

**Appendix 4.** Evaluation of the combined application of static and dynamic visual variables, sound variables and related methods of presentation for users of different age groups

| Number of static visual variables |                 | Number of static and dynamic variables | Dynamized variables | Entities and levels | Combinations of variables                      | Methods of presentation      | Age groups                  |
|-----------------------------------|-----------------|----------------------------------------|---------------------|---------------------|------------------------------------------------|------------------------------|-----------------------------|
| dynamized variables               | other variables |                                        |                     |                     |                                                |                              |                             |
| 1                                 | 4               | 10                                     | <u>1</u> 2 3 4      | ab                  | <u>1</u> (I, II, III, IV, V, VII) 2 3 4; ④⑥⑧⑩  | Sab, Kab, Kdab               | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | <u>1</u> 2 3 4      | ac                  | <u>1</u> (I, II, III, IV, V, VII) 2 3 4; ④⑥⑧⑩  | Kc, Sac, Kac (cs), Kdac (cs) | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | <u>1</u> 2 3 4      | βb                  | <u>1</u> (I, II, III, IV, V, VII) 2 3 4; ④⑥⑧⑩  | Sβb, Kβb, Kdβb               | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | <u>1</u> 2 3 4      | βc                  | <u>1</u> (I, II, III, IV, V, VII) 2 3 4; ④⑥⑧⑩  | Ic, Sβc, Kβc (cs), Kdβc (cs) | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | <u>1</u> 2 3 4      | γb                  | <u>1</u> (I, II, III, IV, V, VII) 2 3 4; ④⑥⑧⑩  | Kγc(cs), KaBc, KDγb          | {2} {3} {4} {5} {6} {7}     |
| 1                                 | 4               | 10                                     | <u>1</u> 2 3 4      | γc                  | <u>1</u> (I, II, III, IV, V, VII) 2 3 4; ④⑥⑧⑩  | KaBc, Kγc(cs), KDγC(cs)      | {2} {3} {4} {5} {6} {7}     |
| 1                                 | 4               | 10                                     | 1 <u>2</u> 3 4      | αa                  | 1 <u>2</u> (I, II, III, IV, V, VII) 3 4; ⑦⑨⑪⑬  | Sac                          | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | 1 <u>2</u> 3 4      | γa                  | 1 <u>2</u> (I, II, III, IV, V, VII) 3 4; ⑦⑨⑪⑬  | MCa, MZa                     | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | 1 2 <u>3</u> 4      | ab                  | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4; ②③⑥⑧⑩ | Sab, Kab, Kdab               | {2} {3} {4} {5} {6} {7}     |
| 1                                 | 4               | 10                                     | 1 2 <u>3</u> 4      | ac                  | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4; ②③⑥⑧⑩ | Kc, Sac, Kac (cs), Kdac (cs) | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | 1 2 <u>3</u> 4      | βb                  | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4; ②③⑥⑧⑩ | Sβb, Kβb, Kdβb               | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | 1 2 <u>3</u> 4      | βc                  | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4; ②③⑥⑧⑩ | Ic, Sβc, Kβc (cs), Kdβc (cs) | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | 1 2 <u>3</u> 4      | γb                  | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4; ②③⑥⑧⑩ | Kγc(cs), KaBc, KDγb          | {2} {3} {4} {5} {6} {7}     |
| 1                                 | 4               | 10                                     | 1 2 <u>3</u> 4      | γc                  | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4; ②③⑥⑧⑩ | KaBc, Kγ c(cs), KDγC(cs)     | {2} {3} {4} {5} {6} {7}     |
| 1                                 | 4               | 10                                     | 1 2 3 <u>4</u>      | αa                  | 1 2 3 4 (I, II, III, IV, V, VII); ⑤⑥⑨⑪         | Sac                          | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | 1 2 3 <u>4</u>      | βa                  | 1 2 3 4 (I, II, III, IV, V, VII); ⑤⑥⑨⑪         | Sβa, MZa                     | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 4               | 10                                     | 1 2 3 <u>4</u>      | γa                  | 1 2 3 4 (I, II, III, IV, V, VII); ⑤⑥⑨⑪         | MCA, MZa                     | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 5               | 11                                     | 1 2 3 4 <u>5</u>    | βa                  | 1 2 3 4 <u>5</u> (I, II, III, IV, V, VII)      | Sβa, MZa                     | {1} {2} {3} {4} {5} {6} {7} |
