuck or stopped pathways, and perform better against internationally comparable benchmarks; and
- Only half of those following a smooth pathway score above the lowest bound of the TIMSS international benchmarks.

Predicting transitions: Who follows which path?

- Prior achievement is one of the biggest predictors of educational transitions;
- Girls fare better than boys in terms of their overall education transitions, despite no significant differences between genders in terms of raw TIMSS achievement; and
- Those in better-off and independent schools are themselves doing better.

However, that said, the results presented here also throw up some interesting challenges for the existing literature, namely that:

- Social background does not appear significantly to differentiate who has which educational transitions once other factors are taken into account; and
- More salient in differentiating who follows which transition route appear to be factors such as an individual's own academic attitudes and beliefs, and educational expectations, in addition to age, gender, prior achievement and school-level variables.

We also show that there are fewer factors that appear to distinguish between the other less traditional educational transitions, namely the 'staggered', 'stuck' and 'stopped' groups, than for the smooth pathway through school. Our results clearly show a story of predictable advantage, but why then is there not such a clear one of disadvantage? Rather, the results point to a more complex picture where advantage operates, but so, too, does the notion of beating the odds and hence the flip side of advantage is not so formulaically poor outcomes.

A good news story? Beating the odds

The study looks beyond the predictable pattern of advantage and 'achievement begetting achievement' story and also examines evidence of young people succeeding despite the odds. For example, we find that a surprising number of young people from the lowest-ranking schools make comparable educational progress:

- While almost 57% of the 'smooth' group come from fee-paying or independent schools, just over 43% of this group come from non-fee-paying, low-quintile schools; and
- Furthermore, almost three in ten (29.1%) of those in the 'stopped' group come from the top two quintile, fee-paying and independent schools.

Finally, while our results highlight the importance of prior achievement as one of the most important predictors of educational pathways, our findings also show that not only are young people with low average scores in the TIMSS assessments following smooth progression pathways, but they are also doing so from the least well-off schools and with performance levels well below the TIMSS lowest benchmark cut-offs.

Conclusions and policy implications

The report begins with a description of the main activity and grade transitions made by the core SAYPS sample between 2011 and 2014, confirming much of what is already known with respect to high levels of grade repetition and increasingly staggered

school progression in the post-compulsory phase. Our analysis develops previous research in the area by presenting different 'types' of educational transitions and expanding on simple notions of grade repetition, showing that different characteristics differentially predict likely progression routes. The report also tells a new story which

demonstrates that it is possible to beat the odds and succeed academically despite disadvantage.

The report highlights patterns of fluidity across the achievement spectrum and transition pathways that require further investigation, but, given the context that is frequently painted of South African learners being at the bottom of the international league tables and performing well below accepted benchmarks, our findings suggest that there is nevertheless a positive story to tell and there are reasons to be optimistic.

Policy implications

A number of policy implications emerge from our findings:

National

- Our predictable story supports commitments to increasing educational opportunities and ensuring that learners thrive at school, and lends support to the National Development Plan's (NDP) focus on early intervention in order to address opportunity gaps;
- Our results also suggest that shifts into and out of the schooling system might be more frequent than previously thought, and so it is important that the country's post-schooling system is well integrated so as to allow for these movements;

- Equally important is clarifying which options are available for learners in terms of technical and vocational education and training (TVET) and community colleges, the terrain of which is currently very complicated; and
- The results also compel us to reflect on the role of international assessments in evaluating South Africa's educational progress and to tighten the feedback loop between assessment and intervention.

Schools

- Evidence of persistent grade repetition suggests a need to understand how the current progression policy is applied in practice across different schools; and
- There are systematic challenges faced by boys at school that require further attention.

Learners, households and communities

- One potentially policy-amenable finding from our research concerns the relationship between attitudes and progress through school. It also underscores the crucial role that parents can play in shaping positive views about education, no matter what their own level of schooling might be.

1. INTRODUCTION

South African learners perform poorly by both local and international standards (Department of Basic Education 2012; Ross, Saito, Dolata, Hungi & Makuwa 2007). Only a quarter of Grade 9 learners reach the lowest achievement level of international benchmarks in mathematics and science, and just 1% reach the advanced achievement level (Reddy et al. 2015).

At a country level, a high proportion of young people exit the school system prematurely, but the considerable grade repetition within the education system itself further exacerbates both low average levels of schooling and high educational inequalities (Branson & Lam 2010; Branson & Zuze 2012). Understanding educational transitions is vital in order to address basic skills shortages and improve the life chances of all South African learners. Efforts in this respect have, however, been hampered by a lack of high-quality longitudinal data.

In response to the lack of appropriate data to examine these issues and to obtain a better understanding of the varied pathways and transitions taken by the South African youth, the first wave of the South African Youth Panel Study (SAYPS) was administered in 2011. SAYPS, a longitudinal panel study, followed Grade 9 learners who participated in the Trends in International Mathematics and Science Study (TIMSS) in order to explore the educational transitions of young people. The SAYPS provides the first national longitudinal data collected annually on young people in South Africa, making it possible to study the detail of individual transitions over a four-year period.

This report uses the SAYPS and its information collected on the same individuals over four consecutive years in order to explore in detail what young people are doing, how they move through the education system, and how background and school-level factors influence those pathways.

The current study

Existing reports such as *Beyond Benchmarks* (Reddy et al. 2015) use data from the different TIMSS surveys and paint a picture of current learners in South Africa, documenting the trends in educational gains and achievements that have been made over the past 20 years. The current study builds on the *Beyond Benchmarks* synthesis and exploits for the first time the longitudinal nature of the SAYPS data so as to better examine individual change over time. We also aim to develop research by authors such as Reddy et al. (2012a) and Taylor, Van der Berg, Reddy and Janse van Rensburg (2015) by using a genuinely longitudinal panel, rather than a quasi-one (i.e. where two separate panel studies are pieced together in an ad hoc way), in order to examine successful school outcomes. Moreover, we add to research by Lam, Ardington and Leibbrandt (2011), for example, by exploring school progression in more detail and taking into account individual motivation, as well as by considering national data rather than the area-specific studies.

Our approach refines the work by Branson, Hofmeyr and Lam (2014) on educational transitions by exploring in more detail patterns of grade repetition over four years and comparing them with those who are able to follow a smooth, grade-on-grade

progression over the same period. Moreover, our interest lies in understanding the determinants of this so-called smooth transition and how it differs from other progression routes, rather than simply focusing on school dropout, for which there is already a substantial volume of international literature (see, for example, the Ministerial Report on School Retention, 2007, and the National Policy on Learner Progression, Department of Basic Education, 2013). In this way, we hope to demonstrate evidence of successful outcomes and provide more positive conclusions and implications for policy.

Our analysis also enables a focus on the different dynamics of school transitions in terms of how they are defined (smooth, staggered or stopped), as well as with respect to the factors associated with progression. In this way, we move beyond a simple definition of ‘transition’, such as is put forward in Bhorat, Lilenstein, Magadla and Steenkamp (2015) and entails only one that is either entering higher education or seeking employment, towards one that tries to understand the detail of the different types of pathways through post-compulsory schooling and so examine the nature of the pipeline itself. We also explore in more depth what ‘non-smooth’ pathways through education might look like given the increase in unsuccessful progression and high dropout rates post Grade 9 observed by others (Bhorat et al. 2015; Branson et al. 2014).

Much has been written about the role that education plays in improving job prospects in South Africa (Branson, Leibbrandt & Zuze 2009; Keswell & Poswell 2004; Mlatsheni 2012; Montenegro & Patrinos 2014). Policies to promote opportunities for South African youths often focus on the inactive group that is outside both the education sector and the labour market, likely reflecting the fact that statistics on South African youth unemployment are alarmingly high even when South Africa’s high unemployment rate is accounted for (Statistics South Africa 2015; Woolard 2013). In 2012, youth unemployment (including discouraged jobseekers) was estimated to be 66% (Southern African Labour and Development Research Unit 2013). Recent policy responses have focused on reducing the risk of employing young, inexperienced workers (Bhorat,

Hirsch, Kanbur & Ncube 2014) and expanding post-school educational opportunities (DHET 2013). This study therefore also provides an additional lens to this discussion by showing what progress through school looks like for different types of learners.

Against this backdrop, we consider in detail the different transition patterns through post-compulsory school taken by learners and analyse the characteristics of young people who make different transitions. We do this to better understand how learners move through school in the post-compulsory phase and, in turn, inform policies to ease young people’s educational transitions and entry into the labour market.

The current study will therefore address the following research questions:

- What are the main activity choices of young people over time, and how do learners move through the education system?
- What are the characteristics of young people following different pathways through education?
- How do individual characteristics, family background and school factors predict educational pathways?

A note on methodology

This study uses the SAYPS, which contains detailed information on the transitions made by learners in Grade 9 from 2011 to 2014, and includes internationally validated achievement data measured at baseline, as well as a wealth of data on individual, household and school characteristics. The SAYPS does, however, suffer from high levels of missing data, making easy generalisation to the wider population problematic (see Section 3 and Table 1 for further details).

Our methodological approach is to use the richest data available in order to address the research questions put forward, and so we focus on the core sample of 3 616 learners present for all four waves, while acknowledging the upward bias inherent in this reduced sample. For example, Branson and Lam (2009) report figures from the National Income

Dynamics Study (NIDS), the 2007 Community Survey, and the September 2007 Labour Force Survey, which show between 93% and 97% of 15-year-olds being in – or enrolled in – school, in comparison with the SAYPS study core sample which has 100% enrolment at Grade 9 level. Similarly, Branson et al. (2014) report, using the NIDS, that, after Grade 8, dropout rates increase year on year, with 15.3% of those exiting the school system by Grade 12 not completing matric, compared with just 7.7% in our core analytic sample.

The remainder of this report is structured as follows: in Section 2, we discuss the current educational context in South Africa and review the existing evidence on the various individual-, family- and school-level factors associated with educational transitions; in Section 3, we describe the data used in the analysis in more detail, as well as outline the analytic strategy and some of the issues pertaining to missing data and the bias in our sample; in Sections 4, 5 and 6, we report the results of each stage of the analysis; and, in the concluding section, namely Section 7, we draw the results together with concluding comments, a policy discussion, and suggestions for future study.

2. EXISTING EVIDENCE

The current state of the educational sector for young people in South Africa

The 2011 Trends in International Mathematics and Science Study (TIMSS) highlights that South African Grade 9 learners perform very poorly, with roughly three-quarters of learners achieving below the minimum benchmark levels set for mathematics and science (Reddy et al. 2015). While there have been some modest improvements over the past 20 years, the pace of progress continues to be slow. Results of local and regional assessments for primary school are similar: according to the 2011 Annual National Assessments, less than a third of Grade 3 learners were achieving results of 50% and above, the level that the Department of Basic Education defined as acceptable (Department of Basic Education 2012). Similarly, the 2007 SACMEQ (Southern and Eastern Africa Consortium for Monitoring Educational Quality) results also showed little improvement in Grade 6 literacy and numeracy between 2000 and 2007, and the results for South Africa have remained below the average of a typical learner in Southern and Eastern Africa (Moloi & Chetty 2010). On all counts, the quality of education received by South African learners varies greatly, with the wealthiest 20% of schools achieving results that are far above the rest of the learner population (Fiske & Ladd 2004; Fleisch 2008; Van der Berg 2009).

