

SCHOOL SNACKING PREFERENCES OF CHILDREN FROM A LOW SOCIO-ECONOMIC STATUS COMMUNITY IN SOUTH AFRICA

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ABSTRACT

There is a growing concern about energy dense snacking preferences in developing countries and its impact on the prevalence of lifestyle diseases. Identifying snacking trends among children from low socio-economic communities, is potentially of great importance in developing interventions towards promoting healthy eating habits at an early age. The aim of this study was to determine the snacking preferences among primary school-going children from a low socio-economic status community in South Africa. The study was set in a peri-urban area in KwaZulu-Natal, South Africa. Ten parents were involved in the focus group discussion to identify snacking preferences of their children. The purchasing pattern of five hundred and thirty-six children was observed at a school tuck shop. Thereafter, two hundred children in grades 4–7 completed a Snack Food Frequency Questionnaire. The focus group discussion revealed that most children carried a packed lunch to school, which was supplemented with money to purchase items from school. The focus group discussion identified chips as being a popular snack eaten at home. The tuck shop purchases showed that sweets (39%) and chips (34%) were the most popular snacks purchased from the tuck shop. This was further confirmed from the results of the Snack Food Frequency Questionnaire. It was evident that snacks most commonly purchased were inexpensive and energy dense, enabling quick satiety. Research directed towards the exploration of snacking practices may assist in developing strategies to improve the availability and quality of snacks consumed.

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INTRODUCTION AND BACKGROUND

The increased prevalence of overweight and obesity has now become a norm among some of the poorest countries in the world (Boots et al., 2015). Research conducted by Black et al. (2013), in sub-Saharan Africa, revealed one of the main contributory factors of adult obesity to be childhood overweight, as eating practices and food preferences are imprinted in childhood. A recent study conducted on snacking habits of adolescents from nine European countries highlighted habit strength as being a driver of poor food choices (De Vet et al., 2015). In addition, the over-consumption of energy dense foods such as snacks also plays a major role in non-communicable diseases (NCDs) (Boots et al., 2015, De Vet et al., 2015).

The South African youth risk behaviour survey in 2002 (Reddy et al., 2003) found that children in grades 8–11 frequently consumed foods high in fat and sugar. Likewise, a similar trend has been documented in studies in developed countries (Ellaway et al., 2012; Boots et al., 2015 & Fisher et al., 2015). Furthermore, studies also justify the prevalence of overweight and obesity as a result of obesogenic environments that encourage the consumption of energy-dense foods usually high in sugar, salt and/or fat equating to hyper palatable food (Zizza et al., 2001; Kruger & de Villers, 2011). Additionally, the increase in portion size of these snacks is a direct contributor to overweight and obesity (Rizk & Treat, 2015; Scholliers, 2015). Hence, the central issue seen is not merely the frequency and quantity of snacks consumed but equally as important, the nutritional composition of these items (Boyer et al., 2012). A study conducted with children in Ghana identified a relationship between the intake of high fat and sugar snacks with high body mass index values,

indicating an early risk of life style diseases (Asiedu et al., 2012).

Challenges exist in attempting to break unwanted habits related to snacking and food choices. Research indicates that adolescents may have been taught about healthy foods by their parents or in the school setting (De Vet et al., 2015). However, this may not necessarily result in the consumption of healthier foods. Snacking remains an integral part of a child's diet, with food based strategies and behavioural change playing a quintessential role in addressing the current situation (Nørgaard et al., 2014). The quality, access and availability of the food items creates the environment the children are exposed to and ultimately affects their consumption (Datar & Nicosia, 2012).

In South Africa, vending machines and tuck shops in schools stock an array of products for sale to children, many with the sole purpose of generating a profit. A study by Faber et al. (2014) aimed at determining the school food environment of poorly resourced primary schools in South Africa, showed that 57% of the children in grades 5–7 were given money to take to school. These tuck shops are placed strategically in schools to provide children with snacks and food items during school hours where the demand for foods high in sugar, fat and additives is met.