| 1                                 | 5               | 11                                     | 1 2 3 4 <u>5</u>    | βb                  | 1 2 3 4 <u>5</u> (I, II, III, IV, V, VII)      | Sβb, Kβb, Kdβb               | {1} {2} {3} {4} {5} {6} {7} |

|   |   |    |                             |            |                                                                                                    |                                           |                             |
|---|---|----|-----------------------------|------------|----------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------------------|
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 5}$ | $\gamma a$ | $\underline{1\ 2\ 3\ 4\ 5}$ (I, II, III, IV, V, VII)                                               | MCa, MZa                                  | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 7}$ | $\alpha a$ | $\underline{1\ 2\ 3\ 4\ 7}$ (I, II, III, IV, V, VII)                                               | Sac                                       | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 7}$ | $\alpha b$ | $\underline{1\ 2\ 3\ 4\ 7}$ (I, II, III, IV, V, VII)                                               | Sab, Kab, Kdab                            | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 7}$ | $\beta a$  | $\underline{1\ 2\ 3\ 4\ 7}$ (I, II, III, IV, V, VII)                                               | S $\beta$ a, MZa                          | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 7}$ | $\beta b$  | $\underline{1\ 2\ 3\ 4\ 7}$ (I, II, III, IV, V, VII)                                               | S $\beta$ b, K $\beta$ b, Kd $\beta$ b    | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 8}$ | $\alpha a$ | $\underline{1\ 2\ 3\ 4\ 8}$ (I, II, III, IV, V, VII)                                               | Sac                                       | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 8}$ | $\alpha b$ | $\underline{1\ 2\ 3\ 4\ 8}$ (I, II, III, IV, V, VII)                                               | Sab, Kab, Kdab                            | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 8}$ | $\beta a$  | $\underline{1\ 2\ 3\ 4\ 8}$ (I, II, III, IV, V, VII)                                               | S $\beta$ a, MZa                          | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 8}$ | $\beta b$  | $\underline{1\ 2\ 3\ 4\ 8}$ (I, II, III, IV, V, VII)                                               | S $\beta$ b, K $\beta$ b, Kd $\beta$ b    | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 9}$ | $\alpha a$ | $\underline{1\ 2\ 3\ 4\ 9}$ (I, II, III, IV, V, VII)                                               | Sac                                       | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 9}$ | $\alpha b$ | $\underline{1\ 2\ 3\ 4\ 9}$ (I, II, III, IV, V, VII)                                               | Sab, Kab, Kdab                            | {1} {2} {3} {4} {5} {6} {7} |
| 1 | 5 | 11 | $\underline{1\ 2\ 3\ 4\ 9}$ | $\alpha c$ | $\underline{1\ 2\ 3\ 4\ 9}$ (I, II, III, IV, V, VII)                                               | Kc, Sac, Kac (cs), Kdac (cs)              | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 16 | $\underline{1\ 2\ 3\ 4}$    | $\alpha b$ | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3}$ (I, II, III, IV, V, VII) 4; ④⑥⑧⑩ ②③⑥⑧⑩ | Sab, Kab, Kdab                            | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 16 | $\underline{1\ 2\ 3\ 4}$    | $\beta b$  | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3}$ (I, II, III, IV, V, VII) 4; ④⑥⑧⑩ ②③⑥⑧⑩ | S $\beta$ b, K $\beta$ b, Kd $\beta$ b    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 16 | $\underline{1\ 2\ 3\ 4}$    | $\beta c$  | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3}$ (I, II, III, IV, V, VII) 4; ④⑥⑧⑩ ②③⑥⑧⑩ | S $\beta$ c, K $\beta$ c (cs), KDBC (CS)  | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 16 | $\underline{1\ 2\ 3\ 4}$    | $\gamma b$ | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3}$ (I, II, III, IV, V, VII) 4; ④⑥⑧⑩ ②③⑥⑧⑩ | Kyc(cs), KaBc, KD $\gamma$ b              | {2} {3} {4} {5} {6} {7}     |
| 2 | 5 | 16 | $\underline{1\ 2\ 3\ 4}$    | $\gamma c$ | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3}$ (I, II, III, IV, V, VII) 4; ④⑥⑧⑩ ②③⑥⑧⑩ | KaBc, K $\gamma$ C(cs), KD $\gamma$ C(cs) | {2} {3} {4} {5} {6} {7}     |
