1 Variables in indexes

Index composition: questions as they apper in the 2012 questionnaire.
Analytical skills:

- cpeople: In your job, how important is dealing with people?
- cteach: How important is instructing, training or teaching people, individually or in groups?
- cpersuad: How important is persuading or influencing others?
- cplanoth: How important is planning the activities of others?
- csolutn: How important is thinking of solutions to problems? The problems could be with your own work, someone else's work or equipment.
- canalyse: How important is analysing complex problems in depth?
- ccalca: In your job, how important is adding, subtracting, multiplying or dividing numbers? (Note: using a calculator or computer if necessary)
- cpercent: How important are calculations using decimals, percentages or fractions? (Note: using a calculator or computer if necessary)
- cwritelg: How important is writing long documents with correct spelling and grammar (for example, long reports, manuals, articles or books)?
- cwritesh: How important is writing short documents (for example, short reports, letters or memos)?
- clong: How important is reading long documents such as long reports, manuals, articles or books?
- cshort: How important is reading short documents such as reports, letters or memos?

Routine: *main change: combined all indexes into only one*

- bme4: How much influence do you personally have on deciding the quality standards to which you work?
- brepeat: How often does your work involve carrying out short, repetitive tasks? (I recoded this variable so that larger values). I recoded the variable so that larger values imply **less** repetitiveness in the job.
- bvariety: How much variety is there in your job?
- cplanme: In your job, how important is planning your own activities? (higher values imply less importance)

Manual: before I was using skphys (physical strength) but I realized that this a derived index that included cstreng, cstam, ctools and chand. I excluded skphys and put its components instead.

- cstreng: how important is physical strength?
- cstam: how important is physical stamina?
- chands: how important is skill or accuracy in using your hands or fingers (for example, to mend, repair, assemble, construct or adjust things)?
- ctools: how important is knowledge of how to use or operate tools, equipment or machinery?

1.1 Indexes types

- **Simple average**: I just take the simple average of the variables in the index.
- **Restricted factors**: for each skill group separately, I extract the first factor.
- **Orthogonal factors**: I do factor analysis on all the variables and extract six factors. I then group them appropriately according to the variables with the largest loadings.

References

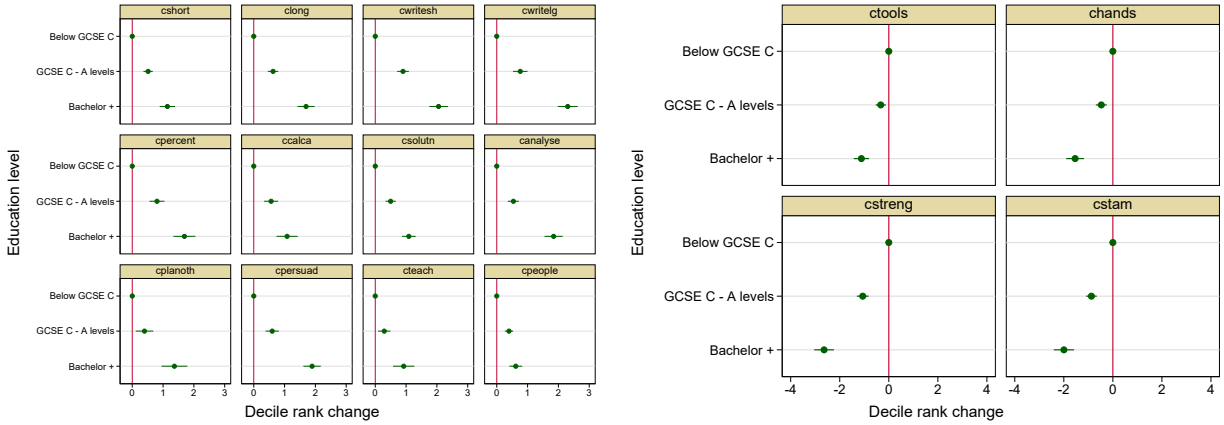
Autor, D. H. and Dorn, D. (2013). The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market. *American Economic Review*, 103(5):1553–1597.

