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Attitudinal difference surveys perpetuate harmful tropes: A comment on Nattrass, *S. Afr. J. Sci.*

We reply to the article, 'Why are black South African students less likely to consider studying biological sciences?', authored by University of Cape Town (UCT) researcher Nicoli Nattrass[1] and published in the *South African Journal of Science* on 27 May 2020. At the time of writing our reply the article had already received sharp criticism from the Black Academic Caucus at UCT and in a statement released on 5 June 2020, the UCT executive distanced itself from the content of the paper, inviting rigorous, respectful review of the published research.

Nattrass' article[1] follows two papers published in 2019 by scholars associated with South African universities, both of which were widely denounced for the racist undertones of their content. The first article was authored by Stellenbosch University researchers who reported on low cognitive functioning of coloured women linked to education levels and lifestyles[2]; see comment by Le Grange[3]. The second article was co-authored by an adjunct professor at UCT and examined the role of cognitive ability or intelligence on slave exports from Africa[4]. These publications gave rise to a broader debate on enduring racism in science and the re-ascendency of race science internationally.

In this reply, we focus on the methodology of attitudinal survey used for the study reported by Nattrass (and by many other scientists). There are two lines of argument that we weave together: the quality of the research as reported, and problems inherent to comparative attitudinal survey research (regardless of how well it is executed). It should be noted that the Black Academic Caucus at UCT has also critiqued the research design, identifying many of the points we make here, and they have additionally included a discourse analysis of the paper (circulated via e-mail).

To demonstrate how problematic a survey design can be, particularly when it is not rigorously executed, we share data and observations that counter the apparent findings of Nattrass' study. We then argue that the publication of this research, in this manner, is detrimental to the biodiversity sector in which the tropes being perpetuated, can cause enormous harm. In the process we hope to encourage scientists to be more reflexive about their methodology, and we encourage the *South African Journal of Science* to publish works that are worthy of the young people of this country - research in which they can recognise themselves, rather than being forced to look at reductionist portrayals, legitimised under the banner of science.

Poor survey design

Nattrass[1] describes the study on which she reports in her paper as 'exploratory' (p.1), and the findings as 'tentative' (p.2). She is nonetheless confident enough in the study to publish the findings in a high-profile journal. One would therefore expect the article to meet high standards of rigour and ethics.

Starting Assumptions

The title in no way suggests the tentative nature of the findings or the exploratory nature of the study, and indeed misrepresents even the tentative findings. The reference to 'black South African students' is an over-statement of the scope of the study and the findings.

It is worth noting that there is an ethical dimension to selecting a research topic and its formulation as a title. As Raffe, Blundell and Bibby[5] wrote in relation to the ethics of survey research:

> *With respect to the public, researchers should pursue openness, sensitivity, accuracy, honesty and objectivity in their choice of topic, methods, analysis and dissemination. This includes respecting the interests of different groups in society; avoiding research designs which preclude particular outcomes of the enquiry* (p.15).

Nattrass' paper[1] is based on a number of problematic assumptions. As a start, it equates studying in the biological sciences ('conservation biology, zoology, and other', p.1) with an interest in wildlife conservation. It does not take into account that there are many additional study areas that a person interested in wildlife could choose to study, particularly if they kept their eye on the job market (as the survey respondents seemed to do). It fails to qualify or justify its focus on the biological sciences as just a small sub-section of the study fields that have relevance to the conservation of wildlife as practiced in contemporary South Africa (others being, for example, environmental sciences, veterinary sciences, resource economics, environmental education, geographic information systems, or bio-informatics).

