Dear Charlotte,

I have put my responses to the two questions in your email below the text of the questions in your email (ie see your email below).

I have also attached documents related to (1) a report on the appeals process (2) a report on various options for needs-based funding plus the associated spreadsheet which was prepared for the department (3) the recalculation reports for 2006 and 2011 census data [these are my copies, not the department's official copies]

In regard to the question on notice in the Hansard papers ("Regarding the SES data ... outline of your thoughts ... prior to arrangements post-2013" .. page 7 near top) my response is as follows.

The SES model was operating from early 2000's until 2014. Over that period it was essentially unchanged except for (a) recalculations because of new census data and (b) appeals. Any reviews that may have been done were by others, and are mostly written from the perspective of the organisations involved.

I hope all this helps,

Warm regards,

Steve

1. Are you aware that in the National Education Reform Agreement, agreed by Labor with NSW, Victoria, SA and Act, which is still in place, it has not been dissolved stated that the "the Commonwealth will also review the socio-economic status (SES) score methodology by 2017, to ensure this score remains the most appropriate means of assessing the relative educational advantage of non-government schools, including their capacity to contribute". Are you aware of any work that occurred arising from this?

I am not aware of work that specifically reviews the methodology for constructing the SES score in terms of whether it is the most appropriate means of assessing capacity to contribute in non-government schools. In 2015 I did undertake some work for the government/department, and I have attached herewith a copy of my report and the associated statistical tables.

2. With the removal of system weighted average calculations of the SES would you anticipate a growth in appeals?

In my opinion, the removal of system weighted average calculations of the SES is likely to create a growth in appeals. The disclosure of nominal funding levels to systemic non-government schools would identify schools whose nominal funding (based on SES) was

different to the amount received from the system. As one might anticipate, those schools who receive more than the SES-based amount would not appeal, however, those who feel they receive less than the SES-based amount would potentially see some advantage in appealing, especially if they could negotiate to receive some or all of the increased funding that was a result of the appeal.
It is human nature to feel that one is less well off than others, even if this is not true. Any evidence suggesting this may lead to actions to redress the perceived inequity.

Model Specifications							
Model Number	Model Type	Number of Dimensions	ATSI variable	ARIA variable	SEA variable	SIZE variable	ATSI loading
201	Unitary	1	ATSIF				1
202	Unitary	1		ARIA			
203	Unitary	1		ARIA2			
204	Unitary	1		ARIAL			
205	Unitary	1		ARIAL2			
206	Unitary	1			QSEAL		
207	Unitary	1			QSEAQ		
208	Unitary	1			QSEAL2		
209	Unitary	1				SIZEL	
301	Nominal	3	ATSIF	ARIA	QSEAL		1
302	Nominal	3	ATSIF	ARIA	QSEAL		2
303	Nominal	3	ATSIF	ARIA	QSEAL		1
304	Nominal	3	ATSIF	ARIA	QSEAL		1
305	Nominal	3	ATSIF	ARIA	QSEAL		2
306	Nominal	3	ATSIF	ARIA	QSEAL		1
307	Nominal	3	ATSIF	ARIA	QSEAL		2
308	Nominal	3	ATSIF	ARIA	QSEAL		1
309	Nominal	3	ATSIF	ARIA	QSEAL		1
310	Nominal	3	ATSIF	ARIA	QSEAL		2
311	Nominal	3	ATSIF	ARIA	QSEAL		2
312	Nominal	3	ATSIF	ARIA	QSEAL		3
313	Nominal	3	ATSIF	ARIA	QSEAL		3
314	Nominal	2		ARIA	QSEAL		
315	Nominal	2	ATSIF		QSEAL		1
316	Nominal	2	ATSIF	ARIA			1
317	Nominal	2		ARIA	QSEAL		
318	Nominal	2		ARIA	QSEAL		
319	Nominal	2	ATSIF		QSEAL		1
320	Nominal	2	ATSIF	ARIA			1
321	Nominal	2	ATSIF		QSEAL		2
322	Nominal	2	ATSIF	ARIA			2
323	Nominal	3	ATSIF	ARIA	QSEAL		1
324	Nominal	3	ATSIF	ARIA	QSEAL		2
325	Nominal	3	ATSIF	ARIA	QSEAL		1
326	Nominal	3	ATSIF	ARIA	QSEAL		1
327	Nominal	3	ATSIF	ARIA	QSEAL		2
328	Nominal	3	ATSIF	ARIA	QSEAL		1
329	Nominal	3	ATSIF	ARIA	QSEAL		2
330	Nominal	3	ATSIF	ARIA	QSEAL		1
331	Nominal	3	ATSIF	ARIA	QSEAL		1
332	Nominal	3	ATSIF	ARIA	QSEAL		2
333	Nominal	3	ATSIF	ARIA	QSEAL		2
334	Nominal	2		ARIA	QSEAL		
335	Nominal	2	ATSIF		QSEAL		1
336	Nominal	2	ATSIF	ARIA			1
337	Nominal	2		ARIA	QSEAL		

338	Nominal	2		ARIA	QSEAL	
339	Nominal	2	ATSIF		QSEAL	1
340	Nominal	2	ATSIF	ARIA		1
341	Nominal	2	ATSIF		QSEAL	2
342	Nominal	2	ATSIF	ARIA		2
343	Nominal	3	ATSIF	ARIAL	QSEAL	1
344	Nominal	3	ATSIF	ARIAL	QSEAL	2
345	Nominal	3	ATSIF	ARIAL	QSEAL	1
346	Nominal	3	ATSIF	ARIAL	QSEAL	1
347	Nominal	3	ATSIF	ARIAL	QSEAL	2
348	Nominal	3	ATSIF	ARIAL	QSEAL	1
349	Nominal	3	ATSIF	ARIAL	QSEAL	2
350	Nominal	3	ATSIF	ARIAL	QSEAL	1
351	Nominal	3	ATSIF	ARIAL	QSEAL	1
352	Nominal	3	ATSIF	ARIAL	QSEAL	2
353	Nominal	3	ATSIF	ARIAL	QSEAL	2
354	Nominal	2		ARIAL	QSEAL	
355	Nominal	2	ATSIF		QSEAL	1
356	Nominal	2	ATSIF	ARIAL		1
357	Nominal	2		ARIAL	QSEAL	
358	Nominal	2		ARIAL	QSEAL	
359	Nominal	2	ATSIF		QSEAL	1
360	Nominal	2	ATSIF	ARIAL		1
361	Nominal	2	ATSIF		QSEAL	2
362	Nominal	2	ATSIF	ARIAL		2
363	Nominal	3	ATSIF	ARIAL2	QSEAL	1
364	Nominal	3	ATSIF	ARIAL2	QSEAL	2
365	Nominal	3	ATSIF	ARIAL2	QSEAL	1
366	Nominal	3	ATSIF	ARIAL2	QSEAL	1
367	Nominal	3	ATSIF	ARIAL2	QSEAL	2
368	Nominal	3	ATSIF	ARIAL2	QSEAL	1
369	Nominal	3	ATSIF	ARIAL2	QSEAL	2
370	Nominal	3	ATSIF	ARIAL2	QSEAL	1
371	Nominal	3	ATSIF	ARIAL2	QSEAL	1
372	Nominal	3	ATSIF	ARIAL2	QSEAL	2
373	Nominal	3	ATSIF	ARIAL2	QSEAL	2
374	Nominal	2		ARIAL2	QSEAL	
375	Nominal	2	ATSIF		QSEAL	1
376	Nominal	2	ATSIF	ARIAL2		1
377	Nominal	2		ARIAL2	QSEAL	
378	Nominal	2		ARIAL2	QSEAL	
379	Nominal	2	ATSIF		QSEAL	1
380	Nominal	2	ATSIF	ARIAL2		1
381	Nominal	2	ATSIF		QSEAL	2
382	Nominal	2	ATSIF	ARIAL2		2
383	Nominal	3	ATSIF	ARIA	QSEAQ	1
384	Nominal	3	ATSIF	ARIA	QSEAQ	2
385	Nominal	3	ATSIF	ARIA	QSEAQ	1
386	Nominal	3	ATSIF	ARIA	QSEAQ	1
387	Nominal	3	ATSIF	ARIA	QSEAQ	2

388	Nominal	3	ATSIF	ARIA	QSEAQ	1
389	Nominal	3	ATSIF	ARIA	QSEAQ	2
390	Nominal	3	ATSIF	ARIA	QSEAQ	1
391	Nominal	3	ATSIF	ARIA	QSEAQ	1
392	Nominal	3	ATSIF	ARIA	QSEAQ	2
393	Nominal	3	ATSIF	ARIA	QSEAQ	2
394	Nominal	2		ARIA	QSEAQ	
395	Nominal	2	ATSIF		QSEAQ	1
396	Nominal	2	ATSIF	ARIA		1
397	Nominal	2		ARIA	QSEAQ	
398	Nominal	2		ARIA	QSEAQ	
399	Nominal	2	ATSIF		QSEAQ	1
400	Nominal	2	ATSIF	ARIA		1
401	Nominal	2	ATSIF		QSEAQ	2
402	Nominal	2	ATSIF	ARIA		2
403	Nominal	3	ATSIF	ARIA2	QSEAQ	1
404	Nominal	3	ATSIF	ARIA2	QSEAQ	2
405	Nominal	3	ATSIF	ARIA2	QSEAQ	1
406	Nominal	3	ATSIF	ARIA2	QSEAQ	1
407	Nominal	3	ATSIF	ARIA2	QSEAQ	2
408	Nominal	3	ATSIF	ARIA2	QSEAQ	1
409	Nominal	3	ATSIF	ARIA2	QSEAQ	2
410	Nominal	3	ATSIF	ARIA2	QSEAQ	1
411	Nominal	3	ATSIF	ARIA2	QSEAQ	1
412	Nominal	3	ATSIF	ARIA2	QSEAQ	2
413	Nominal	3	ATSIF	ARIA2	QSEAQ	2
414	Nominal	2		ARIA2	QSEAQ	
415	Nominal	2	ATSIF		QSEAQ	1
416	Nominal	2	ATSIF	ARIA2		1
417	Nominal	2		ARIA2	QSEAQ	
418	Nominal	2		ARIA2	QSEAQ	
419	Nominal	2	ATSIF		QSEAQ	1
420	Nominal	2	ATSIF	ARIA2		1
421	Nominal	2	ATSIF		QSEAQ	2
422	Nominal	2	ATSIF	ARIA2		2
423	Nominal	3	ATSIF	ARIAL	QSEAQ	1
424	Nominal	3	ATSIF	ARIAL	QSEAQ	2
425	Nominal	3	ATSIF	ARIAL	QSEAQ	1
426	Nominal	3	ATSIF	ARIAL	QSEAQ	1
427	Nominal	3	ATSIF	ARIAL	QSEAQ	2
428	Nominal	3	ATSIF	ARIAL	QSEAQ	1
429	Nominal	3	ATSIF	ARIAL	QSEAQ	2
430	Nominal	3	ATSIF	ARIAL	QSEAQ	1
431	Nominal	3	ATSIF	ARIAL	QSEAQ	1
432	Nominal	3	ATSIF	ARIAL	QSEAQ	2
433	Nominal	3	ATSIF	ARIAL	QSEAQ	2
434	Nominal	2		ARIAL	QSEAQ	
435	Nominal	2	ATSIF		QSEAQ	1
436	Nominal	2	ATSIF	ARIAL		1
437	Nominal	2		ARIAL	QSEAQ	

438	Nominal	2		ARIAL	QSEAQ	
439	Nominal	2	ATSIF		QSEAQ	1
440	Nominal	2	ATSIF	ARIAL		1
441	Nominal	2	ATSIF		QSEAQ	2
442	Nominal	2	ATSIF	ARIAL		2
443	Nominal	3	ATSIF	ARIAL2	QSEAQ	1
444	Nominal	3	ATSIF	ARIAL2	QSEAQ	2
445	Nominal	3	ATSIF	ARIAL2	QSEAQ	1
446	Nominal	3	ATSIF	ARIAL2	QSEAQ	1
447	Nominal	3	ATSIF	ARIAL2	QSEAQ	2
448	Nominal	3	ATSIF	ARIAL2	QSEAQ	1
449	Nominal	3	ATSIF	ARIAL2	QSEAQ	2
450	Nominal	3	ATSIF	ARIAL2	QSEAQ	1
451	Nominal	3	ATSIF	ARIAL2	QSEAQ	1
452	Nominal	3	ATSIF	ARIAL2	QSEAQ	2
453	Nominal	3	ATSIF	ARIAL2	QSEAQ	2
454	Nominal	2		ARIAL2	QSEAQ	
455	Nominal	2	ATSIF		QSEAQ	1
456	Nominal	2	ATSIF	ARIAL2		1
457	Nominal	2		ARIAL2	QSEAQ	
458	Nominal	2		ARIAL2	QSEAQ	
459	Nominal	2	ATSIF		QSEAQ	1
460	Nominal	2	ATSIF	ARIAL2		1
461	Nominal	2	ATSIF		QSEAQ	2
462	Nominal	2	ATSIF	ARIAL2		2
463	Nominal	3	ATSIF	ARIA	QSEAL2	1
464	Nominal	3	ATSIF	ARIA	QSEAL2	2
465	Nominal	3	ATSIF	ARIA	QSEAL2	1
466	Nominal	3	ATSIF	ARIA	QSEAL2	1
467	Nominal	3	ATSIF	ARIA	QSEAL2	2
468	Nominal	3	ATSIF	ARIA	QSEAL2	1
469	Nominal	3	ATSIF	ARIA	QSEAL2	2
470	Nominal	3	ATSIF	ARIA	QSEAL2	1
471	Nominal	3	ATSIF	ARIA	QSEAL2	1
472	Nominal	3	ATSIF	ARIA	QSEAL2	2
473	Nominal	3	ATSIF	ARIA	QSEAL2	2
474	Nominal	2		ARIA	QSEAL2	
475	Nominal	2	ATSIF		QSEAL2	1
476	Nominal	2	ATSIF	ARIA		1
477	Nominal	2		ARIA	QSEAL2	
478	Nominal	2		ARIA	QSEAL2	
479	Nominal	2	ATSIF		QSEAL2	1
480	Nominal	2	ATSIF	ARIA		1
481	Nominal	2	ATSIF		QSEAL2	2
482	Nominal	2	ATSIF	ARIA		2
483	Nominal	3	ATSIF	ARIA2	QSEAL2	1
484	Nominal	3	ATSIF	ARIA2	QSEAL2	2
485	Nominal	3	ATSIF	ARIA2	QSEAL2	1
486	Nominal	3	ATSIF	ARIA2	QSEAL2	1
487	Nominal	3	ATSIF	ARIA2	QSEAL2	2

488	Nominal	3	ATSIF	ARIA2	QSEAL2	1
489	Nominal	3	ATSIF	ARIA2	QSEAL2	2
490	Nominal	3	ATSIF	ARIA2	QSEAL2	1
491	Nominal	3	ATSIF	ARIA2	QSEAL2	1
492	Nominal	3	ATSIF	ARIA2	QSEAL2	2
493	Nominal	3	ATSIF	ARIA2	QSEAL2	2
494	Nominal	2		ARIA2	QSEAL2	
495	Nominal	2	ATSIF		QSEAL2	1
496	Nominal	2	ATSIF	ARIA2		1
497	Nominal	2		ARIA2	QSEAL2	
498	Nominal	2		ARIA2	QSEAL2	
499	Nominal	2	ATSIF		QSEAL2	1
500	Nominal	2	ATSIF	ARIA2		1
501	Nominal	2	ATSIF		QSEAL2	2
502	Nominal	2	ATSIF	ARIA2		2
503	Nominal	3	ATSIF	ARIAL	QSEAL2	1
504	Nominal	3	ATSIF	ARIAL	QSEAL2	2
505	Nominal	3	ATSIF	ARIAL	QSEAL2	1
506	Nominal	3	ATSIF	ARIAL	QSEAL2	1
507	Nominal	3	ATSIF	ARIAL	QSEAL2	2
508	Nominal	3	ATSIF	ARIAL	QSEAL2	1
509	Nominal	3	ATSIF	ARIAL	QSEAL2	2
510	Nominal	3	ATSIF	ARIAL	QSEAL2	1
511	Nominal	3	ATSIF	ARIAL	QSEAL2	1
512	Nominal	3	ATSIF	ARIAL	QSEAL2	2
513	Nominal	3	ATSIF	ARIAL	QSEAL2	2
514	Nominal	2		ARIAL	QSEAL2	
515	Nominal	2	ATSIF		QSEAL2	1
516	Nominal	2	ATSIF	ARIAL		1
517	Nominal	2		ARIAL	QSEAL2	
518	Nominal	2		ARIAL	QSEAL2	
519	Nominal	2	ATSIF		QSEAL2	1
520	Nominal	2	ATSIF	ARIAL		1
521	Nominal	2	ATSIF		QSEAL2	2
522	Nominal	2	ATSIF	ARIAL		2
523	Nominal	3	ATSIF	ARIAL2	QSEAL2	1
524	Nominal	3	ATSIF	ARIAL2	QSEAL2	2
525	Nominal	3	ATSIF	ARIAL2	QSEAL2	1
526	Nominal	3	ATSIF	ARIAL2	QSEAL2	1
527	Nominal	3	ATSIF	ARIAL2	QSEAL2	2
528	Nominal	3	ATSIF	ARIAL2	QSEAL2	1
529	Nominal	3	ATSIF	ARIAL2	QSEAL2	2
530	Nominal	3	ATSIF	ARIAL2	QSEAL2	1
531	Nominal	3	ATSIF	ARIAL2	QSEAL2	1
532	Nominal	3	ATSIF	ARIAL2	QSEAL2	2
533	Nominal	3	ATSIF	ARIAL2	QSEAL2	2
534	Nominal	2		ARIAL2	QSEAL2	
535	Nominal	2	ATSIF		QSEAL2	1
536	Nominal	2	ATSIF	ARIAL2		1
537	Nominal	2		ARIAL2	QSEAL2	