A Appendix

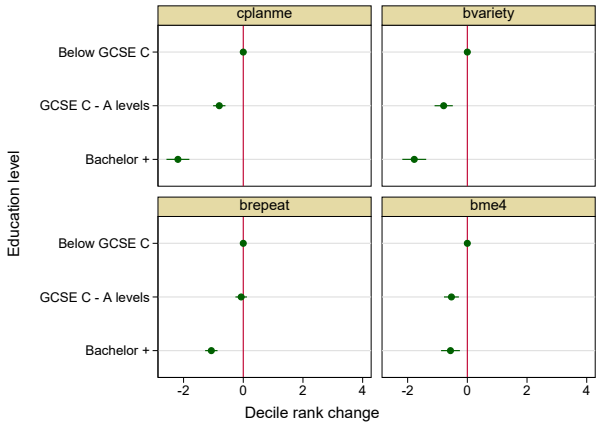
Figure 1: Reported skill use by education level, Autor and Dorn (2013) indexes

(a) Analytical

(b) Manual



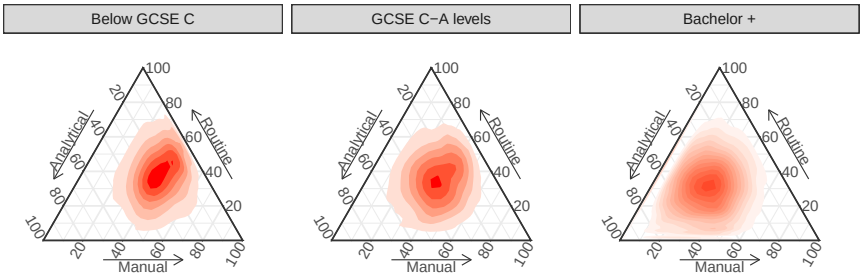
(c) Routine



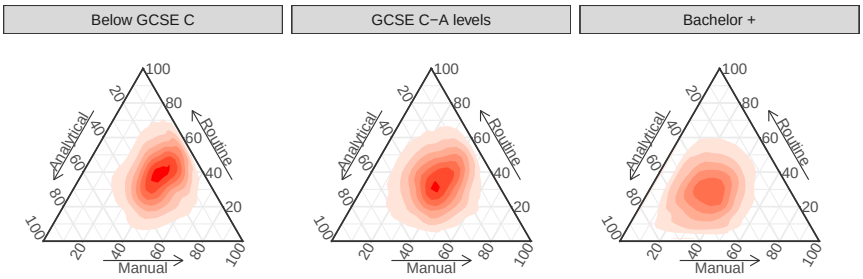
Note: routine regressions control for the level of the manual index.

Figure 2: Skill simplex

(a) Simple average



(b) Factor (restricted)



(c) Factor (orthogonal)