Grade repetition in sub-Saharan Africa is particularly severe, with rates often as high as 20% per grade (Lee, Zuze & Ross 2005), and becomes increasingly staggered as learners move through the education system, exacerbating a system with already low levels of schooling and high educational inequalities. Branson, Hofmeyr and Lam (2014), for example,

used data from the National Income Dynamics Study (NIDS) to examine schooling transitions between 2008 and 2010 for learners in Grade 1 through to Grade 12 and observed patterns of grade repetition, two-year 'desired rates' of progress, and dropout. They found that, prior to Grade 9, successful progression rates sat between 65 and 80%. However, from Grade 9 onwards – the point where compulsory education ends – there was a large increase in both the proportion repeating grades and those who were not enrolled in school at all (see, also, Bhorat, Lilienstein, Magadla & Steenkamp 2015; Lam, Ardington & Leibbrandt 2011). Examination of who repeats also suggests that grade repetition reflects inequalities in the education system, with learners in the top quintile more likely to progress through school at the desired pace (Branson & Lam 2010).

These patterns of grade repetition persist despite evidence to suggest that such repetition is largely ineffective in addressing underachievement and is usually a prelude to school dropout (Jimerson, Anderson & Whipple 2002). Note, however, that, in their study, Lam et al. (2011) found that, by the age of 20, black learners tended to 'catch up' with their coloured counterparts who remained in education.

As noted above, youth unemployment is alarmingly high in South Africa and early exit from the education pipeline is linked to less favourable labour market outcomes (Bhorat et al. 2015; see, also, Crawford, Duckworth, Vignoles & Wyness 2012 for comparable evidence from the United Kingdom). Dropout has also been linked to teenage pregnancy and substance abuse in some communities (Strassburg, Meny-Gibert & Russell 2010).

Trends in International Mathematics and Science Study (TIMSS)

Despite considerable improvement in the national average for mathematics and science performance in the TIMSS assessments between 2002 and 2011, South Africa remains at the bottom of the international league tables, ranking alongside Botswana and Honduras (Highlights from TIMSS 2011: The South African perspective). Reddy et al. (2015) demonstrate that, while improvements have occurred, they have done so at a slower rate than in many other countries, both in Africa and beyond. Moreover, their analysis highlights that only a quarter of South African learners achieve scores above the lowest benchmark set by the TIMSS as denoting the minimal level of competence, with just 1% reaching the advanced benchmark level.

Participation in the TIMSS has contributed immensely to what we know about the performance of South African learners over time and to benchmarking the performance of different groups based on the environment in which they live and learn. However, the TIMSS is not without its critics and concerns have been raised regarding the language of the test administration. Taylor, Van der Berg, Reddy and Janse van Rensburg (2015), for example, suggest that one reason that learners in historically black schools systematically underperform in the TIMSS is that the test is administered only in English or Afrikaans. Consequently, while white, Indian/Asian and coloured learners are assessed in their mother tongue, black learners must frequently take the test in a language not used at home.¹ The TIMSS may then underestimate a learner's true ability. As such, we take into account the language of the test in our analysis.

¹ The TIMSS data used in the study by Taylor et al. (2015) indicated that only 7.4% of learners in historically black schools always spoke the language of the test at home, compared with 61.9% of learners in historically coloured schools.

Background factors relating to the individual, family and school

One of the most consistent findings in the developmental literature is that early cognitive performance predicts later achievement and educational outcomes (Kowleski-Jones & Duncan 1999; McCall, Applebaum & Hogarty 1973). This is equally true in the South African context, with Lam et al. (2011) reporting that baseline cognitive skills are important determinants of progress through secondary school.

Evidence relating to individual-level factors associated with educational progress also suggests that male learners are more likely than female learners to repeat a grade (Zuze & Reddy 2014), as well as drop out of school altogether (Bhorat et al. 2015; Branson et al. 2014). In addition, the younger the learner, the less likely he or she is to drop out of secondary school – an older learner observed in post-compulsory schooling being already more likely to have repeated earlier grades (Bhorat et al. 2015).

Research also shows a positive relationship between academic beliefs and attitudes and achievement over time (Watts et al. 2015) and highlights, for example, that positive attitudes to science are an important component of developing science ability (George 2006). Juan, Reddy and Hannan (2014) further demonstrate that the relationship between attitudes and achievement is complex, with placing value alone on a subject not being sufficient to yield gains in achievement. Rather, encouraging enjoyment and fostering self-confidence in conjunction with subject valuation are necessary to see gains in performance. In contrast, the experience of bullying has been shown to have an adverse effect on educational attainment and human-capital accumulation beyond school (Brown & Taylor 2008).

Demographic factors, such as race and socio-economic status, including income and parental education, are correlated with the decision to drop out of school (Bhorat et al. 2015; Branson et al. 2014; Lam et al. 2011). Fleisch, Shindler and Perry (2012), for example, used data from the large 2007

Community Survey of seven- to 15-year-olds who were not attending school to paint a picture of the racial pattern evident in dropout statistics: coloured youths had the highest rate of non-attendance, followed by black Africans, with whites and Indians/Asians reporting non-attendance rates of just 1%. Lam et al. (2011) also reported large racial differences in school progression and found that the effect of earlier achievement in literacy and numeracy was stronger for white, Indian/Asian and coloured learners than for African learners (see, also, Reddy, Van der Berg, Janse van Rensburg & Taylor 2012b). The authors concluded that grade progression in African schools was poorly linked to actual ability and learning, and argued that a greater understanding of educational transitions and of which learners advance to higher grades was a critical, understudied dimension of school quality.

In terms of school-level characteristics, learners in the richest quintiles of schools substantially outperform those in the other four quintiles (Van der Berg 2008). Branson et al. (2014) include a measure of school quality (average matric pass rate) in their analysis and show that learner progression is strongly correlated with school quality, and that those who are lagging behind for their age are partly protected from dropping out when they attend a high-quality school. For example, by 2010, 30% of the poorest Grade 11 learners had repeated at least one grade, compared with only 8% of the richest Grade 11 learners. Interestingly, the dropout percentages were more similar, with about 40% of the poorest and 30% of the richest exiting the system by Grade 11.

3. METHODOLOGY

Data

This report uses the South African Youth Panel Study (SAYPS), a longitudinal panel study that commenced in 2011. The SAYPS targeted learners from Grade 9 who took part in the Trends in International Mathematics and Science Study in 2011 (TIMSS) (see Mullis, Martin, Foy & Arora 2012 for further details), ensuring that the baseline sample was drawn from a nationally representative sample of schools and their learners, with background information and achievement data in both mathematics and science from internationally validated and comparable instruments.

Following the baseline data collection and matching with TIMSS, three further annual waves of information were collected in 2012, 2013 and, most recently, 2014,² providing four waves of individual data tracking learners from Grade 9, age 15, onwards. The data provides a wealth of information on individual characteristics and family background and, through matching with TIMSS, school-level detail and achievement scores in mathematics and science, as well as learner- and family-background

factors that can be cross-validated against the 2011 SAYPS baseline learner questionnaire.

The SAYPS baseline survey successfully interviewed 11 898 young people. Thirty per cent of learners opted out of further follow-ups after this baseline, and study dropout in the first follow-up (captured in 2013, and retrospectively collecting data for 2012)

² At the time of writing, a fifth wave of data collection was being undertaken in the field.

brought the overall sample down to just below half of the original sample. In the most recent sweep of data collection, the sample size had fallen to 30% of the original group of learners (see Table 1).

Measures

The main aim of this report is to explore the educational activities and transitions of young people in South Africa over time; hence our key outcome of interest measures the young person's main activity across each of the four waves. Table 2 provides a snapshot of what the sample of learners is doing at any one point in time.

In addition to this central measure of interest, our analysis takes into account other factors known to correlate with and influence educational pathways, including:

- Individual characteristics (age and gender).
- Social background and household resources:
 - Highest household education;
 - Social position;
 - Race;
 - Language; and
 - Number of books in the home.
- Learner academic perceptions, educational expectations, and measures of school climate:
 - Attitudes and beliefs about mathematics and science; and
 - Experience of bullying.
- School factors:
 - School financial/fee-paying quintile, and whether the school is independent; and
 - The economic background of learners.

Table 1: Sample size, by wave and year

Wave	1	2	3	4
Year	2011	2012	2013	2014
Sample N	11 898	5 946	5 872	3 616
% of Wave 1 sample		50.0	49.4	30.4

Table 2: Percentage in each of the four main activity statuses, by wave

Wave	1	2	3	4
Year	2011	2012	2013	2014
Still at school	100	98.0	96.2	92.3
Moved to public/private further education and training (FET) college		0.7	1.4	1.1
Working		0.2	0.5	1.0
Not studying and not working		1.2	1.9	5.6

- Individual achievement performance in mathematics and science.

Summary statistics on all these variables and detailed descriptions of how they were constructed and coded are provided in Appendix I and Appendix Table 1.

Analytic strategy

Using a mixture of transition matrices and regression analyses, this report focuses on the longitudinal strengths of the data so as to examine the research questions outlined above. We first consider the four main activity statuses of young people (see Table 2) using transition matrices to explore year-on-year changes in what young people are doing and, for those remaining in school, how they are progressing through the school-grade system. We go on to distinguish learners following different types of educational pathways, namely:

- **Smooth:** Neat, year-on-year grade progression through school;
- **Staggered:**
 - Learners in school for all waves who make some grade progress but have at least one episode of grade repetition or a move to an FET college; and
 - Individuals who return to school in Wave 4 but are out of education (i.e. are either

working or are not in employment, education or training (NEET)) for at least one wave;

- **Stuck:** Learners in school for all waves, but stuck in Grade 9 or 10 for three or more periods; and
- **Stopped:** Individuals who leave school before Wave 4 and do not return.

Next, we focus on the characteristics of young people who follow these different educational and training transitions, reporting descriptive statistics for those young people who are observed to be following different pathways.

The analyses then explore how background characteristics and other factors predict different transitions, and determine whether patterns in the descriptive results are sustained in a multivariate context when other factors influencing educational choices are controlled for. This analysis will use logistic regression models that enable an understanding of the relationship between a given characteristic and the likelihood of a young person with that characteristic being in a particular transition group. The aim is to identify significant factors associated with being in each of the activity destinations, using young people remaining with a smooth transition through school as the reference group.

Missing data

As noted in Table 1, the SAYPS sample size in the fourth wave is just 30% of its initial population. This level of sample attrition is problematic, particularly for longitudinal analysis that seeks to examine individual change and continuity over time.

Extensive analysis of the patterns of missing data across the four waves of the SAYPS³ strongly suggest fundamental differences between those present and those missing from the longitudinal component of the cohort, indicating that the sample attrition is non-random and cannot therefore be ignored. For example, learners missing after the baseline sweep of data collection are more likely to:

- Be male (see, also, Table 8);
- Come from more disadvantaged backgrounds (lower levels of household education, lower self-ranked social-status position, and fewer books in the home);
- Have lower educational expectations; and
- Attend poorer schools and be less likely to be enrolled at an independent school.

Moreover, young people missing after Wave 1 of the SAYPS also have significantly lower scores in both TIMSS mathematics and science.