Currently, there is no legislation in place in South Africa to specify the food items that can and cannot be sold to children in schools (Kruger & de Villers, 2011; Leyden, 2011; Wiles et al., 2011). Profit driven tuck shops have reported limited retail of fresh fruit and vegetables emphasizing the low demand (Kruger & de Villers, 2011). Children, more especially from previously disadvantaged schools, also have access to street vendors located in close proximity to these schools. Controlling the foods sold by vendors is yet another challenge (Wiles et al., 2011). Research conducted by Totura et al. (2015) to assess the implementation of strategies used in schools aimed at preventing obesity concluded that the school environment and support structure influence the success of obesity prevention. Research by Temple et al. (2006) in South Africa, on food items consumed by students

(aged 12–16 years) attending different socio-economic schools, revealed that 72.9% of the participants purchased food at school. Therefore, one might assume that the school setting may be an ideal environment to encourage the consumption of healthy snack items; however, in most cases the school environment provides a platform whereby energy dense foods are made readily available to children.

Research has revealed that healthier foods such as vegetables and fruits are generally more expensive when compared with processed foods (Brinkman et al., 2010). This coupled with the low socio-economic status (SES) of those living in rural and peri-urban areas inhibits the consumption of healthier foods as inexpensive energy dense processed foods become the preferred choice in attaining satiety in South Africa (Schönfeldt et al., 2010; Temple & Steyn, 2011).

Some of the factors that affect food consumption include food accessibility, availability and choice. South Africa has experienced a shift in food consumption patterns with food accessibility, availability and choice being the main determinants affecting food consumption (Ronquest-Ross et al., 2015). This nutrition transition towards a more westernized diet has contributed towards the obesogenic environment in South Africa (Frayne et al., 2011).

Literature has shown that younger children are still developing food preferences so an intervention at this stage may prevent poor food choices in adulthood (van der Horst et al., 2008). Therefore, the aim of the study was to determine the snacking preferences of children from a low socio-economic status community in South Africa. This will act as a guideline (formative step) to develop healthy snacks to promote healthy eating in South African low SES communities of this kind in the future.

METHODS

Sample characteristics and recruitment

The study population comprised of ten parents/caregivers of children in grades 4–7, all of which

were females (focus group discussion), five hundred and thirty-six children (grades 1–7) in quintile 1 and 2 primary schools (Tuck shop purchases) and two hundred children in grades 4–7 Snack Food Frequency Questionnaire (SFFQ) in quintile 1 and 2, from four schools in Verulam, Durban, KwaZulu-Natal South Africa. The estimated age range for child participants was as follows; grade 4 (9–10 years old), grade 5 (10–11 years old), grade 6 (11–12 years old) and grade 7 (12–13 years old). In KwaZulu-Natal, 102 725 children in grade 4 are classified as being in the quintile 1 and quintile 2 schools' category, with quintile 1 being the poorest and quintile 5 being the least poor schools. Schools are classified into quintiles in order to determine the no-school fees allocation policy in South Africa (Hall & Giese, 2008; Joshua, 2012) to address the inequities among previously disadvantaged communities in South Africa.

Permission to conduct the study in the schools was obtained from the KwaZulu-Natal Department of Education (DoE). A list of the schools in quintile 1 and 2 was obtained from the DoE, this was then narrowed down to six primary schools in Verulam, of the six schools, permission was obtained from four school principals. The school principals were contacted telephonically and a meeting was arranged to discuss the study and to obtain permission to conduct research at the schools. Stratified random sampling was used to determine the participants involved in this study. All four schools were involved in the completion of the SFFQ. The number of pupils varied per grade with on average 13 children per grade per school. Children involved in the study were stratified by grade (grade 4–7). Random sampling took place within each grade (i.e. potential participants were randomly selected of the class register). Information letters for participation in the focus group discussion were handed to children in grade 4–7 to pass on to the parent. Parents that showed interest in participating in the focus group discussion, were then contacted telephonically and an appropriate date and time was arranged for the meeting. No incentives were given to any participants in this study.

All children (grades 1–7) that made purchases from one primary school tuck shop (n=536) were

observed. Power analysis for a chi-square test was conducted in G-POWER (version 3.1.9.2) to determine a sufficient sample size using an alpha of 0.05, power of 0.80, a medium effect size ($w = 0.3$) and 3 degrees of freedom (Faul et al., 2013). Based on the aforementioned assumptions, the desired sample size is 210. The sample size for the self-administered questionnaire was determined in order to observe a medium effect size with 80% power, a total sample of 200. In addition, a further eleven participants made up the pilot study.