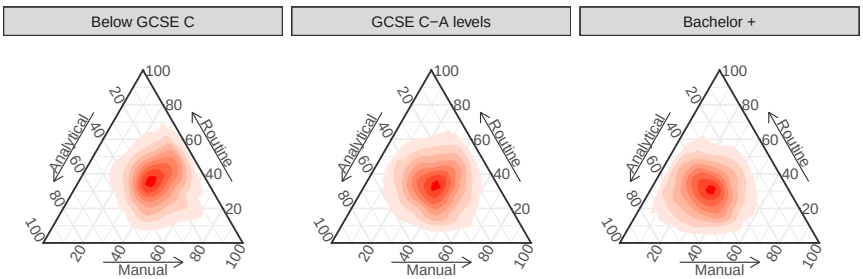


Figure 3: Reported skill use by job and education

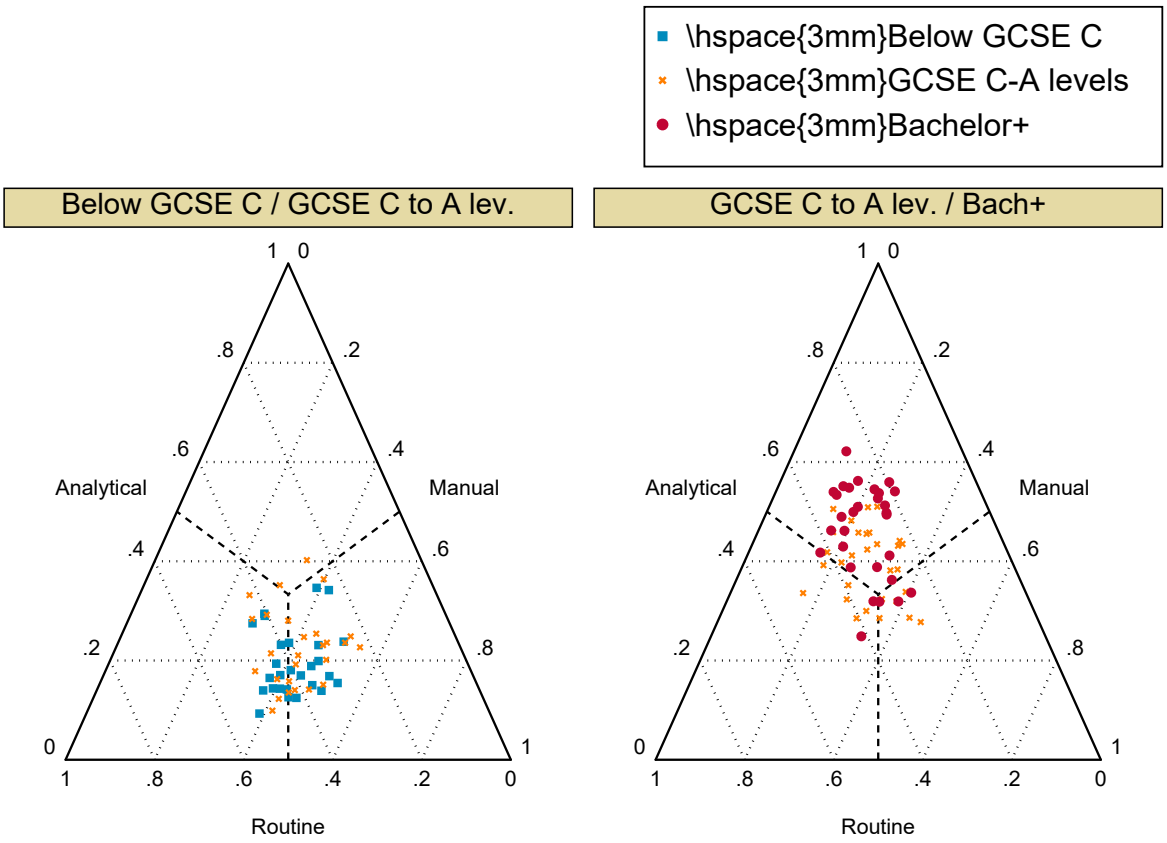


Table 1: Dependent variable: skill use percentile (unweighted)

Base level: GCSE C-A levels	(1) **Analytical**	(2) **Manual**	(3) **Routine**
Simple average indexes			
Bachelor+	7.84***	-7.34***	-4.09***
	(0.81)	(0.78)	(0.93)
Overall R^2	0.15	0.31	0.09
Within R^2	0.02	0.02	0.01
Observations	3,877	3,877	3,877
Factor analysis: restricted			
Bachelor+	8.04***	-7.35***	-6.52***
	(0.81)	(0.79)	(0.89)
Overall R^2	0.13	0.31	0.11
Within R^2	0.03	0.02	0.01
Observations	3,877	3,877	3,877
Factor analysis: orthogonal factors			
Bachelor+	5.46***	-7.26***	-4.67***
	(0.84)	(0.78)	(0.90)
Overall R^2	0.10	0.31	0.09
Within R^2	0.01	0.02	0.01
Observations	3,877	3,877	3,877

Note: robust standard errors in parenthesis. The regression includes data from 29 occupations. I require at least 3 observations from each education level in **each year**. I pool data from all years. Regressions include occupation and year fixed-effects. Unweighted estimates. Table generated on 7 Mar 2020 at 16:01:25.

Table 2: Dependent variable: skill use percentile (weighted)

Base level: GCSE C-A levels	(1) **Analytical**	(2) **Manual**	(3) **Routine**
Simple average indexes			
Bachelor+	7.01***	-7.59***	-4.22***
	(0.01)	(0.01)	(0.01)
Overall R^2	0.15	0.34	0.11
Within R^2	0.02	0.02	0.01
Observations	24,247,321	24,247,321	24,247,321
Factor analysis: restricted			
Bachelor+	7.14***	-7.54***	-6.41***
	(0.01)	(0.01)	(0.01)
Overall R^2	0.13	0.34	0.12
Within R^2	0.02	0.02	0.01
Observations	24,247,321	24,247,321	24,247,321
Factor analysis: orthogonal factors			
Bachelor+	4.57***	-7.69***	-5.33***
	(0.01)	(0.01)	(0.01)
Overall R^2	0.10	0.34	0.10
Within R^2	0.01	0.03	0.01
Observations	24,247,321	24,247,321	24,247,321

Note: robust standard errors in parenthesis. The regression includes data from 29 occupations. I require at least 3 observations from each education level in **each year**. I pool data from all years. Regressions include occupation and year fixed-effects. Weighted estimates using the frequency weights provided in the SES. Table generated on 7 Mar 2020 at 16:01:31.