However, because complex weighting procedures were not available and a priori oversampling methodologies were not employed as part of the original SAYPS design, making it very difficult to take into account the non-random nature of the missing data, the analyses presented in this report focus on the rich, longitudinal sample of 3 616 learners present for all four waves of the SAYPS.⁴

As noted above, our methodological approach is to use the richest data available in order to address our research questions, questions that have not before been addressed in a South African context. While this reduced sample is more advantaged than the original baseline one, it nevertheless represents a wealth of previously untapped information on a current cohort of nearly 3 500 young people passing through the education system. Moreover, to date, there are no other nationally representative, annually collected, longitudinal South African studies of learners that can offer such a detailed insight into the educational transitions of young people. The relationships we observe throughout this report are associational rather than causal, and any conclusions put forward are done so with caution and the necessary caveats in relation to the limitations of these data, but the SAYPS data are the best possible with which to explore these issues, regardless of the attrition levels.

3 The attrition analysis is not reported here for reasons of brevity, but is available from the researchers on request.

4 Variable-level attrition for the sample of 3 616 is very low and so imputation strategies within this population were performed ahead of the multivariate analysis. A sensitivity analysis performed indicates that this imputation does not affect the results presented.

4. YOUNG PEOPLE'S EDUCATIONAL TRANSITIONS

Table 2 reports the cross-sectional main activity percentages of young people for each of the four waves of the South African Youth Panel Study (SAYPS) data. However, this snapshot presents only part of the picture and is limited in what it can tell us about young people's educational pathways. Longitudinal analyses allow exploration of how young people move between different work and education activities over time. More specifically, transition matrices show which main activity states young people are in, given where they were in previous waves – hence showing patterns of proportional movement, or not, over time.

Transition matrices are read by row, from left to right, with each row adding up to 100%. They show both persistence in a given state as well as movement to new ones, and provide insight into how young people move between education, training and employment activities, even where cell sizes may be small.

Main activity transitions

Table 3 shows what young people were doing in Wave 3 (2013), given their main activity state in Wave 2. Looking first at activity persistence, the figures on the diagonal (highlighted) show the number or proportion of learners who carry on doing what they were doing in the previous year. For example, nearly all of those who were in school in Wave 2 (98.0% of the SAYPS sample) were still in school in Wave 3 (97.9%). Similarly, the majority (79.2%) of the small group of young people who were in a further education and training (FET) college in Wave 2 remained there in Wave 3, with 16.7% returning to school and a small proportion

(4.2%) becoming inactive, that is, not being in education or employment. Three-quarters of those who were in work in Wave 2 (eight young people) remained in gainful employment a year on, and similar entrenchment can be seen for those who were not studying or working in Wave 2 – 64.3% remained unemployed and out of education.

Table 3 shows considerable continuity in main activity states between Waves 2 and 3 (cells highlighted in white), but also highlights that young people do move between education and employment categories (the so-called off-diagonals), further emphasising the importance of longitudinal analysis.

Table 4 shows similar levels of continuity, particularly in respect of those young people in school, with 94.8% of those in school in Wave 3 (96.2% of the complete 3 616 sample) remaining in school in Wave 4. The other main movement with regard to this group is that 3.8% have left school and not entered the workforce. Interestingly, just over half (52%) of those who were in an FET college in Wave 3 had moved back into school by Wave 4, indicating that there is also fluidity between educational settings. More than four in ten young people who were working in Wave 3 continued to be employed in Wave 4, but over half (57.9%) had become both educationally and economically inactive.

As in Table 3, there is considerable entrenchment among the NEET (not in employment, education or training) group, with over two-thirds (71.4%) of those not studying or working in Wave 3 remaining inactive a year later in Wave 4. On a more positive note, however, one in five had returned to some kind of education: 18.6% to school and 2.9% to college.

Table 3: Main activity transitions between Wave 2 and Wave 3

		Still at school	Moved to FET college	Working	Not studying & not working	Total
Wave 2: 2012:		Wave 3: 2013:				
	<i>% in W2</i>					
Still at school	3 542	3 467	27	6	42	3 542
	98%	97.9%	0.8%	0.2%	1.2%	100%
Moved to FET college	24	4	19	0	1	24
	0.7%	16.7%	79.2%	0%	4.2%	100%
Working	8	1	1	6	0	8
	0.2%	12.5%	12.5%	75%	0%	100%
Not studying & not working	42	5	3	7	27	42
	1.2%	11.9%	7.1%	16.7%	64.3%	100%
Total		3 477	50	19	70	3 616
	100%	96.2%	1.4%	0.5%	1.9%	100%

Table 4: Main activity transitions between Wave 3 and Wave 4

		Still at school	Moved to FET college	Working	Not studying & not working	Total
Wave 3: 2013:		Wave 4: 2014:				
	<i>% in W2</i>					
Still at school	3 477	3 297	28	20	132	3 477
	96.2%	94.8%	0.8%	0.6%	3.8%	100%
Moved to FET college	50	26	9	4	11	50
	1.4%	52.0%	18.0%	8%	22.0%	100%
Working	19	0	0	8	11	19
	0.5%	0%	0%	42.11%	57.89%	100%
Not studying & not working	70	13	2	5	50	70
	1.9%	18.57%	2.9%	7.1%	71.4%	100%
Total		3 336	39	37	204	3 616
	100%	92.3%	1.1%	1.0%	5.6%	100%

School-grade transitions

The tables above show that the majority of the core sample remained in school across the four waves of the SAYPS. If progression through the school system were smooth, there would be neat year-on-year transition, with all young people moving to the next grade or shifting out of the school system altogether. However, in line with the literature reviewed above, the cross-sectional view in Table 5 indicates repetition in each wave.

Column three of Table 5, for example, shows the grade progression by Wave 3, with 3.4% of learners remaining in Grade 9 two years on, just under a third (30.1%) progressing just one year on, and

almost two-thirds (62.7%) making the ‘desired rate’ of two years’ progress. To put these figures from our reduced, more advantaged sample in context with ones that are more nationally representative, Branson, Hofmeyr and Lam (2014) report that just 43.3% of the National Income Dynamics Study (NIDS) sample who were in Grade 9 in 2008 progressed smoothly to Grade 11 by 2010, with 28.0% repeating one year and 3.9% making no progress at all. Their corresponding dropout rate is 24.8%, which is considerably higher than the 3.8% reported here in our data and indicates that the majority of our ‘missing’ sample is likely to be from the population of early school leavers.

Table 5: School grades, by wave

Wave	Wave 1	Wave 2	Wave 3	Wave 4
Year	2011	2012	2013	2014
Grade 9	100%	14.4%	3.4%	0.9%
Grade 10		83.6%	30.1%	10.0%
Grade 11		0.0%	62.7%	34.0%
Grade 12				47.4%
n/a ⁵		2.0%	3.8%	7.7%

Table 6: Grade transitions between Wave 3 and Wave 4

		Grade 9	Grade 10	Grade 11	Grade 12	Total
Wave 3: 2013:		Wave 4: 2014:				
	% in W3					
Grade 9	124	31	64	0	0	95
%	3.6%	32.6%	67.4%	0%	0%	100%
Grade 10	1 079	0	289	718	0	1 007
%	31.1%	0%	28.7%	71.3%	0%	100%
Grade 11	2 264	0	0	496	1 699	2 195
%	65.3%	0%	0%	22.6%	77.4%	100%
Total		31	353	1 214	1 699	3 297
	100%	0.9%	10.7%	36.8%	51.5%	100%

Table 7: Grade transitions between Wave 1 and Wave 4

	Grade 9	Grade 10	Grade 11	Grade 12	Total
Wave 1: 2011:	Wave 4: 2014:				
Grade 9	33	360	1 230	1 713	3 336
	1	10.8	36.9	51.4	100

Table 6 reports grade progression between Wave 3 and 4 and shows both the smooth progress of some learners (77.4% of those in Grade 11 in Wave 3 continued on into Grade 12), as well as evidence of discontinuity, that is, off-diagonal movement (22.6% of those in Grade 11 in Wave 3 remained there in Wave 4). We also see evidence of movement in respect of those young people previously ‘stuck’, with more than two-thirds of learners progressing from Grade 9 to 10 (67.4%) and from Grade 10 to 11 (71.3%), respectively.

Finally, Table 7 shows the overall picture, across all four waves, of grade progression for those in school. Only half (51.4%) show the ‘ideal’, smooth

progression from Grade 9 to Grade 12⁶ over a four-year period, with 1% remaining stuck in Grade 9 for the entire period. Again, for context, Borhat, Lilenstein, Magadla and Steenkamp (2015) report that, in the NIDS data, only 31.4% of young people in Grade 9 in 2008 progressed at the desired rate, completing their high-school education and exiting the pipeline (21.6% completing high school, and a further 9.8% completing high school and enrolling in tertiary education) by 2012, with 30.3% repeating grades, 2% moving to dropping out and enrolling for a national technical certificate (NTC) or tertiary education, and 36.3% dropping out of education altogether.

⁵ Young people not in school are assigned a value of ‘not applicable’.

⁶ We will only be able to distinguish those Grade 12 learners who matriculate from those who do not once the fifth wave of the SAYPS is available for analysis.

An examination of the main activity state and grade transitions reveals complex patterns of continuity and discontinuity in terms of young people's educational and early employment pathways: approximately half of the sample of young people in the SAYPS did not follow a neat, school-based track through the education system. Our analysis now turns to capturing the different pathways young people take and to understanding some of the key differences between those following a smooth pathway and those not following such a pathway.

A more detailed look at individual transitions across four waves of the SAYPS

Taking into account the complete analytic sample of the SAYPS used here, that is, both those in and out of the education system, the proportion of learners who make a smooth transition (i.e. Grade 9, followed by Grade 10, then 11, and then 12) through school falls to just below half (46.9%). A detailed examination of transitions at an individual level yields four main pathway 'types' (see Appendix Table 2 for further details):

- **Smooth:** Neat, year-on-year grade progression through school;
- **Staggered:**
 - Learners in school for all waves who make some grade progress but have at least one episode of grade repetition or a move to FET college; and
 - Individuals who return to school in Wave 4 but are out of education (either working or NEET) for at least one wave;

- **Stuck:** Learners in school for all waves, but stuck in Grade 9 or 10 for three or more periods; and
- **Stopped:** Individuals who leave school before Wave 4 and do not return.

As noted, the 'smooth' group is by far the largest, with almost half (46.9%) of the sample following this pathway. Those in the 'staggered' group are the next most common, with 39.4% of young people following a more protracted pathway, but were nevertheless in school at the time of the most recent wave of data collection. 'Stuck' learners, as indicated in Table 6, represent a small (6.9% of the sample) but problematic group of young people who appear lost in the school system, with at least three observations in the same school grade, while the 'stopped' group (6.8%) represents those who exit the education system prematurely.

Table 8 presents summary statistics for several key variables by these four transition-pattern categories and offers an insight into the different characteristics of young people following different pathways. For example, 63% of the 'smooth' group are girls, while just 43% of those in the 'stopped' group are. Those in the 'smooth' group are also the youngest in respect of the Wave 1 baseline, indicating that, up to that point, they had similarly been following a smooth grade progression through school, while those who are stuck or stopped are older, suggesting grade repetition prior to Grade 9.