Data collection

Qualitative and quantitative methods were used to gauge the snacking habits from both the child (SFFQ) and parents' perspective (Focus group). By observing the tuck shop, the researcher was able to verify that what the children (SFFQ) and parents (Focus group) regarded as popular snacks were the actual items being purchased at the tuckshop. This ensured a holistic overview as to what children claimed to be snacking on and what they were actually snacking on.

The study comprised of three parts, namely, the focus group discussion, tuck shop observation and SFFQ. Firstly, the focus group discussion was conducted at one school with the parents/caregivers of children in grade 4–7. During the focus group discussion an interview schedule comprising of themes was used to obtain as much information as possible. The focus group study was recorded on a digital voice recorder and the researcher also transcribed notes during the focus group discussion. The voice recordings were transcribed and verified by a fieldworker. The findings of the focus group study (qualitative aspect) were grouped into themes and reported as such in order to identify the snacking preferences of children in the study sample. The objective of the focus group discussion was to determine parents' knowledge about their child's snacking patterns.

The tuck shop purchases were viewed at one out of the four schools. This was done to identify actual snacking practices of the children. It was identified that all four tuck shops stocked the same items. This was due to these items being popular in quintile 1–2 schools which are typical of low SES areas, hence snack

purchases were only observed from one tuck shop. The researcher compiled a list of the main snack items stocked at the tuck shop after viewing the inventory and used a tally table to record the number of purchases of each item, in order to indicate the most popular snacks purchased. All children from grade 1–7 that purchased food items were recorded due to the apparent difficulty in grade differentiation. Once the focus group discussion and tuck shop purchase records were completed at one of the four schools, the information was analysed and the ten most common/preferred snack food items formed part of the SFFQ. The four most frequently purchased snacks will be reported on in this article.

The SFFQ was developed using a validated Likert scale and piloted in order to ensure reliability (Saloheimo et al., 2015). The questionnaire was piloted on a sample of children ($n=11$) who met the requirements of the sample population. Thereafter the questionnaire was administered to the children to complete ($n=200$) in order to identify the four most popular snack items. The SFFQ was conducted to obtain information from the children themselves regarding the snacking habits. The children involved in the pilot study were not included in the main study sample.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 23® (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY) was used to analyse the data collected. The results are reported as descriptive statistics in the form of graphs and cross tabulation. To determine whether the differences between the means were significant, non-parametric tests were used as the distributions were not normal; (Kolmogorov-Smirnov; test $p < 0.05$). The Kruskal-Wallis H test and Fisher's exact test ($p < 0.05$) were also utilized.

Ethics

The research proposal was reviewed and approved by the Durban University of Technology (DUT) Institutional Research Ethics Committee (IREC) and the KwaZulu-Natal (DoE) research office ethics committees. An ethical

TABLE 1: FOCUS GROUP DISCUSSION CONDUCTED WITH PARENTS/CAREGIVERS OF CHILDREN IN GRADES 4–7, REPORTED IN THE FORM OF THEMES (N=10)

Themes	Focus group questions	Discussion	Direct quotes
Consumption of snack items	How often do you purchase snack foods for your child? Does your child often purchase snack food items from their school tuck shop?	Majority of the participants said snacks were packed with the lunch every day. The children receive spending money almost every day to purchase items from the tuckshop.	"I do make lunch for my kids but they are spoilt, they get spending every day."
Choice of snack item	What snack foods does your child prefer? Why do they prefer that specific snack food?	Varieties of snack items that the children preferred included inexpensive corn based chips marketed in South Africa as Spookies, Snappers, and Jiggies. Children purchased these snacks mainly because they are cheap and the taste is addictive.	"Fried chips (homemade potato fried chips) is the easiest snack for me to give my children when they come home." "Spookies and Snappers are yummy I myself love the taste."
Factors that affect selection of snack item	Is the price of the snack food items important? Are the snack foods your child prefers sold at the school tuck shop? Do your child's friends influence the snack foods your child eats?	Price was viewed as a very important factor; the average amount of spending that is sent is usually between R2.00–R5.00. All the snacks are sold at the school tuck shop. The children usually join a group of friends and they each buy an item and share with each other.	"I have three children; I can't afford to give them a lot of spending." "The tuck shop has all the things my kids like to eat." "My son buys what the other boys like."
Purchasing of an enhanced snack item	Would you purchase a snack food for your child if it were nutritious? Would price play an important factor as to whether you would purchase it or not?	Overall, the majority of the parents were interested in purchasing a healthy snack for their children. The price of the snack would be an important factor, however, if the snack was nutritious the parents indicated that they would want their children to eat a healthier snack.	"I don't mind giving my daughter extra spending if I know she will be buying a healthy snack but money is important, the price must be reasonable."