| 2 | 5 | 16 | $\underline{1\ 2\ 3\ 4}$    | $\alpha a$ | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3}$ (I, II, III, IV, V, VII) 4; ④⑥⑧⑩ ②③⑥⑧⑩ | Sac                                       | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 16 | $\underline{1\ 2\ 3\ 4}$    | $\gamma a$ | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3}$ (I, II, III, IV, V, VII) 4; ④⑥⑧⑩ ②③⑥⑧⑩ | MCa, MZa                                  | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | $\underline{1\ 2\ 3\ 4\ 5}$ | $\beta b$  | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3\ 4\ 5}$ (I, II, III, IV, V, VII)         | S $\beta$ b, K $\beta$ b, Kd $\beta$ b    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | $\underline{1\ 2\ 3\ 4\ 7}$ | $\alpha b$ | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3\ 4\ 7}$ (I, II, III, IV, V, VII)         | Sab, Kab, Kdab                            | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | $\underline{1\ 2\ 3\ 4\ 7}$ | $\beta b$  | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3\ 4\ 7}$ (I, II, III, IV, V, VII)         | S $\beta$ b, K $\beta$ b, Kd $\beta$ b    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | $\underline{1\ 2\ 3\ 4\ 8}$ | $\alpha b$ | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3\ 4\ 8}$ (I, II, III, IV, V, VII)         | Sab, Kab, Kdab                            | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | $\underline{1\ 2\ 3\ 4\ 8}$ | $\beta b$  | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3\ 4\ 8}$ (I, II, III, IV, V, VII)         | S $\beta$ b, K $\beta$ b, Kd $\beta$ b    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | $\underline{1\ 2\ 3\ 4\ 9}$ | $\alpha a$ | $\underline{1}$ (I, II, III, IV, V, VII) $\underline{2\ 3\ 4\ 9}$ (I, II, III, IV, V, VII)         | Sac                                       | {1} {2} {3} {4} {5} {6} {7} |

|   |   |    |                    |            |                                                                             |                                        |                             |
|---|---|----|--------------------|------------|-----------------------------------------------------------------------------|----------------------------------------|-----------------------------|
| 2 | 5 | 17 | <u>1 2 3 4 9</u>   | $\alpha c$ | <u>1</u> (I, II, III, IV, V, VII) 2 3 4 <u>9</u> (I, II, III, IV, V, VII)   | $Kc, Sac, Kac (cs), Kdac (cs)$         | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 <u>2 3 4 5</u>   | $\gamma a$ | 1 <u>2</u> (I, II, III, IV, V, VII) 3 4 <u>5</u> (I, II, III, IV, V, VII)   | MCA, MZa                               | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 <u>2 3 4 7</u>   | $\alpha a$ | 1 <u>2</u> (I, II, III, IV, V, VII) 3 4 <u>7</u> (I, II, III, IV, V, VII)   | Sac                                    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 <u>2 3 4 8</u>   | $\alpha a$ | 1 <u>2</u> (I, II, III, IV, V, VII) 3 4 <u>8</u> (I, II, III, IV, V, VII)   | Sac                                    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 <u>2 3 4 9</u>   | $\alpha a$ | 1 <u>2</u> (I, II, III, IV, V, VII) 3 4 <u>9</u> (I, II, III, IV, V, VII)   | Sac                                    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 <u>3 4 5</u>   | $\beta b$  | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4 <u>5</u> (I, II, III, IV, V, VII)   | S $\beta$ b, K $\beta$ b, Kd $\beta$ b | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 <u>3 4 7</u>   | $\alpha b$ | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4 <u>7</u> (I, II, III, IV, V, VII)   | Sab, Kab, Kdab                         | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 <u>3 4 7</u>   | $\beta b$  | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4 <u>7</u> (I, II, III, IV, V, VII)   | S $\beta$ b, K $\beta$ b, Kd $\beta$ b | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 <u>3 4 8</u>   | $\alpha a$ | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4 <u>8</u> (I, II, III, IV, V, VII)   | Sac                                    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 <u>3 4 8</u>   | $\alpha b$ | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4 <u>8</u> (I, II, III, IV, V, VII)   | Sab, Kab, Kdab                         | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 <u>3 4 8</u>   | $\beta b$  | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4 <u>8</u> (I, II, III, IV, V, VII)   | S $\beta$ b, K $\beta$ b, Kd $\beta$ b | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 <u>3 4 9</u>   | $\alpha a$ | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4 <u>9</u> (I, II, III, IV, V, VII)   | Sac                                    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 <u>3 4 9</u>   | $\alpha