A brief look at the social background across the four groups shows that young people following a smooth educational pathway come from households with higher levels of parental education

Table 8: Descriptive statistics for reduced-transition pattern groups

	Freq.	%	Girl		Baseline age (in 2011)		Highest household education		Position on social ladder		Number of books in the home (scale)	
			Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
All			.58	(.49)	15.70	(1.06)	4.82	(1.72)	5.46	(2.06)	2.01	(1.03)
Smooth	1 697	46.9	.63	(.48)	15.37	(.78)	5.11	(1.79)	5.58	(1.82)	2.15	(1.09)
Staggered	1 425	39.4	.54	(.50)	15.80	(1.08)	4.62	(1.63)	5.41	(2.19)	1.88	(.96)
Stuck	250	6.9	.54	(.50)	16.05	(1.20)	4.55	(1.62)	5.37	(2.33)	1.82	(.91)
Stopped	244	6.8	.43	(.50)	17.03	(1.26)	4.28	(1.44)	5.10	(2.43)	1.91	(.97)

Table 9: TIMSS achievement in mathematics and science, by transition group

	TIMSS mathematics score				TIMSS science score			
	Mean	Std. dev.	Min.	Max.	Mean	Std. dev.	Min.	Max.
All	366.8	(77.3)	193.6	746.0	351.2	(101.2)	98.8	756.2
Smooth	408.6	(81.4)	195.3	746.0	406.5	(102.3)	145.3	756.2
Staggered	343.3	(55.4)	199.8	562.8	321.2	(75.5)	98.8	618.7
Stuck	318.4	(51.3)	207.3	485.0	286.0	(71.5)	139.1	507.8
Stopped	309.2	(55.6)	193.6	600.9	271.0	(78.4)	140.5	616.0

Table 10: TIMSS performance at international benchmarks of achievement in mathematics and science – proportions by transition group

	Freq.	%	TIMSS benchmarks:				
			Below benchmark	Low: 400–475	Intermediate: 475–550	High: 550–625	Advanced: >625
Maths:							
All			71.5	19.8	6.0	2.0	0.6
Smooth	1 697	46.9	50.4	30.8	12.7	4.6	1.5
Staggered	1 425	39.4	84.8	14.1	1.0	0.1	0.0
Stuck	250	6.9	94.0	5.9	0.1	0.0	0.0
Stopped	244	6.8	95.1	4.0	0.9	0.1	0.0
Science:							
All			71.2	17.6	7.6	2.5	1.2
Smooth	1 697	46.9	49.4	26.9	15.3	5.7	2.8
Staggered	1 425	39.4	86.0	11.8	2.1	0.2	0.0
Stuck	250	6.9	91.2	7.9	0.9	0.0	0.0
Stopped	244	6.8	92.3	6.6	1.0	0.1	0.0

and social standing, as well as more resources as measured by number of books in the home. Those who stop and exit the education system prematurely appear to come from the most disadvantaged households.

Those in the ‘smooth’ group also have higher than average achievement scores as measured by the TIMSS assessments in mathematics and science. Table 9 reports the average scores for the complete sample as well as by transition group and shows that those in the ‘smooth’ group have a much higher average in both subjects than the complete sample of any of the other transition groups (for further detail on TIMSS achievement distributions by transition group, see Appendix Figures 1 and 2).

Finally, it is interesting to note that, even though the ‘smooth’ group outperforms both the SAYPS sample and other transition-group averages, its mean scores of 408.6 and 406.5 points,

respectively, are well below the international standards set by TIMSS, only just reaching the bottom limit of the ‘low’ benchmark of 400. However, despite the apparently low internationally comparable standards, across all groups some young people are meeting and exceeding these benchmarks.

Table 10 reports the proportions of young people performing at TIMSS benchmarks by transition group and, in line with Table 9, highlights the particular achievement advantage of the ‘smooth’ group. Indeed, all those performing at an *advanced* TIMSS level are in the ‘smooth’ group, and half of the this group are performing at least at the *low* level, in comparison with 71% of the overall SAYPS sample and between 85% and 95% of the ‘staggered’, ‘stuck’ and ‘stopped’ groups.⁷

⁷ See Reddy et al. (2015) for a further discussion on TIMSS benchmarks and South African educational performance.

Summary

- Transition matrices confirm findings from other research (e.g. Taylor et al. 2015; Lam et al. 2011; Borat et al. 2015; Branson et al. 2014) in terms of high levels of grade repetition, but also show complex patterns of continuity and discontinuity that cannot be captured by simple 'three-year progress' definitions such as those in Lam et al. (2011);
- Patterns of transition can be categorised into four broad types (smooth, staggered, stuck and stopped) to help understand key characteristics of young people's different educational pathways;
- Less than half of the sample follows a smooth grade progression through secondary school. Comparable data from the NIDS reflecting a less biased, more nationally representative figure suggest this 'smooth' group is more like a third of learners;
- Girls are more likely to have smooth transitions through school than boys and are less likely to have prematurely stopped educational pathways;
- As shown in other research, those with smooth transitions through school typically come from more advantaged backgrounds;
- Young people with smooth transitions also have higher average achievement in mathematics and science than those with staggered, stuck or stopped pathways and perform better against internationally comparable benchmarks; and
- Only half of those following a smooth pathway score above the lowest bound of the TIMSS international benchmarks, a finding contrary to those highlighting the predictability of prior performance.

5. PREDICTING YOUNG PEOPLE'S EDUCATIONAL TRANSITIONS

Patterns of association: Exploring correlations

Building on the descriptive tables presented above, we now turn to the multivariate analyses. Table 11 shows the pairwise correlations of the key variables and indicates that, by and large, the associations observed operate in the expected directions. For example, there is a very high correlation (namely 0.91) between the TIMSS achievement in mathematics and science. Similarly, achievement in both mathematics and science is positively associated with social advantage (social-ladder position and household education), as well as household resources (number of books in the home), and, unsurprisingly, achievement is also positively linked to school advantage, with those in the better-off and independent schools scoring, on average, more highly on the TIMSS assessments.

Achievement is negatively associated with age, likely reflecting prior grade repetition and learners failing to progress smoothly through the education system before Grade 9, and so taking the TIMSS assessments at an older age than those young people who move up through the grade system without difficulty. Interestingly, there is no association between gender and achievement in terms of the simple pairwise correlation, but, as was reported above (Table 8), there is a negative relationship between being female and age, reflecting that girls are more likely to have a smooth pathway through school and so are younger at the beginning of the study when age was measured. Moreover, there is a negative association between age and most of the other variables considered here (social background and household resources,

learner perceptions, educational expectations, school type), suggesting that, even within this reduced⁸ SAYPS sample, those who have more problematic transitions through the education system come from more disadvantaged backgrounds and have more negative experiences of school.

Again, as might be expected, there are positive, though fairly modest, associations between the two measures of social background (social position and household education, $r = .22$) and indicators of household resources (number of books in the home). Similarly, the almost universal finding that those from the most advantaged, educated, resourced homes also attend the best-off schools is evident in these data.

There are clear domain-specific relationships between achievement and learner academic perceptions, with associations being stronger between mathematics scores and attitudes and beliefs about mathematics and the same correspondence with science. And again, as expected, absence of bullying as well as high educational expectations are also positively correlated with achievement.

Finally, it is interesting to note that the relationships between learner's perceptions and school quintile/independence/private-school status are also generally negative; that is, better-off, more advantaged schools appear to have learners with lower enjoyment of, and confidence and

⁸ As discussed above, the analytic sample used in this report is not reflective of the baseline sample.

engagement in, academic subjects. It may be that, in the top schools, competition is so much greater, creating more negative attitudes to subjects such as mathematics and science, or that the most disadvantaged schools are simply better at fostering positive attitudes. Correlational analyses cannot, however, shed light on the causal underpinnings of the associations observed, but merely highlight some of the nuances in the data to be examined further. We therefore now turn to our multivariate analyses in order to explore the more complex associations between educational transitions and individual, household and school characteristics in our data.

‘Perceived position on a social ladder’ and ‘Highest household education’ are scaled positively, with a higher score indicating high social standing or education, respectively. ‘Frequency of TIMSS language spoken at home’ is scaled negatively, with a lower score indicating less frequent/no use of the language of the test at home. ‘Attitudes and beliefs about mathematics and science’ are scaled positively, with higher scores indicating more

positive attitudes. ‘Not bullied at school’ is scaled positively, where a high score indicates less frequent bullying. ‘Educational expectations’ are scaled positively, with a higher score indicating greater expectations. ‘School quintile’ is scaled positively, with a higher quintile indicating a more financially advantaged school. ‘Economic background’ of schools’ learners is scaled low to high, with a higher score indicating that a greater proportion of a school’s intake comes from a disadvantaged background.

Predicting transition groups: What differentiates the ‘smooth’ group?

The above tables, and Table 11 below, show the associations between key variables and individual achievement as measured by the TIMSS assessments. We now turn our attention to understanding the characteristics of young people who follow different pathways through the education system. This analysis uses logistic regression techniques to enable an understanding of the relationship between any particular characteristic,

Table 11: Correlations between key variables

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
<i>Achievement:</i>															
1.	TIMSS mathematics score	1													
2.	TIMSS science score	.91*	1												
<i>Individual characteristics:</i>															
3.	Girl	.00	.01	1											
4.	Age	-.31*	-.33*	-.26*	1										
<i>Social background & household resources:</i>															
5.	Social ladder	.35*	.35*	.06*	-.20*	1									
6.	Household education	.14*	.15*	.04*	-.12*	.22*	1								
7.	Freq. lang. TIMSS test spoken	-.40*	-.45*	-.06*	.16*	-.22*	-.13*	1							
8.	Number of books in the home	.26*	.25*	.05*	-.06*	.29*	.14*	-.25*	1						
<i>Student academic perceptions:</i>															
9.	Attitudes about mathematics	.18*	.08*	-.02	-.08*	.00	.00	-.01	.02	1					
10.	Attitudes about science	.10*	.17*	-.02	-.09*	.00	.01	-.02	.05*	.44*	1				
11.	Not bullied at school	.32*	.36*	.10*	-.13*	.14*	.06*	-.14*	.07*	.11*	.11*	1			
12.	Educational expectations	.45*	.47*	.12*	-.25*	.29*	.07*	-.19*	.12*	.12*	.14*	.23*	1		
<i>School characteristics:</i>															
13.	School quintile	.46*	.48*	.01	-.12*	.29*	.15*	-.30*	.19*	-.06*	-.09*	.21*	.22*	1	
14.	School is independent	.30*	.28*	.02	-.11*	.22*	.09*	-.11*	.10*	-.05*	.01	.06*	.12*	.	1
15.	Economic background	-.40*	-.38*	-.01	.07*	-.24*	-.10*	.24*	-.21*	.12*	.12*	-.17*	-.13*	-.30*	-.28*

Note: * indicates correlation is significant at the 5% level.

for example gender or race, and the likelihood of a young person with that characteristic having a given educational transition compared with a different one.

Firstly, we identify factors associated with having a smooth transition (Panel 1), that is, which characteristics learners who have a smooth pathway are more or less likely to have in comparison with those who have any other type of transition (i.e. staggered, stuck or stopped). Given the particular importance of achievement in influencing educational pathways discussed above, and demonstrated in Tables 9 and 10, we show the model with and without controls for TIMSS performance. In doing so, we are able to examine some of the relationships that might be masked once achievement is included in the model. Next, we adopt the same analytic approach to tease out the characteristics of those in the remaining groups, that is, to predict the likelihood of having a staggered transition in contrast to one which is stuck or stopped, excluding those in the smooth category entirely (Panel 2), again with and without controls for achievement.