clearance number (IREC 040/14) was issued by IREC to conduct research in schools. A safety, monitoring and annual recertification report to continue the study was also obtained from the DUT IREC.

Once approval was obtained from the KZN DoE, the researcher then scheduled meetings with the principals of four schools to discuss the nature of the study as well as to obtain permission to conduct research.

Information letters and consent forms were given to all potential participants to pass on to the parent/guardian to grant consent to be involved in the study. Participants were made aware that should they wish to be excluded from the study they were allowed to do so. Confidentiality was maintained by using numbers for reference to participants throughout the study.

RESULTS

Findings from the focus group discussion reflect that children were given spending money along with a packed lunch. Price was identified as an important factor and parents responded positively towards purchasing a healthy snack item; however, purchasing power in a school setting belonged to the child (Table 1).

Fig. 1 reflects the most common items purchased by children from the tuck shop, with sweets (39%; n=207) being the most popular choice. Chips (34%; n=180), soft drinks (9%; n=48) and chocolates (7%; n=38) were also popular snack choices. These snack items were

identified as the four most purchased products by children in grade 1–7.

Table 2 depicts that there was an equal percentage (25%) of children from each of the respective grades. Overall, the ratio of girls to boys was approximately 1:2 (34.0%: 66.0%). Distribution of race was predominantly Indian (54%), followed by the African (45%) race group. Children from the coloured race group comprised of only 1% of the sample population. The differences in the patterns displayed in Table 2 are not significant (Fisher's Exact Test; $p=0.302$).

Consumption of chips as a snack item varied among the grades (Table 3), with 34% of grade 7 children eating chips every day of the week as opposed to a mere 12% of children in grade 4. The consumption of chocolate was not significant throughout the grades (Kruskal-Wallis test; $p=0.058$). Table 3 indicates that almost half of the sample population (40.5%) consumed chocolate 'once a week'. Soft drinks were consumed by almost all the participants (97.5%) and the consumption of soft drinks was not significant across the grades (Kruskal-Wallis;

