

# **Explaining the Scaling Process**

**2009**

## Introduction

This booklet has been prepared by the 'Scaling and Tertiary Selection Monitoring Committee' to assist its readers with an understanding of the process used to scale year 12 scores gained by school students in South Australia.

The Committee's principal purpose is to oversee the fairness and accuracy of the scaling process. Its membership includes representatives of the:

- Minister of Education;
- Vice-Chancellors of each of South Australia's universities;
- South Australian Tertiary Admissions Centre (SATAC);
- SACE Board of South Australia;
- Department of Education and Children's Services;
- Association of Independent Schools of SA;
- Catholic Education Office;
- Multicultural Education Coordinating Committee.

The results of scaling are used by SATAC to provide a Tertiary Entrance Rank (TER) and a TAFE Score for eligible candidates completing the South Australian Certificate of Education.

## Why do we scale subjects?

**To combine scores from a wide variety of different subjects to form an aggregate we need to be sure that the scores are on a common scale. Scaling is the process we use to convert scores to a common scale.**

In order to choose which students gain entry to tertiary institutions, a fair overall measure of a student's ability is required. No measure can ever be perfect, but we believe that forming an aggregate from scaled scores provides a good measure of the likelihood of a candidate's success at a tertiary institution. Note that the scaled scores are intended to be used only for tertiary entrance purposes and for this reason, scaled scores are reported to students as "tertiary entrance points".

The SACE Board provides Subject Achievement Scores which measure achievement against criteria specific to a subject. However the criteria for one subject may be very different to those for another subject.

Scaling adjusts the raw scores in these different subjects to a common scale, so that they can be added to form an aggregate. Without a scaling system, students who wished to gain entry to particular tertiary institutions might have to choose from a very small set of 'approved' subjects. With scaling, students have a much greater range of choice.

*Suppose Leah did Italian, Mathematical Studies, Modern History, English Studies and Biology*

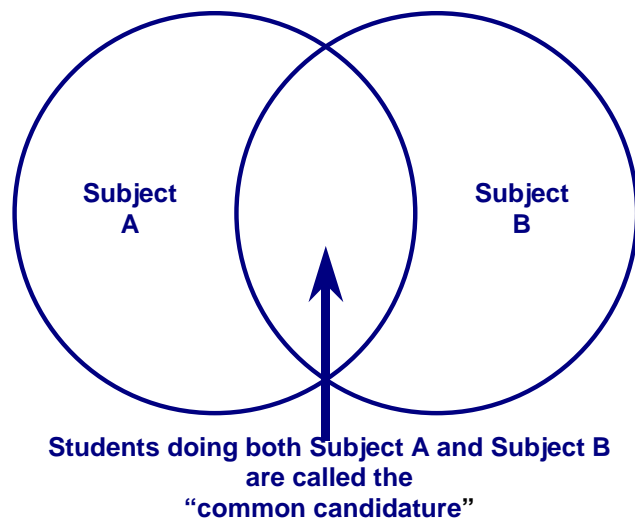
*and*

*Chris did English Communications, Outdoor Education, Mathematical Applications, Geography and Studies of Societies.*

*They are doing quite different subjects, and possibly have quite different goals. However if both students were to apply for the same course, the universities need to be sure that their aggregates are comparable.*

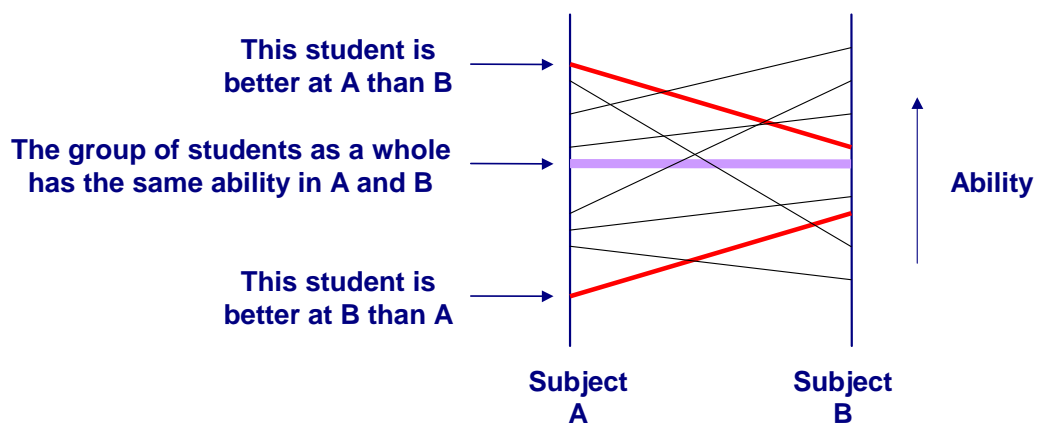
## How does scaling work?