Table 12 reports the summary results for the logistic models that show only whether a particular characteristic is significantly positively or negatively associated with being in a particular transition group. As in the earlier descriptive analysis, we see that, even when controlling for key features of social background, individual characteristics and school factors, girls are more likely (+) than boys to have a smooth transition through school. Column 2 of Panel 1 shows that this is also the case, conditional on TIMSS achievement (+).⁹

9 Details of the full odds ratios are reported in Appendix Table 3. Odds ratios are interpreted as the likelihood that the outcome of a smooth transition (as opposed to all other transitions) will occur with each unit increase in that variable. So, for example, in Appendix Table 3, girls are 1.3 times more likely than boys to be in the smooth-transition group, controlling for other individual characteristics, social background and school factors, and 1.59 times more likely once prior achievement is also controlled for.

Again, as indicated in the descriptive analysis, those who are younger are also more likely to have a smooth pathway through school; age is negatively, though significantly, associated with the likelihood of being in the 'smooth' group, indicating that members of this category are younger than those who are in other types of transition group. White and Indian/Asian young people are more likely (+) than black Africans¹⁰ to be in the 'smooth' group, while those who *sometimes* (-) or *never* (-) speak the language of the TIMSS test at home are significantly less likely to have a smooth transition through school. Interestingly, in contrast to much of the literature reviewed, social background as measured by highest household education and the young person's own perception of the family's social position is not predictive of educational transitions. We discuss this further in our concluding section.

Table 12 also shows that those with stronger, more positive attitudes and beliefs about mathematics, those who are not bullied,¹¹ those with higher educational expectations, and those wanting to finish a degree or higher, are similarly more likely to have a smooth pathway through school. We note, however, that, in this sample of learners, educational expectations are particularly high, with almost 60% of learners expecting to finish a degree (7.9%) or an honours degree or higher (52%). We discuss this in more detail in our concluding section. Finally, we see that young people in the most well-off, highest fee-paying government schools (Quintile 5) and learners in the independent school sector are also more likely to have smooth transitions, while those in the most disadvantaged schools are less likely to have smooth pathways.

10 In the case of categorical variables, each category is compared with a 'reference' group, typically the largest of the categories, in order to ascertain the likelihood of being significantly associated with group membership. So, for race, being coloured and white, Indian/Asian and other are compared with the likelihood of black young people being in the 'smooth' group.

11 A positive coefficient on the 'Not bullied at school' scale reflects here that those who are never or rarely bullied are more likely to be in the 'smooth' group than any other, since the measure is scaled such that a high score means less or no bullying.

Table 12: Odds ratios: Predicting the likelihood of having a smooth and staggered transition (summary)

	Smooth (Panel 1)		Staggered (Panel 2)	
	excl. ACH	incl. ACH	excl. ACH	incl. ACH
<i>Individual characteristics:</i>				
Girl	+	+		
Age	-	-	-	-
<i>Social background:</i>				
Highest household education (ref: None/low):				
~ Completed Grade 9 only				
~ Completed Grade 12				
~ Post-matric certificate/diploma				
~ Degree and higher				
Perceived position on social ladder				
Race (ref: black African):				
~ Coloured				
~ White, Indian/Asian, other	+		-	-
Freq. lang. of test spoken (ref: Always/almost always)				
~ Sometimes	-			
~ Never	-			
<i>Household resources:</i>				
Number of books in the home				
<i>Student academic perceptions:</i>				
Attitudes and beliefs about mathematics				
Attitudes and beliefs about science				
Not bullied at school (high = never/rarely bullied)				
Educational expectations (ref: finish Grade 9 only):				
~ Finish Grade 12				-
~ Finish post-matric certificate				
~ Finish diploma				
~ Finish degree	+			
~ Finish honours degree or higher	+			
<i>School factors:</i>				
School quintile (ref: quintile 1 = low)				
Quintile 2				
Quintile 3				
Quintile 4				
Quintile 5	+		+	+
Independent school				
Economic background (ref: 0–10% disadv. learners)				
~ 11–25%				
~ 26–50%	-	-		
~ More than 50%	-	-		
<i>Achievement:</i>				
TIMSS mathematics score				
TIMSS science score				

However, as predicted, once prior achievement is controlled for (see Column 2, Panel 1), most of the significant relationships fall away, suggesting that many of these associations may be mediated by (i.e. their relationship operates through) individual achievement: learners with greater educational expectations for themselves, those in the better-off government schools, as well as those in the independent sector, for example, are also more likely to have higher levels of TIMSS achievement, and the association between being in the smooth-transition group and prior achievement is stronger. Only gender, age, and the economic background of the schools' learners remain significant alongside TIMSS mathematics and science achievement scores in predicting the likelihood of having a smooth progression through school.

By contrast, those in the 'staggered' group (as opposed to being in either the 'stuck' or 'stopped' groups) are less likely (–) to be white and Indian/Asian than black African, even controlling for prior achievement (Column 2, Panel 2), and have lower educational expectations: young people who expect to finish Grade 12 are less likely than those who expect to finish Grade 9 to be only in the 'staggered' group. Young people following a staggered pathway are similarly more likely than those in the 'smooth' group to be from the best-off government schools than the least well-off and resourced, though interestingly not so from independent schools.¹² On the whole, however, there are fewer characteristics that seem to differentiate those in the 'staggered' group from those in the 'stuck' and 'stopped' groups than there are for distinguishing those in the 'smooth' category from the other three transition pathways, at least with respect to the set of individual, family and school factors considered here. Again, we discuss this in more detail below.

¹² We note, however, that 70% of independent-school learners (9% of the overall sample) have smooth pathways, making the numbers here quite small.

Summary

In summary, the pattern of associations observed in Table 11 and the characteristics predicting who has a smooth transition are broadly in line with the extant literature, that is:

- Girls fare better than boys in terms of their overall education transitions, despite no significant differences between genders in terms of raw TIMSS achievement;
- Prior achievement is one of the biggest predictors of educational transitions; and
- As expected, there is also an 'advantage' story operating wherein those in the better-off schools, with fewer disadvantaged learners, are themselves doing better.

However, that said, the results presented here also throw up some interesting challenges for the existing literature, namely that:

- Social background as measured by parental education and the young person's perception of social-ladder position does not significantly differentiate educational transitions (this finding is, however, in line with Fleisch, Shindler and Perry (2012) who report no meaningful relationship between measures of poverty, such as income or the presence of an employed person in the household, and learners *not* attending compulsory schooling. Similarly, Branson, Hofmeyr and Lam (2012) only find an association between lower household income and the likelihood of dropping out for males);
- It is rather race and the frequency with which the language of the test is spoken in the home that emerge as more consistent family-background correlates; and
- More salient in differentiating who follows which transition route appear to be factors such as an individual's own academic attitudes and beliefs, and educational expectations, in addition to age, gender, prior achievement and school-level variables. (It may be that these other factors mediate, to some extent, any association with parents' own education, but only further analyses will yield answers to such questions.)

It is also interesting that there are fewer factors that appear to distinguish between the other, less traditional educational transitions than for the smooth, apparently normative pathway through school. There is clearly a story of predictable advantage here, but why then is there not such a

clear one of disadvantage? Rather, the results presented here point to a more complex picture where advantage operates, but so, too, does the notion of beating the odds – and hence the flip side of advantage is not so formulaically poor outcomes.

6. AND FINALLY: A GOOD NEWS STORY?

The results presented from the outset of this report have highlighted patterns of both continuity and discontinuity, advantage and a lack of advantage. This final section looks beyond the predictable pattern of advantage and ‘achievement begetting achievement’ story and examines evidence of young people succeeding despite the odds. For example, the regression analyses presented highlight that those in the most advantaged schools are more likely to have a smooth transition through school, but the data also show that a surprising number of young people from the lowest-ranking schools make comparable educational progress.

Table 13 shows, for example, that, while almost 57% of the ‘smooth’ group come from fee-paying or independent schools, just over 43% of this group come from non-fee-paying, low-quintile schools. Similarly, almost three in ten (29.1%) of those in the ‘stopped’ group come from the top two quintile, fee-paying and independent schools. Compare this

with the finding in Branson, Hofmeyr and Lam (2012) that dropout rates between the richest and poorest schools are far more similar than the proportions achieving smooth progression routes: 20% of Grade 10 learners from the poorest quintile schools progress successfully, compared with 50% of the richest Grade 10 learners as opposed to about 40% of Grade 11 learners dropping out in the poorest schools with 30% of the richest Grade 11s. Understanding the dynamics of these unexpected trajectories may actually prove more beneficial to elucidating educational transitions in South Africa as confirming the patterns of advantage already observed.

Similarly, the results presented in Table 12 show that achievement scores as assessed by the TIMSS are one of the most important predictors of educational pathways, and that those with higher scores are more likely to follow smooth, idealised transitions through school. However, Figure 1 shows that not

Table 13: Transition group, by quintile of school attended in Grade 9

	School quintile					Independent	Total
	Non-fee-paying			Fee-paying			
Transition group:	1	2	3	4	5		
Smooth	188	269	275	306	424	235	1 697
	11.1	15.9	16.2	18.0	25.0	13.9	100
Staggered	228	311	354	296	152	84	1 425
	16.0	21.8	24.8	20.8	10.7	5.9	100
Stuck	56	70	59	41	14	10	250
	22.4	28	23.6	16.4	5.6	4	100
Stopped	47	58	68	50	16	5	244
	19.3	23.8	27.9	20.5	6.6	2.1	100
Total	519	708	756	693	606	334	3 616
	14.4	19.6	20.9	19.2	16.8	9.2	100

only are young people with low average scores in the TIMSS assessments following smooth progression pathways, but they are also doing so from the least well-off schools and with performance levels well below the TIMSS lowest benchmark cut-offs (see Table 10 for further details here).

Moreover, Table 14 clearly shows that a small but notable proportion of the South African Youth Panel Study (SAYPS) sample who score in the lowest deciles of the TIMSS assessments nevertheless achieve this positive, smooth-transition outcome,

while those in the top deciles are far from absent from the 'staggered', 'stuck' and 'stopped' transition groups. Clearly, there are patterns of fluidity across the achievement spectrum and transition pathways that require further investigation, but, given the context that is frequently painted of South African learners being at the bottom of the international league tables and performing well below accepted benchmarks, our findings suggest that there is nevertheless a positive story to tell and reasons to be optimistic.