538	Nominal	2		ARIAL2	QSEAL2		
539	Nominal	2	ATSIF		QSEAL2		1
540	Nominal	2	ATSIF	ARIAL2			1
541	Nominal	2	ATSIF		QSEAL2		2
542	Nominal	2	ATSIF	ARIAL2			2
543	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
544	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
545	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
546	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
547	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
548	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
549	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
550	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
551	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
552	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
553	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
554	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	3
555	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	3
556	Nominal	3		ARIA	QSEAL	SIZEL	
557	Nominal	3	ATSIF		QSEAL	SIZEL	1
558	Nominal	3	ATSIF	ARIA		SIZEL	1
559	Nominal	3		ARIA	QSEAL	SIZEL	
560	Nominal	3		ARIA	QSEAL	SIZEL	
561	Nominal	3	ATSIF		QSEAL	SIZEL	1
562	Nominal	3	ATSIF	ARIA		SIZEL	1
563	Nominal	3	ATSIF		QSEAL	SIZEL	2
564	Nominal	3	ATSIF	ARIA		SIZEL	2
565	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
566	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
567	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
568	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
569	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
570	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
571	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
572	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
573	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	1
574	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
575	Nominal	4	ATSIF	ARIA	QSEAL	SIZEL	2
576	Nominal	3		ARIA	QSEAL	SIZEL	
577	Nominal	3	ATSIF		QSEAL	SIZEL	1
578	Nominal	3	ATSIF	ARIA		SIZEL	1
579	Nominal	3		ARIA	QSEAL	SIZEL	
580	Nominal	3		ARIA	QSEAL	SIZEL	
581	Nominal	3	ATSIF		QSEAL	SIZEL	1
582	Nominal	3	ATSIF	ARIA		SIZEL	1
583	Nominal	3	ATSIF		QSEAL	SIZEL	2
584	Nominal	3	ATSIF	ARIA		SIZEL	2
585	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	1
586	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	2
587	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	1

588	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	1
589	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	2
590	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	1
591	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	2
592	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	1
593	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	1
594	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	2
595	Nominal	4	ATSIF	ARIAL	QSEAL	SIZEL	2
596	Nominal	3		ARIAL	QSEAL	SIZEL	
597	Nominal	3	ATSIF		QSEAL	SIZEL	1
598	Nominal	3	ATSIF	ARIAL		SIZEL	1
599	Nominal	3		ARIAL	QSEAL	SIZEL	
600	Nominal	3		ARIAL	QSEAL	SIZEL	
601	Nominal	3	ATSIF		QSEAL	SIZEL	1
602	Nominal	3	ATSIF	ARIAL		SIZEL	1
603	Nominal	3	ATSIF		QSEAL	SIZEL	2
604	Nominal	3	ATSIF	ARIAL		SIZEL	2
605	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	1
606	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	2
607	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	1
608	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	1
609	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	2
610	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	1
611	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	2
612	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	1
613	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	1
614	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	2
615	Nominal	4	ATSIF	ARIAL2	QSEAL	SIZEL	2
616	Nominal	3		ARIAL2	QSEAL	SIZEL	
617	Nominal	3	ATSIF		QSEAL	SIZEL	1
618	Nominal	3	ATSIF	ARIAL2		SIZEL	1
619	Nominal	3		ARIAL2	QSEAL	SIZEL	
620	Nominal	3		ARIAL2	QSEAL	SIZEL	
621	Nominal	3	ATSIF		QSEAL	SIZEL	1
622	Nominal	3	ATSIF	ARIAL2		SIZEL	1
623	Nominal	3	ATSIF		QSEAL	SIZEL	2
624	Nominal	3	ATSIF	ARIAL2		SIZEL	2
625	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	1
626	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	2
627	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	1
628	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	1
629	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	2
630	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	1
631	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	2
632	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	1
633	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	1
634	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	2
635	Nominal	4	ATSIF	ARIA	QSEAQ	SIZEL	2
636	Nominal	3		ARIA	QSEAQ	SIZEL	
637	Nominal	3	ATSIF		QSEAQ	SIZEL	1

638	Nominal	3	ATSIF	ARIA		SIZEL	1
639	Nominal	3		ARIA	QSEAQ	SIZEL	
640	Nominal	3		ARIA	QSEAQ	SIZEL	
641	Nominal	3	ATSIF		QSEAQ	SIZEL	1
642	Nominal	3	ATSIF	ARIA		SIZEL	1
643	Nominal	3	ATSIF		QSEAQ	SIZEL	2
644	Nominal	3	ATSIF	ARIA		SIZEL	2
645	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	1
646	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	2
647	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	1
648	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	1
649	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	2
650	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	1
651	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	2
652	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	1
653	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	1
654	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	2
655	Nominal	4	ATSIF	ARIA2	QSEAQ	SIZEL	2
656	Nominal	3		ARIA2	QSEAQ	SIZEL	
657	Nominal	3	ATSIF		QSEAQ	SIZEL	1
658	Nominal	3	ATSIF	ARIA2		SIZEL	1
659	Nominal	3		ARIA2	QSEAQ	SIZEL	
660	Nominal	3		ARIA2	QSEAQ	SIZEL	
661	Nominal	3	ATSIF		QSEAQ	SIZEL	1
662	Nominal	3	ATSIF	ARIA2		SIZEL	1
663	Nominal	3	ATSIF		QSEAQ	SIZEL	2
664	Nominal	3	ATSIF	ARIA2		SIZEL	2
665	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	1
666	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	2
667	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	1
668	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	1
669	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	2
670	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	1
671	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	2
672	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	1
673	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	1
674	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	2
675	Nominal	4	ATSIF	ARIAL	QSEAQ	SIZEL	2
676	Nominal	3		ARIAL	QSEAQ	SIZEL	
677	Nominal	3	ATSIF		QSEAQ	SIZEL	1
678	Nominal	3	ATSIF	ARIAL		SIZEL	1
679	Nominal	3		ARIAL	QSEAQ	SIZEL	
680	Nominal	3		ARIAL	QSEAQ	SIZEL	
681	Nominal	3	ATSIF		QSEAQ	SIZEL	1
682	Nominal	3	ATSIF	ARIAL		SIZEL	1
683	Nominal	3	ATSIF		QSEAQ	SIZEL	2
684	Nominal	3	ATSIF	ARIAL		SIZEL	2
685	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	1
686	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	2
687	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	1

688	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	1
689	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	2
690	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	1
691	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	2
692	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	1
693	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	1
694	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	2
695	Nominal	4	ATSIF	ARIAL2	QSEAQ	SIZEL	2
696	Nominal	3		ARIAL2	QSEAQ	SIZEL	
697	Nominal	3	ATSIF		QSEAQ	SIZEL	1
698	Nominal	3	ATSIF	ARIAL2		SIZEL	1
699	Nominal	3		ARIAL2	QSEAQ	SIZEL	
700	Nominal	3		ARIAL2	QSEAQ	SIZEL	
701	Nominal	3	ATSIF		QSEAQ	SIZEL	1
702	Nominal	3	ATSIF	ARIAL2		SIZEL	1
703	Nominal	3	ATSIF		QSEAQ	SIZEL	2
704	Nominal	3	ATSIF	ARIAL2		SIZEL	2
705	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	1
706	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	2
707	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	1
708	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	1
709	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	2
710	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	1
711	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	2
712	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	1
713	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	1
714	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	2
715	Nominal	4	ATSIF	ARIA	QSEAL2	SIZEL	2
716	Nominal	3		ARIA	QSEAL2	SIZEL	
717	Nominal	3	ATSIF		QSEAL2	SIZEL	1
718	Nominal	3	ATSIF	ARIA		SIZEL	1
719	Nominal	3		ARIA	QSEAL2	SIZEL	
720	Nominal	3		ARIA	QSEAL2	SIZEL	
721	Nominal	3	ATSIF		QSEAL2	SIZEL	1
722	Nominal	3	ATSIF	ARIA		SIZEL	1
723	Nominal	3	ATSIF		QSEAL2	SIZEL	2
724	Nominal	3	ATSIF	ARIA		SIZEL	2
725	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	1
726	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	2
727	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	1
728	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	1
729	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	2
730	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	1
731	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	2
732	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	1
733	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	1
734	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	2
735	Nominal	4	ATSIF	ARIA2	QSEAL2	SIZEL	2
736	Nominal	3		ARIA2	QSEAL2	SIZEL	
737	Nominal	3	ATSIF		QSEAL2	SIZEL	1

738	Nominal	3	ATSIF	ARIA2		SIZEL	1
739	Nominal	3		ARIA2	QSEAL2	SIZEL	
740	Nominal	3		ARIA2	QSEAL2	SIZEL	
741	Nominal	3	ATSIF		QSEAL2	SIZEL	1
742	Nominal	3	ATSIF	ARIA2		SIZEL	1
743	Nominal	3	ATSIF		QSEAL2	SIZEL	2
744	Nominal	3	ATSIF	ARIA2		SIZEL	2
745	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	1
746	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	2
747	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	1
748	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	1
749	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	2
750	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	1
751	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	2
752	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	1
753	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	1
754	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	2
755	Nominal	4	ATSIF	ARIAL	QSEAL2	SIZEL	2
756	Nominal	3		ARIAL	QSEAL2	SIZEL	
757	Nominal	3	ATSIF		QSEAL2	SIZEL	1
758	Nominal	3	ATSIF	ARIAL		SIZEL	1
759	Nominal	3		ARIAL	QSEAL2	SIZEL	
760	Nominal	3		ARIAL	QSEAL2	SIZEL	
761	Nominal	3	ATSIF		QSEAL2	SIZEL	1
762	Nominal	3	ATSIF	ARIAL		SIZEL	1
763	Nominal	3	ATSIF		QSEAL2	SIZEL	2
764	Nominal	3	ATSIF	ARIAL		SIZEL	2
765	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	1
766	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	2
767	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	1
768	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	1
769	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	2
770	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	1
771	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	2
772	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	1
773	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	1
774	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	2
775	Nominal	4	ATSIF	ARIAL2	QSEAL2	SIZEL	2
776	Nominal	3		ARIAL2	QSEAL2	SIZEL	
777	Nominal	3	ATSIF		QSEAL2	SIZEL	1
778	Nominal	3	ATSIF	ARIAL2		SIZEL	1
779	Nominal	3		ARIAL2	QSEAL2	SIZEL	
780	Nominal	3		ARIAL2	QSEAL2	SIZEL	
781	Nominal	3	ATSIF		QSEAL2	SIZEL	1
782	Nominal	3	ATSIF	ARIAL2		SIZEL	1
783	Nominal	3	ATSIF		QSEAL2	SIZEL	2
784	Nominal	3	ATSIF	ARIAL2		SIZEL	2

			PRIMARY			
			Linear Correlations		Rank Correlations	
ARIA loading	SEA loading	SIZE loading	SRS	Naplan	SRS	NAPLAN
			0.629	0.272	0.632	0.481
1			0.879	0.224	0.743	0.251
1			0.843	0.175	0.743	0.251
1			0.718	0.234	0.649	0.221
1			0.782	0.227	0.649	0.221
	1		0.511	0.739	0.827	0.758
	1		0.503	0.729	0.827	0.755
	1		0.491	0.720	0.827	0.758
		1	0.880	0.125	0.788	0.184
1	1		0.892	0.634	0.980	0.658
1	1		0.878	0.607	0.978	0.657
2	1		0.926	0.535	0.975	0.601
1	2		0.810	0.703	0.955	0.707
2	1		0.922	0.528	0.975	0.603
2	2		0.877	0.642	0.979	0.659
1	2		0.834	0.690	0.957	0.705
2	3		0.824	0.686	0.967	0.690
3	2		0.904	0.584	0.980	0.625
1	3		0.786	0.717	0.936	0.725
3	1		0.932	0.469	0.962	0.571
1	2		0.835	0.671	0.957	0.702
2	1		0.901	0.516	0.974	0.604
1	1		0.840	0.644	0.978	0.660
	1		0.713	0.728	0.865	0.750
1			0.889	0.281	0.821	0.377
1	2		0.735	0.707	0.947	0.711
2	1		0.905	0.533	0.976	0.599
	2		0.656	0.742	0.856	0.754
2			0.898	0.260	0.813	0.366
	1		0.736	0.678	0.875	0.742
1			0.770	0.298	0.818	0.393
1	1		0.892	0.634	0.980	0.658
1	1		0.878	0.607	0.978	0.657
2	1		0.926	0.535	0.975	0.601
1	2		0.810	0.703	0.955	0.707
2	1		0.922	0.528	0.975	0.603
2	2		0.877	0.642	0.979	0.659
1	2		0.834	0.690	0.957	0.705
2	3		0.824	0.686	0.967	0.690
3	2		0.904	0.584	0.980	0.625
1	3		0.786	0.717	0.936	0.725
3	1		0.932	0.469	0.962	0.571
1	1		0.840	0.644	0.978	0.660
	1		0.713	0.728	0.865	0.750
1			0.889	0.281	0.821	0.377
1	2		0.735	0.707	0.947	0.711

2	1	0.905	0.533	0.976	0.599
	2	0.656	0.742	0.856	0.754
2		0.898	0.260	0.813	0.366
	1	0.736	0.678	0.875	0.742
1		0.836	0.298	0.830	0.393
1	1	0.822	0.610	0.913	0.608
1	1	0.831	0.593	0.916	0.609
2	1	0.819	0.508	0.885	0.554
1	2	0.760	0.686	0.922	0.683
2	1	0.842	0.509	0.887	0.554
2	2	0.792	0.613	0.910	0.607
1	2	0.796	0.676	0.925	0.681
2	3	0.757	0.662	0.920	0.655
3	2	0.796	0.552	0.890	0.567
1	3	0.755	0.706	0.915	0.711
3	1	0.831	0.451	0.885	0.550
1	1	0.737	0.610	0.904	0.607
	1	0.713	0.728	0.865	0.750
1		0.809	0.289	0.781	0.411
1	2	0.674	0.685	0.911	0.686
2	1	0.765	0.499	0.879	0.555
	2	0.656	0.742	0.856	0.754
2		0.785	0.268	0.780	0.410
	1	0.736	0.678	0.875	0.742
1		0.792	0.309	0.782	0.413
1	1	0.855	0.629	0.928	0.642
1	1	0.851	0.605	0.931	0.641
2	1	0.871	0.530	0.897	0.570
1	2	0.783	0.699	0.924	0.703
2	1	0.879	0.525	0.900	0.571
2	2	0.833	0.635	0.925	0.643
1	2	0.813	0.687	0.927	0.700
2	3	0.788	0.680	0.927	0.682
3	2	0.849	0.577	0.909	0.597
1	3	0.769	0.714	0.914	0.723
3	1	0.879	0.467	0.887	0.552
1	1	0.781	0.635	0.918	0.643
	1	0.713	0.728	0.865	0.750
1		0.842	0.285	0.782	0.412
1	2	0.698	0.701	0.911	0.707
2	1	0.826	0.525	0.889	0.569
	2	0.656	0.742	0.856	0.754
2		0.836	0.264	0.781	0.411
	1	0.736	0.678	0.875	0.742
1		0.807	0.303	0.783	0.414
1	1	0.886	0.629	0.978	0.650
1	1	0.875	0.604	0.977	0.649
2	1	0.921	0.532	0.972	0.594
1	2	0.800	0.696	0.957	0.699
2	1	0.919	0.525	0.972	0.596

2	2	0.869	0.636	0.978	0.650
1	2	0.828	0.685	0.958	0.697
2	3	0.814	0.679	0.968	0.681
3	2	0.897	0.579	0.977	0.616
1	3	0.701	0.711	0.847	0.719
3	1	0.865	0.467	0.914	0.565
1	1	0.834	0.637	0.977	0.650
	1	0.706	0.723	0.866	0.747
1		0.889	0.281	0.821	0.377
1	2	0.728	0.698	0.950	0.702
2	1	0.901	0.529	0.973	0.591
	2	0.645	0.734	0.856	0.751
2		0.898	0.260	0.813	0.366
	1	0.733	0.676	0.876	0.738
1		0.836	0.298	0.830	0.393
1	1	0.887	0.660	0.949	0.706
1	1	0.865	0.623	0.950	0.701
2	1	0.931	0.568	0.971	0.679
1	2	0.797	0.716	0.921	0.731
2	1	0.915	0.551	0.970	0.676
2	2	0.875	0.672	0.947	0.709
1	2	0.823	0.701	0.925	0.727
2	3	0.813	0.706	0.930	0.724
3	2	0.910	0.621	0.961	0.693
1	3	0.772	0.722	0.908	0.738
3	1	0.930	0.490	0.978	0.659
1	1	0.832	0.677	0.937	0.712
	1	0.706	0.723	0.866	0.747
1		0.858	0.251	0.852	0.428
1	2	0.716	0.719	0.905	0.735
2	1	0.910	0.573	0.965	0.682
	2	0.645	0.734	0.856	0.751
2		0.875	0.225	0.847	0.413
	1	0.733	0.676	0.876	0.738
1		0.803	0.273	0.851	0.445
1	1	0.815	0.605	0.909	0.598
1	1	0.828	0.590	0.912	0.599
2	1	0.814	0.505	0.884	0.552
1	2	0.750	0.678	0.921	0.672
2	1	0.838	0.506	0.886	0.552
2	2	0.783	0.607	0.906	0.597
1	2	0.788	0.671	0.924	0.671
2	3	0.745	0.654	0.918	0.643
3	2	0.788	0.547	0.888	0.562
1	3	0.745	0.699	0.916	0.703
3	1	0.827	0.448	0.884	0.549
1	1	0.730	0.603	0.900	0.596
	1	0.706	0.723	0.866	0.747
1		0.809	0.289	0.781	0.411
1	2	0.667	0.676	0.911	0.674

2	1	0.760	0.495	0.879	0.553
	2	0.645	0.734	0.856	0.751
2		0.785	0.268	0.780	0.410
	1	0.733	0.676	0.876	0.738
1		0.792	0.309	0.782	0.413
1	1	0.849	0.624	0.925	0.632
1	1	0.848	0.602	0.928	0.631
2	1	0.866	0.526	0.894	0.565
1	2	0.773	0.692	0.924	0.694
2	1	0.876	0.522	0.897	0.566
2	2	0.824	0.629	0.922	0.631
1	2	0.806	0.682	0.927	0.692
2	3	0.777	0.672	0.925	0.672
3	2	0.841	0.572	0.905	0.588
1	3	0.759	0.708	0.915	0.716
3	1	0.876	0.464	0.886	0.550
1	1	0.774	0.628	0.915	0.631
	1	0.706	0.723	0.866	0.747
1		0.842	0.285	0.782	0.412
1	2	0.691	0.691	0.912	0.697
2	1	0.821	0.520	0.887	0.564
	2	0.645	0.734	0.856	0.751
2		0.836	0.264	0.781	0.411
	1	0.733	0.676	0.876	0.738
1		0.807	0.303	0.783	0.414
1	1	0.881	0.626	0.978	0.645
1	1	0.871	0.602	0.977	0.644
2	1	0.917	0.529	0.969	0.589
1	2	0.790	0.691	0.960	0.695
2	1	0.916	0.523	0.970	0.591
2	2	0.861	0.632	0.978	0.644
1	2	0.821	0.681	0.960	0.692
2	3	0.803	0.673	0.970	0.676
3	2	0.890	0.576	0.976	0.611
1	3	0.768	0.705	0.941	0.716
3	1	0.927	0.466	0.957	0.562
1	1	0.826	0.631	0.977	0.644
	1	0.698	0.718	0.867	0.748
1		0.889	0.281	0.821	0.377
1	2	0.718	0.691	0.953	0.698
2	1	0.896	0.525	0.970	0.586
	2	0.632	0.728	0.858	0.753
2		0.898	0.260	0.813	0.366
	1	0.728	0.674	0.876	0.739
1		0.836	0.298	0.830	0.393
1	1	0.881	0.656	0.951	0.704
1	1	0.862	0.621	0.951	0.699
2	1	0.927	0.565	0.972	0.676
1	2	0.786	0.710	0.924	0.730
2	1	0.913	0.550	0.971	0.673

