

# **The missing boys: Understanding the unbalanced sex ratio in South Africa, 1894–2011**

*Short title:* Missing boys in South Africa, 1894-2001

Francisco J. Marco-Gracia, Department of Applied Economics, Universidad de Zaragoza (Spain), and Department of History, Stellenbosch University (South Africa). ORCID: 0000-0002-8150-9823.

Johan Fourie, Department of Economics, Stellenbosch University (South Africa). ORCID: 0000-0002-7341-017X. Phone: +27 (0)21 808 3590. Twitter: @JohanFourieZA. LinkedIn: <https://za.linkedin.com/in/johan-fourie-72b2204>

Corresponding author: Johan Fourie, [johanf@sun.ac.za](mailto:johanf@sun.ac.za)

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## **Abstract**

At the beginning of the twentieth century in South Africa the sex ratio for black children under five years was one of the lowest ever recorded. Sex ratios also differed markedly by racial group. Those for white children remained almost invariable, with more boys than girls, while black children had a clear majority of girls, a situation that the literature has almost completely overlooked. The reasons are still not completely clear. Although sex ratios at birth show more births of boys than girls, boys' mortality was higher than girls' mortality. Why boys' mortality was so high and why, as a consequence, the twentieth-century under-five sex ratio for black children was so skewed towards girls, a ratio much lower, for example, than the sex ratios of pre-industrial European countries, remains unanswered. We suggest several possible explanations. The most likely explanation, we argue, was a preference for girls.

**Keywords:** Sex ratio, racial difference, gender discrimination, gender preferences

## **Introduction**

Since the eighteenth century, scientists have been interested in the secondary sex ratio: the ratio of boys to girls at birth (Dyson 2012). The proper functioning of the monogamous marriage market, with a low rate of final singleness, has largely depended on maintaining an equilibrium between the sexes in the long term (e.g. Goldman and Lord 1983). It was not until the second half of the twentieth century that sex ratio researchers took an interest in the African continent (James 1984; Visaria 1967) and South Africa entered the picture only in the 1980s (MacGillivray et al. 1986). When the first articles on African sex ratios were published, the Statistical Offices found very low sex ratios for the under-five population in various countries around the continent, and some of these Offices questioned the values. However, none of them found a satisfactory explanation and they continued to find similar results in the next censuses, including those in South Africa.

Scientists generally expect to find sex ratios at birth over 100 (more boys than girls). During the first months of life, however, more boys die, because of, among other factors, their greater natural weakness at birth and less developed immune system (Vaupel et al. 1979; Wisser and Vaupel 2014). This brings the ratio closer to 100 (Gini 1908), although the number of males under five years still exceeds the number of females under five years in most societies. In this context, in many regions of the world, in the present and past, there are and were very high under-five sex ratios, which suggests a much higher mortality in girls than in boys in those societies. This is, following the proposal of Amartya Sen for the situation in some Asian countries in the twentieth and twentieth-first century, what scholars have called the ‘missing women’ or ‘missing girls’ hypothesis (Das Gupta et al. 2003; Sen 1992).

Our findings confirm that in South Africa black children had much lower sex ratios, an observation we characterise as the ‘missing boys’ conundrum. We are not the first to document this for Africans. In the Preliminary Report of the 1963 Census of Northern Rhodesia (Northern Rhodesia Government 1964: 5-6), one observer wrote:

In most populations more males are born than females but as male mortality is higher than female mortality there are normally more females than males in all age groups except at very young age where an excess of males can reasonably be expected. This has been true of most Western nations but it has yet to be confirmed for under-developed African conditions. [...] It is interesting, however, to find that this peculiarity was observed in the 1962 Census of Africans in Southern Rhodesia, the 1960 Census of Tanganyika and in a recent sample survey of Swaziland. It is evident that unless there is an inherent bias in reporting sex and ages which is peculiar to Africa that accepted beliefs about the sex ratio at birth and differential mortality must be revised.

This suggests that census authorities, at least as far back as the mid-twentieth century, were aware of the missing boys conundrum. These census takers were not wrong in their initial estimations. In contrast to the rest of the world, sub-Saharan countries during the twentieth century had a very low sex ratio of the under-five population. This is not because parents were underreporting the number of their boys to avoid tax or conscription. It is also not reasonable to assume that African mothers would hide their boys during the first five years of life; there is no anthropological literature to support such a claim. This leaves us with a ‘missing boys’ conundrum, one that we hope to explain in this paper.

The objective of this research is to, first, document the ‘missing boys’ conundrum for the case of the late nineteenth and twentieth century South Africa. A second objective is to identify why there is such a big difference between the sex ratios at birth, which for black children were around 100 boys per 100 girls or over, and the under-five sex ratios that reached levels close to 90 in the first half of the twentieth century. What is the reason for such a rapid reduction in the number of black boys in the early years of life compared to girls? We analyse whether these extremely low values can be explained exclusively by the boys’ greater likelihood of dying or if there could be other complementary factors. Our hypothesis is that there were gender preferences associated with social traditions and customs that conditioned family behaviour. The existence of a preference for girls in traditional African societies, a consequence of a high land-labour ratio, had implications for social institutions such as the prevalence of the brideprice and largely explains the greater number of girls than boys in the censuses.

This research therefore not only measures, for the first time in a systematic way, the low sex ratios of black South Africans, but also provides novel explanations for their level and trajectory. In addition to this contribution to South African demographic history, our findings also inform several demographic, social, economic and cultural trends in South Africa today.

## **1. Sources and evidence**

Our research uses two kinds of sex ratios: at birth and in the under-five (zero–four) age group. The sex ratio at birth is defined as the number of boys born per 100 girls born, and the sex ratio of the under-five population as the number of living boys under five years for every 100 living girls under five years. We focus on the under-five sex ratios – the

number of individuals zero to four years in each census, by race and sex – using the sex ratios at birth only as comparison. For the under-five sex ratios we always use cohorts defined by the birth date of the children.

In any research on South Africa, it is necessary to explain the use of racial classifications. Four race groups were classified by the government during the twentieth century: black, coloured, Indian/Asian, and white. These racial categories are still used in South Africa today, and because all the censuses report population figures in these crude classifications, we used them to compare the sex ratios. But it is also true that South Africa is a melting pot of cultures, languages, races and ethnic groups that make it difficult to classify individuals accurately by racial group (Christopher 2002). All four census groups present challenges of measurement over space and time. Coloured South Africans, for example, may be classified as black in earlier censuses (Posel 2001). Those classified as Indians/Asians varied considerably during the late nineteenth century and throughout the twentieth century. For this reason, we have left them out of the analysis.

Our study is based on the South African censuses of 1911, 1921, 1936, 1946, 1951, 1960, 1970, 1980, 1991, 2001 and 2011. We selected these ones because of their detail (all of them include the black population) and their periodicity.<sup>1</sup> They include the distribution of population by age, race and sex, except for the 1921 census, which does not have the information for the under-five black population. For the 1921 census we used the under-one black population as a proxy, which had a sex ratio of 89.17. If we use the variation between the under-one and under-five black sex ratios from the 1911 census, for 1921 we estimate a sex ratio of 90.61 (+1.44). If we use the variation from the 1936 census (+1.11),

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<sup>1</sup> Between two main censuses it was common to carry out an intermediate census. But these censuses were based on the previous census and presented more aggregated information. In some cases, information by race was not provided.

we estimate a sex ratio of 90.28. In both cases we obtain, for the 1921 census, a sex ratio below 91, the lowest value of the twentieth century. To extend the period of analysis, we also used the censuses of 1894 and 1904 for the Cape Colony.

The South African censuses enable us to study population sub-registries and variations in the total population from one census to another, especially for the black and coloured populations. However, most of them present some errors because of incomplete information (Christopher 2011). Thus, for example, the 1951 census records 1,226,982 black children under five years and the 1960 census, following this same cohort, 1,287,998. That is, according to these data, not only had no children died, but also 61,016 new children had appeared. Obviously, some children must have died, so the underreporting is even greater. Official immigration data do not explain the discrepancy. The evolution of the population in some of the censuses is also incoherent. The numbers show extreme variation over a very short time. We must conclude that there were mistakes and biases associated with the volume of population analysed in all the censuses of the entire twentieth century. These errors and biases, however, do not invalidate the quality and interest of the source (Christopher 2011; Moultrie and Timæus 2003), or the trustworthiness of the sex ratios for the purpose of our study. There is no reason to think that families with many children of one sex would have avoided the census takers. Nor does it seem likely that the censuses focused on areas where children of one sex abounded. It is more likely, given the situation in South Africa and the available data, that the most isolated places were not taken into account, or the territories discriminated against by South Africa's policies of segregation and apartheid were deliberately 'forgotten'. This possible under-registration of data affects our analysis but does not invalidate our finding that South Africa's black population had a low sex ratio during the twentieth century.