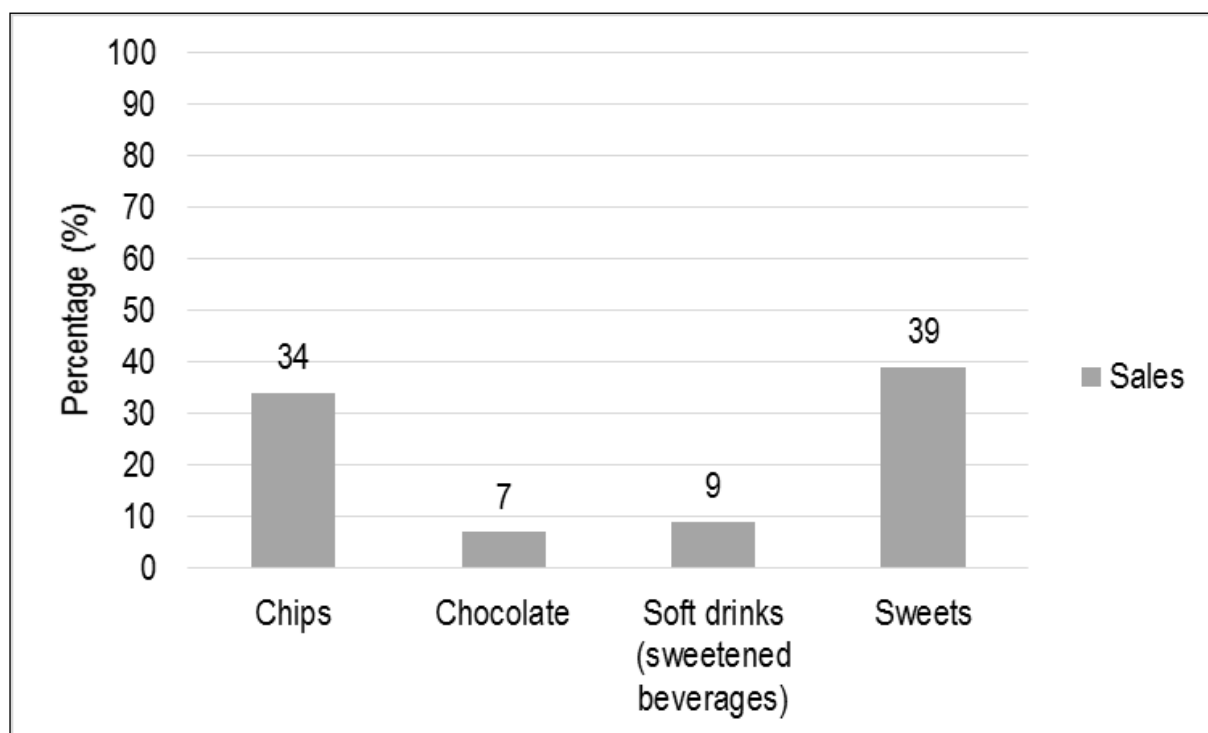


FIGURE 1: TUCK SHOP SNACK ITEMS REPORTED AS THE PERCENTAGE OF CHILDREN (GRADE 1–7) THAT PURCHASED ITEMS DURING THE SCHOOL BREAKS AT ONE SCHOOL LOCATED IN KWAZULU-NATAL SOUTH AFRICA (N=536)

TABLE 2: DEMOGRAPHICS OF THE SFFQ PARTICIPANTS (N=200)

Demographics	Grade 4	Grade 5	Grade 6	Grade 7
n (%)	50 (25)	50 (25)	50 (25)	50 (25)
Gender				
Girls	17 (34)	13 (26)	16 (32)	22 (44)
Boys	33 (66)	37 (74)	34 (68)	28 (56)
Race				
Indian	26 (52)	23 (46)	30 (60)	29 (58)
African	23 (46)	27 (54)	19 (38)	21 (42)
Coloured	1 (2)	0	1 (2)	0
Total	100	100	100	100

TABLE 3: FREQUENCY OF CHIPS, SWEETS, SOFT DRINKS AND CHOCOLATES CONSUMED BY CHILDREN (N=200), IN GRADES 4–7 IN FOUR SCHOOLS LOCATED IN KWAZULU-NATAL, SOUTH AFRICA

	Grade	Every day of the week (%)	More than three times a week	Three times a week (%)	Two times a week (%)	Once a week (%)	Not at all (%)
Chips	Grade 4	12	4	10	16	56	2
	Grade 5	14	14	14	24	34	0
	Grade 6	30	18	12	22	14	4
	Grade 7	34	18	10	12	26	0
Sweets	Grade 4	24	4	12	8	46	6
	Grade 5	36	8	12	18	18	8
	Grade 6	38	16	14	10	16	6
	Grade 7	28	14	6	20	28	4
Soft drinks	Grade 4	16	12	18	24	30	0
	Grade 5	16	22	24	16	16	6
	Grade 6	18	24	10	20	24	4
	Grade 7	30	22	12	14	22	0
Chocolates	Grade 4	6	4	14	18	52	6
	Grade 5	16	14	12	24	28	6
	Grade 6	10	14	10	26	36	4
	Grade 7	8	10	8	22	46	6

p=0.206). The consumption of sweets was reported as significant (Kruskal-Wallis; p=0.044). Children in grade 4 consumed sweets less frequently (52% once a week or less) in comparison to the higher grades (26% of grade 5, 22% of grade 6 and 32% of grade 7). Table 3 presents the highest frequency of sweets consumed by children was in grade 7 (38% every day). No pattern was observable with regards to the consumption of sweets.