Table 3: Jobs included in GCSE C to A levels-Bachelor+ regression

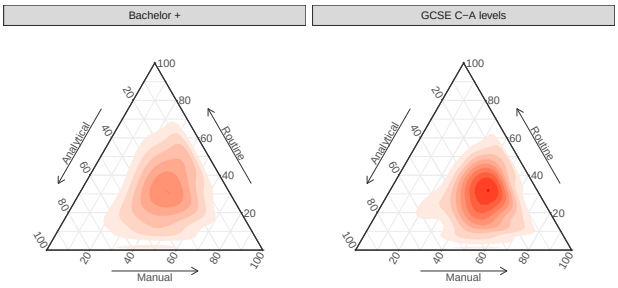
	Number of observations	
Occupation	**GCSE C to A levels**	**Bachelor +**
1121 prod. works & maintenance managers	88	121
1122 managers in construction, mining an	43	51
1132 marketing and sales managers	115	182
1136 info & communication technol mngers	47	111
1141 quality assurance and customer care	21	27
1151 Financial institution and office ma	108	125
1181 healthcare and social service manag	23	69
1231 Managers And Proprietors In Other S	46	44
1239 mngers and prop. in other srvcs nec	74	88
2132 software professionals	32	149
2315 prim & nurs eductn teaching profs	19	251
2423 mngmnt cons, actuar, econs & statn	20	67
3111 laboratory, engineering, and qualit	57	62
3131 it technitians	54	58
3212 healthcare techinitians, except nur	34	58
3231 youth and community workers	31	38
3232 housing and welfare officers	60	73
3312 police, fire, and prison officers	92	53
3421 graphic designers	20	34
3431 Media Associate Professionals	38	64
3511 Transport Associate Professionals	15	20
3531 Estimators, valuers, assessors, bro	39	36
3534 fin., invest, and taxation analysts	26	83
3541 sales representatives, marketing pr	102	101
3561 public service associates, personne	54	59
3563 vocatn & indust trainrs & instrctrs	44	60
4111 civil service officers and assistan	78	56
4113 local gov clerical offs & assists /	75	53
5241 Electrical trades	164	65

Table 4: Jobs included in GCSE C to A levels-Bachelor+ regression

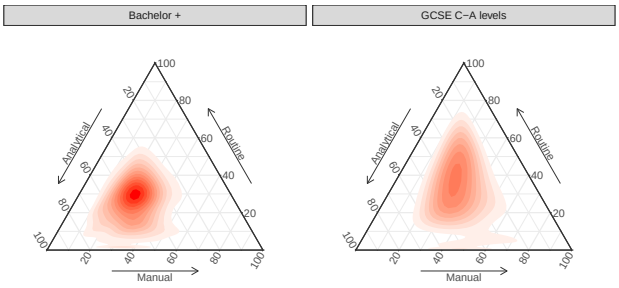
	Employment shares	
Occupation	**GCSE C-A levels**	**Bachelor+**
1121 prod. works & maintenance managers	0.46	0.42
1122 managers in construction, mining an	0.50	0.35
1132 marketing and sales managers	0.42	0.47
1136 info & communication technol mngers	0.32	0.60
1141 quality assurance and customer care	0.51	0.41
1151 Financial institution and office ma	0.54	0.33
1181 healthcare and social service manag	0.27	0.62
1231 Managers And Proprietors In Other S	0.56	0.30
1239 mngers and prop. in other srvcs nec	0.45	0.35
2132 software professionals	0.28	0.64
2315 prim & nurs eductn teaching profs	0.02	0.96
2423 mngmnt cons, actuar, econs & statn	0.18	0.76
3111 laboratory, engineering, and qualit	0.50	0.39
3131 it technitians	0.48	0.41
3212 healthcare techinitians, except nur	0.31	0.59
3231 youth and community workers	0.44	0.40
3232 housing and welfare officers	0.36	0.54
3312 police, fire, and prison officers	0.70	0.19
3421 graphic designers	0.38	0.56
3431 Media Associate Professionals	0.31	0.61
3511 Transport Associate Professionals	0.50	0.29
3531 Estimators, valuers, assessors, bro	0.54	0.38
3534 fin., invest, and taxation analysts	0.50	0.41
3541 sales representatives, marketing pr	0.49	0.39
3561 public service associates, personne	0.46	0.47
3563 vocatn & indust trainrs & instrctrs	0.49	0.43
4111 civil service officers and assistan	0.65	0.25
4113 local gov clerical offs & assists /	0.60	0.25
5241 Electrical trades	0.72	0.17