2	2	0.867	0.667	0.949	0.706
1	2	0.816	0.697	0.927	0.725
2	3	0.803	0.700	0.933	0.722
3	2	0.903	0.617	0.963	0.690
1	3	0.763	0.717	0.910	0.738
3	1	0.927	0.488	0.979	0.656
1	1		0.670		0.710
	1	0.698	0.718	0.867	0.748
1		0.858	0.251	0.852	0.428
1	2	0.706	0.712	0.908	0.735
2	1	0.905	0.569	0.967	0.679
	2	0.632	0.728	0.858	0.753
2		0.875	0.225	0.847	0.413
	1	0.728	0.674	0.876	0.739
1		0.803	0.273	0.851	0.445
1	1	0.809	0.602	0.907	0.592
1	1	0.824	0.587	0.910	0.593
2	1	0.808	0.502	0.884	0.552
1	2	0.739	0.673	0.920	0.665
2	1	0.835	0.503	0.886	0.552
2	2	0.774	0.603	0.904	0.591
1	2	0.781	0.666	0.924	0.664
2	3	0.734	0.649	0.916	0.636
3	2	0.781	0.544	0.887	0.561
1	3	0.736	0.694	0.917	0.698
3	1	0.824	0.447	0.884	0.549
1	1	0.722	0.598	0.898	0.590
	1	0.698	0.718	0.867	0.748
1		0.809	0.289	0.781	0.411
1	2	0.657	0.669	0.910	0.667
2	1	0.755	0.491	0.879	0.554
	2	0.632	0.728	0.858	0.753
2		0.785	0.268	0.780	0.410
	1	0.728	0.674	0.876	0.739
1		0.792	0.309	0.782	0.413
1	1	0.842	0.620	0.923	0.625
1	1	0.844	0.600	0.926	0.625
2	1	0.861	0.523	0.893	0.563
1	2	0.762	0.686	0.924	0.689
2	1	0.873	0.520	0.896	0.563
2	2	0.815	0.624	0.920	0.624
1	2	0.799	0.677	0.928	0.687
2	3	0.766	0.666	0.925	0.665
3	2	0.833	0.568	0.902	0.583
1	3	0.750	0.702	0.917	0.713
3	1	0.873	0.463	0.886	0.550
1	1	0.766	0.622	0.913	0.624
	1	0.698	0.718	0.867	0.748
1		0.842	0.285	0.782	0.412
1	2	0.681	0.684	0.912	0.692

2	1		0.816	0.516	0.886	0.563
	2		0.632	0.728	0.858	0.753
2			0.836	0.264	0.781	0.411
	1		0.728	0.674	0.876	0.739
1			0.807	0.303	0.783	0.414
1	1	1	0.918	0.590	0.955	0.631
1	1	1	0.901	0.569	0.957	0.631
2	1	1	0.926	0.511	0.950	0.585
1	2	1	0.830	0.678	0.918	0.686
2	1	1	0.921	0.504	0.953	0.587
2	2	1	0.869	0.622	0.935	0.644
1	2	1	0.845	0.665	0.921	0.684
2	3	1	0.809	0.671	0.914	0.677
3	2	1	0.882	0.569	0.937	0.614
1	3	1	0.785	0.701	0.890	0.710
3	1	1	0.920	0.455	0.944	0.560
1	2	1	0.842	0.647	0.923	0.682
2	1	1	0.903	0.494	0.955	0.589
1	1	1	0.880	0.601	0.945	0.629
	1	1	0.833	0.670	0.897	0.704
1		1	0.943	0.264	0.895	0.342
1	2	1	0.759	0.684	0.903	0.688
2	1	1	0.886	0.510	0.941	0.582
	2	1	0.733	0.719	0.849	0.732
2		1	0.930	0.255	0.880	0.338
	1	1	0.822	0.629	0.903	0.701
1		1	0.795	0.281	0.780	0.362
1	1	1	0.918	0.590	0.955	0.631
1	1	1	0.901	0.569	0.957	0.631
2	1	1	0.926	0.511	0.950	0.585
1	2	1	0.830	0.678	0.918	0.686
2	1	1	0.921	0.504	0.953	0.587
2	2	1	0.869	0.622	0.935	0.644
1	2	1	0.845	0.665	0.921	0.684
2	3	1	0.809	0.671	0.914	0.677
3	2	1	0.882	0.569	0.937	0.614
1	3	1	0.785	0.701	0.890	0.710
3	1	1	0.920	0.455	0.944	0.560
1	1	1	0.880	0.601	0.945	0.629
	1	1	0.833	0.670	0.897	0.704
1		1	0.943	0.264	0.895	0.342
1	2	1	0.759	0.684	0.903	0.688
2	1	1	0.886	0.510	0.941	0.582
	2	1	0.733	0.719	0.849	0.732
2		1	0.930	0.255	0.880	0.338
	1	1	0.822	0.629	0.903	0.701
1		1	0.899	0.281	0.906	0.362
1	1	1	0.879	0.573	0.925	0.584
1	1	1	0.875	0.559	0.928	0.586
2	1	1	0.862	0.489	0.904	0.541

1	2	1	0.799	0.663	0.908	0.661
2	1	1	0.873	0.489	0.907	0.542
2	2	1	0.814	0.596	0.905	0.594
1	2	1	0.821	0.653	0.912	0.660
2	3	1	0.764	0.649	0.897	0.642
3	2	1	0.811	0.540	0.892	0.559
1	3	1	0.765	0.691	0.886	0.695
3	1	1	0.856	0.439	0.904	0.538
1	1	1	0.825	0.575	0.914	0.581
	1	1	0.833	0.670	0.897	0.704
1		1	0.908	0.273	0.881	0.344
1	2	1	0.723	0.665	0.893	0.662
2	1	1	0.806	0.482	0.896	0.540
	2	1	0.733	0.719	0.849	0.732
2		1	0.867	0.263	0.878	0.343
	1	1	0.822	0.629	0.903	0.701
1		1	0.879	0.291	0.890	0.364
1	1	1	0.895	0.588	0.933	0.612
1	1	1	0.884	0.569	0.936	0.614
2	1	1	0.889	0.508	0.912	0.554
1	2	1	0.811	0.675	0.905	0.681
2	1	1	0.891	0.504	0.916	0.556
2	2	1	0.837	0.617	0.911	0.626
1	2	1	0.829	0.663	0.909	0.679
2	3	1	0.781	0.666	0.896	0.669
3	2	1	0.840	0.563	0.903	0.585
1	3	1	0.772	0.699	0.880	0.707
3	1	1	0.881	0.454	0.906	0.540
1	1	1	0.848	0.596	0.922	0.610
	1	1	0.833	0.670	0.897	0.704
1		1	0.920	0.269	0.884	0.346
1	2	1	0.735	0.680	0.889	0.682
2	1	1	0.838	0.505	0.903	0.551
	2	1	0.733	0.719	0.849	0.732
2		1	0.891	0.260	0.879	0.343
	1	1	0.822	0.629	0.903	0.701
1		1	0.882	0.287	0.892	0.365
1	1	1	0.916	0.586	0.955	0.622
1	1	1	0.900	0.566	0.956	0.624
2	1	1	0.924	0.507	0.948	0.578
1	2	1	0.826	0.672	0.921	0.677
2	1	1	0.920	0.502	0.951	0.581
2	2	1	0.865	0.616	0.936	0.635
1	2	1	0.843	0.660	0.924	0.675
2	3	1	0.804	0.664	0.916	0.668
3	2	1	0.879	0.564	0.936	0.606
1	3	1	0.782	0.695	0.894	0.702
3	1	1	0.918	0.453	0.942	0.555
1	1	1	0.877	0.594	0.945	0.620
	1	1	0.831	0.665	0.899	0.697

1		1	0.943	0.264	0.895	0.342
1	2	1	0.755	0.676	0.906	0.678
2	1	1	0.884	0.506	0.939	0.575
	2	1	0.729	0.712	0.851	0.727
2		1	0.930	0.255	0.880	0.338
	1	1	0.822	0.626	0.905	0.695
1		1	0.899	0.281	0.906	0.362
1	1	1	0.912	0.613	0.937	0.666
1	1	1	0.888	0.584	0.939	0.666
2	1	1	0.920	0.541	0.946	0.647
1	2	1	0.818	0.692	0.892	0.706
2	1	1	0.906	0.526	0.948	0.647
2	2	1	0.859	0.651	0.908	0.688
1	2	1	0.834	0.677	0.897	0.703
2	3	1	0.794	0.692	0.880	0.708
3	2	1	0.873	0.605	0.916	0.674
1	3	1	0.773	0.707	0.867	0.722
3	1	1	0.903	0.475	0.951	0.634
1	1	1	0.878	0.631	0.925	0.668
	1	1	0.831	0.665	0.899	0.697
1		1	0.923	0.243	0.918	0.353
1	2	1	0.745	0.698	0.874	0.709
2	1	1	0.883	0.547	0.935	0.647
	2	1	0.729	0.712	0.851	0.727
2		1	0.905	0.228	0.914	0.351
	1	1	0.822	0.626	0.905	0.695
1		1	0.873	0.263	0.928	0.380
1	1	1	0.876	0.568	0.922	0.575
1	1	1	0.874	0.555	0.926	0.577
2	1	1	0.859	0.486	0.904	0.538
1	2	1	0.794	0.656	0.909	0.650
2	1	1	0.872	0.486	0.907	0.539
2	2	1	0.810	0.591	0.903	0.585
1	2	1	0.818	0.648	0.913	0.650
2	3	1	0.758	0.642	0.897	0.631
3	2	1	0.807	0.536	0.891	0.554
1	3	1	0.761	0.684	0.889	0.686
3	1	1	0.855	0.437	0.904	0.536
1	1	1	0.822	0.569	0.913	0.571
	1	1	0.831	0.665	0.899	0.697
1		1	0.908	0.273	0.881	0.344
1	2	1	0.719	0.656	0.895	0.651
2	1	1	0.804	0.478	0.896	0.537
	2	1	0.729	0.712	0.851	0.727
2		1	0.867	0.263	0.878	0.343
	1	1	0.822	0.626	0.905	0.695
1		1	0.879	0.291	0.890	0.364
1	1	1	0.893	0.584	0.932	0.602
1	1	1	0.883	0.566	0.935	0.604
2	1	1	0.887	0.505	0.911	0.548

1	2	1	0.806	0.669	0.907	0.671
2	1	1	0.890	0.501	0.914	0.551
2	2	1	0.832	0.611	0.911	0.615
1	2	1	0.827	0.658	0.911	0.670
2	3	1	0.775	0.659	0.897	0.658
3	2	1	0.836	0.558	0.901	0.577
1	3	1	0.768	0.692	0.883	0.699
3	1	1	0.879	0.452	0.906	0.537
1	1	1	0.845	0.590	0.921	0.599
	1	1	0.831	0.665	0.899	0.697
1		1	0.920	0.269	0.884	0.346
1	2	1	0.731	0.671	0.892	0.672
2	1	1	0.836	0.500	0.902	0.546
	2	1	0.729	0.712	0.851	0.727
2		1	0.891	0.260	0.879	0.343
	1	1	0.822	0.626	0.905	0.695
1		1	0.882	0.287	0.892	0.365
1	1	1	0.913	0.583	0.955	0.617
1	1	1	0.899	0.564	0.957	0.619
2	1	1	0.922	0.505	0.947	0.574
1	2	1	0.820	0.667	0.924	0.671
2	1	1	0.918	0.500	0.950	0.577
2	2	1	0.860	0.612	0.937	0.629
1	2	1	0.839	0.656	0.927	0.670
2	3	1	0.797	0.659	0.919	0.662
3	2	1	0.874	0.561	0.936	0.600
1	3	1	0.776	0.690	0.898	0.698
3	1	1	0.917	0.451	0.940	0.552
1	1	1	0.874	0.590	0.946	0.614
	1	1	0.828	0.661	0.902	0.694
1		1	0.943	0.264	0.895	0.342
1	2	1	0.749	0.669	0.910	0.672
2	1	1	0.881	0.502	0.938	0.570
	2	1	0.721	0.706	0.856	0.726
2		1	0.930	0.255	0.880	0.338
	1	1	0.821	0.624	0.908	0.692
1		1	0.899	0.281	0.906	0.362
1	1	1	0.909	0.610	0.939	0.663
1	1	1	0.887	0.582	0.941	0.662
2	1	1	0.918	0.538	0.947	0.643
1	2	1	0.813	0.687	0.896	0.703
2	1	1	0.905	0.524	0.949	0.644
2	2	1	0.854	0.647	0.911	0.684
1	2	1	0.830	0.673	0.901	0.700
2	3	1	0.786	0.687	0.884	0.705
3	2	1	0.868	0.601	0.919	0.670
1	3	1	0.767	0.702	0.871	0.720
3	1	1	0.901	0.473	0.952	0.631
1	1	1	0.874	0.626	0.927	0.663
	1	1	0.828	0.661	0.902	0.694

1		1	0.923	0.243	0.918	0.353
1	2	1	0.738	0.692	0.879	0.705
2	1	1	0.880	0.544	0.937	0.642
	2	1	0.721	0.706	0.856	0.726
2		1	0.905	0.228	0.914	0.351
	1	1	0.821	0.624	0.908	0.692
1		1	0.873	0.263	0.928	0.380
1	1	1	0.873	0.565	0.922	0.569
1	1	1	0.872	0.553	0.925	0.572
2	1	1	0.856	0.483	0.904	0.536
1	2	1	0.788	0.651	0.911	0.643
2	1	1	0.870	0.484	0.907	0.538
2	2	1	0.804	0.586	0.903	0.578
1	2	1	0.814	0.644	0.914	0.643
2	3	1	0.751	0.636	0.898	0.623
3	2	1	0.802	0.532	0.892	0.552
1	3	1	0.755	0.679	0.892	0.681
3	1	1	0.853	0.435	0.905	0.535
1	1	1	0.818	0.564	0.912	0.565
	1	1	0.828	0.661	0.902	0.694
1		1	0.908	0.273	0.881	0.344
1	2	1	0.712	0.650	0.897	0.643
2	1	1	0.801	0.475	0.897	0.535
	2	1	0.721	0.706	0.856	0.726
2		1	0.867	0.263	0.878	0.343
	1	1	0.821	0.624	0.908	0.692
1		1	0.879	0.291	0.890	0.364
1	1	1	0.890	0.581	0.931	0.595
1	1	1	0.881	0.564	0.935	0.598
2	1	1	0.884	0.502	0.910	0.545
1	2	1	0.800	0.664	0.910	0.665
2	1	1	0.888	0.499	0.914	0.548
2	2	1	0.827	0.607	0.911	0.608
1	2	1	0.822	0.654	0.913	0.664
2	3	1	0.768	0.654	0.899	0.651
3	2	1	0.831	0.555	0.901	0.571
1	3	1	0.762	0.687	0.887	0.695
3	1	1	0.877	0.450	0.906	0.536
1	1	1	0.841	0.585	0.921	0.591
	1	1	0.828	0.661	0.902	0.694
1		1	0.920	0.269	0.884	0.346
1	2	1	0.725	0.665	0.895	0.665
2	1	1	0.833	0.497	0.902	0.543
	2	1	0.721	0.706	0.856	0.726
2		1	0.891	0.260	0.879	0.343
	1	1	0.821	0.624	0.908	0.692
1		1	0.882	0.287	0.892	0.365

SECONDARY			
Linear Correlations		Rank Correlations	
SRS	NAPLAN	SRS	NAPLAN
0.700	0.339	0.766	0.564
0.824	0.245	0.633	0.257
0.750	0.194	0.633	0.257
0.660	0.249	0.535	0.217
0.714	0.251	0.535	0.217
0.718	0.842	0.891	0.886
0.703	0.846	0.891	0.885
0.687	0.845	0.891	0.886
0.619	0.260	0.612	0.331
0.880	0.739	0.985	0.770
0.906	0.737	0.986	0.771
0.903	0.614	0.966	0.696
0.800	0.810	0.973	0.825
0.921	0.615	0.967	0.697
0.865	0.739	0.984	0.769
0.822	0.810	0.974	0.825
0.821	0.787	0.980	0.803
0.888	0.670	0.977	0.727
0.771	0.829	0.959	0.849
0.907	0.534	0.949	0.663
0.841	0.809	0.975	0.825
0.934	0.615	0.968	0.698
0.942	0.738	0.986	0.769
0.686	0.853	0.896	0.888
0.837	0.277	0.735	0.408
0.875	0.808	0.975	0.825
0.966	0.611	0.966	0.695
0.653	0.849	0.893	0.887
0.812	0.262	0.732	0.404
0.740	0.854	0.903	0.888
0.836	0.300	0.723	0.416
0.880	0.739	0.985	0.770
0.906	0.737	0.986	0.771
0.903	0.614	0.966	0.696
0.800	0.810	0.973	0.825
0.921	0.615	0.967	0.697
0.865	0.739	0.984	0.769
0.822	0.810	0.974	0.825
0.821	0.787	0.980	0.803
0.888	0.670	0.977	0.727
0.771	0.829	0.959	0.849
0.907	0.534	0.949	0.663
0.942	0.738	0.986	0.769
0.686	0.853	0.896	0.888
0.837	0.277	0.735	0.408
0.875	0.808	0.975	0.825

0.966	0.611	0.966	0.695
0.653	0.849	0.893	0.887
0.812	0.262	0.732	0.404
0.740	0.854	0.903	0.888
0.868	0.300	0.743	0.416
0.790	0.695	0.897	0.691
0.821	0.697	0.899	0.692
0.763	0.562	0.863	0.643
0.754	0.784	0.933	0.784
0.786	0.566	0.866	0.644
0.772	0.693	0.895	0.690
0.777	0.786	0.934	0.785
0.758	0.752	0.922	0.748
0.764	0.616	0.867	0.649
0.743	0.814	0.937	0.824
0.752	0.489	0.865	0.642
0.847	0.689	0.893	0.689
0.686	0.853	0.896	0.888
0.679	0.278	0.742	0.460
0.829	0.780	0.932	0.784
0.820	0.556	0.860	0.642
0.653	0.849	0.893	0.887
0.647	0.264	0.741	0.460
0.740	0.854	0.903	0.888
0.731	0.301	0.742	0.460
0.829	0.728	0.922	0.738
0.858	0.727	0.925	0.739
0.824	0.600	0.871	0.652
0.771	0.804	0.939	0.816
0.845	0.603	0.874	0.653
0.811	0.727	0.921	0.737
0.794	0.805	0.941	0.816
0.783	0.778	0.936	0.787
0.817	0.656	0.890	0.680
0.752	0.826	0.936	0.845
0.819	0.523	0.865	0.643
0.885	0.725	0.919	0.736
0.686	0.853	0.896	0.888
0.742	0.282	0.742	0.460
0.845	0.801	0.939	0.815
0.879	0.596	0.867	0.651
0.653	0.849	0.893	0.887
0.710	0.267	0.742	0.460
0.740	0.854	0.903	0.888
0.788	0.305	0.742	0.460
0.870	0.742	0.983	0.759
0.897	0.740	0.984	0.760
0.895	0.615	0.961	0.686
0.786	0.814	0.975	0.815
0.913	0.616	0.962	0.688