One would therefore be justified to counter the starting assumption and enduring conclusion that black South African students are less likely to study in this field, with the data recently analysed in the mid-term review of the implementation of the 20-year Biodiversity Human Capital Development Strategy (BHCDS, SANBI and the Lewis Foundation[6]). This data has been sourced by Jenkin[7] from the Department of Higher Education's publicly accessible database, the Higher Education Management Information System (HEMIS). Jenkin used the study fields scoped as relevant to the core biodiversity sector by the Human Sciences Research Council for the BHCDS[6]. According to HEMIS some 40,034 students enrolled in biodiversity-related study fields in South Africa in 2018. In this body of students, 75% of the enrollment in three-year degree courses relevant to biodiversity were black (politically defined); 69% of those graduating with a three-year degree in these fields were black. Significantly, because employment as a scientist typically requires a post-graduate qualification, 63% of Masters and 59% of PhD students in biodiversity-related study fields in South Africa in 2018 were black (up from respectively 25% and fewer than 19% in 2000).

It would seem that the assumption that black South African students are *less likely* (than others) to consider studying biological sciences, is questionable and perhaps based on a particular course at a particular institution, or on trends in a previous decade. This is highly problematic, given the limitations of the sample for testing the assumption, considered next.

Sampling

Nattrass[1] noted that the survey was opportunistic, as it used one of the weakest sampling techniques available to survey researchers, a non-probability sampling technique called convenience sampling. She notes that the sample of 211 students was neither 'representative' (p.1, her quotation marks) of the students at UCT, nor the black

students at UCT. Similarly, the sample would then also not be representative of the students at the 25 other universities in the country where black South Africans are enrolled, or not, in the biological sciences. The power of survey research is its claim to greater external validity, which in turn is dependent on probability sampling that allows for the use of inferential statistics, and generalisation. Since this study cannot lay claim to external validity, its findings are overstated.

The findings are further weakened by the poor **construct and content validity** of the survey design (answering the methodological question: Does the instrument really measure what it is said to measure?). The paper does not contain the full survey instrument, but the items provided allow us some comment on survey design. There is no substantiation given to support assumptions that: 'I like having starlings around at UCT' equates to 'attitudes towards animals'; that a '"Fallist"' attitude is also an 'anti-conservation attitude; or that agreement with the statement 'Humans evolved from apes' equate to support for evolution (for example). To elaborate on just one item: 'Humans evolved from apes' is a misrepresentation of general evolution theory (which rather states that humans and apes derived from common ancestors but followed separate evolutionary branches) and can surely not be viewed as a valid item for students' attitudes towards evolution, not to mention the leap to a lack of interest in studying biological sciences (which also implies, through the reasoning in the rest of the paper, that those interested in the biological sciences are unlikely to be religious). The author does not indicate how the validity of these controversial survey items was determined. This links to the issue of **reliability**. The reader is not provided with the reliability coefficient of the survey instrument, which is fairly standard practice when survey research is reported. The way in which the research was conducted certainly raises reliability concerns (answering the question: Can the results be repeated?). A once-off survey during a lunch break may not produce reliable results; we do not know how students might have responded on another occasion or in other contexts; more on this later.

These issues are related to basic matters of rigour in survey research. We now turn to more general concerns that seem to be endemic to the attitudinal difference survey, and on the basis of which the methodology perpetuates what ultimately manifests as racist tropes.

General Features of Survey Research

Attitudinal surveys have to force people into making choices they would not actually make (or make without qualification) in real life. An example in this case, is the forced choice between 'addressing social justice' or 'wildlife conservation'. This is a non-choice in the view of many environmentalists. The 1992 Earth Summit argued that development and sustainability issues need to be addressed together; and Raworth[8] is among many contemporary economists who argue that economics for the 21st century should address both planetary and social needs. In many communities, from the Limpopo to the Amazon, the protection of nature is the basis of people's livelihoods and well-being. It is only a particular, narrow framing of economic development that suggests that There Is No Alternative to exploitative economic development as the basis for addressing social inequality[9]. In South Africa (as in Brazil) exploitative economic development has in fact exacerbated rather than addressed social inequalities, made so vividly obvious by the Covid-19 crisis.