Figure 4: Skill use in big sample occupations (GCSE C to A levels / Bachelor+)

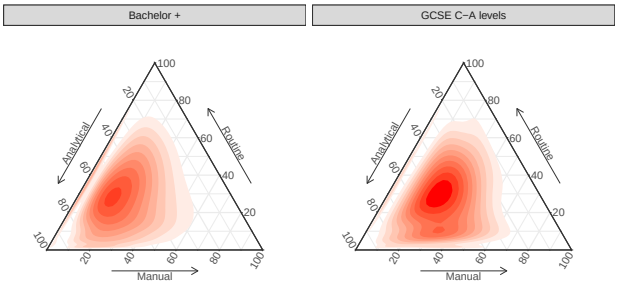
(a) Electrical trades



(b) Prim & nurs eductn teaching profs



(c) Marketing and sales managers



(d) Financial institution and office managers

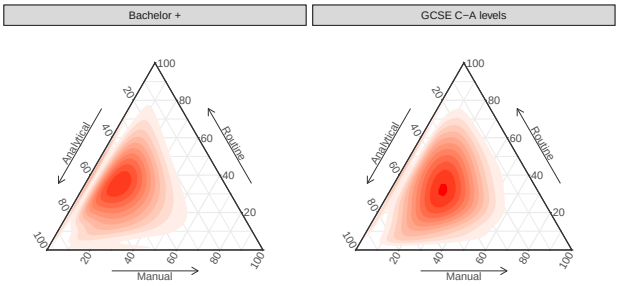


Table 5: Dependent variable: skill use percentile (unweighted)

Base level: Below GCSE C	(1) **Analytical**	(2) **Manual**	(3) **Routine**
Simple average indexes			
GCSE C-A levels	4.18***	-0.42	-3.33***
	(0.78)	(0.67)	(0.86)
Overall R^2	0.15	0.36	0.15
Within R^2	0.01	0.00	0.00
Observations	4,591	4,591	4,591
Factor analysis: restricted			
GCSE C-A levels	3.78***	-0.90	-2.60**
	(0.79)	(0.65)	(0.83)
Overall R^2	0.16	0.37	0.16
Within R^2	0.00	0.00	0.00
Observations	4,591	4,591	4,591
Factor analysis: orthogonal factors			
GCSE C-A levels	3.93***	-0.71	-1.46
	(0.83)	(0.68)	(0.90)
Overall R^2	0.16	0.35	0.15
Within R^2	0.00	0.00	0.00
Observations	4,591	4,591	4,591

10

Note: robust standard errors in parenthesis. The regression includes data from 27 occupations. I require at least 3 observations from each education level in **each year**. I pool data from all years. Regressions include occupation and year fixed-effects. Unweighted estimatess. Table generated on 7 Mar 2020 at 16:01:26.

Table 6: Dependent variable: skill use percentile (weighted)

Base level: Below GCSE C	(1) **Analytical**	(2) **Manual**	(3) **Routine**
Simple average indexes			
GCSE C-A levels	2.84***	-0.92***	-3.90***
	(0.01)	(0.01)	(0.01)
Overall R^2	0.15	0.39	0.16
Within R^2	0.00	0.00	0.00
Observations	26,995,074	26,995,074	26,995,074
Factor analysis: restricted			
GCSE C-A levels	2.47***	-1.21***	-3.55***
	(0.01)	(0.01)	(0.01)
Overall R^2	0.16	0.40	0.18
Within R^2	0.00	0.00	0.00
Observations	26,995,074	26,995,074	26,995,074
Factor analysis: orthogonal factors			
GCSE C-A levels	2.78***	-1.02***	-3.06***
	(0.01)	(0.01)	(0.01)
Overall R^2	0.17	0.37	0.16
Within R^2	0.00	0.00	0.00
Observations	26,995,074	26,995,074	26,995,074

Note: robust standard errors in parenthesis. The regression includes data from 27 occupations. I require at least 3 observations from each education level in **each year**. I pool data from all years. Regressions include occupation and year fixed-effects. Weighted estimates using the frequency weights provided in the SESs. Table generated on 7 Mar 2020 at 16:01:31.