0.853	0.741	0.982	0.759
0.809	0.814	0.976	0.815
0.808	0.790	0.980	0.793
0.878	0.671	0.973	0.715
0.746	0.834	0.944	0.841
0.900	0.534	0.936	0.657
0.933	0.740	0.984	0.758
0.669	0.859	0.897	0.886
0.837	0.277	0.735	0.408
0.864	0.811	0.977	0.815
0.959	0.611	0.961	0.684
0.635	0.854	0.893	0.886
0.812	0.262	0.732	0.404
0.726	0.861	0.904	0.886
0.868	0.300	0.743	0.416
0.849	0.798	0.961	0.838
0.880	0.793	0.964	0.838
0.898	0.690	0.979	0.807
0.756	0.841	0.939	0.862
0.919	0.688	0.980	0.808
0.829	0.799	0.959	0.838
0.782	0.842	0.942	0.862
0.776	0.829	0.947	0.853
0.868	0.745	0.971	0.821
0.731	0.851	0.930	0.872
0.915	0.599	0.987	0.786
0.903	0.798	0.962	0.838
0.669	0.859	0.897	0.886
0.809	0.241	0.777	0.455
0.829	0.838	0.941	0.862
0.953	0.690	0.981	0.806
0.635	0.854	0.893	0.886
0.778	0.220	0.768	0.443
0.726	0.861	0.904	0.886
0.840	0.273	0.786	0.469
0.779	0.696	0.889	0.678
0.811	0.698	0.892	0.679
0.754	0.561	0.863	0.643
0.739	0.786	0.929	0.769
0.777	0.566	0.866	0.643
0.760	0.693	0.887	0.677
0.764	0.789	0.931	0.770
0.744	0.753	0.916	0.733
0.753	0.616	0.865	0.646
0.728	0.817	0.936	0.812
0.745	0.488	0.865	0.642
0.837	0.689	0.885	0.676
0.669	0.859	0.897	0.886
0.679	0.278	0.742	0.460
0.817	0.782	0.928	0.769

0.812	0.554	0.860	0.642
0.635	0.854	0.893	0.886
0.647	0.264	0.741	0.460
0.726	0.861	0.904	0.886
0.731	0.301	0.742	0.460
0.817	0.730	0.916	0.723
0.848	0.729	0.919	0.725
0.814	0.600	0.868	0.648
0.757	0.807	0.938	0.803
0.837	0.603	0.871	0.648
0.799	0.728	0.914	0.722
0.781	0.808	0.940	0.803
0.769	0.781	0.932	0.772
0.807	0.656	0.883	0.669
0.737	0.830	0.937	0.836
0.812	0.522	0.866	0.643
0.875	0.726	0.912	0.721
0.669	0.859	0.897	0.886
0.742	0.282	0.742	0.460
0.833	0.804	0.937	0.802
0.871	0.595	0.864	0.646
0.635	0.854	0.893	0.886
0.710	0.267	0.742	0.460
0.726	0.861	0.904	0.886
0.788	0.305	0.742	0.460
0.861	0.741	0.981	0.750
0.888	0.739	0.982	0.751
0.888	0.613	0.957	0.679
0.773	0.813	0.977	0.806
0.907	0.614	0.958	0.680
0.843	0.740	0.980	0.749
0.797	0.815	0.978	0.806
0.796	0.789	0.981	0.784
0.870	0.670	0.968	0.705
0.743	0.834	0.966	0.834
0.896	0.532	0.941	0.652
0.924	0.738	0.982	0.748
0.654	0.859	0.898	0.888
0.837	0.277	0.735	0.408
0.853	0.810	0.979	0.806
0.952	0.609	0.956	0.677
0.618	0.854	0.894	0.887
0.812	0.262	0.732	0.404
0.712	0.863	0.906	0.887
0.868	0.300	0.743	0.416
0.838	0.798	0.965	0.834
0.871	0.793	0.967	0.833
0.890	0.689	0.981	0.802
0.742	0.841	0.944	0.860
0.911	0.687	0.982	0.802

0.818	0.798	0.963	0.834
0.769	0.842	0.946	0.860
0.763	0.828	0.951	0.849
0.858	0.744	0.973	0.815
0.717	0.851	0.933	0.871
0.908	0.598	0.988	0.780
	0.797		0.833
0.654	0.859	0.898	0.888
0.809	0.241	0.777	0.455
0.816	0.837	0.945	0.860
0.944	0.688	0.983	0.801
0.618	0.854	0.894	0.887
0.778	0.220	0.768	0.443
0.712	0.863	0.906	0.887
0.840	0.273	0.786	0.469
0.769	0.694	0.884	0.670
0.802	0.697	0.887	0.671
0.746	0.558	0.864	0.644
0.727	0.785	0.926	0.758
0.770	0.563	0.867	0.644
0.749	0.691	0.882	0.669
0.752	0.788	0.928	0.759
0.732	0.751	0.912	0.722
0.745	0.613	0.865	0.646
0.714	0.816	0.935	0.801
0.739	0.486	0.866	0.642
0.827	0.687	0.880	0.668
0.654	0.859	0.898	0.888
0.679	0.278	0.742	0.460
0.805	0.780	0.924	0.757
0.805	0.552	0.860	0.643
0.618	0.854	0.894	0.887
0.647	0.264	0.741	0.460
0.712	0.863	0.906	0.887
0.731	0.301	0.742	0.460
0.807	0.728	0.911	0.713
0.839	0.729	0.915	0.714
0.807	0.598	0.868	0.647
0.744	0.806	0.936	0.791
0.830	0.601	0.870	0.647
0.788	0.726	0.910	0.712
0.769	0.808	0.938	0.792
0.757	0.779	0.929	0.761
0.797	0.654	0.879	0.662
0.723	0.830	0.938	0.827
0.806	0.520	0.866	0.643
0.865	0.724	0.907	0.711
0.654	0.859	0.898	0.888
0.742	0.282	0.742	0.460
0.821	0.802	0.935	0.791

0.863	0.593	0.863	0.646
0.618	0.854	0.894	0.887
0.710	0.267	0.742	0.460
0.712	0.863	0.906	0.887
0.788	0.305	0.742	0.460
0.895	0.731	0.980	0.768
0.917	0.727	0.981	0.769
0.912	0.611	0.963	0.697
0.809	0.807	0.963	0.821
0.928	0.611	0.964	0.698
0.870	0.736	0.975	0.769
0.830	0.806	0.964	0.821
0.824	0.785	0.968	0.802
0.892	0.668	0.970	0.728
0.776	0.828	0.947	0.846
0.915	0.533	0.947	0.665
0.849	0.805	0.965	0.821
0.941	0.611	0.965	0.699
0.940	0.731	0.979	0.767
0.726	0.849	0.902	0.877
0.866	0.292	0.770	0.416
0.866	0.805	0.962	0.821
0.960	0.609	0.960	0.696
0.671	0.850	0.887	0.883
0.835	0.272	0.760	0.409
0.772	0.846	0.908	0.876
0.829	0.311	0.719	0.426
0.895	0.731	0.980	0.768
0.917	0.727	0.981	0.769
0.912	0.611	0.963	0.697
0.809	0.807	0.963	0.821
0.928	0.611	0.964	0.698
0.870	0.736	0.975	0.769
0.830	0.806	0.964	0.821
0.824	0.785	0.968	0.802
0.892	0.668	0.970	0.728
0.776	0.828	0.947	0.846
0.915	0.533	0.947	0.665
0.940	0.731	0.979	0.767
0.726	0.849	0.902	0.877
0.866	0.292	0.770	0.416
0.866	0.805	0.962	0.821
0.960	0.609	0.960	0.696
0.671	0.850	0.887	0.883
0.835	0.272	0.760	0.409
0.772	0.846	0.908	0.876
0.889	0.311	0.779	0.426
0.812	0.691	0.900	0.689
0.840	0.692	0.902	0.691
0.781	0.562	0.867	0.641

0.766	0.782	0.928	0.781
0.802	0.566	0.869	0.642
0.782	0.692	0.893	0.690
0.789	0.783	0.929	0.781
0.764	0.751	0.916	0.747
0.774	0.617	0.866	0.649
0.749	0.813	0.928	0.821
0.767	0.491	0.867	0.640
0.854	0.688	0.896	0.688
0.726	0.849	0.902	0.877
0.730	0.294	0.755	0.435
0.823	0.780	0.925	0.780
0.825	0.557	0.862	0.641
0.671	0.850	0.887	0.883
0.681	0.274	0.755	0.435
0.772	0.846	0.908	0.876
0.772	0.313	0.764	0.445
0.847	0.722	0.924	0.735
0.873	0.720	0.926	0.736
0.838	0.599	0.876	0.651
0.782	0.801	0.933	0.812
0.858	0.601	0.878	0.652
0.819	0.725	0.917	0.736
0.804	0.801	0.934	0.811
0.787	0.777	0.928	0.785
0.824	0.655	0.889	0.680
0.758	0.825	0.926	0.842
0.831	0.523	0.868	0.641
0.888	0.721	0.921	0.734
0.726	0.849	0.902	0.877
0.786	0.298	0.755	0.434
0.837	0.800	0.931	0.811
0.879	0.596	0.871	0.650
0.671	0.850	0.887	0.883
0.741	0.278	0.755	0.435
0.772	0.846	0.908	0.876
0.821	0.317	0.765	0.445
0.885	0.734	0.978	0.758
0.909	0.730	0.979	0.758
0.905	0.611	0.958	0.688
0.796	0.811	0.965	0.811
0.921	0.612	0.960	0.689
0.859	0.738	0.973	0.758
0.818	0.811	0.966	0.811
0.811	0.788	0.969	0.791
0.882	0.669	0.965	0.716
0.761	0.833	0.950	0.837
0.909	0.533	0.942	0.659
0.932	0.734	0.977	0.757
0.712	0.856	0.904	0.873

0.866	0.292	0.770	0.416
0.855	0.809	0.964	0.811
0.954	0.609	0.955	0.687
0.654	0.856	0.888	0.881
0.835	0.272	0.760	0.409
0.760	0.854	0.910	0.872
0.889	0.311	0.779	0.426
0.867	0.789	0.957	0.829
0.893	0.781	0.959	0.829
0.906	0.685	0.973	0.803
0.767	0.839	0.930	0.856
0.925	0.681	0.974	0.803
0.834	0.795	0.949	0.834
0.792	0.839	0.933	0.856
0.778	0.828	0.934	0.849
0.870	0.742	0.960	0.818
0.736	0.850	0.918	0.868
0.919	0.597	0.981	0.783
0.904	0.791	0.956	0.829
0.712	0.856	0.904	0.873
0.844	0.267	0.804	0.453
0.820	0.837	0.930	0.856
0.944	0.686	0.973	0.802
0.654	0.856	0.888	0.881
0.806	0.238	0.799	0.444
0.760	0.854	0.910	0.872
0.863	0.290	0.816	0.469
0.801	0.692	0.893	0.676
0.830	0.694	0.896	0.678
0.772	0.561	0.867	0.640
0.752	0.785	0.925	0.767
0.794	0.566	0.869	0.640
0.771	0.692	0.886	0.677
0.776	0.786	0.927	0.767
0.750	0.753	0.911	0.732
0.763	0.616	0.864	0.646
0.734	0.816	0.928	0.808
0.761	0.490	0.868	0.639
0.844	0.688	0.889	0.675
0.712	0.856	0.904	0.873
0.730	0.294	0.755	0.435
0.812	0.782	0.922	0.766
0.817	0.556	0.862	0.639
0.654	0.856	0.888	0.881
0.681	0.274	0.755	0.435
0.760	0.854	0.910	0.872
0.772	0.313	0.764	0.445
0.837	0.724	0.918	0.721
0.864	0.722	0.921	0.722
0.829	0.599	0.872	0.646

0.768	0.805	0.932	0.798
0.850	0.601	0.874	0.647
0.807	0.726	0.911	0.722
0.792	0.805	0.934	0.799
0.773	0.779	0.925	0.771
0.813	0.655	0.882	0.669
0.743	0.829	0.927	0.832
0.824	0.523	0.868	0.640
0.878	0.722	0.915	0.719
0.712	0.856	0.904	0.873
0.786	0.298	0.755	0.434
0.825	0.802	0.930	0.798
0.872	0.595	0.868	0.645
0.654	0.856	0.888	0.881
0.741	0.278	0.755	0.435
0.760	0.854	0.910	0.872
0.821	0.317	0.765	0.445
0.877	0.733	0.977	0.748
0.901	0.730	0.978	0.749
0.898	0.610	0.955	0.681
0.785	0.811	0.968	0.802
0.916	0.611	0.956	0.682
0.850	0.737	0.972	0.748
0.808	0.811	0.969	0.803
0.800	0.788	0.970	0.783
0.874	0.668	0.962	0.705
0.749	0.833	0.955	0.830
0.904	0.531	0.940	0.654
0.924	0.732	0.975	0.747
0.698	0.857	0.908	0.871
0.866	0.292	0.770	0.416
0.845	0.808	0.967	0.802
0.948	0.607	0.952	0.680
0.639	0.856	0.892	0.881
0.835	0.272	0.760	0.409
0.749	0.856	0.914	0.870
0.889	0.311	0.779	0.426
0.858	0.789	0.961	0.824
0.886	0.782	0.963	0.824
0.899	0.684	0.975	0.797
0.754	0.839	0.936	0.853
0.918	0.680	0.977	0.797
0.824	0.795	0.954	0.829
0.780	0.840	0.938	0.853
0.766	0.827	0.939	0.845
0.860	0.741	0.963	0.812
0.723	0.850	0.923	0.866
0.913	0.595	0.982	0.777
0.895	0.791	0.960	0.824
0.698	0.857	0.908	0.871

0.844	0.267	0.804	0.453
0.808	0.837	0.935	0.853
0.937	0.684	0.975	0.796
0.639	0.856	0.892	0.881
0.806	0.238	0.799	0.444
0.749	0.856	0.914	0.870
0.863	0.290	0.816	0.469
0.792	0.691	0.889	0.668
0.822	0.692	0.892	0.669
0.765	0.559	0.868	0.640
0.741	0.784	0.923	0.756
0.788	0.564	0.870	0.640
0.761	0.690	0.883	0.669
0.765	0.786	0.925	0.757
0.738	0.751	0.908	0.722
0.755	0.614	0.864	0.645
0.721	0.816	0.929	0.797
0.755	0.488	0.869	0.638
0.836	0.686	0.885	0.667
0.698	0.857	0.908	0.871
0.730	0.294	0.755	0.435
0.801	0.780	0.920	0.755
0.811	0.553	0.863	0.639
0.639	0.856	0.892	0.881
0.681	0.274	0.755	0.435
0.749	0.856	0.914	0.870
0.772	0.313	0.764	0.445
0.828	0.723	0.915	0.710
0.856	0.722	0.918	0.712
0.822	0.597	0.872	0.644
0.756	0.804	0.932	0.788
0.844	0.599	0.874	0.645
0.797	0.725	0.908	0.711
0.781	0.805	0.934	0.788
0.761	0.778	0.923	0.760
0.805	0.653	0.879	0.662
0.730	0.829	0.930	0.823
0.819	0.521	0.869	0.639
0.870	0.721	0.911	0.709
0.698	0.857	0.908	0.871
0.786	0.298	0.755	0.434
0.814	0.801	0.929	0.787
0.865	0.593	0.867	0.643
0.639	0.856	0.892	0.881
0.741	0.278	0.755	0.435
0.749	0.856	0.914	0.870
0.821	0.317	0.765	0.445

FINAL REPORT

Consideration of needs based loadings in school funding arrangements

Stephen Farish
30 June 2015

Introduction

Current schools funding arrangements under the *Australian Education Act 2013* and the *Australian Education Regulation 2013* will be maintained through to the year 2017. Funding which is targeted towards educational disadvantage is intended to address the cost of achieving certain educational outcomes for students and schools with particular characteristics.

The current Schooling Resource Standard (SRS) model contains separate loadings to address educational disadvantage including for students from low socio-economic status backgrounds (low SES), Aboriginal and Torres Strait Islander students (ATSI), students with disability (SWD), students with low English proficiency, school location and school size.

The purpose of this project is to examine the feasibility of simplifying the loadings structure and the possibility of using a single composite loading for allocating needs-based funding.

A composite approach has the potential to more accurately compensate for overlaps where particular measures of disadvantage are correlated by identifying the central construct of educational disadvantage.

Summary of the project process

A large dataset of schools was constructed with four main dimensions (ATSI, Remoteness, socio-educational advantage (SEA) and school size). A large number of potential composite indices were constructed, and then tested by being referenced to both existing SRS funding levels and National Assessment Program - Literacy and Numeracy (NAPLAN) scores. The SWD and low English proficiency loadings were excluded from the development of a potential composite index, as there are separate policy and data processes underway to review these loadings.

The conclusion to be drawn from the analyses herewith is that it is possible to construct a wide variety of composite indices that are well correlated with current SRS funding levels whilst concurrently being also reasonably well correlated with NAPLAN outcomes. The indices tested herein did not utilise SRS nor NAPLAN directly in their construction. SRS and NAPLAN were used only as reference variables to identify how well the models performed.

Work remains to be done to identify whether such a composite index would have relative stability over time, thereby reducing funding volatility. At the time of performing these analyses and writing this report the data were not available to investigate this issue.

Considerations to understand loadings

In a composite index there are two different mechanisms available for creating a linear combination of those factors. The first mechanism is an empirical approach whereby the data determines the loadings. This was performed through Principal Components Analysis, and is indicated in Attachment A.

The second mechanism for combining factors is where a judgement is made about the weightings, which may be based on various political or social considerations. These are denoted in Attachment B.

One commonly used weighting scheme is where all the components are equally weighted. However it is essential that if components are to be weighted equally that they have the same level of influence. As such they need to be standardised prior to aggregation so that they have the same mean and standard deviation. In the empirical approach, the mean and standard deviation become mathematically irrelevant, therefore the relative components were standardised prior to any analyses. For the purposes of this analysis a mean of 50 and a standard deviation of 10 was used. It should be noted that regardless of the mean and standard deviation chosen, all the values in the tables would remain identical.