Figure 1: TIMSS average and 'smooth'-group-only achievement, by school quintile

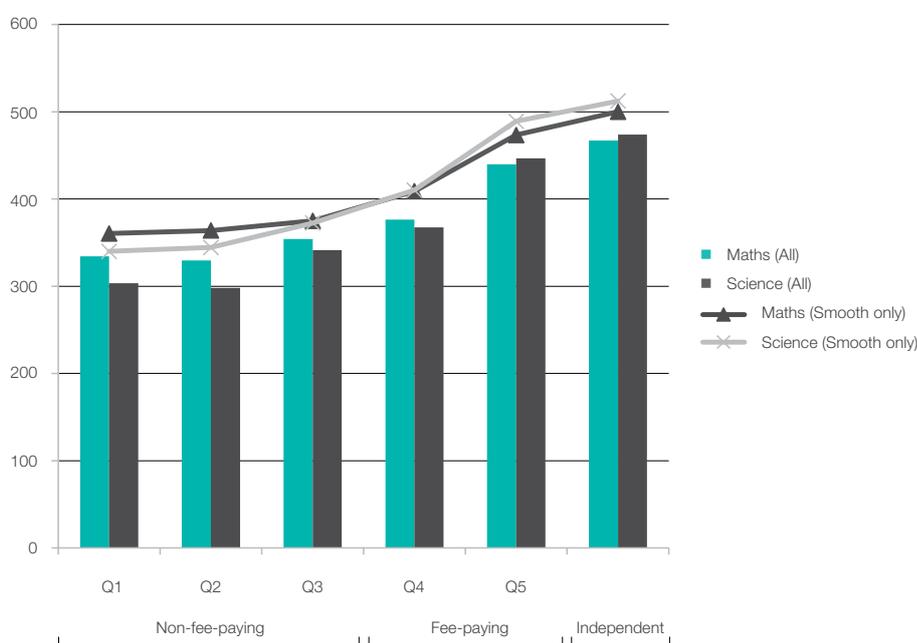


Table 14: Transition group, by deciles of TIMSS achievement

	TIMSS achievement in mathematics: Deciles										Total
	0-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%	
Smooth	55	67	100	108	132	158	212	234	294	337	1 697
	3.2	4.0	5.9	6.4	7.8	9.3	12.5	13.8	17.3	19.9	100
Staggered	170	197	195	197	184	161	123	115	64	19	1 425
	11.9	13.8	13.7	13.8	12.9	11.3	8.6	8.1	4.5	1.3	100
Stuck	70	52	36	24	24	17	17	7	3	0	250
	28.0	20.8	14.4	9.6	9.6	6.8	6.8	2.8	1.2	0.0	100
Stopped	67	46	30	33	21	26	10	5	1	5	244
	27.5	18.9	12.3	13.5	8.6	10.7	4.1	2.1	0.4	2.1	100
Total	362	362	361	362	361	362	362	361	362	361	3 616
	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	100

7. CONCLUSIONS AND IMPLICATIONS

The South African Youth Panel Study (SAYPS) provides the first national, longitudinal data collected annually on young people in South Africa, making it possible to study the detail of individual transitions over a four-year period. In addition to the wealth of data available on individual and household characteristics, the SAYPS is matched with the Trends in International Mathematics and Science Study (TIMSS), which provides a baseline measure of achievement in mathematics and science, as well as school-level factors. Together, these data provide a unique opportunity to study the variation in learners' pathways through the school system and observe some of the key characteristics associated with different transitions.

The predictable story as opposed to a new one ...

The report begins with a description of the main activity and grade transitions made by the core SAYPS sample between 2011 and 2014, confirming much of what is already known with respect to high levels of grade repetition and increasingly staggered school progression in the post-compulsory phase. For example, just under half of the sample achieves the desired rate of smooth, grade-on-grade progression from Grade 9 to Grade 12, with a further 39.4% having staggered progression routes, 6.9% being stuck for at least three consecutive periods within the grade system, and 6.8% exiting school altogether. Note, however, that these figures are upwardly biased, since much of the cohort is missing from the four-year longitudinal component of the data. National estimates from the National Income Dynamics Study (NIDS) data suggest that those with a smooth transition comprise roughly

only a third of learners, while those who drop out make up about 30 to 40% of the cohort, depending on whether the learner passed matric (Branson, Hofmeyr & Lam 2013).

The descriptive analysis of the different transition groups similarly confirms much of what is known in terms of racial and socio-economic inequalities in education, with those from the most advantaged schools most likely to succeed, and, in terms of 'achievement begetting achievement', those performing best in mathematics and science assessments having the easiest pathway through school – and this, again, despite our sample representing the upper end of the full cohort.

But, interestingly, in addition to the confirmatory story, the results presented here also tell a new one that demonstrates that it is possible to beat the odds and succeed academically despite disadvantage. For example, there are a surprising number of young people from the lowest-ranking schools who make good, 'desirable' educational progress, as well as learners with low scores on the TIMSS assessment who nevertheless have positive, smooth pathways through school.

The findings presented here, and an upper bound estimate at that, indicate that more than 70% of the SAYPS sample (71.5%) and 50% of those who have a smooth transition through the post-compulsory phase of schooling score below the minimum benchmark level of the TIMSS assessment. This lends some support to the argument that the TIMSS assessment may be a noisy measure of ability (see, also, Lam, Ardington & Leibbrandt 2011; Taylor, Van der Berg, Reddy & Janse van Rensburg 2015),

particularly in respect of those who are unable to take the test in their primary language.¹³ Evidence such as this is important from a policy perspective, though, as it helps shift the debate away from South Africa's poor international ranking to a focus on what other measures of educational success look like and who is and is not achieving them.

We also find evidence of a significant role for individuals' own academic attitudes and beliefs, as well as educational expectations in predicting educational transitions, that has not previously been demonstrated in South African data sets: young people who expect more for themselves are more likely to have a smooth, repetition-free pathway through school. It is interesting to note here, however, the very high, possibly unrealistically so, educational expectations of learners in these data. As noted above, almost 60% of young people when asked in Grade 9 expect to achieve at least a degree-level qualification. Given that national estimates indicate that the true dropout rate prior to matriculation from school is around 40% (Branson et al. 2014), this seems unfeasibly high, though it may be that these high Grade 9 expectations do reduce in subsequent grades. While high educational expectations need not necessarily be problematic, there is evidence to suggest that individuals whose expectations and aspirations are misaligned are more likely to have poorer employment outcomes, particularly women (Sabates, Harris & Staff 2011).

While the role of advantage is clearly evident in the findings presented here, it does not appear to be one driven by family background alone as one might expect. Rather, the advantage stems from being in the better-off public or independent schools where the proportion of disadvantaged learners is lower and overall achievement is, on average, higher. However, in a sample where less than 20% of learners come from households where at least one parent has a degree and a similar proportion (17.7%) has no more than a matric, it may not be so

13 However, we highlight this point mindful of the fact that English is the official language of instruction in African schools and is used for many assessments, including the Grade 12 matriculation examination.

surprising that we do not see a stronger relationship. This is also more apparent in the smaller correlations between household education and learner achievement in the TIMSS than with social standing or the number of books in the home. One explanation might be that parents have a lower level of education than they are actually capable of achieving – a reflection of the socio-historical context particular to South Africa – and so want more for their children, which is reflected in high educational expectations and strong academic motivation. The importance of learners' own attitudes and expectations may then be a manifestation of the 'effect' of parents' own education observed in so much of the extant international literature (see Feinstein, Duckworth & Sabates 2008, for a review).

An alternative explanation is simply that the measure of parents' own level of education and the indicator of social standing are not very reliable: socio-economic status is drawn from children's reports of family and household characteristics and there is evidence to suggest that young people are not always accurate in estimating these indicators of social background (Buchmann 2002; Lien, Friestad & Klepp 2001; West, Sweeting & Speed 2001). Jerrim and Micklewright (2014), for example, use data from two large international surveys of pupil achievement, PISA and PIRLS, and show that, while children's reports of their father's occupation were fairly reliable, their reports of number of books in the home and parental education were more prone to measurement error. Measures of socio-economic status, such as family income, used by others (e.g. Lam et al. 2011) might show a stronger relationship between family background and educational transitions, but were not available in the SAYPS. However, we will explore the interaction between family background, school characteristics and educational transitions in more detail in future work.

Finally, our analysis develops previous research in the area by presenting different 'types' of educational transitions and expanding on simple notions of grade repetition, showing that different characteristics differentially predict likely progression routes. It will, for example, be interesting to observe

this cohort of young people in another couple of years to see whether those in the ‘staggered’ group catch up with the ‘smooth’ group’s matriculation success, as Lam et al. (2011) have found that black youths do with their coloured counterparts who remain in education.

Policy implications

National

At the level of national government, there are a number of implications that emerge from our findings. South Africa’s population is relatively young, with 30% of the population being younger than 15 years (Statistics South Africa 2015). The National Development Plan (NDP), which represents government’s long-term strategic outlook, has at its core the need to create opportunities for the youth (National Planning Commission 2013). In many ways, our ‘predictable’ story supports these broader commitments to increasing educational opportunities and ensuring that learners thrive at school. Socio-economically advantaged learners have a distinct edge over learners from more disadvantaged backgrounds in our study, which also lends support to the NDP’s focus on early intervention so as to address these opportunity gaps. The NDP recommends investing in nutrition intervention for young mothers and improving access to early childhood development as possible options to help children from poor families to be adequately prepared for their schooling careers. Such a focus would potentially contribute to higher pass rates and decreased learner repetition as children move through the school system.

While we acknowledge efforts to bolster youth-services programmes, expand vocational education (DHET 2013), and reduce the costs of hiring youths (Levinsohn, Rankin, Roberts & Schoer 2014), our results show that shifts into and out of the schooling system might be more frequent than previously thought. It is important that the country’s post-schooling system is well integrated to allow for these movements and possibly target, at an early stage, those at risk of falling behind in the system, such as our ‘staggered’ group which makes up nearly 40% of the current sample. Equally important is clarifying what options are available for learners,

depending on their circumstances. At the moment, the combination of programmes available at technical and vocational education and training (TVET) and community colleges is very complicated. Although these programmes are being reviewed and consolidated by the Department of Basic Education (DBE) and the Department of Higher Education and Training (DHET), the results need to be clearly communicated to learners and their families as well so that available options are well understood.

Our results also compel us to reflect on the role of international assessments in evaluating South Africa’s educational progress. Questions have been raised about the role of educational assessments in South Africa and how effectively they contribute to what is known about the quality of education in the country. Critics have suggested that South African learners are over-assessed and that not enough time is allowed between assessment and intervention. Supporters maintain that international assessments provide valuable information about South Africa’s global standing in an increasingly competitive environment. What is clear is that the feedback loop between assessment and intervention needs to be tightened, regardless of whether learners are assessed internationally, locally or at the school level.

Schools

The country’s National Youth Policy recommends that retention rates should increase to 90% by 2020 (National Youth Development Agency 2015). The current policy on learner progression is intended to strike a balance between providing learners with extra time to grasp the curriculum and ensuring that they progress through school and acquire a school-leaving qualification. In reality, this means that learners can only repeat a grade once in any given phase of schooling. Thereafter, learners are expected to advance through the system, irrespective of whether or not they have met the requirements for promotion (Department of Basic Education 2013). The fact that dropout rates remain high in spite of this policy raises questions about how it is applied or whether, as has happened in the past, schools put pressure on learners to repeat additional grades in order to improve the overall

performance of the school (Crouch & Vinjevod, 2006). This pressure might be the lever that pushes discouraged learners to drop out. It could also explain why our results showed that some low-achieving learners progress smoothly through school. Understanding how progression policy is applied in practice is an important priority for the future.

The focus of most education policy related to gender has been on the problems that girls face. Although this is understandable given the challenges that girls continue to face in society at large, our results also suggest that a gender dialogue needs to address why boys are repeating and dropping out in greater numbers. Other studies have shown that boys, especially those of low socio-economic status, are at the highest risk of exposure to violence and tend to be the least motivated about school. Clearly, there are systematic challenges faced by boys at school that are not fully understood. How gender differences might amplify other kinds of inequalities, such as those related to gender, is an area that policymakers need to investigate in the future.

