

Cultural Context in Standardised Tests

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A randomised controlled trial shows large effects of cultural context on performance in standardised reading tests in New South Wales schools. The difference in performance on contextualised reading tests represents 33% of the rural-urban gap and 50% of the Indigenous-non-Indigenous gap.



How does cultural context affect student performance on standardised tests?

Understanding the nature and extent of cultural bias in standardised tests is important for two reasons.

First, it can provide a more accurate picture of how students from certain cultural groups are actually performing in mastering the curriculum. Second, it provides a step toward understanding how educational materials such as textbooks, handouts, and multi-media content may also be culturally biased.

Answering the cultural bias question is challenging. It requires isolating the effect of the test content (items and language) on performance, rather than misattributing differences in performance due to other factors. In other words, we need to know the causal impact of test content on test scores. Moreover, it's crucial to understand the magnitude of any effect detected. If there is an effect then how large an effect does cultural context have on test performance?

Our experiment

To address this, we partnered with the NSW Aboriginal Education Consultative Group and the New South Wales Department of Education to conduct a randomised controlled trial. Our experiment involved 1135 year 6 and 8 students in the Dubbo area. Half were randomly assigned to a "control group" that took a series of NAPLAN reading and numeracy tests, and half were assigned to a "treatment group" that took culturally contextualised tests specifically written for this purpose by the Aboriginal Education Consultative Group—the peak body for Aboriginal education in New South Wales. These tests closely mimic the NAPLAN tests taken by the control group, but used items and language culturally and contextually relevant to students living in Dubbo. The tests were designed to be of equal difficulty.

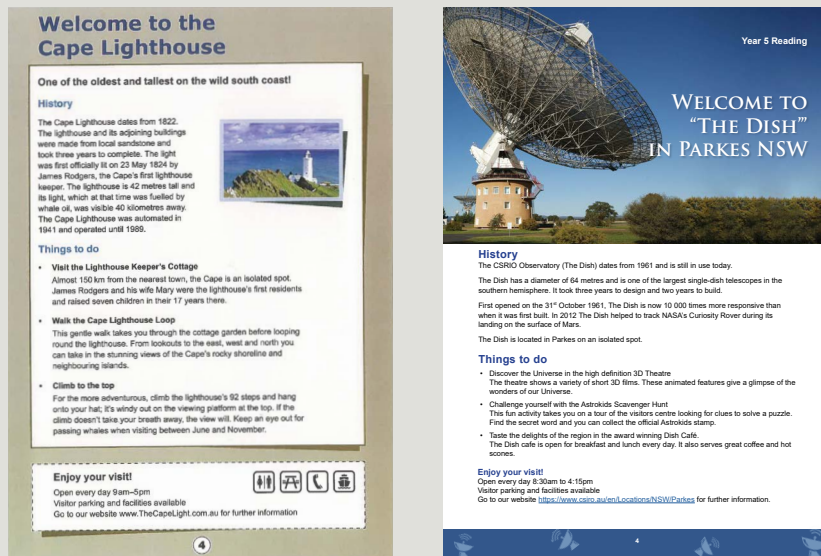
Figure 1 shows one of the control group's reading prompts (left panel) and the treatment group's contextualised prompt (right panel).



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FIGURE 1: Original and Contextualised Reading Prompts



Why a randomised controlled trial?

Because students were randomly assigned to the treatment and control groups, any individual differences in student characteristics (including educational background) “wash out” on average. The causal effect of the contextualised test on performance is then just the average of the scores in the treatment and control groups.

This is why pharmaceutical trials are conducted in this way. It would be impossible to control for all the relevant individual characteristics that might be relevant to the performance of, for example, heart medication on the prevalence of cardiac events.

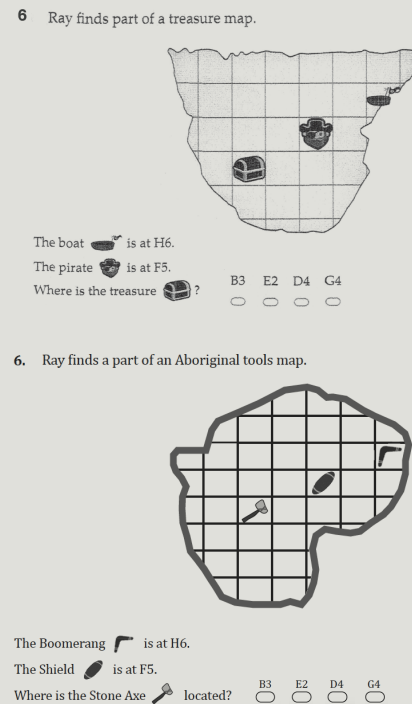
Because of the large number of students in our experiment (1135) we were able to randomise separately within the year 6 and year 8 cohorts, and within indigenous and non-indigenous students. Importantly, this allows us to separately identify the treatment effect of cultural context for both indigenous and non-indigenous students.

Location and Local Context

Our field experiment took place among 6th- and 8th-grade school students in Australia. The National Assessment Program Literacy and Numeracy (NAPLAN) is a series of basic-skills tests given to Australian students. In our experiment, 1135 students in Dubbo—a regional town in the North-Western part of the state of New South Wales—were randomly assigned to either a regular NAPLAN test or a contextualised test designed to mimic the regular test, but with items and language adapted to the local context of Dubbo. That local context includes being part of a “rural and remote” community about 400 km (250 miles) from Sydney, with a population of just over 70,000, having a median household income 79% of the statewide median, and a comparatively high Indigenous population (18.6% compared to 2.9% statewide). Figure 3 shows the location of schools involved in the RCT.

Figure 2 is an example of the original (top panel) and contextualised (lower panel) numeracy tests.

FIGURE 2: Original and Contextualised Numeracy Questions



The Results

We evaluated the impact of the contextualised tests on numeracy scores for students in years 6 and 8, and reading scores for students in Year 6. In the numeracy tests, we do not find robust evidence of a treatment effect. In Year 8, treatment has no impact on numeracy scores in the pooled sampled of students, as well as separate sub-samples for Indigenous and non-Indigenous students.

In Year 6, there is no evidence of an impact on Indigenous test scores and weak evidence of a negative impact on non-Indigenous scores, namely through an increase in the number of questions not attempted. In reading, however, we find qualitatively large effects for all students. The average treatment effect is 0.27 standard deviations (s.d.), with higher effects for Indigenous students (0.30 s.d.) than non-Indigenous students (0.24 s.d.).

These magnitudes mean that the contextualised reading test closes the rural-urban reading gap by 33 percent and the Indigenous-non-Indigenous gap by 50 percent. Together these results imply that cultural context may be important for performance on certain types of basic-skills tests.

Culturally Contextualised Education Material

Testing is important, but the big prize for getting cultural context right is improvement in actual learning outcomes. Given the magnitude of the effects in reading tests it seems plausible that providing tailored educational materials such as handouts, textbooks, and multi-media content could have a large effect on learning outcomes.

We are planning a future RCT to investigate these effects.

FIGURE 3 : Location of the trial



The difference in performance on contextualised reading tests represents 33% of the rural-urban gap and 50% of the Indigenous-non-Indigenous gap.

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