We found no reason to suspect that the censuses were biased by negligent or deliberate under-reporting of the number of boys or girls. More importantly, the trends are credible because the large samples analysed favour a low standard deviation of the sample. Our findings do not depend on just one census or one small geographic region. In addition, the obtained values were similar to those available for other sub-Saharan countries according to their censuses and the UN data. These consistent patterns cannot be the result merely of idiosyncratic census-taking practices.

[INSERT FIGURE 1]

Given the availability of the censuses, it is surprising that South Africa's historical unbalanced sex ratio of the under-five population has received almost no scholarly attention. Figure 1 shows the evolution of sex ratios in the zero-to-four years group according to race with 95% confidence intervals. The patterns are very different. White children have high values, always above 100, very similar to the sex ratios of European countries (Mitchell 2013). They are in marked contrast to the sex ratios of black children which remain below 100 for almost the whole period, dropping to figures close to 90 in the first decades of the twentieth century.

We can do more than simply illustrate the low sex ratios of black South Africans over the late nineteenth and twentieth centuries, though. In what follows, we provide evidence in support of our hypothesis that a preference for girls may be one important explanation for the observed low sex ratios. To do so, we first review several other competing explanations and assess their validity as best as we can.

## **2. Potential explanations**

### **2.1 Geography**

We first test the assertion that geography matters. Perhaps our results are simply the consequence of an outlier region that pulls the average down. To investigate this, we calculate the differences between the black, coloured and white sex ratios for the former provinces (Cape, Natal, Transvaal and Orange Free State) and the whole country for four available years (1936, 1946, 1960 and 1970). Figure 2 reports the results. For most of the years the provinces are very close to the average, with a difference of less than two points. For the sex ratios of black children we could calculate given the available evidence, all the provincial averages are close to the state average, except for Natal in 1946. For the sex ratios of coloured children, a larger difference occurs in the provinces of the Transvaal and Orange Free State where they were a minority group and therefore the standard deviation is greater. For the sex ratios of white children, the differences occur randomly over time.

[INSERT FIGURE 2]

The proportions of rural and urban populations (as defined by each census) vary enormously from one race group to another and with the passage of time. To mention two extremes: 83% of black residents lived in rural areas in 1936; less than 10% of white residents lived in rural areas in 1996. We would expect under-five sex ratios to evolve faster in the underdeveloped rural areas because they would have been more likely to preserve traditions (such as sex-selective neglect and/or infanticide) that discriminated against a particular sex. As Table 1 shows, though, there were no big differences between the rural and urban sex ratios. This means that sex ratios are more likely to be linked to race than to place of residence. We have seen above that the ratios did not vary greatly

from province to province and we find a similar pattern in urban and rural areas. Geography, therefore, cannot explain the low black sex ratios.

[INSERT TABLE 1]

## **2.2 Ethnicity**

The differences according to ethnic group do not explain the values obtained either. Figure 3 shows that all groups increased their under-five sex ratio from 1970 to 1991. In general, and with slight variations, the sex ratios for the western ethnic groups (Xhosa, Tswana and Basotho) are slightly higher than those of the eastern ethnic groups (Zulu, Venda or Swazi). This may be attributed to differences in living standards, as Mpeta et al. (2018) suggest, but more evidence is needed to make a strong case. The point is that we do not see substantial differences in the level or trajectory of sex ratios by ethnic group that would explain the evolution of black South African sex ratios during the twentieth century.

## **2.3 Genetics**

Garenne (2002; 2017) attributes sub-Saharan low sex ratios to Bantu genetics. The term ‘Bantu’ refers to more than 400 African ethnic groups speaking Bantu languages in central and southern Africa, the vast majority of the population in these areas. One argument supporting this possible explanation is that American, British and Caribbean blacks historically have a lower sex ratio at birth than their white counterparts (Ciocco 1938; Garenne 2004; James 1984; Visaria 1967).

However, the large variation in sex ratios in recent decades cannot be explained by changes in genetics. Genes simply do not vary that much within two or three generations. This is not to say that there is no genetic propensity among blacks for lower sex ratios at

birth (this is an interesting question that needs to be discussed deeply), but the observed variability (to approximate the results for all races) must be explained in relation to other changes in the study period (such as improvements in living standards). Although we would assume that expected sex ratios for blacks may be slightly lower than those expected for other races, we would expect sex ratios above 100 for all breeds under optimal conditions (as Figure 1 shows for the last decades).

## **2.4 Maternal health**

Low sex ratios at birth could also be the consequence of poor maternal nutrition, leading to high rates of miscarriages that affect male foetuses more severely. Scalone and Rettaroli (2015) argue that poorer maternal nutrition is linked to a higher rate of miscarriage, affecting a larger proportion of boys, because they are weaker in uterus. Although the theory of higher male intrauterine mortality has not been fully demonstrated (Chahnazarian 1988), several medical research papers support it (Boklage 2005). According to Eriksson et al. (2010), male foetuses grow faster and have a more efficient placenta, but their smaller size means there is a risk of detachment in the case of maternal malnutrition. These factors may explain why some scholars have found low sex ratios in Europe at times of famine or war (Bromen and Jöckel 1997). This has led some authors to argue that the low African sex ratios could be linked to the malnutrition of the mother and consequent higher rate of miscarriages of boys.

Morse and Luke (2021) provide some evidence to support this view. They first show that the sex ratio at birth for seventeen African countries is below that of other world regions. They then use the length of the birth interval as a proxy for foetal loss, arguing that foetal loss forces mothers to restart the clock on time to conception. They find that longer second

birth intervals are significantly related to lower odds of a male second birth and to lower sex ratios at birth.

While Morse and Luke (2021) offer a welcome additional explanation for the relatively low sex ratios at birth of Africans, foetal loss cannot, of course, explain the sharp decline in the sex ratio in the first five years of life. The official sources available for South Africa show that more boys than girls were born. For example, there is information about the sex ratios at birth for the country during the 1910s. The sex ratios at birth for all races were at or above 100, with the exception of the black sex ratio in Natal (Office of Census and Statistics, 1921). The annual medical reports from Cape Town, as can be seen in Table 2, show that in almost all the periods analysed the number of boys at birth was the same as the number of girls, or higher.

[INSERT TABLE 2]

Statistical yearbooks with vital statistics for South Africa are available for most of the twentieth century. They have big gaps, unfortunately, largely the consequence of South Africa's discriminatory policies that either collected less information on black residents or excluded certain territories with high black density. This meant that the registration of births and deaths by race changed frequently until the end of the twentieth century. Analysis is further complicated by the fact that not all provinces and territories followed the same rules. We, for example, do not have national birth data from the Statistical Yearbooks for the coloured population until the second half of the twentieth century, or by sex for the black population until after 1994, when apartheid ended.<sup>2</sup> Table 3 shows the sex ratios at birth for white and coloured children between 1955 and 1989 according

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<sup>2</sup> Sometimes we have the number of births but not their distribution by gender, which makes it less useful for this research.

to the Statistical Yearbooks. In all cases the sex ratios remain above 100 and are higher for white children. Although we do not have information for black children, Table 3 confirms that the low sex ratios for coloured children did not originate during pregnancy and at birth. Where black sex ratios at birth are available, usually for more recent years and in small samples, we do not find values below 95 as the censuses of different countries revealed for the under-fives in some years (e.g. South Africa in 1921). Despite the limitations of the data, we can be confident that sex ratios at birth do not entirely explain the values obtained in the under five years groups.

[INSERT TABLE 3]

[INSERT FIGURE 3]

### **3. The first years of life**

The sex ratios at birth cannot explain the extremely low under-five sex ratios of the first half of the twentieth century. We need a better explanation. In this section we consider possible explanations for these surprising differences in under-five sex ratios. Several theories have been put forward to explain uneven sex ratios. Biological, environmental, nutritional, economic, social, and cultural reasons have all been analysed as determining factors. First, though, we provide estimates of infant mortality in the first five years of life.