All standardisations were performed across the entire dataset. This was necessary because ultimately any index that is constructed would be applied to primary schools, secondary schools and combined schools, with appropriate adjustments being made for whether students were primary or secondary students. Standardisation separately across primary and secondary schools would confound the analysis because indices would be based on different measures for the four dimensions used (ATSI, Remoteness, SEA and School Size).

Empirical Models

For the empirical models, the loadings are those determined by a Principal Components Analysis which maximises the total explained common variation within the group of variables included in the model, by constructing a single variable which contains this common variation. For this reason they are generally decimal values between zero and one. Analysis was conducted separately for primary and secondary schools because SRS levels for students at these schools are different, and correlations with SRS would be confounded by the different base funding levels. For this reason, the loadings differ, and are thus reported separately in the tables.

NAPLAN was considered as one of the variables for inclusion in a model. However, any index that actually utilises NAPLAN scores as part of the index creates the risk of rewarding failure by increasing funding in a way that is dependent on decreasing NAPLAN scores. Using NAPLAN in the model also risks creating an index similar to the Index of Community Socio-Educational Advantage (ICSEA), which was developed to enable fair and meaningful comparisons between schools on the basis of the performance of their students in NAPLAN, rather than distribute funding.

It was thus decided to just use NAPLAN as a reference variable to ensure that funding would be directed, in general terms, towards schools that were expected to perform less well on NAPLAN. This was achieved by excluding NAPLAN from any model, and then measuring the correlation of the model output with NAPLAN scores.

Nominal Models

For the nominal models, it is possible to construct a particular 'flavour' of index by determining specific weightings. Common weightings are frequently integers so that the relative weightings are readily interpretable. Whilst the variables were standardised prior to analysis to ensure that they had equal weight before specific loadings were applied, it is the case that regardless of the particular mean and standard deviation chosen, all the values in the tables would remain identical.

In the case where a single variable alone is used in the model, the empirical and nominal models generate the same result. In this case the tables report the Model Type as Unitary.

Considerations to understand correlations

Linear correlations measure the extent to which the two variables being correlated fall on a straight line. As such, linear correlation is the most appropriate correlation when trying to determine whether a particular model best predicts the dollar amount of SRS.

It is important to note that funding based on a formula-generated index is simply a linear transformation of that index. The correlation between any two variables is not mathematically changed by recalculating either one (or both) with a linear transformation. This is true for both linear correlations and rank correlations. In this report a high correlation is indicative of the ability of that index to predict or determine an amount of funding via a linear transformation of index into dollar amounts. This linear transformation was not actually performed because it does not affect the interpretation of the index's ability to predict or determine funding. When a model is actually constructed, the loadings are adjusted to reflect the raw variables rather than the standardised variables.

Rank correlations on the other hand only measure the extent to which the order of the two variables being correlated is the same. From the perspectives of school systems, this is often more useful as they are better placed to rank schools rather than to determine exact dollar amounts for funding. Indeed, when presented with fine-grained socio-economic scores for schools, it is generally the case that schools are still compared using this data on the basis of the order in which they fall.

Because per-student base-level funding is substantially different according to whether the school is a primary school or a secondary school, correlations will largely be confounded by whether a school is primary or secondary. Therefore all analyses looking at relationships between the models and the two reference values of SRS and NAPLAN were performed separately for primary and secondary schools. These analyses are presented side-by-side for each model.

Referencing against SRS

In correlating model outcomes with SRS, it is necessary to ensure that the value of SRS is appropriate to those factors included in the model. As noted above, students with disability and students with low English proficiency were deemed not suitable for inclusion in a composite index for data and policy reasons and therefore the corresponding loading amounts were removed from all SRS measures to ensure consistency in the comparison. Similarly, when a model excluded the ATSI and/or size variable, the corresponding SRS value also excluded the ATSI and/or size loading.

In all instances for modelling purposes, SRS measures are calculated on a per-student basis to allow valid comparisons to be made without student enrolments dominating the total dollar amount. Also for comparative purposes, SRS values are exclusive of capacity to contribute and negotiated transition arrangements and deals.

Referencing against NAPLAN

All variables used in the analyses in this report are structured such that a higher value is associated with greater need. The one exception to this is NAPLAN scores. All correlations of indices with NAPLAN scores were therefore negative. For clarity, all correlations with NAPLAN scores are reported without the negative sign in the tables. It should be noted that the magnitude of the correlation is measured by the size of the correlation measured, and the direction is simply indicated by the sign of the correlation. Thus in the tables, all correlations with NAPLAN are still valid measures of the magnitude of the association.

The variables used in the models

Four dimensions were considered and used in this modelling approach. They were:

- ATSI
- Remoteness/isolation as measured by ARIA scores
- SEA[1]
- School size

The specifications for these variables are as follows:

ATSI variable

ATSIF	The fraction of students at school that were identified as being of Aboriginal or Torres Strait Islander background

ARIA variables

ARIA	The actual ARIA score for the school ranging from zero for highly

[1] Given the timeframe for the project, SEA Quarter data published on the My School website was used for the analysis. However, future work should consider whether the more detailed data underpinning the SEA Quarters could be requested from ACARA and used in composite indicators to potential improve the models.,

	accessible areas (i.e. a metropolitan school) to 15 for highly remote areas.
ARIA2	The square of the above ARIA score
ARIAL	The ARIA category of the school used as a number where: 1 = Metropolitan/Urban 2 = Provincial/Urban 3 = Remote 4 = Very remote
ARIAL2	The ARIA category of the school used as a number but with different magnitude (squared pattern) where: 1 = Metropolitan/Urban 4 = Provincial/Urban 9 = Remote 16 = Very remote

SEA variables

QSEAL	SEA values were available according to the percentage (P1-P4) of student families (students, effectively) in each of four SEA quartiles (Q1-Q4). QSEAL was calculated via the following formula: QSEAL=(P1 x 1 + P2 x 2 + P3 x 3 + P4 x 4)/(P1+P2+P3+P4)
QSEAQ	This was calculated using the same quartile percentages as used in QSEAL but according to a quadratic formula: QSEAL=(P1 x 1 + P2 x 4 + P3 x 9 + P4 x 16)/(P1+P2+P3+P4)
QSEAL2	This was the square of QSEAL, that is QSEAL2 = QSEAL x QSEAL

SIZE variable

SIZEL	The size variable was calculated separately for primary and secondary schools. For primary schools the currently used size loading does not apply if the school size exceeds 300 students. For secondary schools it does not apply if the school size exceeds 700 students. A reciprocal formula ensured that the smaller the school the greater the loading. The primary school size variable was calculated as: SIZEL=MAXIMUM OF 0 and 300/Enrolment–1 The secondary school size variable was calculated as: SIZEL= MAXIMUM OF 0 and 700/Enrolment–1

The variables representing ATSI, School Size and Remoteness were pointed such that higher values suggested greater disadvantage. The measures based on SEA pointed in the other direction. Therefore SEA components of indices were reversed before analysis for consistency. In addition because SRS increased with perceived need, it was important that all measures were facing in the same direction. This also allowed loadings to be represented as positive, rather than being inconveniently negative at times.

The reference variables used to compare the models

The two variables used to check the dimensions used in this modelling approach. They were:

- NAPLAN Scores
- SRS

The specifications for these variables are as follows:

NAPLAN variable

For each school the NAPLAN scores were based on two consecutive years of data (2013 and 2014) and utilised two core domains of NAPLAN; reading and numeracy. Year 5 mean scores were used for primary schools and Year 9 mean scores were used secondary schools.

SRS variable

For each school the SRS variable was the 2014 per-student amount of funding after adjustment as described above under the heading "*Referencing against SRS*".

Dataset considerations

Overall a total of 8,900 schools were available for initial analysis. These were the schools for which all data was available. Of these 6,219 were primary schools, 1,350 were secondary schools and 1,331 were combined schools. Schools flagged as "special" were excluded at the outset because of the decision to not include students with disability.

The 1,331 combined schools were also subsequently excluded for the reasons previously stated. The potential impact of excluding combined schools from the analysis and potential methods for including them needs to be considered if further work is undertaken.

A further 61 schools were excluded. Sixteen because of very small enrolments, 31 because of per-student SRS over $50,000 and 14 for both very small enrolments and high SRS. This left a total of 7,508 schools in the data set that was used.

Discussion of findings

In this project a total of 563 variations of possible indices were produced.

Very high correlations (greater than 0.90) with SRS are able to be obtained for a large number of models. Correlations with NAPLAN around 0.60 are relatively easy to obtain.

A measure of the average of primary and secondary school linear correlations with SRS was calculated, and the best 60 correlations were extracted. These are sorted in Attachment C. The sort order is based on the average of the primary and secondary linear correlations with SRS. It should be noted that although there were 493 nominal models and 70 empirical models, in the top 60 there were 24 empirical models and 36 nominal models. Remember that neither form of model explicitly incorporated any SRS measure, which suggests that an empirical model is more likely to best correlate with SRS.

Simple means were calculated across various measures that defined the models. Using all models, the following statements can be made.

- Empirical models were only slightly better than nominal models
- There difference between models with 3 dimensions and those with 4 are minor. Models with 2 or 1 dimensions perform considerably worse.
- Models with ATSI excluded performed marginally better than those with ATSI included (this could be related to the method of inclusion)
- ARIA and ARIA2 outperformed ARIAL2, which outperformed ARIAL
- QSEAL and QSEAL2 outperformed QSEAQ
- The inclusion of SIZEL only marginally improved most model outcomes

For Empirical models:

- The best number of dimensions was 4, however this is mathematically always true, and 3 is almost as effective.
- ARIA2 performed best
- QSEAL performed best
- SIZEL had negligible effect

For Nominal models:

- Three dimensions appears to perform best
- ARIA or ARIA2 are the most effective
- QSEAL performed best
- SIZEL had little effect

A potential best model has these features: An Empirical model which includes the variables ARIA2, QSEAL and SIZEL, but no ATSI (handled separately). However, it should be noted that several variant loading combinations produce very similar outcomes.

Possible application of a composite index

As with the previous SES model approach, it is a relatively simple to design a formula by which specific values of an index are able to be translated into an amount of dollar funding for a particular school. This can include specific features such as floor and ceiling levels of funding, and may or may not include a straight line or other form of slope.

The analysis included in this report has focused on the broad fit of the models to the current SRS, however, further work needs to be done to apply actual dollar figures against potential best models for comparison with current levels of school funding. This was not in scope for the current analysis.

These indices all utilise data that is currently already being collected at the school level. Thus the cost associated with constructing a composite index should only be the marginal cost beyond what is already spent on data collection.

Other considerations

One potential disadvantage is the averaging effect of utilising multiple components. However, each of the variables used is correlated with the other variables in the model. The averaging effect is a major disadvantage when there is no correlation between the composite variables. This is not the case and as such the averaging effect is not severe enough to discount such an approach.

A technical comment about composite scores and separately funded programs

Constructing a composite index as the basis of a single funding formula that can determine funding levels has several advantages. However two things should be made clear.

The first is that a composite index can often be confusing to the stakeholders in that there is a strong desire to understand how the composite index is constructed. Generally this comes from a perceived need to identify the individual components, and thereby to validate that the funding has been appropriately targeting the identified needs and disadvantages of a particular school. When programs are separately funded it becomes clear what money is provided for, and where it comes from. If the school is provided with a single composite index score to determine funding it is often unclear how much of funding is attributable to each measure. This reduces the face validity of the index and of the received funding.

The second is a mathematical issue. In some applications, there may be no fundamental mathematical difference between providing funds for separate programs and the construction of a composite index from which single-source funding is made available. The following hypothetical example, based on the data for a secondary school used in this analysis, and a real result from an example 3-variable empirical model will serve to illustrate this point.

Consider that a composite index of the following form exists, where a higher score means greater need.

$$\text{Index} = 183 + 122 \times \text{ATSIF} + 8 \times \text{ARIA} - 18 \times \text{QSEAL}$$

Imagine that the funding is set at 100 times the index score. So a school with ATSIF= 0.02 (2%), ARIA=2.1, QSEAL=2.2 would have an index score of 162.64 and thus would receive per-student funding of 100 x 162.64 or $16,264 per student.

However, if instead there was a minimum base entitlement of $11,100 and three separate funding programs as follows: $800 for every ARIA point, $122 for every 1% ATSI enrolment plus $18 for each QSEAL point below 4 (the theoretical maximum), then the same school would receive a base of $11,100 plus 122 x 2 = $244 for the

ASTI program plus \$80 x 2.1 = \$162 from the remoteness program (ARIA) and \$18 x (4–2.2) = \$3,240 from the SEA program. This is a total of \$16,264 per student, and is exactly the same amount as determined from the composite Index score. This would occur regardless of the chosen ATSI percentage, ARIA score, and SEA value, with possible exceptions.

The obvious exception being when a ceiling or floor was reached in an individual program. For example if one chose that the remoteness program did not fund below an ARIA score of 1, as currently occurs in the school location loading in the SRS, then the composite index and the sum of the separate funding programs would differ. Components of the index would not necessarily have ceiling or floor amounts, and may cancel each other out. This is however a trivial difference.

The difference between indices such as ICSEA and others such as SEA or SES

It is important to understand the difference between the construction of ICSEA and the construction of the SES scores used by the Australian Government to fund non-government schools from 2001-2013.

The SES model was chosen because it incorporated a series of variables that were correlated with academic achievement of students. However, once these were identified, they were put into a Principal Components Analysis which did not take immediate regard to the individual relationships between those variables and academic achievement. These variables were also chosen because they were measures with face validity as measures of socio-economic status, and once identified, the construction of dimensions (indices) proceeded without regard to student achievement.

ICSEA, on the other hand was constructed by a regression approach which maximised the relationship between the components of ICSEA and NAPLAN. This explains why ICSEA scores at the school level have a much stronger association with NAPLAN than do SES scores.

There is potentially merit in having both parent level and community level socio-economic measures included in a composite index. Criticism has been targeted at individual parent level data underlying the ICSEA and SEA measures because of the possibility of manipulation, and because of volatility over time. Census-based data, on which SES is based, captures community levels of social economic status and is not subject to these two criticisms. However, SES scores are already being used in the current funding model as a measure of parents and school communities “capacity to contribute” to a school’s operating costs. Reviewing capacity to contribute was out-of-scope for this work.

Conclusion

There are several excellent options for the production of an empirical or a nominal model that correlates very highly (greater than 0.93) with 2014 SRS funding levels. A potential best model could include ARIA2, QSEAL and SIZEL, with ATSI handled separately.

An empirical model has face validity because it directly uses the data available in order to establish the relationships between the variables used. It has the disadvantage that over time these relationships may change slightly and need revision which can lead to a lack of faith in the model. A hybrid alternative is to establish the relationships with an empirical model and then to select a nominal model that closely reflects the empirical one. Consistent with the above analysis, the loadings of the nominal model could be rounded values of the empirical loadings.

Further work could identify the potential best model for consideration. This would require actual dollar figures to be placed against such models for comparison with current levels of school funding.

If more data became available, further work could also explore the stability of composite indices over time and investigate whether the inclusion of more detailed SEA data could improve the composite indicators.

Consultant's Report on Recalculation of the "Modified A" SES Index using the 2006 Census.

Comparability of percentage variables used – 2001 and 2006.

Key percentage variables are used in constructing the four dimensions (*Occupation*, *Education*, *Income*, and *Income for families with children*). Several of the variables in the 2006 ABS data file are directly comparable to those in the 2001 ABS data file, whilst several are not.

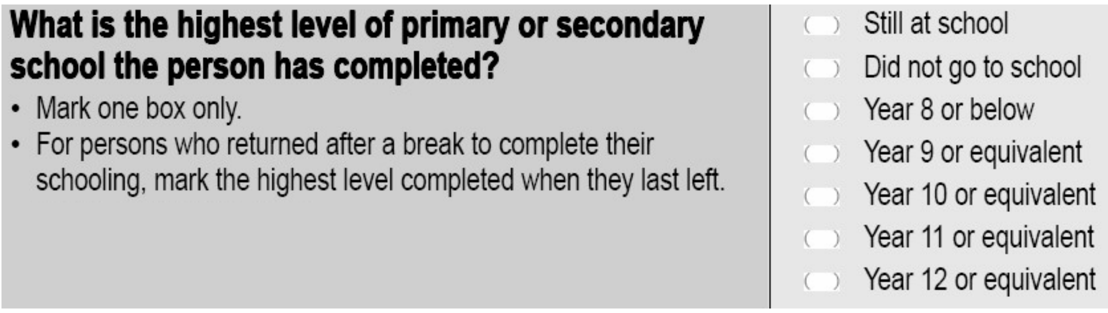
In some cases, variables had to be adjusted for inflationary influences. The table below shows the variables used in 2001 and in 2006. Descriptions are for the 2006 variable, except where a 2001 variable is dropped (described in italics). The national averages are also given. Variables in 2006 that had special adjustments between censuses are shown in bold. The adjustments are described below the table.

Var 2001	Var 2006	Var 2006	Value 2001	Value 2006
Education Dimension				
EDN_DEGR	EDN_DEGR	Diploma, degree+	21.1	23.1
EDN_LSY9	EDN_LSY9	Left school year 9	18.3	14.2
EDN_NOTA	EDN_NOTA	Never attend school	1.1	0.9
EDN_ST15		*Still at schools aged 15+*	3.7	
	EDN_STUD	Tertiary Students 15-24		22.0
EDN_TROQ	EDN_TROQ	Trade certificate	17.9	17.6
EDN_WNOQ	EDN_WNOQ	No qualifications	61.0	59.3
Income (families with children) Dimension				
FIN_G100	**FIN_G130**	Fam w/kids Income > $130,000pa	6.6	15.9
FIN_LT52	FIN_LT52	Fam w/kids Income < $52,000pa	25.0	35.3
Income Dimension				
INC_G100	**INC_G117**	HH Income > $117,000pa	9.6	15.5
INC_LT40	**INC_LT52**	HH Income < $52,000pa	49.4	45.9
Occupation Dimension				
BWK_LABR	BWK_LABR	Labourers	9.5	11.4
BWK_UNEM	BWK_UNEM	Unemployed	7.4	5.6
FWK_ADMN	**FWK_MGRS**	Female Managers	5.6	9.7
FWK_CLER		*Female Clerical workers*	34.0	
FWK_ELCS	**FWK_SALE**	Female Sales	14.5	13.6
FWK_PPWK	**FWK_MACH**	Female Operator/Drivers	2.7	1.6
FWK_PROF	FWK_PROF	Female Professional	32.1	22.1
FWK_SSPR		*Female Service/Sport/Rec'n workers*	2.5	
FWK_TRAD	FWK_TRAD	Female Trades	3.1	4.7
	FWK_CPSW	Female Community Service workers		13.7
MWK_ADMN	**MWK_MGRS**	Male Managers	11.7	15.8
MWK_CLER	**MWK_CLER**	Male Clerical	9.5	6.5
MWK_ELCS		*Male Elementary Clerk/Sale/Service*	6.2	
MWK_PPWK	**MWK_MACH**	Male Operator/Drivers	13.4	11.6
MWK_PROF	MWK_PROF	Male Professional	27.8	17.1
MWK_SALE		*Male Sales*	8.8	
MWK_TRAD	MWK_TRAD	Male Trades	20.6	23.3

EDUCATION VARIABLES

The question regarding highest level of school completed changed between 2001 and 2006. Both versions are shown here:

2001 Version

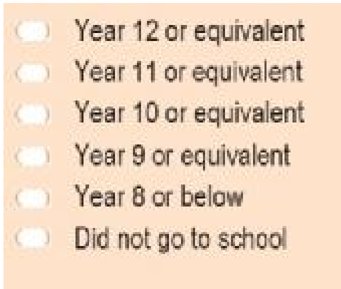


What is the highest level of primary or secondary school the person has completed?