DISCUSSION

The focus group study identified important factors that may influence the snacking preferences of children (Table 1). The theme titled 'Factors that affect selection of snack

foods', aimed at understanding the force (parental or peer) that drives the purchase of certain snack items being preferred. Parental influence may affect snacking choices of children but peers have a stronger impact on snacking choices children make (Nørgaard et al., 2013; Boots et al., 2015). In the school setting, children are surrounded by peers who play an influential role in purchasing decisions. Results from the focus group interview also identified price as a contributory factor to the purchases made at the tuck shop. Unhealthy food items were generally less expensive than the healthier counterparts (Brinkman et al., 2010).

In the focus group study (Table 1) a parent stated, 'My son will buy what his friends buy;' majority of the participants (90%) agreed with this statement, reinforcing the results of the study conducted by Giese et al. (2015). Focus group studies conducted with mothers of preschool-aged children from low SES backgrounds revealed that they also had an affinity towards salty and sweet snacks (Fisher et al., 2015). Similarly, the results in this study also showed that some parents/caregivers (80%) indicated that they thought certain snacks, salty and sweet tasted 'yummy'.

Several factors limited the sale of healthier snacks at tuck shops and this study prompted awareness of both the parents and children into questioning the type and diet quality of the snacks consumed. The type of and variety of snack food items available at school tuck shops has a direct impact on the characteristics and eating habits of children in primary schools. Most of the snacks were high in sugar, salt and/or fat. Cheaper snack items are generally high in fat and or carbohydrates (sugar) and salt. The most popular snacks purchased from the tuck shops were sweets (39%) followed by chips (34%). Tuck shops in these schools were reported to be vending mainly unhealthy food items.

According to Temple et al. (2006), 'Junk food' such as, chips, soft drinks and sweets are widely available at schools. These items are generally, if not always, high in fat and/or sugar and contain little/no nutritional value. These results correlate with the results of this study. The top four snack items from the SFFQ were chips, soft drinks sweets and chocolates (Table 3), these items contain large amounts of salt, fat and/or sugar which assist in satiety. Trends in the results of this study show the visible increase in the eating of chips "every day of the week" from grade 4 (12%), grade 5 (14%) and grade 6 (30%) to grade 7 (34%). This indicates that the older children in the sample (grades 5–7) consumed chips on a more frequent basis which may represent a sense of ownership in terms of buying behaviour. A study in Ghana reaffirmed that it is simply not snacking that poses a problem, rather, the actual types and quantities consumed (Asiedu et al., 2012). Notably, as reported in a Danish study, as a

child grows older, a sense of ownership and need for independence results in the child having more control over food choices (Kumpel et al., 2013). Grade 4 children in this study consumed sweets less frequently (52% once a week or less) in comparison to the higher grades (26% grade 5, 22% grade 6 and 32% grade 7). The highest frequency of sweets consumed was by the grade 6 children (38% every day).

The SFFQ results in this study identified soft drinks as being consumed by almost all the participants (97.5%) and the consumption of soft drinks did not differ across the grades (Kruskal-Wallis; $p=0.206$). The International Food and Agriculture Organisation STAT FBS survey on popular foods identified soft drinks as the second most commonly purchased street food (fruit being the most common), this is a cause for concern as studies have linked high sugar intake with obesity and NCD's. In South Africa, total soft drink consumption increased by 68.9% from the year 1999 to 2012, and the proposed current sugar tax on sugar sweetened beverages is anticipated to receive much opposition from the beverage industry (South African Department of National Treasury, 2016).

CONCLUSION

As with other similar studies, this research reported that children in low SES communities in South Africa are consuming unhealthy snacks. This could be as a result of economic circumstances, limited knowledge and limited access to healthy snacks. Poor snacking habits developed during childhood will continue in adulthood thus negatively affecting overall health and wellbeing. The most popular snacks consumed included; chips, soft drinks and sweets. These food items contain high amounts of fat, sugar or sugar and fat, predisposing children to non-communicable diseases and an imprinting of unhealthy eating behaviours at an early age.

The information presented in this study could be instrumental in the development of nutrient enriched snacks that are acceptable to children from a low SES community. Future research should focus specifically on determining the portion size of snacks consumed and more

especially the sugar, salt and fat content. This would assist in the reformulation of snacks with an increased nutrient profile and sensory acceptability of snacks targeted at children in low SES communities.

This study was not without limitations, the study was conducted within a specific population and snack purchases were reported on one tuck shop, hence the snacking preferences cannot be generalized for all children in South Africa.

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