We lack adequate long-term data on infant mortality by race. Information is only available for recent decades, and even this is often biased and underrepresent certain groups. From 1945 in South Africa, we know that black children had a high infant mortality (around

180 per thousand), followed by coloured children (around 120 per thousand) and white children (around 38 per thousand) (Nattrass and Seekings 2010).

To build a convincing case, though, we need to show the evolution of infant mortality rates by sex. As noted above, for most of the century South Africans were not required to register children's births, so it is not until the second half of the twentieth century that we have the necessary statistics, and for black children not until the 1980s. Nor can we compare our data with data from other sub-Saharan countries, because most of the African continent presented similar problems and had even scantier data (Klasen and Wink 2002). Demographic surveys do provide data on infant mortality, showing lower infant mortality rates for girls than for boys. These surveys are, however, only available for the last years of the twentieth century when infant mortality had already fallen drastically and there were hardly any differences by race.

We are interested in the period of high infant mortality. Doing the best with the evidence available, we have used a complementary source, which can give us new clues about mortality under 5 years. Table 4 shows the sex ratios from the Statistical Yearbooks of South Africa between 1955 and 1990, including the proportion of male children who died between birth and five years for every 100 girls and the difference between the sex ratio at birth (registered in the Statistical Yearbooks) and the sex ratio in the under-five age group reflected in the censuses. An important proviso must be pointed out: Since we do not have the sex ratio at birth for black children, the sex ratios reported are for those in their first year<sup>3</sup>. They are lower than those found at birth elsewhere (it seem to show that

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<sup>3</sup> From the 1998 South Africa Demographic and Health Survey we have some approximations of sex ratios at birth in the 1990s (these data have a sub-sample of the population). Thus, the Survey found a sex ratio of 92.4 in 1989, 98.0 in 1990, 105.6 in 1991, 95.9 in 1992, 103.2 in 1993, 112.1 in 1994, 98.2 in 1995, 99.6 in 1996 and 96.6 in 1997. Although highly variable, all these values are close to the sex ratios under one year, which were 98.7 in the 1991 census, 99.4 in the 1996 census and 100.2 in the 2001 census.

the excess of mortality of boys was concentrated in the first months of life). Using sex ratios for children under 1 year of age could be the explanation why the sex ratio increased, despite the fact that there was an excess of infant mortality in the first five years of life. Because, as we have explained, the highest peak of infant mortality is normally concentrated in the first weeks and months of life and this effect had already been largely included in the sex ratio for children under one year of age. It would be expected that the sex ratio at birth for blacks in this period would be slightly higher than 100 (Garenne, 2004). In addition, the information was, unfortunately, only collected from the 1980s for black children, so the analysis is mainly based on coloured and white children. We observe that in all cases there was a clear excess of mortality of male children. This was also the case for the black population in the 1980s.

The highest proportion of deceased male children occurred among the white population. This requires an explanation. In groups with low infant mortality, such as the white population at this time, the number of deaths are very small. Although the ratio of male to female infant deaths is high, it does not materially affect the sex ratios because the number of deceased children is inconsequential, especially among urban dwellers. This was not the case for the mortality of black and coloured children in the past. In the 2011 census, however, with low infant mortality for all race groups, the trends converged, and the mortality patterns were similar among the races.

[INSERT TABLE 4]

To obtain information for an earlier period, we transcribed 13,174 individual-level death certificates for Kimberley, one of the largest towns of what was then the Cape Province,

between 1895 and 1940.<sup>4</sup> Kimberley is not representative of the South African population at the time; it was probably more affluent owing to the diamond mining industry. The benefit of using Kimberley, however, is that it includes a large sample of all three race groups. In Table 5 we analyse mortality by gender and race among the 0-4 year group. As we expected, for all races, mortality among children under 6 and under 18 months was much higher for boys than for girls. It would seem that the greater weakness of male children at birth and during the first years of life is the main reason for their excess mortality.

However, from the 18 months onwards the trend changes. While among black and coloured children there continued to be higher mortality of boys than girls (more than 101 boys per 100 girls dying), among white children the mortality patterns reversed (92 boys per 100 girls dying). This also reflects the trend of most Western countries. Table 5 shows that the higher mortality of black and coloured boys continued beyond the first few months of life, unlike what happened with white boys. Put differently, mortality between 18 and 60 months among white boys was 70% lower than in the first 6 months of life. By contrast, mortality among black boys only fell by 50% (60% for coloured boys). This is despite the fact that the black and coloured populations started out with a higher infant mortality rate. As a result, the cumulative balance of deaths had an important influence on the modification of the sex ratios of black and coloured children.

[INSERT TABLE 5]

The excess mortality of male children in the first months of life seem to cause the low sex ratios. However, in historical societies with a preference for male children this excess

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<sup>4</sup> The original sources are available from the National Archives in Pretoria. We transcribed from digitised versions available on familysearch.org.

mortality is reversed in the early years of life and, as a result, under-five sex ratios are similar to those at birth (Marco-Gracia and Beltrán Tapia 2020). In our sample of black children, low sex ratios remain almost constant from one to four years. This would suggest that no efforts were made to reverse the effects of the boys' excess mortality in the first months of life. In South Africa, we do not observe the preference for boys that was evident in many other previously cited regions of the world. What, then, can explain the surprisingly low under-five sex ratios?

### **3.1 Biological and environmental explanations**

One possible explanation could be biological and environmental. We do not have a long historical sample of causes of death to ascertain the reasons for death. However, when boys and girls have similar levels of exposure to diseases such as malaria, reports on causes of death in recent decades do not point to sex as an important variable to consider (Kahn et al. 1999; UNICEF 2017). The Kimberley death notices also do not reveal large differences in the causes of death between black and coloured children.

One biological explanation may be that black children are born weaker than white and coloured children, and therefore are more likely to die in the first few months. Table 6 refutes this hypothesis. It reports data from Cape Town's annual medical reports for 1979 to 1994, showing average weight at birth, the percentage of children weighing less than 2.5 kg, and the percentage of stillbirths, by race. In all cases, coloured children have the lowest average weight at birth and the highest percentage with very low weight. Black children also have lower average weights than white children, although not as low as coloured children. This would suggest that biological explanations of differences in infant mortality do not seem to explain the low under-five sex ratio of black children.

[INSERT TABLE 6]

### 3.2 Nutritional and economic

One possible explanation of the low under-five sex ratios links higher sex ratios with improvements in living standards (Andersson and Bergström 1998; Fellman and Eriksson 2011). Mpeta et al. (2018) analysed the way black South Africans' heights, or stature, evolved during the twentieth century in South Africa. They found an evolution of heights very close to the evolution we find in the sex ratios. The lowest average heights corresponded with the lowest sex ratios during 1920s and 1930s. Although height is at approximately 80% determined by genetic factors, it is also affected by nutrition and environment, especially during the first years of life. Similarly, mortality rates are strongly related to the economic situation, especially in low-income households. Periods of economic crisis are historically associated with higher mortality rates. Therefore, if more boys than girls are dying, the under-five sex ratios would decrease relative to periods of lower mortality.

Poor nutrition could therefore be a proximate explanation for the trend we observe. Individuals with worse nutritional status, especially if they are children, are more likely to die as a result of famine and disease.<sup>5</sup> This is observable in the case of epidemics, when mortality rates tend to be highest for the weakest individuals. During the Spanish flu of 1918, for example, coloured and black South Africans died at higher rates than white South Africans (Fourie and Jayes 2021). While the high infant mortality is a valid explanation of the high mortality of black and coloured children, it does, however, not explain why there were a lot more boys dying than girls, or why there were such different

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<sup>5</sup> Differences in nutrition could be due to variations in breastfeeding practices by gender. In India, girls have shorter average breastfeeding periods than boys (Jayachandran and Kuziemko, 2011). However, in historical rural Spain the main differences in mortality were observed from weaning onwards (Marco-Gracia and Beltrán Tapia, 2020). In South Africa we have not found sources that corroborate the existence of different breastfeeding practices.

sex ratios for black and coloured children. We would need a reason why boys were more affected by poor nutrition. One possibility, from a sociological perspective, is that parents discriminated voluntarily or involuntarily in the provision of nutrition by gender. This would lead to a higher mortality of boys, which would have been reflected in the evolution of the sex ratios. Rosenzweig and Schultz (1982) show that in low-income countries the survival of children is a good indicator of the investment of parents in their children by gender.

