

Appendix 9.B

Rational Number Characteristics on the CA and OA Instruments

The following lists catalog the item characteristics for the Rational Number Concepts Assessment (CA) and Operations Assessment (OA). For each test, a list of numbered characteristics is given, followed by a list of numbers (an "item vector") given for each of the 95 items (60 on CA and 35 on OA). Each of these numbers represents one of the rational number characteristics in the respective item. Each CA item is identified by 6 characteristics, and each OA item is identified by 6 characteristics. The item numbering for the lists of vectors corresponds to the ordering on the *original* tests, and thus to the number appearing before each item stem (and the number in parentheses in the information line following) in the reordered versions in Appendix 9.A.

CONCEPTS TEST ITEM CHARACTERISTICS

Translation type:

1. Symbol-picture
2. Picture-symbol
3. Picture-written
4. Written-picture
5. Picture-picture
6. Symbol-symbol
7. Written-symbol
8. symbol-written
9. (unused code)

Picture types:

10. Circular region representation
11. Polygonal region representation
12. Discrete object representation
13. Number line representation
14. Nonpicture representation
15. Volume representation
16. Discrete object-polygonal region translation
17. Polygonal region-discrete object translation
18. Discrete object-discrete object translation
19. Polygonal region-polygonal region translation
20. Number line-polygonal region translation

Imposition of measure on picture:

21. Measure imposed on picture or measure not applicable
22. No measure imposed on picture

Subconstruct:

23. Ratio subconstruct
24. Fraction subconstruct

Numerator characteristics:

25. Unit rational
26. Subitizable numerator (> 1)
27. Nonsubitizable numerator
28. Numerator size not applicable

Denominator characteristics:

29. Denominator = 1
30. Subitizable denominator
31. Nonsubitizable denominator (> 1)
32. Denominator size not applicable

Rational number size characteristics:

33. Rational = $1/2$
34. Rational is less than 1 ($< 1/2$)
35. rational greater than 1 in mixed form
36. Improper fraction form
37. Problem is to identify whole
38. Whole number rational

Congruency of parts in picture:

39. Parts congruent or congruency not applicable
40. Parts not congruent

Perceptual distracter characteristics:

41. Discrete object perceptual distracter
42. Polygonal perceptual distracter
43. Distracters not analyzed

Task characteristic:

44. Identify p/q
45. Identify ordinal denominator or size of parts
46. Identify cardinal numerator or denominator

CONCEPTS TESTS: ITEM VECTORS KEYED TO NUMBERED
CHARACTERISTICS ABOVE

1.	2	10	21	24	25	30	33	39	43	44
2.	3	11	22	24	26	30	34	39	43	44
3.	2	12	21	24	26	30	34	39	43	44
4.	4	11	21	24	26	30	34	39	43	44
5.	4	12	21	24	26	30	34	39	43	44
6.	1	10	21	24	25	30	33	39	43	44
7.	4	12	21	24	28	30	38	39	41	45
8.	3	13	21	24	25	30	35	39	43	44
9.	5	20	21	24	25	30	33	39	43	44
10.	7	14	21	24	26	30	34	39	43	44
11.	4	15	21	24	28	30	38	39	43	45
12.	1	13	21	24	25	30	33	39	43	44
13.	4	10	21	24	28	31	38	39	43	45
14.	1	10	22	24	26	30	34	39	43	44
15.	7	14	21	24	28	30	38	39	43	45
16.	2	12	21	24	26	31	34	39	43	44
17.	7	14	21	24	26	30	34	39	43	44
18.	8	14	21	24	26	30	34	39	43	44
19.	2	13	21	24	26	30	35	39	43	44
20.	5	16	21	24	26	30	34	39	42	44
21.	1	13	21	24	26	30	34	39	43	44
22.	3	13	21	24	28	30	38	39	43	45
23.	2	13	21	23	26	30	34	39	43	44
24.	4	12	21	23	26	30	34	39	43	44
25.	3	12	21	23	26	30	34	39	43	44
26.	7	14	21	24	28	30	38	39	43	45
27.	1	12	21	24	26	30	34	39	43	44
28.	5	17	21	23	26	30	35	39	43	44
29.	2	10	22	24	25	30	34	39	43	44
30.	3	10	22	24	25	30	34	39	42	44
31.	2	11	21	24	25	30	34	39	42	44
32.	3	13	21	24	25	30	33	39	43	44
33.	2	12	21	24	25	31	34	39	43	44
34.	2	12	21	24	25	30	35	39	43	44
35.	2	12	21	23	27	29	35	39	43	44
36.	3	12	21	23	27	30	35	39	43	44
37.	2	13	21	23	25	31	34	39	43	44
38.	2	10	21	23	25	29	38	39	43	44
39.	2	12	21	24	25	30	34	40	43	44