Table 7: Jobs included in Below GCSE C- GCSE C to A levels regression

	Number of observations	
Occupation	**Below GCSE C**	**GCSE C-A levels**
1163 retail and wholesale managers	24	112
1221 Managers and proprietors in hospita	24	62
4131 Administrative occupations: records	45	178
4150 general office assistants or clerks	43	248
4211 Secretarial and related occupations	60	282
5111 Farmers, gardeners and ground women	39	61
5213 Metal forming, welding and related	18	47
5221 Metal Machining, Fitting And Instru	50	160
5231 Vehicle trades	28	85
5312 bricklayers, masons, roofers	108	243
5321 building trades	41	58
5432 chefs, cooks, bakers, flour confect	50	92
6111 nursing aux, amb staff, dental nurs	38	112
6114 houseprnts, residential wardens, ca	104	303
7111 sales and retail assistants	163	295
7112 retail cashiers/check-out operators	44	61
7122 Sales related occupations	24	55
8111 food, drink & tobac process operat	47	39
8211 heavy goods vehicle drivers	83	61
8212 van drivers	52	59
8214 taxi, cab drivers and chauffeurs	41	38
8222 fork-lift truck drivers	33	28
9121 labrers build & woodworking trades	30	37
9134 packers, bottlers, canners, fillers	42	33
9149 oth good hndlng & storage occup nec	99	73
9223 kitchen and catering assistants	85	71
9233 cleaners, domestics	177	106

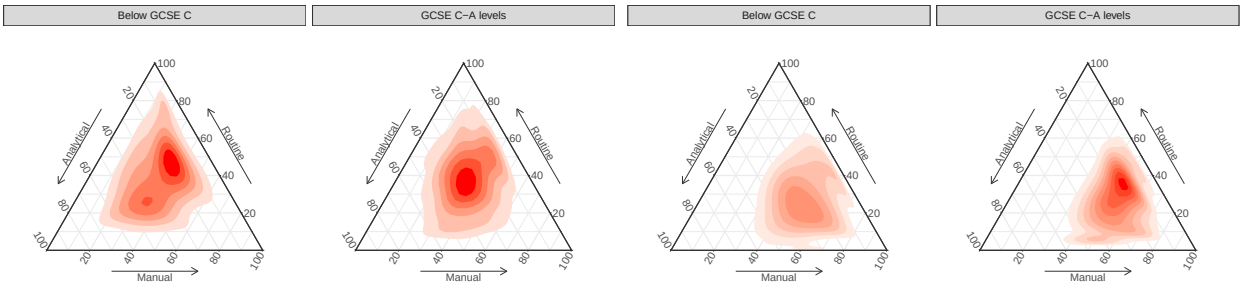
Table 8: Jobs included in Below GCSE C- GCSE C to A levels regression

	Employment share	
Occupation	**Below GCSE C**	**GCSE C-A levels**
1163 retail and wholesale managers	0.22	0.58
1221 Managers and proprietors in hospita	0.27	0.51
4131 Administrative occupations: records	0.22	0.58
4150 general office assistants or clerks	0.23	0.60
4211 Secretarial and related occupations	0.23	0.64
5111 Farmers, gardeners and ground women	0.40	0.47
5213 Metal forming, welding and related	0.26	0.70
5221 Metal Machining, Fitting And Instru	0.19	0.71
5231 Vehicle trades	0.21	0.75
5312 bricklayers, masons, roofers	0.21	0.74
5321 building trades	0.32	0.65
5432 chefs, cooks, bakers, flour confect	0.37	0.57
6111 nursing aux, amb staff, dental nurs	0.29	0.52
6114 houseprnts, residential wardens, ca	0.41	0.49
7111 sales and retail assistants	0.40	0.52
7112 retail cashiers/check-out operators	0.47	0.47
7122 Sales related occupations	0.33	0.56
8111 food, drink & tobac process operat	0.60	0.37
8211 heavy goods vehicle drivers	0.59	0.39
8212 van drivers	0.48	0.47
8214 taxi, cab drivers and chauffeurs	0.52	0.42
8222 fork-lift truck drivers	0.62	0.35
9121 labrers build & woodworking trades	0.60	0.37
9134 packers, bottlers, canners, fillers	0.65	0.34
9149 oth good hndlng & storage occup nec	0.52	0.45
9223 kitchen and catering assistants	0.59	0.37
9233 cleaners, domestics	0.73	0.25

Figure 5: Skill use in big sample occupations (Below GCSE C - GCSE C to A levels)