Several studies on health in sub-Saharan Africa in recent decades, mainly from the Demographic and Health Surveys, have shown that the boys' nutritional status was worse than that of girls and women.<sup>6</sup> Wamani et al. (2007), using 16 of these surveys from ten countries, found that boys are more likely to be stunted than girls. Svedberg (1990) found that sub-Saharan girls had an anthropometric-nutritional status similar to or better than that of boys, unlike the case in other developing countries. Sahn and Stifel (2002) found similar results. Klasen (1996), on the other hand, found a small but growing discrimination against girls. Overall, studies of the twentieth century suggest that girls had an advantageous situation or, at least, were not clearly discriminated against.

These results are echoed in South Africa. Again, unfortunately, we only have data on the health of children under five years of age since the last decades of the twentieth century, when improvements in nutritional status had already taken place. The results from the 1990s confirm that poor children (especially coloured and black children) were more likely to be stunted, and boys more than girls (Health Systems Trust 1999; Lesiapeto et al. 2010; Zere and McIntyre 2003). Poor black and coloured male children were therefore more likely to suffer problems related to poor nutrition. In the twenty-first century, in

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<sup>6</sup>Girls could have eaten more food if they had been actively involved in preparing the meals. However, we are analysing girls under five. It is unlikely that they played a very active role in the kitchen.

South Africa, these nutritional problems have almost disappeared (May and Timæus 2014).

### **3.3 Social and cultural**

One reason for poor nutrition of boys may be a preference for girls. Parents make different investments in sons or daughters according to the social potential of each sex. Our hypothesis is that the distribution of resources in historical South Africa contributed to a lower under-five sex ratio. We are not the first to make this claim. Anthropologists who have worked with communities in sub-Saharan Africa have sometimes found a preference for girls. Studying the Herero in Botswana, Harpending and Pennington (1991) found evidence of such a preference, although the Herero themselves did not recognize this. The daughters were given better food than the sons and were more protected from risks, with a resulting lower rate of female infant mortality. In South Africa we find another example. Badassy (2011: 18-19) cites a case reported in *The Natal Witness* in 1882 of a married mother in Tarkastad (Eastern Cape) who had twins, a boy and a girl. The mother said she could not feed two babies, so she killed the boy ‘who was the least value’. Although this is just one anecdote, it provides partial evidence of a preference for girls in late nineteenth century southern Africa.

We also hypothesise that this situation tends to be found in areas where females are more productive because they have a fundamental role in the workplace, and particularly where their families receive a brideprice when a daughter marries (Cronk 1991; Rosenzweig and Schultz 1982). We return to the brideprice topic below. We propose this hypothesis because a similar pattern – although in the opposite direction (in favour of boys) – can be found in the distribution of food and care in historical Spain and in other parts of the world (Marco-Gracia and Beltrán Tapia 2020).

Women have historically played an important role in South Africa and sub-Saharan Africa more generally (Akyeampong and Fofack 2014; O’Laughlin 1998). One reason for this is Africa’s high land-labour ratio (Austin 2008). A high land-labour ratio meant labour scarcity. Women’s reproductive ability was therefore of great value. Cultural institutions that developed as a consequence were indigenous slavery, polygamy and brideprice.

The brideprice has various names in southern Africa, for example *lobola* in Zulu, Xhosa and others, *bohali* in Sesotho, and *roora* in Shona (Posel and Rudwick 2014). Although a brideprice payment is a complex practice that varies in nature, amount and the people involved, in South Africa brideprice payments have in common that it is the groom, his immediate family and sometimes his relatives who make a payment – in cattle or, increasingly, in cash – to the bride's family. In these societies, women are a source of family income. Interviewing Zulu parents about their daughters’ brideprice, Posel and Rudwick (2014) were told it is economic compensation for the expenses involved in bringing up daughters. Some respondents even said they wanted not just compensation but profit. Boys, on the other hand, are a drain on the budget since the family has to pay the brideprice when they marry (Anderson 2007).

Brideprice and its related cultural institution, polygyny, were common cultural practices in southern Africa. In fact, they remain common. According to the 1911 census, 29.5 % of married South African black women were in a polygynous marriage (there were 82.9 married men per every 100 married women); according to the 1921 census, the figure was 27.8 % (84.1 married men per 100 married women), and according to the 1998 Demographic and Health Survey of South Africa, the figure was 16.3% (Department of Health 1998). To maintain a polygynous system with a very low singleness rate in the long-term, such as the one that characterized black South African populations historically,

an excess of girls would be desirable. In a polygyny system, the demand for brides in the marriage market (with its corresponding brideprice) was higher than that of grooms. Parents received a brideprice for their daughters but had to pay one for their sons. The number of sons and daughters strongly influenced the family budget, especially when the parents reached an advanced age. If there was a strong demand for women in the marriage market due to polygyny, parents might have more incentives to favour the survival of their daughters. The low sex ratios could therefore be the consequence of the social and marriage system of black South Africans.

The mechanisms that explain how preferences are translated into low sex ratios are more controversial and difficult to prove. One possibility is infanticide. Some anthropologists say that infanticide, both direct (murder) or indirect (due to a discriminatory behaviour), has been common in most societies historically (Brewis 1992). Hanlon (2016) claimed that infanticide in the first hours of life has been a common technique to adjust fertility to the desired objectives throughout most of history. Proofs of non-preferred gender children infanticide were found in Europe among the poorest people during the eighteenth and nineteenth centuries (Beltrán Tapia and Marco-Gracia, 2020). Clark et al. (1995) detected a clear preference for girls when studying the case of twin births (twin killing practices) in Zambia. They reported a sex ratio of 92. During the twentieth century, though, only sporadic cases of infanticide were reported in South Africa.

There are, however, some evidence for the nineteenth century that confirm the existence of twin killing in South Africa (Badassy 2011; Devlieger 2000). They were documented among the Zulu, Tsonga, Basotho, Tswana and other groups. These practices diminished or disappeared during the last decades of the nineteenth century and the first decades of the twentieth century, continuing only in some small groups who maintained the tradition longer. Historical anthropologists who described infanticide practices in South Africa

usually did not directly report gender discrimination practices (e.g. Junod 1927; Bryant 1967). This makes it difficult to link these practices to gender preferences. However, the Badassy (2011: 18-19) example cited above is an illuminating example of gender discrimination among black communities historically in southern Africa.

The preference for girls can also be observed in other cultural practices. According to Akyeampong and Fofack (2014), women in sub-Saharan Africa societies had many rights and responsibilities in the public sphere, and they played powerful roles in the social and labour environment.<sup>7</sup> In several ethnic groups, including some of the South African groups we analyse, there was a traditional matrilineal transmission of surnames, highlighting the importance of the mother's legacy in the family lineage (Barnard 1975). These cultural practices provide some evidence to explain the low level of under-five sex ratios for black children in South Africa.

Yet, as we showed above, sex ratios evolved over time, suggesting that we should also incorporate time-variant factors in our explanation. The rise in the under-five sex ratio suggests, for example, that the preference for girls observed during the first half of the twentieth century has declined. One reason is globalisation. As South African society has become more integrated with Western cultural, the strong preference for girls may have relaxed, increasing the sex ratio. But it is equally possible to observe a rise in the under-five sex ratio without a change in the preference for girls. The increase in the sex ratio occurred in a context of improvements in healthcare, lower childhood mortality, a fall in fertility and better living standards (Sawyer 2012; Mpeta et al. 2018). As a result, gender preferences may not be reflected in a low under-five sex ratio, as the reduction in

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<sup>7</sup> The non-introduction or late introduction of the plough in many African societies may have been at the origin of the smaller labour differences by gender, because the advantage in male upper-body strength was not as effective as elsewhere (Alesina et al. 2013).

childhood mortality is partially conditioning the sex ratio. In addition, throughout the twentieth century, South African women were affected by labour migration, remittances, the collapse of herding and smallholder farming and gendered unemployment. As a result of this, the role of women changed throughout the twentieth century in South Africa (Gaitskell et al. 1983; Manicom 1992). This modified the role of women in society, we believe, also affected sex ratios. It is clear that there are several other probable hypotheses for the equalisation of the under-five sex ratio. The exact causal factors responsible for this remain poorly understood – and deserves more attention.