Suppose there were only two subjects, called Subject A and Subject B. Consider the group of students doing both subjects. We call this group the **common candidature**.



Some students will be better at A than they are at B. Others will be better at B than they are at A. But we would expect that the **whole group of students** will have the **same average achievement** in each subject.

The scaling system uses this assumption to adjust the scores in each subject, by comparing the **raw scores** of students in pairs of subjects.



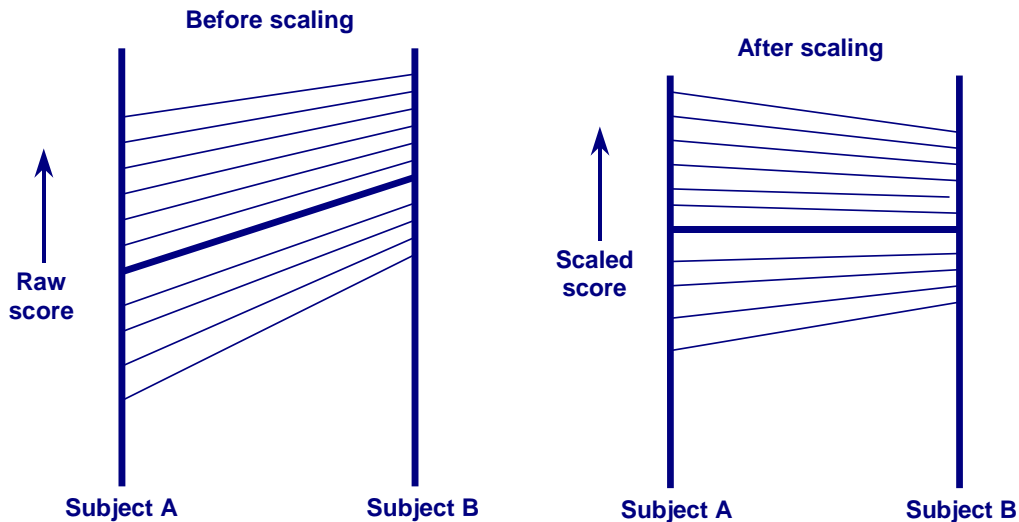
The **raw score** is a score out of 200. In some subjects it is made up of 50% school mark and 50% examination mark. In other subjects it is derived from the Subject Achievement Score out of 20.

A Subject Achievement Score of 20 in a subject with an external examination might correspond to a raw score of 194.

For other subjects, a 20 achievement score is converted to a raw score of 195 for scaling purposes.

## How does scaling work? (continued...)

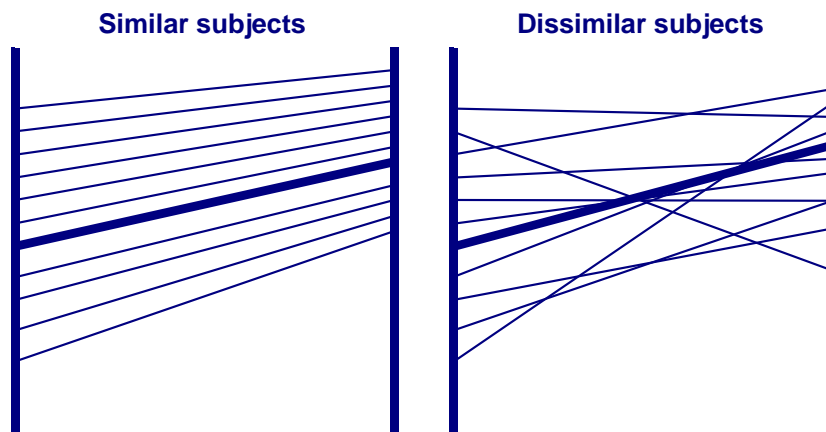
Suppose that the group of students who are doing both Subject A and Subject B have consistently higher raw scores in Subject B than in Subject A. Scaling will adjust the scores in both subjects, so that the average scaled score in Subject A is close to the average scaled score in Subject B.