- Mark one box only.
- For persons who returned after a break to complete their schooling, mark the highest level completed when they last left.

- Still at school
- Did not go to school
- Year 8 or below
- Year 9 or equivalent
- Year 10 or equivalent
- Year 11 or equivalent
- Year 12 or equivalent

2006 Version



- Year 12 or equivalent
- Year 11 or equivalent
- Year 10 or equivalent
- Year 9 or equivalent
- Year 8 or below
- Did not go to school

As illustrated here →

the 2006 version omitted one particular response, which changes the interpretation of the result. The order was also changed to reduce the error rate.

The *Still at school* category captured students who had not yet left secondary school. By removing this in the 2006 Census, students who were still at school were forced to answer in terms of the year level they had completed by the end of 2005. This confounded the table, because the counts included two groups: (1) adults who had left school at an early stage and (2) students who were in fact still at school, and for whom this answer did not indicate at what level they *completed* school. Because the numbers in the first category would heavily outweigh the numbers in the second, this variable was left in the dimension. The evidence of this outweighing is indicated by two different effects operating. The passage of 5 years would generally decrease the percentage of students who left school early (as it does to the *Did not go to school* category). The inclusion of current year 10 students would increase this percentage. Clearly the decreased percentage indicates that the effect of the added year 10 students is small in comparison to expected decrease over 5 calendar years.

This leaves the issue of the variable *Still at school*, which could not be readily synthesised from other variables. Therefore a new substitute variable was constructed to indicate educational participation. The percentage of persons aged 15-24 who were attending tertiary institutions was introduced. This had the potential to be of limited validity because of student address issues; however the fact that the 2006 Census enumeration is based on usual residence rather than place of enumeration (as occurred in 2001) conveniently resolved this issue.

Income Variables

Some surprising changes occurred for the income dimensions shown above. Whilst the goal of approximately matching proportions from 2001 to 2006 was attempted, there were nevertheless some major socio-demographic changes over that period. It appears that overall "divide between rich and poor" has increased for families – consistent with the findings of social research. The much higher proportion of families with children having high incomes is presumably a reflection of the trend toward more female parents engaging in the workforce (and also reflected in Australia's shortage of childcare places).

In both 1996 and 2001 the upper ends of the income variables were coarsely measured, with cutpoints at $1,500 and $2,000+ per week. The only increase possible in the upper income level was from $78,000+ ($1,500 per week) to the next (and highest) cutpoint of $104,000+ (2,000 per week). In the 2006 Census these upper ends were substantially increased, and this was taken advantage of in constructing the dimensions.

Occupation Variables

From 2001 to 2006 the ABS dramatically changed the occupational classifications. Several classifications were no longer available. Some new classifications were introduced. This is summarised in the table below.

Occupational Classifications in the ABS BCP file

2001	2006
Managers and Administrators	Managers
Professionals	Professionals
Associate Professionals	Technicians & Trades Workers
Tradespersons & Related Workers	Community & Personal Service Workers
Advanced Clerical & Service Workers	Clerical & Administrative Workers
Intermediate Clerical, Sales and Service Workers	Sales Workers
Intermediate Production & Transport Workers	Machinery Operators & Drivers
Elementary Clerical, Sales and Service Workers	Labourers
Labourers & Related Workers	

With such dramatic changes, it was no longer possible to "match" classifications on a 1:1 basis. An exploratory Principal Components Analysis was conducted with all classifications included for men and women. Three variables were found to be neither positive nor negative markers of occupational status. They were: *Male Sales Workers, Female Clerical & Administrative Workers* and *Male Community & Personal Service Workers.* For comparision, *Female Sales* and *Female Community & Personal Service Workers* were good negative contributors, and *Male Clerical & Administrative Workers* was a good positive contributor.

COMPARABILITY OF PRINCIPAL COMPONENTS ANALYSES – 1996, 2001 AND 2006

The final test of these analyses is the eigenvalues (expressed here as a percentage) compared to those in the 2001 analysis (with 1996 for reference). As can be seen below, the 2006 analyses were very close in outcome to the 2001 analyses, with dimensions that were generally a little stronger than in 2001 or 1996.

		Eigenvalues (%)		
Dimension	Variables	1996	2001	2006
Occupation	14	29.4	31.6	33.4
Education	6	49.1	54.1	52.3
Income	2	89.7	88.6	90.6
Family Income	2	79.4	80.5	84.0

In each case, the proportion of common variance from the 2006 analysis of each dimension at the CD level was very close to that obtained in the 2001 analysis (and the 1996 analysis).

FINAL ISSUES – PLACE OF ENUMERATION VS PLACE OF USUAL RESIDENCE

In the 1996 and 2001 Censuses, the figures for each CD were based on the persons in that CD on the night of the census. This is called *Place of Enumeration*, in ABS terminology. The disadvantage of this is that visitors contribute to the CD score. Usually the number of visitors is not large, however, in some rare instances this is the case, and it can then substantially influence the CD score.

In the 2006 Census, the ABS data for CDs is based on the *Place of Usual Residence* criterion. That is, each person is mapped back to their "home" CD and the data for each CD is for the persons normally resident there, regardless of their actual location on the night of the census.

This increases the validity of the CD scores as representative of the persons who live there.

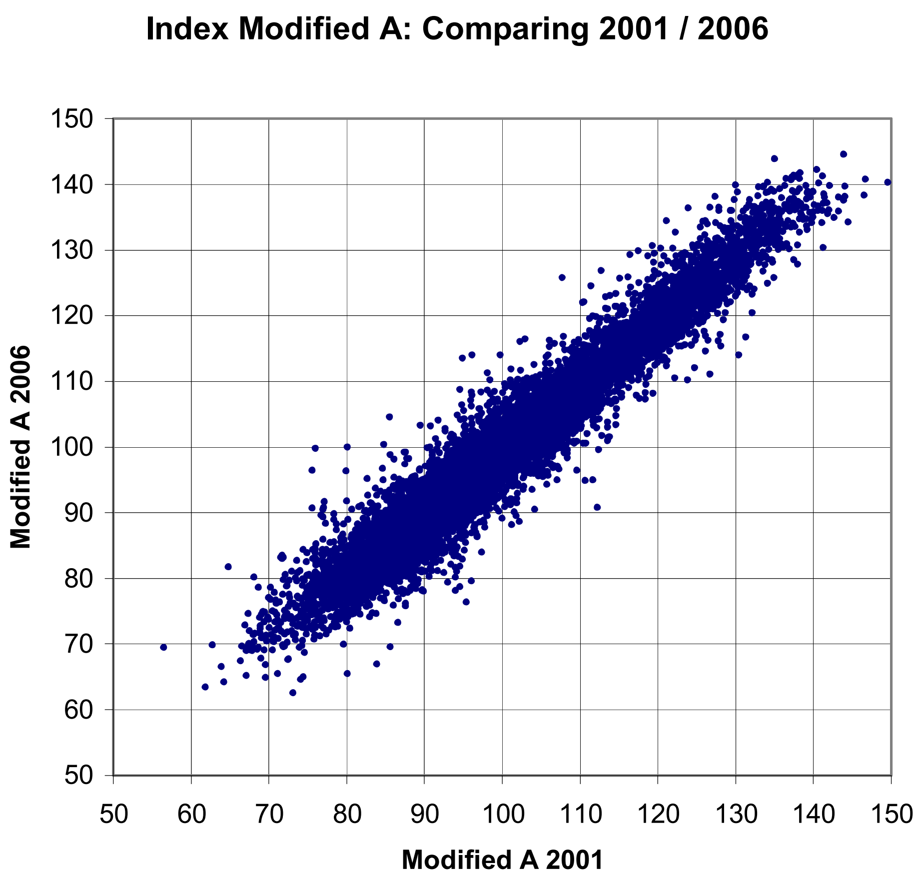
Comparability of Index Scores (Modified A) – 2001 and 2006

To perform this comparison at CD level required the use of the ABS *2001-2006 CD Comparability File*. This file maps each of the 2006 CDs to their corresponding 2001 CD. The level of comparability is scored using a system outlined in detail elsewhere. There are 38,697 CDs in the 2006 file.

The comparability of CDs is not in any way based on socio-economic or similar factors. Comparability is based solely on the geographic boundaries of the CDs and the number of household dwellings they contain. CDs with minimal boundary changes and population changes from 2001 to 2006 are considered "comparable". The relevant comparability codes are numbered from 0 to 9. Non-comparable CDs are identified as "not comparable" (code 6) or "not directly comparable" (codes 4, 5, 7, and 8). Of those CDs that are "comparable", the least comparable group (code 3) represents 2001 CDs with populations greater than 10 persons that also differed between 1996 and 2001 by less than 10% (area or households). Even better matches are identified by codes of 0, 1, 2, and 9.

Of the 38,697 CDs in 2006, only 23,617 were comparable with a matching 2001 CD (codes 0, 1, 2, 3 and 9).

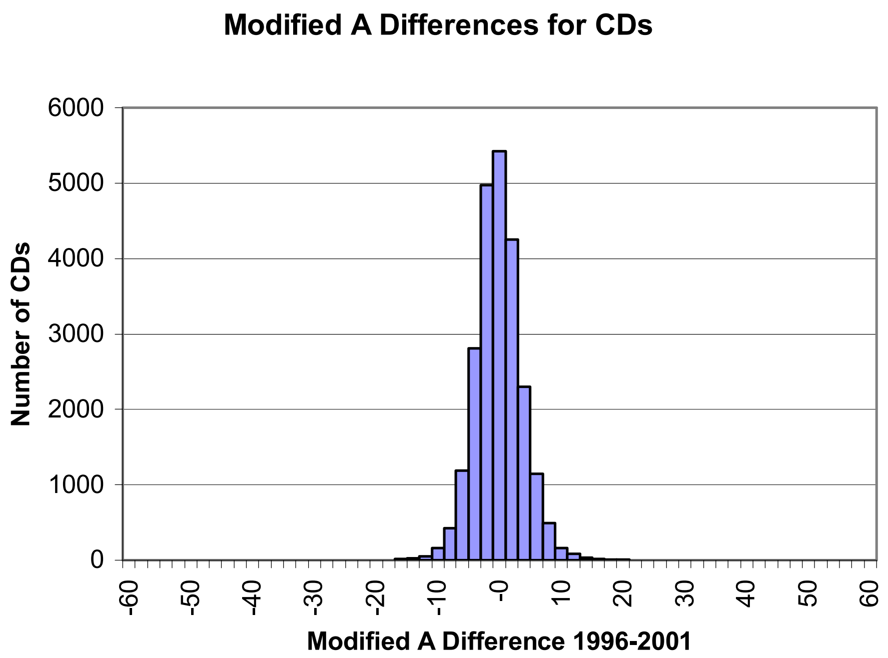
Using this file of 23,617 CDs that could be considered "stable" between 2001 and 2006, there was a (population weighted) correlation of 0.97 between the Modified A scores in 2001 and 2006.



Correlation = **0.97** (population weighted)

This correlation of 0.97 is extremely good, when compared to the previous recalculation where it only reached 0.85. This represents an increase in stability over the more recent inter-census period. The overall effect is likely to be less variability in school scores based on the change from 2001 to 2006 data than occurred in the change from 1996 to 2001.

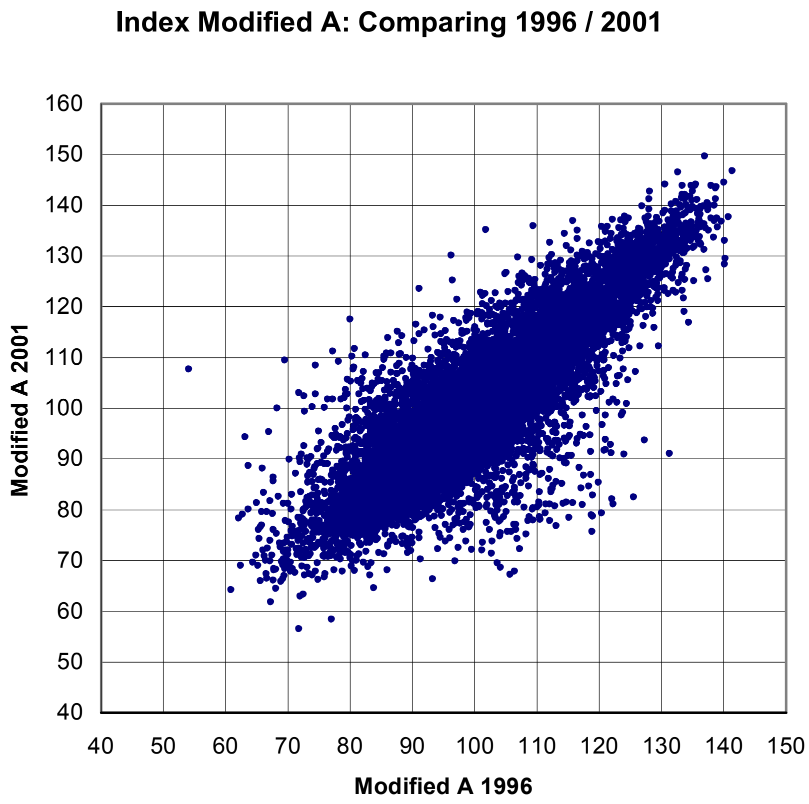
The average absolute difference in Modified A scores was 2.9 with a standard deviation of 2.4. The greatest difference for an individual CD was 24. These are plotted below.



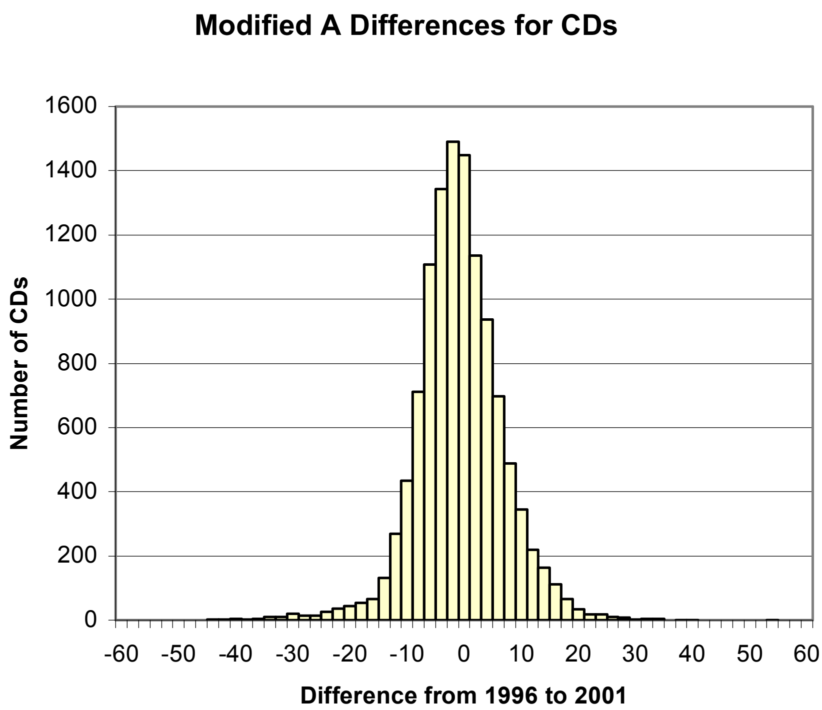
The average absolute difference is 2.9 (standard deviation 2.4).
Maximum difference is 24.

For reference, the equivalent pages showing graphs from the previous index recalculation report follow.

Comparability of Index Scores (Modified A) – 1996 and 2001



Correlation = 0.85 (population weighted)



The average absolute difference is 5.6 (standard deviation 5.2).
Maximum difference is 54 (not visible).

Recalculation of the Modified A Socioeconomic (SES) Indicator using 2011 Australian Bureau of Statistics Census Data

Consultant's Technical Report

Stephen Farish

May 2013

Foreword

In 2001, the Australian Government introduced new funding arrangements for non-government schools based on the socioeconomic status (SES) of the school community. The SES approach involves linking student residential address data to Australian Bureau of Statistics national Census data to obtain a measure of the capacity of the school community to support its school.

Student residential addresses are collected from each school and mapped to the correct *Statistical Area 1* (SA1) by a process called geocoding. Each school's community is defined in terms of the SA1s from which it draws its students. The SA1 is the smallest spatial unit in the Australian Statistical Geography Standard (ASGS) classification for which data is made publically available (the smaller unit of a *Mesh Block* is used internally by ABS). In urban areas, SA1s average approximately 190 dwellings. In rural areas, the number of dwellings per SA1 reduces as population densities decrease. The States and Territories of Australia are defined by approximately 54,800 SA1s. The SA1 is the closest equivalent to the previous geographical unit, the Collection District (CD) which was classified in the Australian Standard Geographical Classification (ASGC) which had been used in the 1996, 2001 and 2006 census.

The SES Indicator that is used to calculate schools' SES scores comprises the dimensions Occupation, Education and Income (½ household income and ½ family with children income). SES scores are calculated as a weighted average of the dimension scores for each school's SA1s. Data from the Census is analysed using a recognised statistical technique known as Principal Components Analysis to produce a score for each dimension for all SA1s in Australia.

The methodology for the SES funding model is explained in detail in the *Schools Funding: SES Simulation Project Report. A report by the Steering Committee for the Simulation Project on a socioeconomic status (SES)-based model for recurrent funding of non-government schools* (December 1998). This report was released in May 1999 at the time of the Government's announcement of the new SES funding arrangements for non-government schools for the funding period 2001-2004.

In order to determine schools' funding entitlements for 2005-2008, the SES Indicator on which schools' SES scores are based, was recalculated using the 2001 ABS Census data. That recalculation was described in *Funding Arrangements for Non-government Schools 2005-2008: Recalculation of the Modified A Socioeconomic Status (SES) Indicator using 2001 Australian Bureau of Statistics Census Data* (June 2004).

A second recalculation occurred with the availability of the 2006 ABS Census data. This was described in *Funding Arrangements for Non-government Schools 2009-2012: Recalculation of the Modified A Socioeconomic Status (SES) Indicator using 2006 Australian Bureau of Statistics Census Data* (June 2008)

With the release of the 2011 ABS Census data the Modified A Socioeconomic Indicator was again recalculated. The new indicator effectively comprises the same dimensions as the Indicator based on the 2006 ABS Census data.