(a) Secretarial and related occupations

(b) Bricklayers, masons, roofers



(c) Houseprnts, residential wardens, ca

(d) Sales and retail assistants

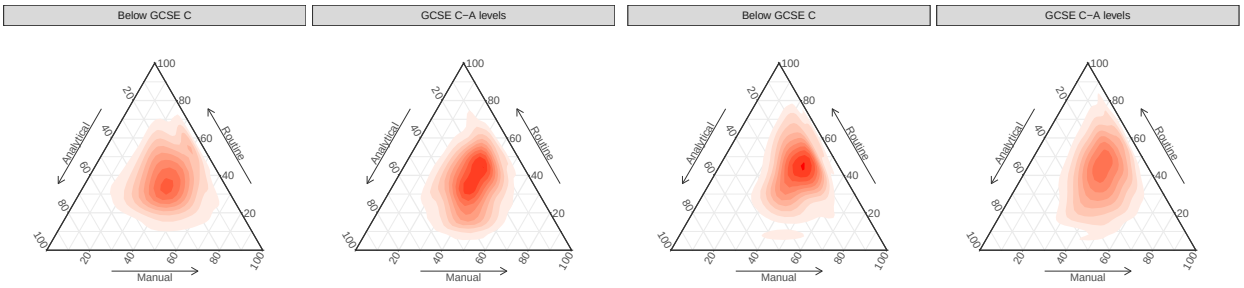


Figure 6: Reported skill use by education level

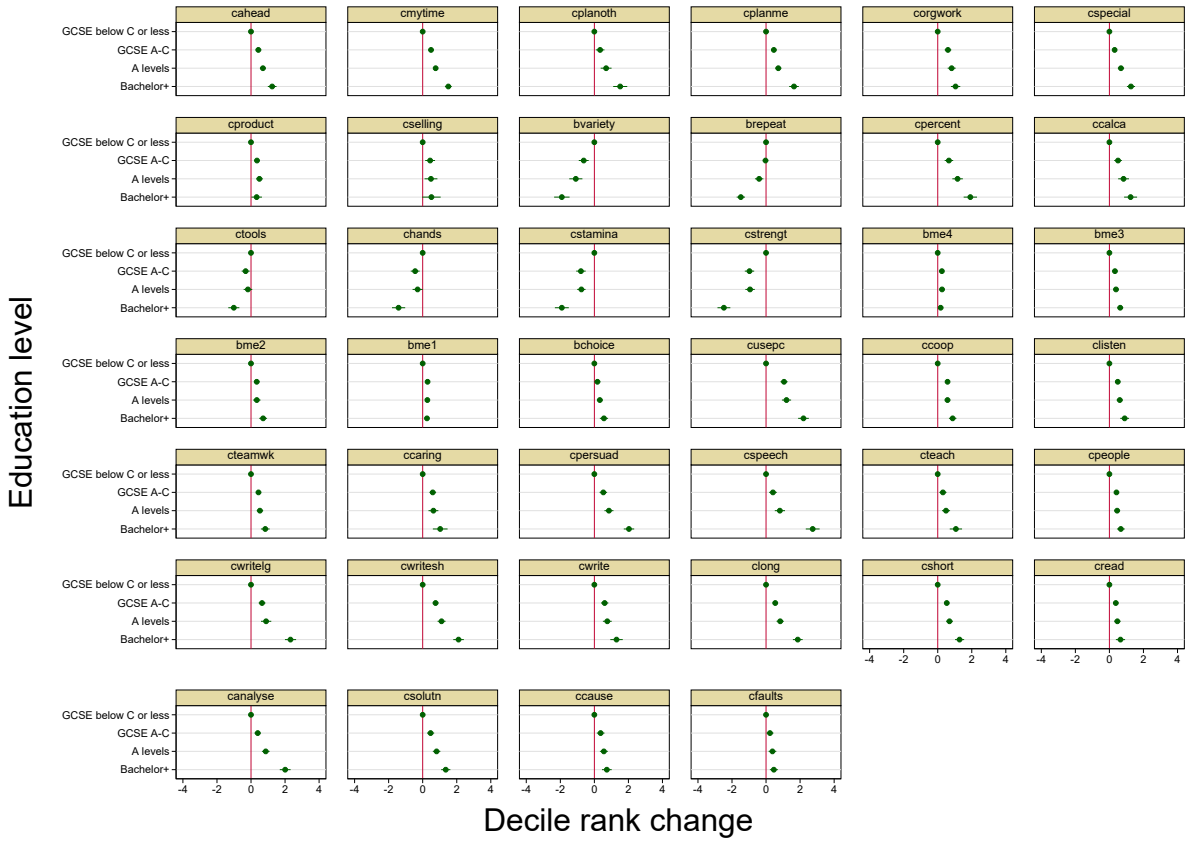


Table 9: Orthogonal factors

(a) Factor loadings

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
cstamina	0.03013	0.33648	-0.01303	0.08342	-0.05449	-0.205
cstrengt	0.02289	0.36756	-0.0073	0.02498	-0.05233	-0.18528
chands	0.01439	0.21548	0.02358	-0.10242	0.00983	0.23012
ctools	0.0161	0.16175	0.02001	-0.08773	0.04585	0.23253
brepeat	0.00949	0.03715	0.01111	0.032	0.21217	-0.0108
bvariety	0.01221	0.00034	0.00689	-0.00919	0.33277	-0.02458
cplanme	0.0027	-0.00773	-0.0115	-0.07376	0.23847	-0.00677
bme4	0.01961	-0.0202	-0.00095	-0.01123	0.18314	-0.0144
cpeople	0.00327	-0.00158	-0.01501	0.13225	-0.06691	-0.08071
cteach	-0.015	0.02014	-0.02171	0.31192	0.15771	-0.00196