#### **4. Conclusions and implications**

Our data sources, old and new, reveal clear differences in the sex ratios in the under-five age group between black, coloured and white children in South Africa. White children had high sex ratios and a trend similar to that of most Western countries, with a less pronounced slope after the end of apartheid. Black children had very low sex ratios during most of the twentieth century, with a trend to converge with the rest. Coloured children were somewhere in the middle. The low black sex ratios are difficult to explain and interpret. The traditional explanation is based on the weakness of boys during pregnancy (Morse and Luke 2021). We show, however, that the sex ratio at birth is not enough to explain the even lower under-five sex ratios; in the first five years of life, boys had higher mortality than girls, resulting in a remarkably low sex ratio for black children during the first half of the twentieth century.

Although excess male mortality in the first months of life is found in all societies and historical contexts where infants of both sexes received the same quality of nurture and care, the values for the South African case are extreme. The high incidence of the boys'

mortality in comparison with other world areas is most likely the consequence of, we argue, better care and nutrition received by girls during the first years of life.

We suggest that these differences in care and nutrition emerge as a result of an ancestral preferences for girls in southern Africa. Girls were preferred because of their important social and economic role and the possibility of recovering the investment in daughters through the brideprice in a context of polygyny and almost universal marriage.

By the second half of the century sex ratios had converged, and this trend has continued into the twenty-first century. With economic, social and health improvements, mortality rates have dropped to a fraction of what they were less than a century ago. Today the sex ratio of the under-five population is very close to the sex ratio at birth. In addition, the socio-cultural changes experienced by South Africa, in the context of globalization, may have modified the preference for girls to the benefit of boys (Anderson and Ray 2017). The future of the brideprice and other related social customs will determine whether a new marriage model will arise.

## Supplementary material

Number of males and females in the zero-four age group and sex ratio by race according to the South African censuses, 1894-2011.

| YEAR               | BLACK   |         |           | COLOURED |         |           | WHITE  |         |           |
|--------------------|---------|---------|-----------|----------|---------|-----------|--------|---------|-----------|
|                    | MALES   | FEMALES | SEX RATIO | MALES    | FEMALES | SEX RATIO | MALES  | FEMALES | SEX RATIO |
| <b>1894 (Cape)</b> | 119998  | 126982  | 94.50     | 22380    | 22473   | 99.59     | 37347  | 36653   | 101.89    |
| <b>1904 (Cape)</b> | 45935   | 48559   | 94.60     | 21381    | 21490   | 99.49     | 35438  | 34839   | 101.72    |
| <b>1911</b>        | 291588  | 313872  | 92.90     | 51985    | 52652   | 98.73     | 94232  | 91340   | 103.17    |
| <b>1921*</b>       | 112050  | 125652  | 89.17     | 39008    | 39042   | 99.91     | 96387  | 92265   | 104.47    |
| <b>1936</b>        | 455101  | 497636  | 91.45     | 61318    | 61860   | 99.12     | 107120 | 103378  | 103.62    |
| <b>1946</b>        | 514348  | 540865  | 95.10     | 69538    | 70040   | 99.28     | 136524 | 132050  | 103.39    |
| <b>1951</b>        | 601314  | 625668  | 96.11     | 92921    | 93031   | 99.88     | 161293 | 155204  | 103.92    |
| <b>1960</b>        | 834605  | 864047  | 96.59     | 134495   | 134408  | 100.06    | 180129 | 174776  | 103.06    |
| <b>1970</b>        | 1195353 | 1210384 | 98.76     | 158870   | 160780  | 98.81     | 208895 | 201125  | 103.86    |
| <b>1980</b>        | 1340342 | 1326352 | 101.05    | 166065   | 166938  | 99.48     | 199645 | 193054  | 103.41    |
| <b>1991</b>        | 1511351 | 1490709 | 101.38    | 186027   | 184286  | 100.94    | 178045 | 169786  | 104.86    |
| <b>2001</b>        | 1871949 | 1880246 | 99.56     | 197105   | 195781  | 100.68    | 116892 | 113232  | 103.23    |
| <b>2011</b>        | 2432232 | 2398210 | 101.42    | 238027   | 232063  | 102.57    | 137796 | 130472  | 105.61    |

\* The 1921 Census only provides information on the black population of less than 1 and 15 years. The black population younger than 1 year has been taken as a reference in the article for this year.

## References

- Akyeampong, E., & Fofack, H. (2014) The contribution of African women to economic growth and development in the pre-colonial and colonial periods: historical perspectives and policy implications. *Economic History of Developing Regions* 29 (1), 42–73.
- Alesina, A., Giuliano, P. & Nunn, N. (2013) On the Origin on Gender Roles: Women and the Plough. *Quarterly Journal of Economics* 128 (2), 469-530.
- Anderson, S. (2007) The economics of dowry and brideprice. *Journal of Economic Perspectives* 21 (4), 151–174.
- Anderson, S., & Ray, D. (2017) Excess female mortality in Africa. *WIDER Working Paper*, 116, 1–22.
- Andersson, R., & Bergström, S. (1998) Is maternal malnutrition associated with a low sex ratio at birth? *Human Biology* 70 (6), 1101–1106.
- Austin, G. (2008) Resources, techniques, and strategies south of the Sahara: revising the factor endowments perspective on African economic development, 1500–2000 1. *The Economic History Review*, 61(3), pp.587-624.
- Badassy, P. (2011) *A Severed Umbilicus: Infanticide and the Concealment of Birth in Natal, 1860-1935*. PhD dissertation. Durban: University of KwaZulu-Natal.
- Barnard, A. (1975) Australian models in the South West African highlands. *African Studies* 34 (1), 9–18.
- Beltrán Tapia, F. J., & Marco-Gracia, F. J. (2020) Death, sex and fertility: Female infanticide in rural Spain, 1750-1950. *European Historical Economics Society Working Paper* 186.
- Boklage, C. E. (2005) The epigenetic environment: secondary sex ratio depends on differential survival in embryogenesis. *Human Reproduction* 20 (3), 583–587.

- Brewis, A. A. (1992) Anthropological perspectives on infanticide. *Arizona Anthropologist* (8), 103-119.
- Bromen, K., & Jöckel, K.H. (1997) Change in male proportion among newborn infants. *The Lancet* 349 (9054), 804–805.
- Bryant, A.T. (1967) *The Zulu people, As they were Before the White Man Came*. 2<sup>nd</sup> edition. Pietermaritzburg: Shuter and Shooter.
- Chahnazarian, A. (1988) Determinants of the sex ratio at birth: review of recent literature. *Social biology* 35 (3-4), 214–235.
- Christopher, A. (2011) The Union of South Africa censuses 1911-1960: an incomplete Record. *Historia* 56 (2), 01–18.
- Christopher, A. J. (2002) ‘To define the indefinable’: population classification and the census in South Africa. *Area* 34 (4), 401–408.
- Ciocco, A. (1938) Variation in the sex ratio at birth in the United States. *Human Biology* 10 (1), 36-64.
- Clark, S., Colson, E., Lee, J., & Scudder, T. (1995) Ten thousand Tonga: a longitudinal anthropological study from southern Zambia, 1956–1991. *Population Studies* 49 (1), 91–109.
- Cronk, L. (1991) Preferential parental investment in daughters over sons. *Human Nature* 2 (4), 387–417.
- Das Gupta, M., Zhenghua, J., Bohua, L., X. Zhenming, Chung, W., & B. Hwa-ok, B. (2003) Why is son preference so persistent in East and South Asia? A cross-country study of China, India and the Republic of Korea. *The Journal of Development Studies* 40 (2), 153–187.
- Department of Health Republic of South Africa (1998) *Demographic and Health Survey. Full Report*. Pretoria: Department of Health Republic of South Africa.