The specialist adviser for the 1998 SES Simulation Project was Professor Stephen Farish, University of Melbourne. He recalculated the indicator for the 2005-2008 funding quadrennium based on 2001 Census data and the recalculation for the 2009-2012 quadrennium based on the 2006 census Data. He has prepared all three recalculation Technical Reports. This technical report describes the dimensions and variables used in the recalculated Indicator based on 2011 Census data and the steps taken to align it to the previous one. A brief summary of the dimensions and relevant changes to their structure follows:

- the *Occupation* dimension required no changes in order to create a revised Occupation dimension that was comparable to the one in 2006;
- the *Education* dimension was comparable to the one in 2006, with one trivial change;
- the two *Household Income* dimension variables have been changed to take account of changes in income levels over the intervening 5 years;
- the two *Family Income* dimension variables have been changed to take account of changes in income levels over the intervening 5 years.

These changes are detailed below in this document.

May 2013

Table of contents

(dependent on edits etc)

Introduction

This document details the processes involved in the recalculation of the SES Modified A index using 2011 Australian Bureau of Statistics (ABS) Census data. These processes are straightforward, being simply a translation of the 2006 approach to the 2011 data. Two major changes are important. Firstly, the change in geographic unit from a Collection District (CD) to a Statistical Area 1 (SA1). The second change was that the percentage variables were all produced using the ABS utility "TableBuilder Pro" at SA1 level. In previous iterations a single large data file was utilised outside the ABS – namely the "Basic Community Profile" at CD level. This change means that cell references such as those used in previous cycles are no longer relevant. The TableBuilder Pro classifications are specified instead (see Appendix A). This recalculation is essentially a repeat of the process used to recalculate the 2006 version of the Modified A Indicator.

In various instances it was necessary to make changes to the data used in order to align 2011 Census data with the equivalent 2006 Census data. For example, movements in wages make the income variables from 2006 less relevant in 2011. In all instances where slight adjustments were made, these are also described herein, along with the rationale for each adjustment.

The Principal Components Analyses, being based on a new 2011 dataset, are not identical in outcome to the 2006 analyses but, as seen further below, were well aligned and in all cases had similar Eigenvalues, which indicated a good result from the Principal Components Analyses in terms of summarisation of the underlying traits or dimensions. An Eigenvalue is a statistical term which, in plain language, measures the value of the overall dimension in terms of how much common information is represented in that dimension. For example, a dimension that has an Eigenvalue of 6 and which is based on 10 variables, indicates that 60% of the total information in the 10 variables is common, and that this common information is captured in the single dimension score. In most cases in this document the Eigenvalues are expressed as a percentage of the total information captured, in order to make interpretation easier.

Within the adjustments made to align the 2011 percentage variables to those used in the 2006 analysis, the new Modified A Index is an appropriate successor to the 2006 version. Real changes in socio-demographics mean that the 2006 and 2011 versions will not have identical scores for the same geographical areas. However, in this change from 2006 to 2011, there is no longer the same concept of the "same geographical areas" because of the change from CDs to SA1s. As occurred with the 2006 data, the availability of 2011 Census data coded to place of usual residence adds to the utility and validity of the recalculated Modified A scores.

One minor cosmetic change has been introduced. To aid in clarity, what was previously called the *Income* dimension in previous Technical Reports has been renamed the *Household Income* dimension to more clearly distinguish it from the *Family Income* dimension.

In order to recalculate the 2011 version of the 2006 Index called "Modified A", and defined as the weighted combination of four dimensions:

$$Modified\ A = \frac{2 \times Occupation + 2 \times Education + Household\ Income + Family\ Income}{6}$$

it is necessary to ensure that the four component dimensions are aligned closely to those used in 2006.

Steps taken to align the 2011 SES Index to the 2006 SEX Index

Occupation Dimension

In the 2011 Census the ABS retained the occupational classifications that were used in the 2006 Census. These are summarised below.

Occupational Classifications in the ABS Census data for 2011 and 2006
Managers
Professionals
Technicians & Trades Workers
Community & Personal Service Workers
Clerical & Administrative Workers
Sales Workers
Machinery Operators & Drivers
Labourers

Whilst the 2011 classifications and variables could be replicated in the same way as occurred in 2006, it was still necessary to ensure that these were still valid when analysed in a Principal Components Analysis. Therefore – just as in the 2006 data – an exploratory Principal Components Analysis was conducted with all classifications included for men and women. Three variables were found to be neither positive nor negative markers of occupational status. They were: *Male Sales Workers, Female Clerical & Administrative Workers* and *Male Community & Personal Service Workers.* By comparision, *Female Sales* and *Female Community & Personal Service Workers* were good negative contributors, and *Male Clerical & Administrative Workers* was a good positive contributor. This outcome was consistent with the exploratory Principal Components Analysis conducted on the 2006 data. Thus the 2011 *Occupation* dimension was able to be created using the same variables as used in the 2006 dimension. Using 1996 data the Eigenvalue for this dimension was 29%, for 2001 data it was 31%, for 2006 data it was 33%, and for 2011 data it was 34%.

Education Dimension

The *Education* dimension was able to be reproduced using the same classifications as the 2006 version. The only difference involved one variable. In the 2006 data there was a classification for people with “no qualifications”. In the 2011 data this classification was absent. In 2006 the qualifications data was provided for all persons aged 15 and over. Using the 2011 data, the number of people 15 and over was determined, and by subtracting all those with any qualification, it was possible to estimate the number without any qualifications. This is not fully consistent with the 2006 variable, because in the 2011 data the numbers come from different tables, and non-response or other factors may introduce minor discrepancies. However, these should be of minimal significance. The overall national percentage with no qualifications is also consistent with that for 2006. Using 1996 data the Eigenvalue for the *Education* dimension was 49%, for 2001 data it was 54%, for 2006 data it was 52%, and for 2011 data it was 54%.

Household Income Dimension

The *Household Income* dimension uses only two variables, which are based on household income. In 2006 these were the percentage of households with an income below $52,000 (47.0%) and the percentage with an income above $117,000 (15.5%).

Income growth has changed the meaning of these absolute amounts. Therefore, various cutpoints were investigated within the possibilities afforded by the data in the ABS Census tables, as shown below.

1996	below $36,400	53.3%
2001	below $41,600	49.4%
2006	below $52,000	47.0%
2011	below $52,400	40.5%
2011	**below $65,000**	**49.2%**
2011	below $78,000	57.3%

1996	above $78,000	11.9%
2001	above $90,000	10.7%
2006	above $117,000 (1)	15.5%
2011	above $130,000	20.6%
2011	**above $143,000** (2)	**16.1%**
2011	above $156,000	11.7%

[1] The $117,000 cutoff is not provided directly from the 2006 ABS tables, but is generated as the average of the above $104,000 and above $130,000 figures in each Collection District.
[2] The $143,000 cutoff is not provided directly from the 2011 ABS tables, but is generated as the average of the above $130,000 and above $156,000 figures in each Collection District.

For the lower end, increasing an income of $52,000 to $65,000 generates the nearest percentage to 2006. For the upper end, increasing an income of $117,000 to $143,000 generates a percentage close to the 2006 value. Using 1996 data the Eigenvalue for the *Household Income* dimension was 90%, for 2001 data it was 94%, for 2006 data it was 91%, and for 2011 data it was 92%.

Family Income Dimension

The *Family Income* dimension uses only two variables, which are based on the income of families with dependent children. In 2006, the variables used were the percentage of such families with an income below $52,000 (35.4%) and the percentage with an income above $117,000 (15.9%). Various cutpoints were investigated within the possibilities afforded by the data in the ABS Census tables, as shown below:

1996	below $26,000	28.4%
2001	below $36,400	33.5%
2006	below $52,000	35.4%
2011	below $52,000	29.1%
2011	**below $65,000**)	**38.4%**
2011	below $78,000	47.2%

1996	above $78,000	13.6%
2001	above $90,000	18.7%
2006	above $117,000 (1)	15.9%
2011	above $143,000	20.8%
2011	**above $156,000**	**15.1%**
2006	above $169,000	11.5%

[1] The $117,000 cutoff is not provided directly from the 2006 ABS tables, but is generated as the average of the above $104,000 and above $130,000 figures in each Collection District.

At the lower end the cutpoint of $65,000 generated the nearest percentage to the 2006 value. At the upper end the cutpoint of $156,000 generated the closest percentage to the 2011 value. Using 1996 data the eigenvalue for the *Family Income* dimension was 79%, for 2001 data it was 86%, for 2006 data it was 84%, and for 2011 data it was 86%.

Overall summary of the variables used

In constructing the dimensions of *Occupation, Education, Household Income,* and *Family Income* a series of key percentage variables are used. The changes described above between 2006 and 2011 were necessitated by the movement of incomes over time and by one change in the ABS data (the absence of a "no qualifications" category). The variables used in the 2011 ABS data file are either directly comparable to variables available in the 2006 version or a reasonable substitute. Unlike the 2006 recalculation, for the 2011 recalculation no variable was dropped nor any new variable added. These variables are summarised below, along with their national average values across all CDs in 2006 and SA1s in 2011.

Comparability table for percentage variables used – 2006 and 2011.

2006 Variable and national average percent		2011 Variable and national average percent	
Occupation Dimension	**%**		**%**
Male & Female Labourers	11.4	Male & Female Labourers	10.3
Male & Female Unemployed	5.6	Male & Female Unemployed	6.0
Female Managers	9.7	Female Managers	9.6
Female Sales	13.6	Female Sales	12.8
Female Machine Operator/Drivers	1.7	Female Machine Operator/Drivers	1.6
Female Professional	22.1	Female Professional	24.0
Female Trades	4.7	Female Trades	4.6
Female Community Service workers	13.7	Female Community Service workers	15.0
Male Managers	15.8	Male Managers	15.4
Male Clerical/Admin	6.5	Male Clerical/Admin	6.6
Male Operator/Drivers	11.6	Male Operator/Drivers	11.7
Male Professional	17.1	Male Professional	18.2
Male Trades	23.4	Male Trades	23.2
Education Dimension	**%**		**%**
Diploma, degree+	23.1	Diploma, degree+	26.6
Left school year 9	14.2	Left school year 9	13.4
Never attend school	0.9	Never attend school	0.9
Tertiary Students 15-24	22.0	Tertiary Students 15-24	24.9
Trade certificate	17.6	Trade certificate	18.2
No qualifications	59.3	No qualifications	55.2
Household Income Dimension	**%**		**%**
Household Income < $52,000pa	47.0	Household Income < $65,000pa	49.2
Household Income > $117,000pa	15.5	Household Income > $143,000pa	16.1
Family Income Dimension	**%**		**%**
Family Income < $52,000pa	35.4	Family Income < $65,000pa	38.1
Family Income > $130,000pa	15.9	Family Income > $156,000pa	15.1

Principal Components Analyses used to construct the dimensions

Details of the Principal Components Analysis for each dimension are provided below.

Occupation Dimension	Variables 13	Eigenvalue 4.44 or 34%
		2006 Eigenvalue 33%
Variable	Eigenvector	2001 Eigenvalue 31%
Unemployed (M&F)	–0.2225	
Labourers (M&F)	–0.3527	1996 Eigenvalue 29%
Managers (F)	0.2409	
Sales (F)	–0.1918	
Machine Operator/Drivers (F)	–0.1906	
Professional (F)	0.3880	
Trades (F)	–0.1140	
Community Service workers (F)	–0.2554	
Managers (M)	0.2835	
Clerical/Admin (M)	0.1135	
Operator/Drivers (M)	–0.3642	
Professional (M)	0.3892	
Trades (M)	–0.2979	

Education Dimension	Variables 6	Eigenvalue 3.24 or 54%
		2006 Eigenvalue 52%
Variable	Eigenvector	2001 Eigenvalue 54%
Diploma, degree+	0.5373	
Left school year 9	–0.4522	1996 Eigenvalue 49%
Never attend school	–0.1073	
Tertiary Students 15-24	0.4020	
Trade certificate	–0.3002	
No qualifications	–0.4935	

Household Income Dimension	Variables 2	Eigenvalue 1.84 or 92%
		2006 Eigenvalue 91%
Variable	Eigenvector	2001 Eigenvalue 94%
Income < $65,000 pa	–0.7071	
Income > $143,000 pa	0.7071	1996 Eigenvalue 90%

Family Income Dimension	Variables 2	Eigenvalue 1.72 or 86%
		2006 Eigenvalue 84%
Variable	Eigenvector	2001 Eigenvalue 86%
Income < $65,000 pa	–0.7071	
Income > $156,000 pa	0.7071	1996 Eigenvalue 79%

Comparability of Principal Components Analyses – A summary of 1996, 2001, 2006 and 2011

A further test of these analyses is the Eigenvalues (expressed here as a percentage), compared between 2011 and 2006 (with 2001 and 1996 for reference). As can be seen below, the 2011 analyses were very close in outcome to the 2006 analyses, with dimensions that were also of comparable strength to the 2001 and 1996 figures.

		Eigenvalues (%)			
Dimension	Variables	1996	2001	2006	2011
Occupation	13	29.4	31.2	33.4	34.2
Education	6	49.1	54.2	52.3	54.0
Household Income	2	89.7	94.1	90.6	92.3
Family Income	2	79.4	86.2	84.0	85.9

In each case, the proportion of common variance from the 2011 analysis of dimensions at the CD level was very close to that obtained in the 2006 analysis (and in the 2001 and 1996 analyses).

Comparing 2011 and 2006 Modified A Indicator scores

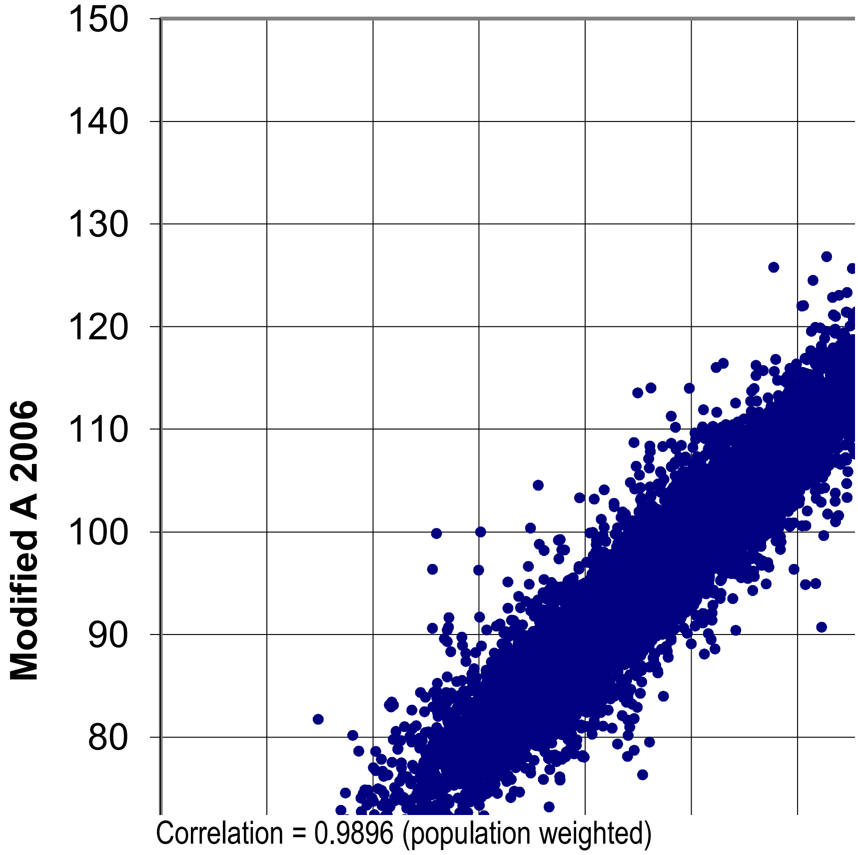
It is important to measure the correlation between 2011 and 2006. In the previous recalculations, this was done on the basis of comparing CD scores. With the move to SA1s as the geographic units, this comparison is not possible. The ABS does not have a correspondence file to equate 2011 SA1s to 2006 CDs. However, 2006 CDs can be mapped into Australia Post Postcodes, as can 2011 SA1s. Therefore one practical way to compare scores from 2006 and 2011 is at the Postcode level.

For both 2006 and 2011 the relevant scores were aggregated up to population weighted Postcode scores. There were 2421 Postcodes that were in both the 2006 and 2011 data. Of these 2421 Postcodes, those that differed in population by more than 15% between 2006 and 2011 were excluded. This left a total of 2273 Postcodes for analysis.

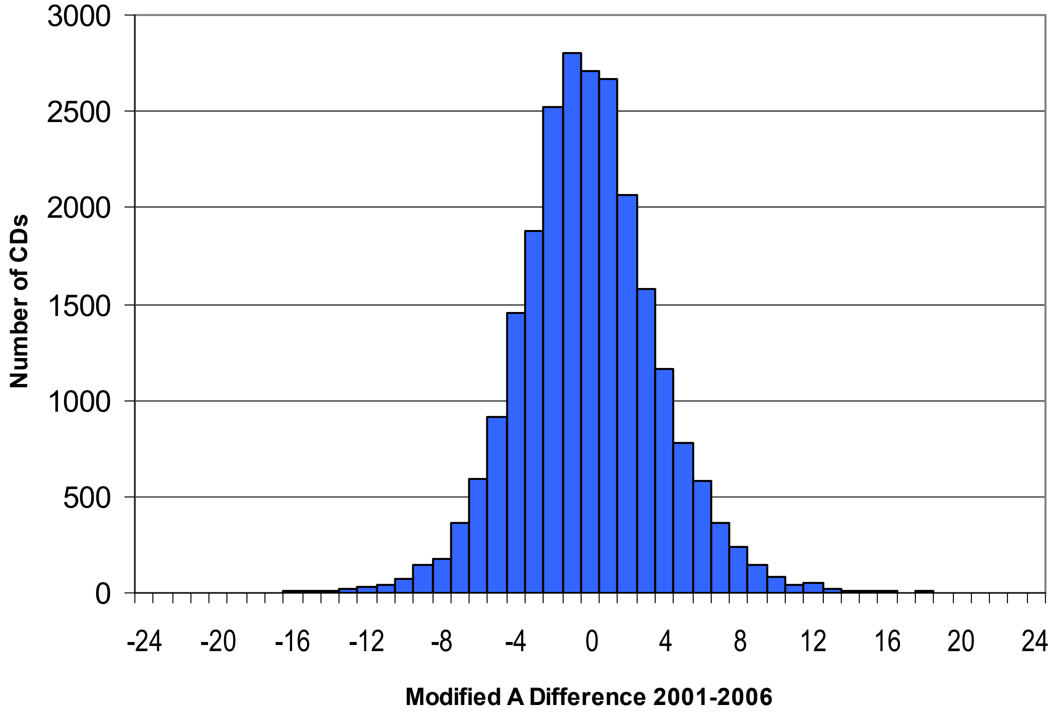
Using this data comprising 2273 Postcodes with an aggregate 2011 population of 21,140,044 people or 98.3% of the population, there was a population-weighted correlation of 0.9896 between the Modified A scores in 2011 and those from 2006.