Notice that before scaling the average score of the students in B is higher than the scores of the same students in A.

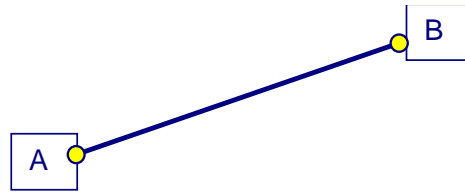
Scaling adjusts the scores in both subjects so that the average scaled score of the students in A is close to the average scaled score of the same students in subject B.

Scaling also takes into account how similar or different the subjects are. If two subjects are very different, the scaling effect will be less.

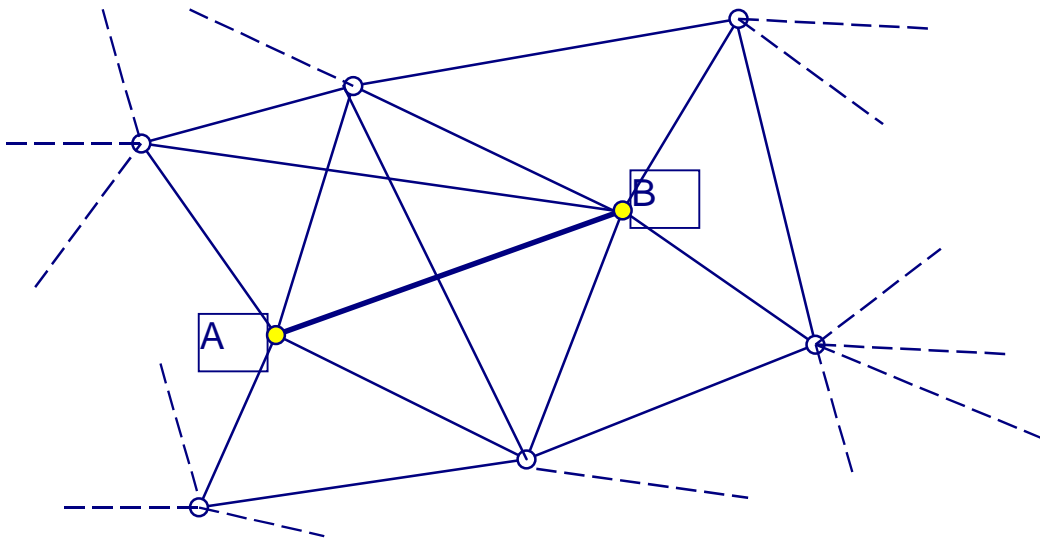


## How does scaling work? (continued...)

There are many more than two subjects involved in the scaling process.

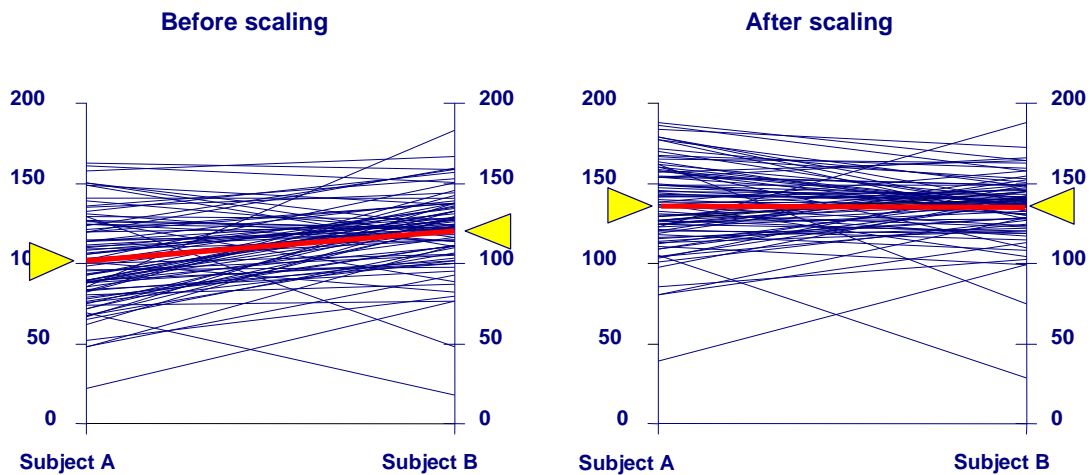


Scaling takes into account the relationships between all subjects at the same time.