- Devlieger, P.J. (2000) The logic of killing disabled children: infanticide, Songye cosmology, and the colonizer. In J. Hubert (Ed.), *Madness, Disability and Social Exclusion: The Archaeology and Anthropology of 'Difference'* (pp. 159–167). London: Routledge.
- Dyson, T. (2012) Causes and consequences of skewed sex ratios. *Annual Review of Sociology* 38, 443–461.
- Eriksson, J. G., Kajantie, E., Osmond, C., Thornburg, K., & Barker, D. J. (2010) Boys live dangerously in the womb. *American Journal of Human Biology* 22 (3), 330–335.
- Fellman, J., & Eriksson, A. W. (2011) Temporal trends in the secondary sex ratio in Nordic countries. *Biodemography and social biology* 57 (2), 143–154.
- Fourie, J. & Jayes, J., 2021. Health inequality and the 1918 influenza in South Africa. *World Development*, 141, p.105407.
- Gaitskell, D., Kimble, J., Maconachie, M., & Unterhalter, E. (1983) Class, race and gender: domestic workers in South Africa. *Review of African Political Economy* 10 (27-28), 86-108.
- Garenne, M. (2002) Sex ratios at birth in African populations: A review of survey data. *Human Biology* 74 (6), 889–900.
- Garenne, M. (2004) Sex ratios at birth in populations of Eastern and Southern Africa. *Southern African Journal of Demography* 9 (1), 91–96.
- Garenne, M. (2017) The enigma of Ethiopian sex ratios at birth. *Journal of biosocial science* 49 (5), 611–622.
- Gini, C. (1908) *Il sesso dal punto di vista statistico: le leggi della produzione dei sessi*. Vol. 7. Milan: Sandron.
- Goldman, N., & Lord, G. (1983) Sex differences in life cycle measures of widowhood. *Demography* 20 (2), 177-195.

- Hanlon, G. 2016. Routine Infanticide in the West 1500–1800. *History Compass* 14 (11), 535–548.
- Harpending, H. C., & Pennington, R. (1991) Age structure and sex-biased mortality among Herero pastoralists. *Human Biology* 63 (3), 329–353.
- Health Systems Trust (1999) *South African Health Review 1998*. Durban: Health Systems Trust.
- James, W. H. (1984) The sex ratios of black births. *Annals of Human Biology* 11 (1), 39–44.
- James, W. H. (1987) The human sex ratio. Part 1: A review of the literature. *Human biology* 59 (5), 721–752.
- Junod, H.A. (1927) *The Life of a South African Tribe – I. Social Life*. London: MacMillan and Co. Limited.
- Jayachandran, S., & Kuziemko, I. (2011) Why Do Mothers Breastfeed Girls Less than Boys? Evidence and Implications for Child Health in India. *The Quarterly Journal of Economics* 126(3), 1485–1538.
- Kahn, K, Tollman, S.M., Garenne, M., & Gear, J.S.S. (1999) Who dies from what? Determining cause of death in South Africa’s rural north-east. *Tropical Medicine and International Health* 4 (6), 433-441.
- Klasen, S. (1996) Nutrition, health and mortality in sub-Saharan Africa: Is there a gender bias? *The Journal of Development Studies* 32 (6), 913-932.
- Klasen, S., & Wink, C. (2002) A turning point in gender bias in mortality? An update on the number of missing women. *Population and Development Review* 28 (2), 285–312.
- Lesiapeto, M.S., Smuts, C.M., Hanekorn, S.M., Du Plessis, J. & Faber, M. (2010) Risk factors of poor anthropometric status in children under five years of age living in rural

districts of the Eastern Cape and KwaZulu-Natal provinces, South Africa. *South African Journal of Clinical Nutrition* 23 (4), 202-207.

Manicom, L. (1992) Ruling Relations: Rethinking State and Gender in South African History. *Journal of African History* 33 (3), 441-465.

MacGillivray, I, Davey, D., & Lawley, C. (1986) Sex ratio at birth in a Cape Coloured population. *Social Science and Medicine* 22 (9), 929–30.

Marco-Gracia, F. J. & Beltrán Tapia, F. J. (2020) Son preference, gender discrimination and missing girls in rural Spain, 1750-1950. *Asociación Española de Historia Económica Working Paper* 2007.

May, J. & Timæus. I.M. (2014) Inequities in under-five child nutrition status in South Africa: What progress has been made? *Development Southern Africa* 31 (6), 761-774.

Mitchell, B.R. (2013) *International Historical Statistics; 1750-2010*. Vol. 134. Basingstoke: Palgrave Macmillan UK.

Moultrie, T. A., & Timæus. I.M. (2003) The South African fertility decline: Evidence from two censuses and a Demographic and Health Survey. *Population Studies* 57 (3), 265–283.

Mpeta, B., Fourie, J., & Inwood, K. (2018) Black living standards in South Africa before democracy: New evidence from height. *South African Journal of Science* 114 (1-2), 1-8.

Natras, N., & Seekings, J. (2010) The economy and poverty in the twentieth century in South Africa. In R. Ross, A.K. Mager and B. Nasson (Eds.) *The Cambridge History of South Africa*, Vol. 2 (pp. 518-572). Cambridge: Cambridge University Press.

Northern Rhodesia Government (1964) *Preliminary Report of the May/June, 1963 Census Africans in Northern Rhodesia*. Lusaka: Ministry of Finance.

O’Laughlin, B. (1998) Missing men? The debate over rural poverty and women-headed households in Southern Africa. *Journal of Peasant Studies* 25 (2), 1–48.

- Office of Census and Statistics (1921). *Statistics of the population of the union, 1918 and previous years, including vital and health statistics 1916* (Pretoria, The Government printing and stationery office).
- Posel, D. (2001) What's in a name? Racial categorisations under apartheid and their afterlife. *Transformation (Durban)* 47, 50–74.
- Posel, D., & Rudwick, S. (2014) Marriage and bridewealth (ilobolo) in contemporary Zulu society. *African Studies Review* 57 (2), 51–72.
- Rosenzweig, M. R., & Schultz, T. P. (1982) Market opportunities, genetic endowments, and intrafamily resource distribution: Child survival in rural India. *The American Economic Review* 72 (4), 803–815.
- Sahn, D. E., & Stifel, D. C. (2002) Parental preferences for nutrition of boys and girls: evidence from Africa. *Journal of Development Studies* 39 (1), 21–45.
- Sawyer, C.C. (2012). Child Mortality Estimation: Estimating Sex Differences in Childhood Mortality since the 1970s. *Plos Med* 9 (8), e1001287.
- Scalone, F., & Rettaroli, R. (2015) Exploring the Variations of the Sex Ratio at Birth from an Historical Perspective. *Statistica* 75 (2), 213–226.
- Sen, A. (1992) Missing women. *BMJ: British Medical Journal* 304 (6827), 587.
- Southern Rhodesia Central Statistical Office (1964) *Report of the May/June 1963 census of Africans*. Vol. 1. Lusaka: Government of the Republic of Zambia.
- Svedberg, P. (1990) Undernutrition in Sub-Saharan Africa: Is there a gender bias? *The Journal of Development Studies* 26 (3), 469–486.
- UNICEF (2017) *Levels and Trends in Child Mortality Report 2017*. New York, NY: UNICEF.
- Vaupel, J.W., Manton, K.G., & Stallard, E. (1979) The impact of heterogeneity in individual frailty on the dynamics of mortality. *Demography* 16 (3), 439-454.

Visaria, P. M. (1967) Sex ratio at birth in territories with a relatively complete registration. *Eugenics Quarterly* 14 (2), 132–142.

Wamani, H., Åström, A. N. Peterson, S., Tumwine, J. K., & Tylleskär, T. (2007) Boys are more stunted than girls in sub-Saharan Africa: a meta-analysis of 16 demographic and health surveys. *BMC Pediatrics* 7 (1), 17.

Wisser, O., & Vaupel, J.W. (2014) *The sex differential in mortality: A historical comparison of the adult-age pattern of the ratio and the difference*. Rostock: Max Planck Institute for Demographic Research, WP-005.

Zere, E., & McIntyre, D. (2003) Inequities in under-five child malnutrition in South Africa. *International Journal of Equity in Health* 2 (7).