The graph below shows a scatterplot of the relationship between the two Modified A indicators based on the 2006 Census data and recalculated using the 2011 Census data as outlined above. This scatterplot includes only the 2273 Postcodes described above.

It should be noted that the graph as drawn does not fully reflect the strength of the relationship because of the large number of data points plotted, which conceals a much higher density towards the core of the plot.



The graph below shows the difference between the 2006 and 2011 Modified A score for the 2273 Postcodes. The average absolute difference is 1.9 (standard deviation also 1.9). The maximum difference is 16.



Final comment

When applied to school scores, the recalculated 2011 index should provide a robust equivalent of the 2006 version. The change from CDs to SA1s should provide some additional precision because of the slightly smaller geographic unit size. The very clear concordance between 2006 and 2011 for both the variables used and the Principal Components Analyses further reinforces that the 2011 index is a good successor for the 2006 index. Similarly the correlation between the 2011 index and the 2006 index at the Postcode level indicates a good match between these two measures. Changes in school scores will nevertheless occur through the changes in school catchments; with changes in the social demographics within the underlying catchment area of the schools; and the change from CDs to SA1s.

Appendix

The ABS variables used to create the percentage variables

The percentage variables from the 2011 Census data were calculated as for the 2006 Census data. However, the use of the ABS data extraction software "TableBuilder Pro" for 2011 data uses different data nomenclature than was used for 2006 data. The table below provides the relevant ABS descriptors for each of the percentage variables calculated at the SA1 level. In all cases, classifications such as "not specified" or "partially specified" or "missing" or other values that cannot be clearly defined are omitted from both the numerator and the denominator.

In all cases the denominator for any numerator is the one preceding it in the table.

Variables in the Occupation Dimension

Denominator *Labour Force Males & Females*	Denominator variable LabourForce **ABS keyword LFSP** Unemployed *plus* Employed
Numerator	
% Male & Female Unemployed	Numerator Variable: B_Unemp **ABS keyword LFSP** Unemployed
Denominator *Employed Males & Females*	Denominator variable BOcc **ABS keyword OCCP** Managers *plus* Professionals *plus* Technicians and trades workers *plus* Community and personal service workers *plus* Clerical and Administrative workers *plus* Sales workers *plus* Machinery operators and drivers *plus* Labourers
Numerator	
% Male & Female Labourers	Numerator variable B_Labourer **ABS keyword OCCP** Labourers
Denominator *Employed Females*	Denominator variable FOcc **ABS keyword OCCP** Managers *plus* Professionals *plus* Technicians and trades workers *plus* Community and personal service workers *plus* Clerical and Administrative workers *plus* Sales workers *plus* Machinery operators and drivers *plus* Labourers Crossed with **ABS keyword SEXP** = Female
Numerators	
% Female Managers	Numerator variable F_Manage **ABS keyword OCCP** Managers Crossed with **ABS keyword SEXP** = Female
% Female Sales	Numerator variable F_Sales **ABS keyword OCCP** Sales Workers Crossed with **ABS keyword SEXP** = Female
% Female Machine Operator / Drivers	Numerator variable F_MachOpDrive **ABS keyword OCCP** Machinery Operators and Drivers Crossed with **ABS keyword SEXP** = Female

% Female Professionals	Numerator variable F_Prof **ABS keyword OCCP** Professionals Crossed with **ABS keyword SEXP** = Female
% Female Trades	Numerator variable F_Trade **ABS keyword OCCP** Technicians and Trades Workers Crossed with **ABS keyword SEXP** = Female
% Female Community Service Workers	Numerator variable F_CPSW **ABS keyword OCCP** Community and Personal Service Workers Crossed with **ABS keyword SEXP** = Female
Denominator *Employed Males*	Denominator variable MOcc **ABS keyword OCCP** Managers *plus* Professionals *plus* Technicians and trades workers *plus* Community and personal service workers *plus* Clerical and Administrative workers *plus* Sales workers *plus* Machinery operators and drivers *plus* Labourers Crossed with **ABS keyword SEXP** = Male
Numerators	
% Male Managers	Numerator variable M_Manage **ABS keyword OCCP** Managers Crossed with **ABS keyword SEXP** = Male
% Male Clerical/Admin	Numerator variable M_Clerical **ABS keyword OCCP** Clerical and Administrative Workers Crossed with **ABS keyword SEXP** = Male
% Male Machine Operator / Drivers	Numerator variable M_MachOpDrive **ABS keyword OCCP** Machinery Operators and Drivers Crossed with **ABS keyword SEXP** = Male
% Male Professionals	Numerator variable M_Prof **ABS keyword OCCP** Professionals Crossed with **ABS keyword SEXP** = Male
% Male Trades	Numerator variable M_Trade **ABS keyword OCCP** Technicians and Trades Workers Crossed with **ABS keyword SEXP** = Male

Variables in the Education Dimension

Denominator *Persons aged 15 and over*	Denominator variable All15plus **ABS keyword AGE5P** The sum of: 15-19 years 20-24 years 25-29 years 30-34 years 35-39 years 40-44 years 45-49 years 50-54 years 55-59 years 60-64 years 65-69 years 70-74 years 75-79 years 80-84 years 85-89 years 90-94 years 95-99 years 100 years and over
Numerators	
% With Degree	Numerator variable DegDiploma **ABS keyword QALLP** Advanced Diploma and Diploma Level *plus* Bachelor Degree Level *plus* Graduate Diploma and Graduate Certificate Level *plus* Postgraduate Degree Level
% With Never Attended School	Numerator variable NotAttend **ABS keyword HSCP** Did not go to school
% With Trade or other Qualifications	Numerator variable TradeCert **ABS keyword QALLP** Certificate Level
% With No Qualifications	Numerator variable NoQuals **ABS keyword QALLP** All15plus *minus* (DegDiploma *plus* TradeCert)
% Left school Year 9	Numerator variable “LeftY9” **ABS keyword HSCP** Year 9 or equivalent *plus* Year 8 or below
% Never Attended School	Numerator variable “DidNotAtt” **ABS keyword HSCP** Year 9 or equivalent *plus* Year 8 or below
Denominator *Persons aged 15-24*	Denominator variable “Age15to24” **ABS keyword AGE5P** 15-19 year *plus* 20-24 years
Numerator	
% Tertiary Students	Numerator variable “Tertiary15to24” **ABS keyword TYPP** University or other tertiary education *plus* Technical or further education institution Crossed with **ABS keyword AGE5P** 15-19 year *plus* 20-24 years

Variables in the Household Income Dimension

Denominator *Households*	Denominator variable "HINDtotal" **ABS keyword HIND** The sum of: Negative income Nil income $1-$199 $200-$299 $300-$399 $400-$599 $600-$799 $800-$999 $1,000-$1,249 $1,250-$1,499 $1,500-$1,999 $2,000-$2,499 $2,500-$2,999 $3,000-$3,499 $3,500-$3,999 $4,000-$4,999 $5,000 or more
Numerators	
% Household Income < $52,000	Numerator variable "HINDunder1250" **ABS keyword HIND** The sum of: Negative income Nil income $1-$199 $200-$299 $300-$399 $400-$599 $600-$799 $800-$999 $1,000-$1,249
% Household Income > $143,000	Numerator variable "HINDover2750" **ABS keyword HIND** *Half of* $2,500-$2,999 *plus* the sum of: $3,000-$3,999 $4,000-$4,999 $5,000 or more

Variables in the Family Income Dimension

Denominator *Families with dependent children*	Denominator variable "FINtotal" **ABS keyword FINFF** The sum of: Negative income Nil income $1-$199 $200-$299 $300-$399 $400-$599 $600-$799 $800-$999 $1,000-$1,249 $1,250-$1,499 $1,500-$1,999 $2,000-$2,499 $2,500-$2,999 $3,000-$3,999 $4,000-$4,999 $5,000 or more Crossed with **ABS keyword CDCF** includes: Couple family with 1, 2, 3, 4, 5, 6 or more dependent children *plus* One parent family with 1, 2, 3, 4, 5, 6 or more dependent children
Numerators	
% Family Income < $52,000	Numerator variable "FINunder1250" **ABS keyword FINFF** The sum of: Negative income Nil income $1-$199 $200-$299 $300-$399 $400-$599 $600-$799 $800-$999 $1,000-$1,249 Crossed with **ABS keyword CDCF** includes: Couple family with 1, 2, 3, 4, 5, 6 or more dependent children *plus* One parent family with 1, 2, 3, 4, 5, 6 or more dependent children
% Family Income > $130,000	Numerator variable "FINover3000" **ABS keyword FINFF** The sum of: $3,000-$3,999 $4,000-$4,999 $5,000 or more Crossed with **ABS keyword CDCF** includes: Couple family with 1, 2, 3, 4, 5, 6 or more dependent children *plus* One parent family with 1, 2, 3, 4, 5, 6 or more dependent children

CONSULTANT'S REPORT ON THE ANALYSIS OF APPELLANT SCHOOL DATA.

This paper briefly outlines the processes used to obtain revised SES scores for appellant schools based on the survey data obtained from those schools combined with ABS data on all non-government schools.

Social Profiles

Using data from the ABS and from the survey of appellant schools it was possible to develop "Social Profiles" of each school. The profiles of appellant schools based on their survey data was then compared to the profile of other schools using ABS data in the "benchmark" data set, comprising all non-government schools, so that a revised SES score could be estimated.

Variables used in constructing social profiles.

Social profiles were created from both the survey data from appellant schools, and ABS-constructed social profiles for all non-government schools (the Benchmark data set). The variables utilised in creating social profiles, and their derivations, are given below. The variables were chosen for similarity to those in the SES model.

Percentage Variable	Numerator	Denominator
Income Variables		
Equivalised income under $36,400 pa	Households with equivalised incomes under $36,400 pa	All households with incomes specified.
Equivalised income over $62,400 pa	Households with equivalised incomes over $62,400 pa	All households with incomes specified.
Education Variables		
No formal qualifications	Persons aged 15+ with no formal qualifications	Persons aged 15+
Completed year 12	Persons aged 15+ who have completed year 12	Persons aged 15+
Bachelor or Higher	Persons aged 15+ who have a bachelor's or higher degree	Persons aged 15+
Occupation Variables		
Managers	Persons employed as Senior Managers and Executives	Employed persons
Professionals	Persons employed as Senior Managers and Executives	Employed persons
Trades, Clerical, Sales, Service	Persons employed as Tradespersons, Sales, Clerical and Service workers	Employed persons
Labourers, Machine operators, elementary sales	Persons employed as Machine operators, drivers, elementary sales, labourers	Employed persons
Unemployed	Unemployed persons 15+ seeking work	Unemployed persons 15+ seeking work + employed persons

Estimation of SES scores based on other schools with similar profiles

The revised SES score of the appellant school was estimated using a weighted average of the established SES scores of the 25 nearest neighbours. The nearest 25 neighbours represents approximately the nearest 1% of schools in the Benchmark data set. These nearest neighbours were identified on the basis of the social profile variables. The method for determining social proximity (near neighbours) is outlined in Appendix 3. The method used to determine the weights for the weighted average is outlined in Appendix 4.

Once the revised SES score had been obtained, this was then provided to DEST so that decisions regarding possible revised funding could be made.

The social profiles used data on Income, or on Income, Education and Occupation, depending on the nature of the appeal and the arguments offered by each appellant school. The variables listed above were used, along with any relevant adjustments necessary, as described below.

Income variables (two adjustments)

The Income variables used were:

- Percentage of Households with equivalised income below $36,400 pa ($700 pw)
- Percentage of Households with equivalised income above $62,400 pa ($1,200 pw)

Adjustment 1: Equivalisation

Equivalised incomes were used for comparison in both the Survey data and the ABS data. Equivalisation is an adjustment to the total income to adjust for family size. The equivalisation formula used was the OECD formula, and may be summarised as follows:

Family Member	Weight
First Adult	1.0
Other adult	0.5
Dependent Child	0.3

The sum of these weights represented the overall divisor to total income to create equivalised income. No distinction was made between adults on the basis of their dependency or income status, because income was measured at the household level, and thus the incomes of those individuals were included at that point.

Adjustment 2: Indexation

Because the survey data were collected in 2006/7, the income information is not directly comparable to the data based on the 2001 Census. Therefore, the Wage Price Index (an ABS index of wages, rather than costs) was applied to adjust (reduce) the stated income obtained from survey data back to mid-2001 levels. The relative adjustment used was reduce incomes by 16.5% over the 5 years, based on the ABS WPI.

Indexation was not performed on the ABS data because this was collected mid-2001 and so was given in 2001 values. These two adjustments resulted in incomes being compared on the same scale (mid-2001) with incorporation of family size for equivalisation purposes.

Education variables

The Education variables used were:

- Percentage of adults with no qualifications
- Percentage of adults who reached year 12
- Percentage of adults with a degree, or higher

Occupation Variables

The Occupation variables used were:

- Percentage that were managers & senior executives
- Percentage that were professionals
- Percentage that were tradespersons, intermediate clerical, sales and service workers.
- Percentage that were elementary clerical, sales, service workers, labourers, machine operators, production/process workers etc.
- Percentage of workforce that was unemployed

Other data adjustments:

No other data adjustments were necessary to account for the differences in the timing of data collection, because all other data was comparable to the 2001 Census data. Educational levels and Occupational status are not specifically sensitive to the year of collection in the same way as income, and no data-specific adjustments were applied to them.

Appendix 1 Creating Social Profiles using ABS data

CD mapping data from all 2683 schools in the DEST database was taken to the ABS, where in-house procedures using confidential unit record data were applied. These procedures utilised the data from families with children in non-government schools in the CDs mapped to those schools. There was no mechanism (nor should there be) to select the actual families from schools, but rather families were selected that are similar in that they also have children in non-government schools. For both households and individuals (as appropriate to the variable), percentage variables were calculated, and then values were averaged across the families in the CD. These percentage variables were then averaged for each school in the benchmark dataset across all students attending that school.

In some instances there were too few such families in a CD (even zero), and when this occurred the next higher aggregation was used. The higher aggregation levels were:

1. Families with children at any school
2. Families regardless of children attending school

In the vast majority of cases, CDs utilised the first level.

In some instances – particularly when very few CDs were used for a school – there was potential for breaches of confidentiality, and in these cases the next higher level of aggregation was also used. This occurred for fewer than 20 schools in the entire database.

Appendix 2 Creating Social Profiles using Survey data

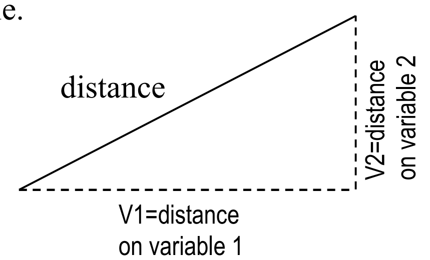
The data collected in the surveys of appellant schools was aggregated according to the same methods used by the ABS, except that all data were based on families rather than CDs. Household income was placed into specific bands. Similarly, the variables associated with occupation and education were likewise aggregated across all households for the appropriate individuals within each household, and then school-level averages of these values were created.

Appendix 3 Measuring social proximity.

In Melbourne, the suburbs of are considered to be far apart. However, when compared to the distance between Fortitude Valley (Qld) and Elizabeth (SA), Dandenong and Sunshine are considered to be very close. Distance is a relative measure. In this context, the distances between schools are measured in the differences of their percentage variables (eg % of professionals). Different variables will have different definitions of "close" or "distant". It is necessary to have a consistent measure of distance for each variable so that when they are combined to give an overall distance, they are effectively on the same "scale".

The solution was to standardise each percentage variable across all schools. In this way, the relativity was maintained and the distances can be compared across all variables.

Next one needs to measure the distances, taking several variables into account. This was done using what is called Euclidian distance. Euclidian distance is the multi-dimensional equivalent of Pythagorean measurement, where the straight-line distance is measured on the diagonal as the square root of the squared distances for each variable.



$$\text{distance}=\sqrt{V1^2+V2^2}$$

The distances between schools were calculated used with the same formula, but with several variables, like so:

$$\text{distance}=\sqrt{V1^2+V2^2+V3^2+V4^2+\ldots..}$$

Appendix 4 Estimating an SES Score from near neighbours (similar schools)

For each appellant school, using the calculated social proximity distances, the 25 nearest neighbours were identified from the entire Benchmark Dataset of 2683 schools. The estimated SES score was the weighted average of the SES scores of these near neighbours. The weights used were such that the furthest school (25th) had weight zero, and all others had a weight that represented how close they were to the appellant school. For example, consider the hypothetical example of these distances from an appellant school:

	School	Distance	Weight
1st ie nearest →	A	0.1	0.875
	:	:	:
	K	0.3	0.675
	L	0.4	0.500
	:	:	:
	P	0.7	0.125
	:	:	:
25th ie furthest →	Y	0.8	0.000

Because school L is half-way between the most distant near neighbour (Y) and the appellant school, it has a weight of 0.5. School P is quite distant, being only 1/8 of the distance from school Y to the appellant school, so its weight is 0.125, and so on. The weighted average of the SES scores of these schools is the revised estimate of the SES score of the appellant school.

Appendix 5 Comments on Data Quality

Two data quality issues arise in this process.

(1) As advised by the ABS, income data from the census is known to be somewhat inaccurate. There are several reasons for this, which the ABS can outline. The most relevant is that because income is not measured on a continuous scale, but in brackets, the application of any equivalisation process inherently introduces errors related to these brackets. For example, in the 2001 census, the highest income level reported is "greater than $2,000 per week". This rather low upper limit means that very high incomes (say over $4,000 per week) and moderately high incomes are grouped together. As such, equivalisation plus adjustment for inflation creates a situation whereby it is highly unlikely for any family to have an equivalised income calculated at above $2,000 per week. This is why the upper income group was those households with equivalised income above $1,200 per week.

(2) A minimum 95% response rate was required from families in the survey of appellant schools. Within this 95% there were also clearly identifiable data errors, where those filling out the survey did not do so correctly. For example, even though "Person 1" was meant to be the parent/caregiver of the student, in some instances the age of Person 1 was given as 1-year-old. Person 2 was then listed as the child of Person 1. Deduction did allow rectification of some, but not all, of these errors.

Appendix 6 Income Validation for Appellant Schools

Income data for Appellant Schools could not be validated directly. However, non-equivalised income data was found to be comparable with (ie not inconsistent with) such data for schools of similar SES to the Appellant Schools through the normal SES process. Incomes were also generally consistent with the Occupational and Educational status of the families of the Appellant Schools.