## A real example

The following graphs show what happens to students' scores in a real pair of subjects in the scaling process.



## A real example (continued...)

**The order of the students in each subject remains the same.**

**Scaling acts on all subjects – both Subjects A and B are scaled.**

**The final outcome of the scaling process is most important – the scaling of each subject may be different, but the average scaled scores will be similar.**

The amount a subject is scaled is not as important as the outcomes for the subject. Notice that A has been scaled up more than B. The average score in A before scaling was about 100. After scaling it was about 140. The average score in B was 120 before scaling, but after scaling it was also about 140.

## The special subject allowance

Some language subjects are taught to groups of students with a wide range of different abilities, some who have a life-long familiarity with the language, others who may have studied it for only a few years.

This means that we would expect the overall ability of the group of students doing this subject to be higher than that of the same students in their other subjects. If the normal assumption of **same average achievement** in each subject (see page 3) were applied then these subjects would be scaled too harshly.

To compensate for this, a special allowance is added to the scaled scores of these subjects. This allowance is carefully monitored from year to year to ensure that it is fair.

## What is important about Scaling?

**The outcomes of scaling in a subject are more important than whether a subject has been “scaled up” or “scaled down”.**

The comparison of Achievement Scores and scaled scores can be very misleading. It is possible that a subject which has been “scaled down” has the same average scaled score as another subject that has been “scaled up”.

**In selecting subjects to study, the most important thing is to do the subjects that you are best at.**

It is often better to be “scaled down” in a subject that you are good at, than to be “scaled up” in a subject that you are not good at!

Suppose that one year you study a subject which is “scaled down”:

- you get an achievement score of 18
- this is “scaled down” to a 16.

The next year, you decide to do a different subject because it was “scaled up” by 2 the previous year:

- you get an achievement score of 13
- this is “scaled up” to a 15.

Despite the fact that you were scaled up, you were better off doing the first subject!

This is not a “made up” example. This has happened to many people who make the mistake of choosing subjects based on whether they will be “scaled up” or “scaled down”.

## Frequently asked questions

**Are subjects with an external assessment scaled differently from subjects without?**

No.

There is no difference in the way that subjects are treated in scaling. Some subjects without an external assessment are scaled up, and some with an external assessment are scaled down.

Whether a subject is scaled up or down depends only on the performance of all students doing that subject, as described earlier.

**Are languages treated harshly by scaling?**

No.

Language subjects are scaled in the same way as all other subjects. They may also benefit from the special subject allowance, which compensates for subjects where there are students from differing language backgrounds.

The average scaled score in language subjects is often higher than in any of the subjects commonly perceived to be advantaged by the scaling process. For example, in 2003 the average scaled score in French, German and Chinese was higher than the average scaled score of students in Physics, Mathematical Studies and English Studies.

## Frequently asked questions (continued...)

### **Is the scaled score affected by the difficulty of an exam?**

No.

The scaled score in a subject depends on the relative performance of students in their other subjects.

This means that if the exam is hard, and the students' marks are lower than in their other subjects, the subject will be scaled up. If, on the other hand, the examination is easy, and the students' scores are higher than in their other subjects, their scores will be scaled down.

The final average scaled score will be the same in each case.

### **My friend was scaled differently in the same subject. Why?**

Page 6 describes how the scaling is different at different points on the scale. If one person gets a high score in a subject, they will not be scaled as much as someone who is nearer the average score in a subject. So two people in one subject may be scaled differently.

### **One of my friends has the same subject achievement score as I, but we have different scaled scores. Why?**

The scaled score is derived from a raw score out of 200. An achievement score may correspond to a range of different raw scores. The scaled scores for these different raw scores may well be different.

For example, suppose you have a raw score of 138 in a subject and your friend has a raw score of 142 in the same subject. You both end up with an achievement score of 15. During scaling, however, your raw score of 138 is scaled to 149, resulting in a scaled score of 15.0. Your friend's raw score of 142 is scaled to 155, resulting in a scaled score of 15.5.

## Further information

For further information on matters relating to Scaling, Aggregation, the Tertiary Entrance Rank (TER) and other tertiary entrance procedures please contact the South Australian Tertiary Admissions Centre.

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