**TABLE 1**

Table 1. Evolution of sex-ratio of the under-five population by race and year, rural vs. urban, 1936–1996

| <b>Race</b>      | <b>Census</b> | <b>Rural pop.</b> | <b>Rural SR</b> | <b>Urban SR</b> |
|------------------|---------------|-------------------|-----------------|-----------------|
| <i>Blacks</i>    | 1936          | 82.7%             | 91.2            | 93.9            |
|                  | 1946          | 78.6%             | 95.2            | 94.6            |
|                  | 1960          | 68.1%             | 96.8            | 95.8            |
|                  | 1970          | 66.9%             | 98.7            | 98.9            |
|                  | 1996          | 56.7%             | 99.5            | 98.6            |
| <i>Coloureds</i> | 1946          | 41.9%             | 100.0           | 98.7            |
|                  | 1960          | 31.7%             | 99.3            | 99.3            |
|                  | 1970          | 25.9%             | 97.7            | 99.5            |
|                  | 1996          | 16.6%             | 98.3            | 100.8           |
| <i>Whites</i>    | 1936          | 34.7%             | 104.7           | 102.8           |
|                  | 1946          | 27.5%             | 104.3           | 102.9           |
|                  | 1960          | 16.5%             | 104.8           | 103.6           |
|                  | 1970          | 13.2%             | 104.7           | 103.7           |
|                  | 1996          | 09.4%             | 103.7           | 102.8           |

*Source:* South African Censuses

*Notes:* The 1936 census does not report separate data for the rural and urban areas in the case of the coloured population

**TABLE 2**

Table 2. Sex ratios at birth in Cape Town by race and year, 1926–1996

| <b>Years</b> | <b>Black children</b> | <b>Coloured children</b> | <b>White children</b> | <b>‘Non-white’ children</b> |
|--------------|-----------------------|--------------------------|-----------------------|-----------------------------|
| 1926–1928    |                       |                          | 112.7                 | 104.3                       |
| 1946–1948    |                       | 99.0                     | 107.9                 |                             |
| 1989–1996    | 101.0                 | 103.0                    | 100.4                 |                             |

*Source:* Medical Officer of Health of the City of Cape Town Reports

*Notes:* <sup>a</sup>All of the analysed years, except for the period 1946–1948, begin on 1 July and end on 30 June of the following year.

<sup>b</sup>Total: 19,509 black children, 89,328 coloured children, 13,014 white children, and 1,982 ‘non-white’ children (all races except white).

**TABLE 3**

Table 3. Sex ratios at birth in South Africa by race, 1955–1989

| <b>Years</b> | <b>Coloured children</b> | <b>White children</b> |
|--------------|--------------------------|-----------------------|
| 1955–59      | 101.7                    | 105.2                 |
| 1960–64      | 100.9                    | 105.0                 |
| 1965–69      | 100.4                    | 104.7                 |
| 1970–74      | 101.9                    | 104.4                 |
| 1975–79      | 102.3                    | 105.0                 |
| 1980–84      | 101.7                    | 104.8                 |
| 1985–89      | 101.4                    | 105.0                 |

*Source:* Statistical Yearbooks of South Africa 1965–1995*Notes:* <sup>a</sup>There are no data for any group in the years 1964 and 1965

**TABLE 4**

Table 4. Evolution of sex ratios (zero to four years) and sex ratios at death according to the Statistical Yearbooks, by race and year, 1955–1990

| <b>Race</b>              | <b>Dates</b> | <b>SR at birth</b> | <b>SR at death 0–4</b> | <b>SR 0–4</b> | <b>Difference</b> |
|--------------------------|--------------|--------------------|------------------------|---------------|-------------------|
| <i>Coloured children</i> | 1955–65      | 101.7              | 108.8                  | 100.1         | -1.6              |
|                          | 1965–74      | 100.9              | 110.5                  | 98.8          | -2.1              |
|                          | 1975–84      | 100.4              | 114.0                  | 99.5          | -0.9              |
|                          | 1985–90      | 101.9              | 115.2                  | 100.9         | -1.0              |
| <i>White children</i>    | 1955–65      | 105.2              | 132.5                  | 103.1         | -2.4              |
|                          | 1965–74      | 105.0              | 135.8                  | 102.8         | -2.2              |
|                          | 1975–84      | 104.7              | 135.8                  | 103.4         | -1.3              |
|                          | 1985–90      | 104.4              | 142.6                  | 104.9         | +0.5              |
| <i>Black children</i>    | 1980–84      | 99.4               | 115.3                  | 101.0         | +1.6              |
|                          | 1985–90      | 98.7               | 108.9                  | 101.4         | +2.7              |

Source: Statistical Yearbooks of South Africa 1965–1995 and Censuses 1960–1991

Notes: <sup>a</sup>We extracted the sex ratios at birth from the Statistical Yearbooks except for black children (not available).

<sup>b</sup>For black children, due to the absence of sex ratios at birth, we instead took the sex ratio of children under one year from the census closest to the period.

<sup>c</sup>‘SR at death 0–4’ means the proportion of male children who died between zero and four years for every 100 girls (for black children, between one and four years).

<sup>d</sup>We took the sex ratios 0–4 years from the census closest to the period.

<sup>e</sup>The last column shows the difference between the sex ratio at birth and at 0–4 years

**TABLE 5**

Table 5. Sex ratios at death (zero to four years) in Kimberley (capital city of Northern Cape) by race, 1895–1940

| Race              | 0-4 years |       | 0-5 months |       | 6 months-1.5 years |      | 1.5-4 years |     |
|-------------------|-----------|-------|------------|-------|--------------------|------|-------------|-----|
|                   | SR        | N     | SR         | N     | SR                 | N    | SR          | N   |
| Black children    | 105.6     | 3,137 | 111.5      | 1,269 | 102.1              | 1247 | 101.0       | 621 |
| Coloured children | 111.8     | 934   | 119.3      | 443   | 107.6              | 326  | 101.2       | 165 |
| White children    | 113.1     | 897   | 125.8      | 499   | 107.4              | 251  | 86.1        | 147 |

*Source:* Death registers of Kimberley 1895-1940

**TABLE 6**

Table 6. Average weight of newborns (in grams), percentage of birthweights under 2,500 grams, and stillbirths per 1,000 by race and year, 1979–1994

| Year    | Black children |       |          | Coloured children |       |          | White children |       |          |
|---------|----------------|-------|----------|-------------------|-------|----------|----------------|-------|----------|
|         | Av.            | % low | Still b. | Av.               | % low | Still b. | Av.            | % low | Still b. |
| 1979    |                |       | 20.2     |                   |       | 17.7     |                |       | 3.8      |
| 1983    | 3,108 g        |       |          | 3,023 g           |       |          | 3,337 g        |       |          |
| 1984    |                | 9.5   |          |                   | 17.4  |          |                | 4.5   |          |
| 1985    | 3,051 g        |       |          | 2,806 g           |       |          | 3,251 g        |       |          |
| 1986    | 3,123 g        |       | 21.7     | 2,987 g           |       | 11.6     | 3,323 g        |       | 4.4      |
| 1987/88 |                |       | 25.0     |                   |       | 16.9     |                |       | 3.8      |
| 1988/89 |                |       | 22.8     |                   |       | 14.5     |                |       | 5.0      |
| 1989/90 |                | 12.0  | 25.9     |                   | 19.2  | 15.2     |                | 6.6   | 6.2      |
| 1990/91 |                | 11.6  | 20.9     |                   | 15.6  | 13.4     |                | 6.1   | 5.9      |
| 1991/92 |                |       | 21.6     |                   |       | 17.3     |                |       | 7.3      |
| 1992/93 |                |       | 33.0     |                   |       | 19.0     |                |       | 3.0      |
| 1993/94 |                |       | 25.9     |                   |       | 15.2     |                |       | 6.4      |

Source: Medical Officer of Health of the City of Cape Town Reports

Notes: <sup>a</sup>The analysed variables are only available in the indicated years