cpersuad	-0.02343	-0.02662	-0.01432	0.30599	0.00031	-0.00369
cplanoth	-0.02627	0.02348	0.00309	0.29193	0.01734	-0.02905
canalyse	0.04314	-0.02117	-0.01128	0.04805	-0.00705	0.3771
csolutn	0.00154	0.01244	0.00512	0.06015	-0.03892	0.31808
ccalca	-0.06709	0.0221	0.46262	-0.01826	0.02825	-0.10675
cpercent	-0.0659	-0.01035	0.50056	-0.04971	0.02991	-0.02897
cwritelg	0.2348	-0.00821	-0.03221	-0.06615	-0.00482	-0.09563
cwritesh	0.28673	0.00504	-0.0279	-0.08661	-0.03124	-0.1327
clong	0.34257	0.03958	-0.06439	-0.14241	0.09751	-0.00731
cshort	0.25205	0.0309	-0.02385	-0.07978	0.10956	-0.06997

(b) Scree plot

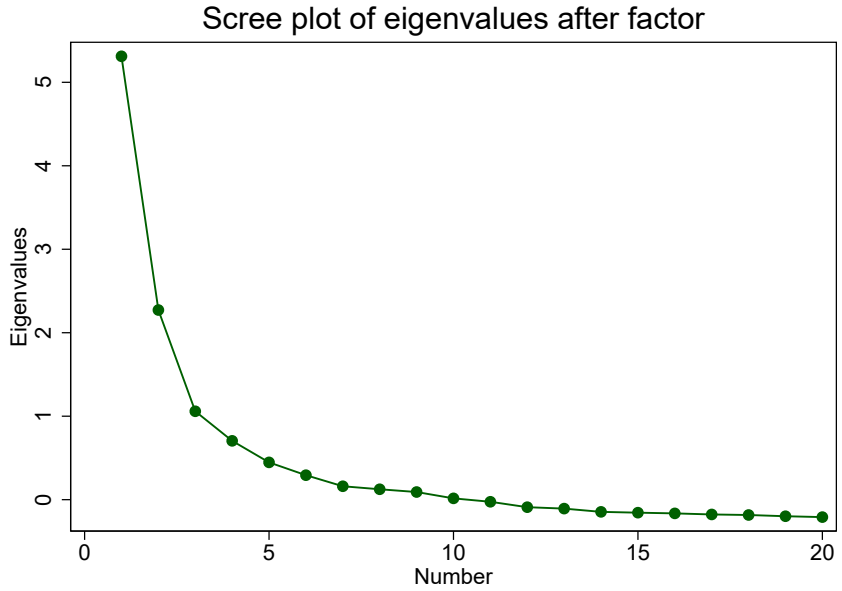


Table 10: Factor loadings

Variable	**Loading**
Analytical	
cpeople	0.394
cteach	0.526
cpersuad	0.623
cplanoth	0.553
canalyse	0.686
csolutn	0.575
ccalca	0.486
cpercent	0.539
cwritelg	0.727
cwritesh	0.757
clong	0.758
cshort	0.701
Manual	
cstamina	0.788
cstrengt	0.801
chands	0.710
ctools	0.626
Routine	
brepeat	0.366
bvariety	0.574
cplanme	0.497
bme4	0.361