40.	7	14	21	24	25	31	34	39	43	45
41.	2	11	22	24	25	30	35	39	43	44
42.	2	12	21	24	26	31	34	40	43	44
43.	2	12	21	24	25	30	35	39	43	44
44.	2	10	21	24	25	30	34	39	43	37
45.	2	11	21	24	25	30	34	39	42	37
46.	2	12	21	24	25	30	34	39	41	37
47.	2	11	21	24	25	30	33	39	42	37
48.	2	10	21	24	25	30	34	39	42	37
49.	3	12	21	24	26	31	34	39	41	46
50.	3	11	21	24	26	30	34	39	41	46
51.	1	13	21	24	27	30	36	39	43	44
52.	5	19	21	24	26	30	34	39	43	44
53.	2	13	21	24	25	32	38	39	43	44
54.	6	14	21	24	25	30	35	39	43	44
55.	6	14	21	24	26	30	34	39	43	44
56.	6	14	21	24	27	30	36	39	43	44
57.	5	18	22	24	25	30	34	39	41	37
58.	5	19	22	24	25	30	34	39	42	37
59.	3	12	21	24	26	31	34	39	43	44
60.	3	11	21	24	27	31	34	39	42	44

OPERATIONS TEST ITEM CHARACTERISTICS

Translation type:

1. Written language-written language
2. Written language-symbols
3. Symbols-symbols
4. Symbols and written language-symbols
5. Symbols and written language-symbols and written language
6. Symbols and written language-symbols
7. Word problem with symbols-symbols
8. Word problem with written language-symbols
9. Written language-picture(s)
10. Symbols-symbols and written language
11. Symbols-picture(s)
12. Picture(s)-symbols
13. Word problem with picture(s) and symbols-symbols

Picture type:

14. Nonpictorial item
15. Discrete object representation

16. Circular region representation
17. Continuous real object in picture
18. Polygonal region in picture

Operation:

19. Addition
20. Multiplication or division
21. Subtraction
22. Multiplication and subtraction
23. Division

Word cue:

24. Word cue - "plus"
25. Word cue - "of"
26. Word cue - "left"
27. Word cue - "add"
28. Word cue - "subtract"
29. Word cue - "sum"
30. Word cue - "older than"
31. Word cue - "product"
32. No word cue or miscellaneous word cue

Response type:

33. Response is translation only
34. Response is a calculation with little or no simplifying
35. Response is a calculation requiring simplification
36. Response identifies a process

Rational size / notation characteristics:

37. Item involves unit fractions(s)
38. Item involves proper fraction(s)
39. Item involves one proper fraction and one whole number
40. Item contains mixed number(s)
41. Non-unit proper fractions need a common denominator
42. Mixed number need a common denominator

**OPERATIONS TEST: ITEM VECTORS KEYED TO
CHARACTERISTICS ABOVE:**

- | | | | | | | |
|----|---|----|----|----|----|----|
| 1. | 5 | 14 | 19 | 24 | 34 | 37 |
| 2. | 2 | 14 | 9 | 25 | 34 | 37 |
| 3. | 3 | 14 | 19 | 27 | 34 | 37 |

4.	6	14	20	25	34	37
5.	8	14	20	25	34	37
6.	6	14	20	25	35	39
7.	8	14	22	25	35	39
8.	3	14	21	28	34	39
9.	9	15	20	25	33	37
10.	5	14	20	25	36	37
11.	3	14	20	31	34	37
12.	3	14	20	31	34	39
13.	3	14	20	31	34	38
14.	11	16	19	32	33	37
15.	1	14	19	27	36	38
16.	3	14	19	29	34	38
17.	3	14	19	29	34	41
18.	3	14	19	29	34	41
19.	2	14	20	25	33	37
20.	6	14	20	25	34	39
21.	3	14	19	29	34	41
22.	3	14	19	29	34	40
23.	12	15	20	25	34	39
24.	3	14	20	31	34	39
25.	3	14	20	31	34	39
26.	7	14	19	30	35	40
27.	13	17	21	32	33	42
28.	6	14	21	26	35	42
29.	6	14	23	32	33	42
30.	6	14	20	25	34	38
31.	8	14	20	25	36	38
32.	12	16	19	32	33	37
33.	12	18	19	32	36	37
34.	12	18	19	32	35	37
35.	6	14	20	25	34	38