Learners, households and communities

One potentially policy-amenable finding from our research concerns the relationship between attitudes and progress through school. The Youth into Science Strategy (2006) and the Science Engagement Strategy (2015) were initiated by the Department of Science and Technology to improve awareness about science-based careers among school-going youths, but attitudes about education are shaped over time and are influenced by factors both inside and outside the school. It is encouraging that learners from different backgrounds benefitted from having a positive outlook on their schooling. It also underscores the crucial role that parents can play in shaping positive views about education whatever their own level of schooling might be.

Limitations of the study

As noted throughout this report, the SAYPS has a high level of missing data and the resulting analytic sample overrepresents those who do better in school and are from more advantaged households,

attending better-off schools. Nevertheless, our findings are in line with much of the extant literature and show interesting variation within this likely narrower, more advantaged group of learners that can inform policies across all South African learners.

Moreover, our methodological approach uses the best available data to address the issues of diverse educational transitions and has considerable advantages over those adopted by others. Reddy et al. (2012a) and Taylor et al. (2015), for example, use a quasi-panel rather than a genuine longitudinal one, with heavy, and most likely similar, levels of biased (detail unreported), attrition, while Lam et al. (2011) use a small area-specific study in the Western Cape, which is similarly likely to overrepresent advantaged groups and to have limited broad generalisation.

While there are limitations regarding the extent to which we can draw broad-brush conclusions based on the core SAYPS sample used here, our study nevertheless adds to a growing body of research that uses the best available data possible, contextualising its estimates with national data where available. In the fullness of time, these findings will be supplemented by the parallel SAYPS II study, which will give us a new longitudinal resource with which to compare these findings as well as offer a more detailed insight into the impact of attrition.

As noted above, we also remain cautious about the overall utility of the TIMSS as an accurate assessment tool for all South African learners. Not only are there possible issues surrounding the language in which the test is administered, but also whether it is a meaningful predictor of achievement potential. However, in the absence of an alternative indicator of achievement, we make the best use of the data available. The next wave of the SAYPS, which, at the time of writing, was being undertaken in the field, will give us further detail on the extent to which learners passed matriculation examinations or not and so provide an alternative measure of educational success against which to compare these results.

Areas for further investigation

This is the first report on the longitudinal aspect of the SAYPS data and has opened the door for several areas that warrant further investigation, including:

- A more detailed focus on the ‘good-news story’ (Are learners who appear to be progressing smoothly through even the poorest schools actually matriculating? If so, which young people and schools are achieving the desired ‘smooth’ rate of educational progress despite the odds being seemingly against them? Is it easier to achieve the desired rate of progress in some schools than in others? In contrast, is

there evidence of a ‘middle-class apathy’ story where well-resourced young people are failing to succeed despite all the advantages afforded them?);

- Separate analysis by gender (For example, Branson et al. (2012) highlight differences by gender in the reasons young people exit the school system. Our analysis shows clear gender differences, but it may be that family background and school-level factors operate differently by gender as well.); and
- Possible mediational analyses to explore in more depth the relationships between parents’ education/family background, individual educational expectations and motivation, and educational transitions.

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APPENDIX

Descriptions of variables

Boy/girl: The young person's gender is coded 0 = boy; 1 = girl.

Age: Age is measured in years at the time of the 2011 baseline interview.

Highest household education: As measured in the Trends in International Mathematics and Science Study (TIMSS) questionnaire, young people are asked: 'What is the highest level of education completed by your mother and father (or stepmother/father or female/male guardian)?' The variable is coded separately for each parent as: 'None/low; completed Grade 9 only'; 'Completed Grade 12'; 'Completed a post-matric certificate/diploma'; 'Completed a first degree or higher'. A highest household indicator is created as the higher of the two values where both parents are present, and for the one in single-parent households.

Perceived position on the social ladder: In the South African Youth Panel Study (SAYPS) baseline questionnaire, young people are asked: 'Imagine that society is a ladder, with the richest person at the top and the poorest at the bottom. Where would your family be on the ladder?' The variable ranges from 1 to 10, with a larger score indicating a higher social ranking.

Race: Race is assessed using five categories: black African (84.4%); coloured (6.5%); Indian or Asian (1.4%); white (6.8%); and other (0.4%). Since the Indian/Asian, white and other groups are so small, these groups were recoded as one, creating a threefold variable.

Frequency [with which the] language of the TIMSS test [is] spoken at home: Young people were asked how often they spoke the language that the TIMSS assessment was given in (English or Afrikaans), at home. The variable was coded as: 'Always/almost always'; 'Sometimes'; 'Never'.

Number of books in the home: Individuals were asked about the approximate number of books in their home, excluding magazines, newspapers and school books. The variable is coded on a five-point scale from: 'None or very few (0–10 books)' to 'Enough to fill three or more bookcases (more than 200)'.

Attitudes and beliefs about mathematics and science: On completing the TIMSS assessments, learners were asked about their attitudes to, and beliefs about, mathematics and science separately, covering their like for, valuation of, confidence in and engagement with the two subjects. These four subject-specific scales were then factor-analysed to create one measure of positive attitudes to, and beliefs about, each subject.

Scale: Not bullied at school: As part of an assessment of school climate, young people were asked six questions about how often, on a four-point scale ranging from 'At least once a week' to 'Never', they experienced bullying behaviours. Bullying behaviours included: how often they were made fun of; left out of games or activities; stolen from; and hit or hurt. A score ranging from low (frequent experience of bullying) to high (rare experience of bullying) was created by the TIMSS (see http://timssandpirls.bc.edu/methods/pdf/T11_G8_G_Scales_SBS.pdf for further detail) and is used here.

Educational expectations: As asked in the TIMSS questionnaire, young people were asked: 'How far in your education do you expect to go?' The variable is coded with the same values as for mother's and father's highest level of education achieved, ranging from 'Finishing Grade 9' to 'Finishing a first, an honours degree or higher'.

School type: Public-school type is measured through quintile membership (no-fee schools: Quintiles 1 to 3) and fee-paying schools (Quintiles 4 and 5).

Independent school: Coded as 1 if the young person attends an independent school, and 0 otherwise.

Economic background of school's learners: Measured by the TIMSS school-level questionnaire, this variable categorises the proportion of a school's learners who come from disadvantaged backgrounds: 0–10%; 11–25%; 26–50%; more than 50%.

TIMSS achievement: First conducted in 1994/1995 across 45 countries, the TIMSS is a cross-national

assessment of the mathematics and science knowledge of fourth- and eighth-grade learners. The TIMSS assessments are designed to align broadly with the mathematics and science curricula in participating countries and, in 2011, were administered to 11 969 Grade 9 learners in 285 schools across South Africa.

For mathematics, TIMSS 2011 assessed the content areas of numbers, algebra, geometry, and data and chance. For science, TIMSS 2011 assessed biology, chemistry, physics and earth sciences.

TIMSS achievement test scores are measured out of a possible 1 000 scale points, with a centre point set at 500 and a standard deviation of 100, and are divided into four international benchmarks:

- Low: 400–475;
- Intermediate: 475–500;
- High: 550–625; and
- Advanced: Over 625.

Note that the SAYPS average is below the 'low' benchmark (see, also, Table 10).

Appendix Table 1: Descriptive statistics

	Mean	Std. dev.	Min.	Max.
<i>Individual characteristics:</i>				
Girl	.58	(.49)	0	1
Age	15.70	(1.06)	10	19.8
<i>Social background:</i>				
Highest household education (ref: None/low):				
~ Completed Grade 9 only	.10	(.29)	0	1
~ Completed Grade 12	.25	(.43)	0	1
~ Post-matric certificate/diploma	.15	(.36)	0	1
~ Degree and higher	.19	(.39)	0	1
Perceived position on social ladder	5.46	(2.06)	1	10
Race (ref: black African):				
~ Coloured	.07	(.25)	0	1
~ White, Indian/Asian, other	.09	(.28)	0	1
Freq. lang. of test spoken (ref: Always/almost always):				
~ Sometimes	.64	(.48)	0	1
~ Never	.05	(.22)	0	1
<i>Household resources:</i>				
Number of books in the home	2.01	(1.03)	1	5
<i>Student academic perceptions:</i>				
Attitudes and beliefs about mathematics	.15	(.98)	-4.21	2.63
Attitudes and beliefs about science	.14	(.98)	-4.55	2.27
Not bullied at school (High = never/rarely bullied)	8.71	(1.57)	2.90	13.04
<i>Educational expectations (ref: Finish Grade 9 only):</i>				
~ Finish Grade 12	.12	(.33)	0	1
~ Finish post-matric certificate	.06	(.23)	0	1
~ Finish diploma	.07	(.25)	0	1
~ Finish degree	.08	(.27)	0	1
~ Finish honours degree or higher	.52	(.50)	0	1
<i>School factors:</i>				
School quintile (ref: Quintile 1 = low)				
Quintile 2	.20	(.40)	0	1
Quintile 3	.21	(.41)	0	1
Quintile 4	.19	(.39)	0	1
Quintile 5	.17	(.37)	0	1
Independent school	.09	(.29)	0	1
Economic background (ref: 0–10% disadvantaged)				
~ 11–25%	.11	(.32)	0	1
~ 26–50%	.08	(.28)	0	1
~ More than 50%	.71	(.45)	0	1
<i>Achievement:</i>				
TIMSS mathematics score	366.76	(77.28)	193.6	746.0
TIMSS science score	351.20	(101.17)	98.8	756.2

Appendix Table 2: Detailed transitions across four waves of the SAYPS

	Transition detail:				Freq.	Per cent
	W1	W2	W3	W4		
<i>Smooth:</i>						
	9	10	11	12	1 697	46.93
<i>Staggered:</i>						
	9	FET	FET	FET	5	0.14
	9	9	10	10	133	3.68
	9	9	10	11	212	5.86
	9	10	10	11	499	13.8
	9	10	11	11	496	13.72
	SCH & FET combos				61	1.69
<i>Subtotal</i>					1 406	38.89
<i>Returners:</i>						
	9	N	N	SCH	6	0.17
	9	N	SCH	SCH	5	0.14
	9	SCH	N	SCH	7	0.19
	9	W	10	11	1	0.03
<i>Subtotal</i>					19	0.53
<i>Stuck:</i>						
	9	9	9	9	31	0.86
	9	9	9	10	64	1.77
	9	10	10	10	155	4.29
<i>Subtotal</i>					250	6.92
<i>Stopped:</i>						
	9	X	X	X	45	1.24
	9	9	X	X	18	0.5
	9	10	X	X	29	0.8
	9	9	9	X	25	0.69
	9	9	10	X	16	0.44
	9	10	10	X	52	1.44
	9	10	11	X	59	1.63
<i>Sub-total</i>					244	6.74
Total					3 616	100

Key:

FET 'smooth': Learners who are in further education and training (FET) for Waves 2, 3 and 4