**FIGURE 1**

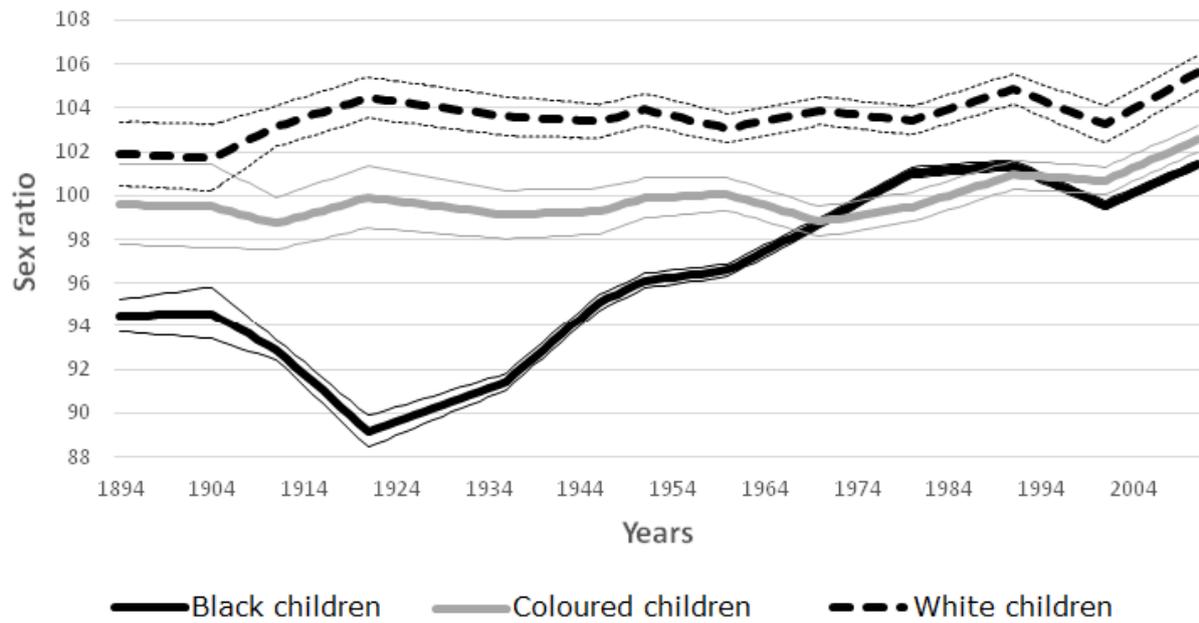


Fig. 1. Sex-ratio of the under-five population in South Africa by race with 95% confidence intervals, 1894–2011

*Sources:* South African Censuses

*Notes:* The data for the period prior to 1911 were taken from the Cape Colony census. The data for black children in 1921 are estimated from data for the population aged below one year (under-five population is not available)

**FIGURE 2**

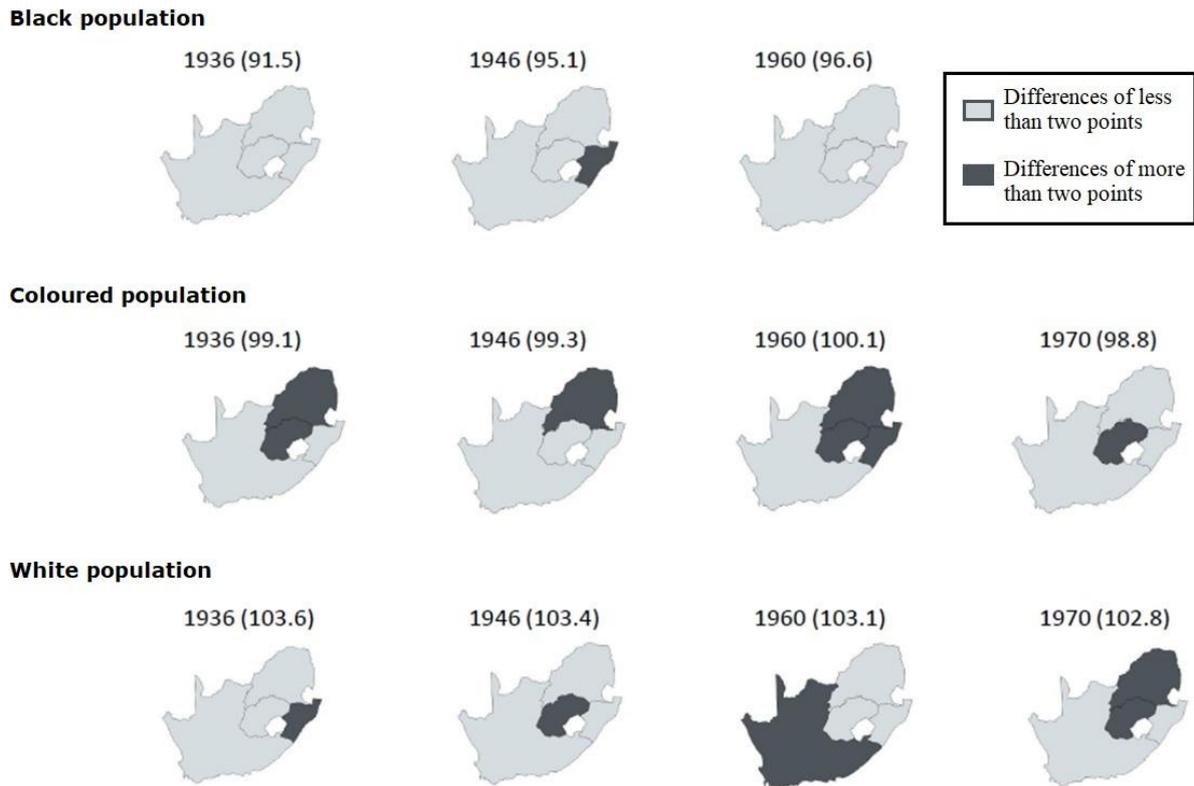


Fig. 2. Average sex ratios for South African provinces (as they were then: Cape, Natal, Transvaal and Orange Free State), with a difference of more than two points highlighted, according to race and census date.

*Source:* South African Censuses

*Notes:* 1970 is omitted for blacks because the 1970 census does not report the age distribution of the black population by province. The blank area is the country of Lesotho.

**FIGURE 3**

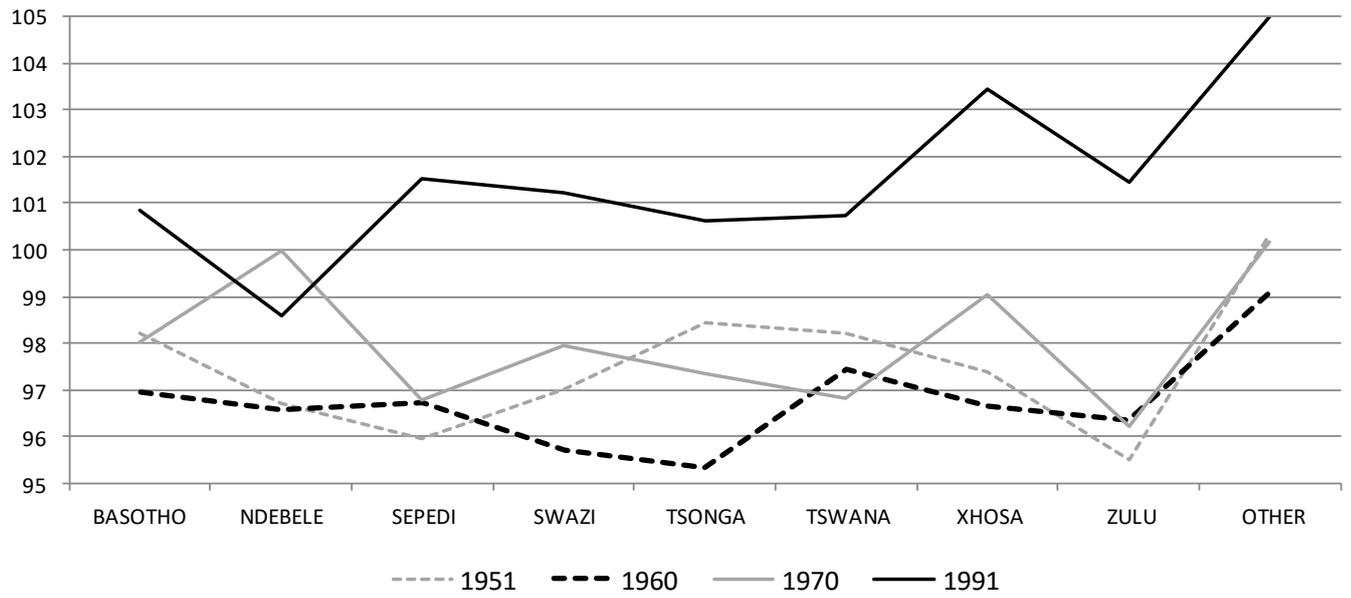


Fig. 3. Sex ratios by ethnic group, 1951–1991

*Source:* South African censuses