Another issue with attitudinal difference surveys is that they fail to allow for the complexity (richness and messiness) of real people's values and views. The study being critiqued here was undertaken on campus during lunch. We can imagine the conversations that would have taken place after and perhaps during the administration of the questionnaires and interviews - conversations we ourselves have had with students about the starlings on our own campus ('I love them too guys, but we had to fumigate the building the last time they nested

at the entrance'); about career choices, coloniality in the curriculum, what we knew when we chose our study area; what our parents and friends said about our choices; which companies come to the career fairs; where the best bursaries are; etc. There is no room for the qualitative and nuanced dimensions of people's intentions, feelings, understandings and actions in the tiny, tidy tables of narrow survey findings. In the real-life situations that surveys promise to accurately portray, it would seem that attitudes and even values are not fixed; they shift. Social psychologist Shalom Schwarz[10] proposed, based on extended studies in 80+ countries, that there are 10 clusters of basic personal values that are present across all cultures and in all healthy individuals; that each of these values can be engaged if triggered, in any of us; that the relative strength of these values change over our lifetime and *even in the course of a day*, so that we may explain ourselves differently whether we are in a social or work or private space; and that the more each of these different values are engaged, the stronger they become. Schwarz' findings resonate with our own experience. As a practical example, the wealthiest families in South Africa (white) presumably do have materialist values, since they have put some effort into accumulating this wealth, but they have also supported wildlife conservation.

It is therefore misleading to reduce complex human beings to a binary (constructed) attitude or a fixed and one-dimensional value. According to Schwarz, psychologically and culturally, multiple values co-exist in individuals and constructed groups. Unfortunately, the comparative attitudinal survey, in order to measure and distinguish, has to pin a value on a person, and pin it down in time, as with a butterfly taken out of its multi-path flight to be pinned for museum display.

One participant on a conservation leaders' WhatsApp group discussing Nattrass' paper (anonymously shared) stated: 'The study was very narrowly scoped so quite unable to answer such a big question'. Different dimensions of the 'big question' around black people and conservation in South Africa have been addressed through a variety of study types including historical, socio-political and anthropological works by Jane Carruthers[11], Farieda Khan[12], Michelle Cocks and co-researchers ([13-14]). Aphiwe-Zona Dotwana's study[15] focussed on black women graduates who, like herself, chose to study in Botany and Zoology. It was complemented with an in-depth analysis of HEMIS data, showing an increase in the number of black women entering these fields. Her use of interviews and a social realist analysis revealed an interplay of structural factors affecting the young people's life stories.

When respondents are forced into choices framed by the starting assumptions of the questionnaire designers, the findings may actually tell us more about the assumptions of the person(s) designing the questionnaire, than the respondents. In the case of Nattrass[1] the framing of the questions suggest that the researcher(s) assumed views that are somewhat sentimental towards wildlife and somewhat one-dimensional in relation to black and/or poor people's lives: assuming that no poor people grow up with animals, for example, or that conservationists all grow up with pets, or would all appreciate bird proliferation on campus. Most of the assumptions evident in the questionnaire would be out of step with the mainstream approaches to conservation in South Africa, and with the framings of wildlife by indigenous peoples around the globe. The broader point is that a survey design, unless backed up by extensive prior research, starts with the assumptions of the designer, which therefore have a significant influence on the outcomes, but unlike in other research genres, the researcher's standpoint is not made clear upfront.

Wanting your academic choices to lead to a career, which the study suggests is the single biggest indicator as to whether a student has considered studying in the biological sciences or not, seems sensible. Currently there are many unemployed graduates with an

environmental degree. There would seem to be not enough paid jobs for all the South Africans, black and white, who are choosing to study in this field. When WWF-South Africa advertises its annual internship programme, they receive hundreds of applications, for around 10 available positions. In 2019, 236 of the 410 applicants were black. These students have not necessarily studied Conversation Biology at UCT, but that does not mean that they are not interested in wildlife and conservation. Those who are well networked, informed and in a position to do so, choose the subjects that are most sought-after in modern conservation agencies. As one senior park manager (black) put it in an interview about skills needs[6]: 'I can't appoint a frog specialist. I need someone who can manage the wetlands'.