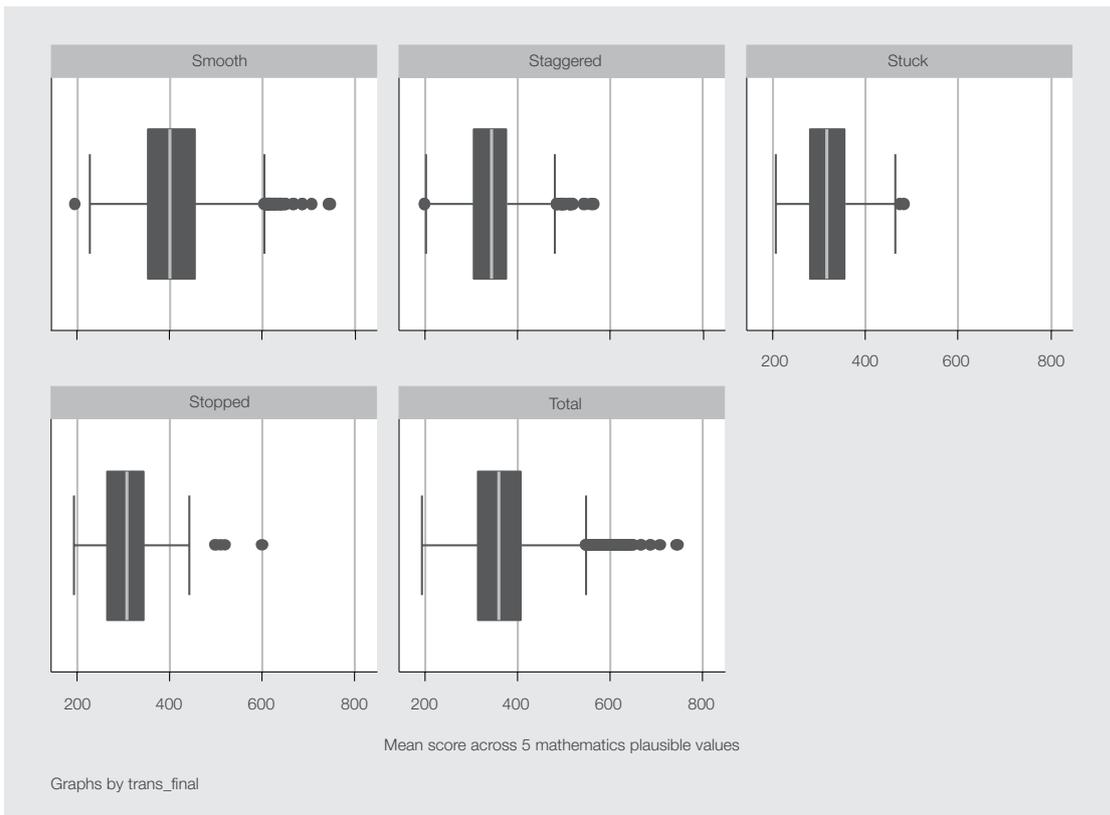
N: Not studying or in work

SCH: In school

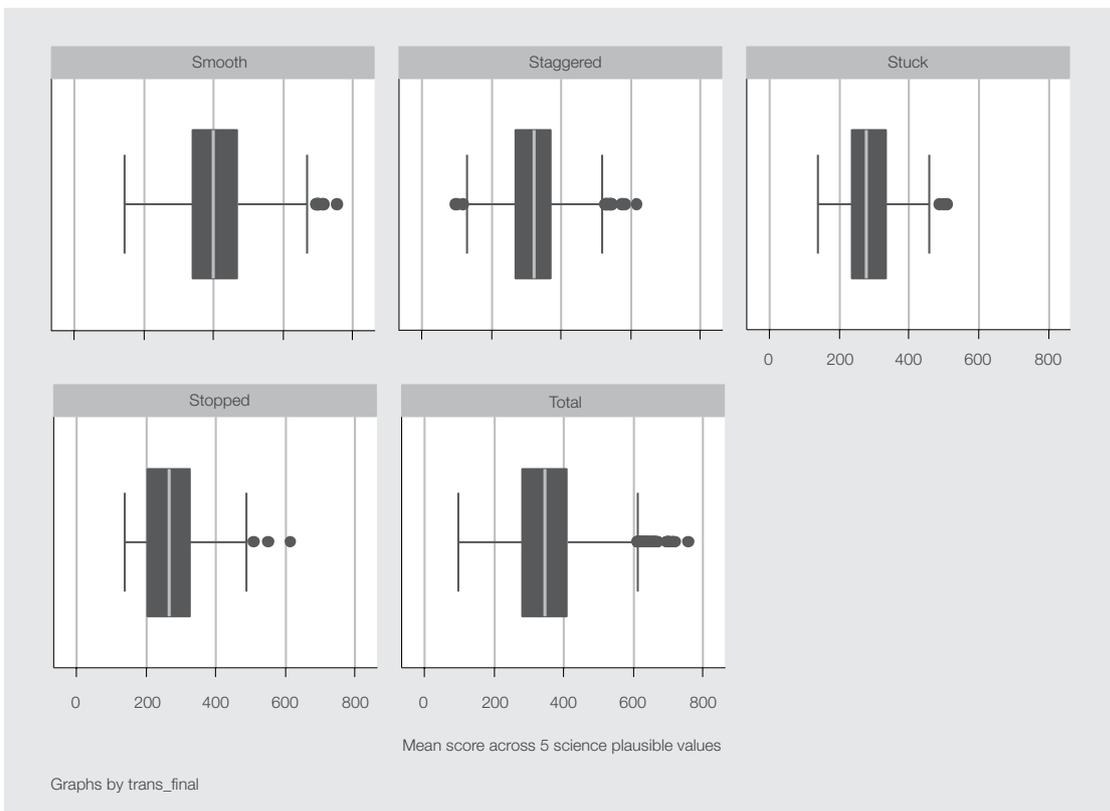
W: Working

X: Not in school or FET college

Appendix Figure 1: Distribution of TIMSS mathematics-achievement scores, by transition group



Appendix Figure 2: Distribution of TIMSS science-achievement scores, by transition group



Appendix Table 3: Odds ratios: Predicting the likelihood of having smooth and staggered transitions

	Smooth (vs all others)						Staggered (vs stuck and stopped)					
	excl. ACH			incl. ACH			excl. ACH			incl. ACH		
	OR	S.E.		OR	S.E.		OR	S.E.		OR	S.E.	
<i>Individual characteristics:</i>												
Girl	1.30	(.13)	**	1.59	(.17)	***	1.03	(.15)		1.09	(.16)	
Age	0.64	(.03)	***	0.73	(.04)	***	0.64	(.04)	***	0.67	(.04)	***
<i>Social background:</i>												
Highest household educ. (ref: None/low):												
~ Completed Grade 9 only	0.90	(.20)		0.90	(.22)		1.12	(.36)		1.16	(.37)	
~ Completed Grade 12	0.93	(.18)		0.95	(.21)		0.92	(.25)		0.91	(.24)	
~ Post-matric certificate/diploma	0.92	(.20)		0.90	(.21)		1.01	(.33)		1.00	(.33)	
~ Degree and higher	0.81	(.18)		0.82	(.19)		1.09	(.36)		1.17	(.38)	
Perceived position on social ladder	0.92	(.04)		0.92	(.05)		0.98	(.06)		0.98	(.06)	
Race (ref: black African):												
~ Coloured	0.99	(.21)		0.93	(.20)		0.60	(.18)		0.56	(.17)	
~ White, Indian/Asian, other	2.50	(.52)	***	1.53	(.34)		0.35	(.14)	**	0.36	(.15)	*
Freq. lang. of test spoken (ref: Always):												
~ Sometimes	0.74	(.09)	**	1.11	(.14)		1.16	(.23)		1.28	(.26)	
~ Never	0.43	(.10)	***	0.73	(.18)		0.87	(.26)		1.03	(.33)	
<i>Household resources:</i>												
Number of books in the home	1.03	(.05)		1.02	(.06)		0.91	(.07)		0.92	(.07)	
<i>Student academic perceptions:</i>												
Attitudes and beliefs about mathematics	1.13	(.06)	*	1.04	(.06)		1.17	(.10)		1.16	(.11)	
Attitudes and beliefs about science	1.01	(.05)		0.92	(.05)		1.03	(.10)		0.95	(.09)	
Not bullied at school (High = never/rarely)	1.21	(.06)	***	1.08	(.06)		1.16	(.09)		1.11	(.09)	
<i>Educational expectations (ref: Finish Grade 9 only):</i>												
~ Finish Grade 12	1.51	(.53)		1.37	(.44)		0.56	(.18)		0.50	(.16)	*
~ Finish post-matric certificate	1.24	(.47)		0.87	(.32)		0.57	(.21)		0.48	(.19)	
~ Finish diploma	1.96	(.72)		1.31	(.45)		0.83	(.32)		0.68	(.27)	
~ Finish degree	2.68	(.96)	**	1.52	(.51)		0.79	(.30)		0.62	(.24)	
~ Finish honours degree or higher	3.48	(1.15)	***	1.62	(.49)		1.15	(.37)		0.82	(.29)	
<i>School factors:</i>												
School quintile (ref: Quintile 1 = low)												
Quintile 2	1.31	(.21)		1.32	(.22)		1.03	(.22)		1.04	(.22)	
Quintile 3	1.02	(.17)		0.80	(.14)		1.13	(.24)		1.00	(.22)	
Quintile 4	1.10	(.18)		0.76	(.13)		1.28	(.29)		1.10	(.25)	
Quintile 5	1.91	(.37)	***	0.90	(.19)		2.52	(.88)	**	2.02	(.69)	*
Independent school	2.33	(.47)	***	0.87	(.20)		1.58	(.60)		1.22	(.48)	
Ec. background (ref: 0–10% disadv.)												
~ 11–25%	0.85	(.22)		0.57	(.18)		0.75	(.34)		0.61	(.29)	
~ 26–50%	0.49	(.13)	**	0.34	(.10)	***	1.25	(.55)		1.10	(.50)	
~ More than 50%	0.54	(.12)	**	0.46	(.12)	**	1.18	(.40)		1.06	(.37)	
<i>Achievement:</i>												
TIMSS mathematics score				1.79	(.26)	***				1.03	(.21)	
TIMSS science score				1.99	(.29)	***				1.52	(.31)	*
R squared	0.18			0.25			0.11			0.12		

Smooth, Staggered or Stopped? Educational transitions in the South African Youth Panel Study

Year-on-year, incremental progress is the gold standard of education. While progression and promotion policies are in place to address any possible anticipated interruption in overall learner journeys, smooth transitions through an individual's schooling career are a key aim for education programmes the world over.

New analysis from a longitudinal study of South African youth suggests that just under half of all learners are following this smooth type of pathway through the Further Education and Training (FET) phase of schooling, with the rest following three other distinct progression routes.

This report provides the first in-depth look at what young people are doing, how they move through the education system, and how background and school-level characteristics influence those pathways.

The study attempts to look beyond the predictable pattern of 'achievement begetting achievement', and demonstrates that educational expectations matter, and that the school attended need not. Together the results paint a complex picture of educational transitions where advantage operates but so too does the notion of 'beating the odds'.

About the LMIP

The Labour Market Intelligence Partnership (LMIP) is a collaboration between the Department of Higher Education and Training, and a Human Sciences Research Council-led national research consortium. It aims to provide research to support the development of a credible institutional mechanism for skills planning in South Africa. For further information and resources on skills planning and the South African post-school sector and labour market, visit <http://www.lmip.org.za>.