Discussion

From our perspective in the field and working with environmental scientists and educators for over three decades, the published paper suggests an author who saw no need to substantiate her assumptions, did not situate the study she reports on in context, and who (along with reviewers and editor) have not adequately thought about the implications of what one has to consider, on balance, an unsupported title.

How is this possible, given that the researcher, her affiliation institution, and the journal, all have sound reputations? We believe that the choice of methodology is part of the reason for this seemingly uncritical judgement. Does the methodology not have all the trappings of solid science? There are three tables in a two-page paper, with a seemingly careful statistical analysis, confidence intervals included, giving us objective answers to contested questions. As the Radical Statistics Education Group[16] noted, 'the use of statistics … is often thought to lend an aura of infallibility to research results' which could be 'used to silence the legitimate concerns of those wishing to speak up for their own interests' (p.3).

To publish, one also needs something worthwhile to say. What do we learn from Nattrass'[1] paper that made it worth publishing? The starting assumptions, that shaped the survey design, still stand at the end of the analysis. This despite Table 2 'showing that attitudes were better predictors of having considered studying biological sciences than the crude indicator of being a black South African' (p.1). On page 2 the author continues to use the 'crude indicator' in the conclusions, re-stating that 'the survey results suggest that black South African students are less likely to consider studying biological sciences than other students'.

The survey, and in particular the 'attitudinal difference' form that divides populations into groups based on unexamined assumptions that there are innate differences between them (e.g., race-based groupings) is a prime example of Modern Western Science which Le Grange[3] traced to the eurocentric worldview in which the researcher is the centre of the universe (akin to Da Vinci's Vitruvian Man) with the right to 'other' and survey all on the periphery of his gaze. This researcher stands outside of the objects being surveyed, and there is no need to declare a standpoint because the position of surveillance[17] is one of ultimate power. Instruments, it is inferred, provide the necessary neutrality and sharpness of vision. However, from this short analysis it is clear that the vantage point of the researcher has an integral effect on the study outcomes, and that the instrument itself is clouded by some inherent limitations, particularly when it is not used with care.

Concluding statement

Numbers do matter, especially at what De Sousa Santos[9] refers to as 'the existential point where reasons and emotions meet in order to nurture the will and the capacity to struggle against domination and oppression' (p.x): *These* numbers matter: in 2018 16,870 black women and 13,305 black men enrolled for a degree in a biodiversity-related field. These *emotions* matter: How does any headline starting with 'Why are black students less likely to …' make us feel? The othering that happens in studies that insist on separation into groups and then continues that separation even if the data does not concur, are experienced

emotionally. One participant in the earlier cited social media group (arising from a *Tomorrow's Leaders Today* event organised by Wildlands) simply said: 'It's hard to be a black scientist'.

Finally, what does this *materially* mean for the field and therefore, also for wildlife? We end with reference to the unemployed (black and white) graduates with degrees in the biological and broader environmental sciences. There is actually much work for these young people - work in rehabilitating mined areas; in protecting wildlife from exploitative trade; in safeguarding and enhancing rural people's livelihoods through land and water management, eco-tourism, and more. However, this work is chronically under-funded, with the fiscal allocation to some conservation agencies being as little as 25% of what they need to be effective[6]. As a result, these agencies have too few funded positions. Fiscal priorities are at least partly shaped by perceptions. For example, even though the number of people employed in the biodiversity sector are comparable to the number of people employed in mining[18-19], there is an enduring perception that mining is better for poverty eradication than wildlife conservation. Tropes that position the environmental sector as a marginal, anti-development indulgence for people who love animals more than social justice, are unhelpful. They leave officials furious and frustrated as they take away their power to argue for bigger budgets, which would result in wildlife (and water, wetland, and livelihood) wins and more employment opportunities for those thousands of young South Africans who *do* choose to study in biodiversity-related fields.

As researchers we need to pay closer attention to the methodology we use, its power to either transform the contexts about which we care, versus inherent methodological biases. The *South African Journal of Science* needs to publish research in which the scientists of the future and the present will recognise themselves, which means it needs to be based on well executed research, and a choice of question and method that are both ethically and conceptually appropriate.

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