c$ | 1 2 <u>3</u> (I, II, III, IV, V, VII) 4 <u>9</u> (I, II, III, IV, V, VII)   | $Kc, Sac, Kac (cs), Kdac (cs)$         | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 3 4 <u>5</u>   | $\beta a$  | 1 2 3 4 (I, II, III, IV, V, VII) <u>5</u> (I, II, III, IV, V, VII)          | S $\beta$ a, MZa                       | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 3 4 <u>5</u>   | $\gamma a$ | 1 2 3 4 (I, II, III, IV, V, VII) <u>5</u> (I, II, III, IV, V, VII)          | MCa,                                   | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 3 4 <u>7</u>   | $\alpha a$ | 1 2 3 4 (I, II, III, IV, V, VII) <u>7</u> (I, II, III, IV, V, VII)          | Sac                                    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 3 4 <u>7</u>   | $\beta a$  | 1 2 3 4 (I, II, III, IV, V, VII) <u>7</u> (I, II, III, IV, V, VII)          | S $\beta$ a, MZa                       | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 3 4 <u>8</u>   | $\alpha a$ | 1 2 3 4 (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII)          | Sac                                    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 3 4 <u>8</u>   | $\beta a$  | 1 2 3 4 (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII)          | S $\beta$ a, MZa                       | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 5 | 17 | 1 2 3 4 <u>9</u>   | $\alpha a$ | 1 2 3 4 (I, II, III, IV, V, VII) <u>9</u> (I, II, III, IV, V, VII)          | Sac                                    | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 6 | 18 | 1 2 3 4 <u>5 7</u> | $\beta a$  | 1 2 3 4 <u>5</u> (I, II, III, IV, V, VII) <u>7</u> (I, II, III, IV, V, VII) | S $\beta$ a, MZa                       | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 6 | 18 | 1 2 3 4 <u>5 7</u> | $\beta b$  | 1 2 3 4 <u>5</u> (I, II, III, IV, V, VII) <u>7</u> (I, II, III, IV, V, VII) | S $\beta$ b, K $\beta$ b, Kd $\beta$ b | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 6 | 18 | 1 2 3 4 <u>5 8</u> | $\beta a$  | 1 2 3 4 <u>5</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII) | S $\beta$ a, MZa                       | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 6 | 18 | 1 2 3 4 <u>5 8</u> | $\beta b$  | 1 2 3 4 <u>5</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII) | S $\beta$ b, K $\beta$ b, Kd $\beta$ b | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 6 | 18 | 1 2 3 4 <u>7 8</u> | $\alpha a$ | 1 2 3 4 <u>7</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII) | Sac                                    | {1} {2} {3} {4} {5} {6} {7} |

|   |   |    |                    |            |                                                                                                                             |                                                       |                             |
|---|---|----|--------------------|------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------|
| 2 | 6 | 18 | <u>1 2 3 4 7 8</u> | $\beta a$  | <u>1 2 3 4 7</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII)                                                 | S $\beta a$ , MZa                                     | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 6 | 18 | <u>1 2 3 4 7 8</u> | $\beta b$  | <u>1 2 3 4 7</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII)                                                 | S $\beta b$ , K $\beta b$ , Kd $\beta b$              | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 6 | 18 | <u>1 2 3 4 7 9</u> | $\alpha b$ | <u>1 2 3 4 7</u> (I, II, III, IV, V, VII) <u>9</u> (I, II, III, IV, V, VII)                                                 | Sab, Kab, Kdab                                        | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 6 | 18 | <u>1 2 3 4 8 9</u> | $\alpha a$ | <u>1 2 3 4 8</u> (I, II, III, IV, V, VII) <u>9</u> (I, II, III, IV, V, VII)                                                 | Sac                                                   | {1} {2} {3} {4} {5} {6} {7} |
| 2 | 6 | 18 | <u>1 2 3 4 8 9</u> | $\alpha b$ | <u>1 2 3 4 8</u> (I, II, III, IV, V, VII) <u>9</u> (I, II, III, IV, V, VII)                                                 | Sab, Kab, Kdab                                        | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 4 | 22 | <u>1 2 3 4</u>     | $\beta c$  | <u>1</u> (I, II, III, IV, V, VII) <u>2 3</u> (I, II, III, IV, V, VII) <u>4</u> (I, II, III, IV, V, VII);<br>④⑥⑧⑩ ②③⑥⑧⑩ ⑤⑥⑧⑩ | Ic, S $\beta c$ , K $\beta c$ (cs), Kd $\beta c$ (cs) | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 5</u>   | $\beta b$  | <u>1</u> (I, II, III, IV, V, VII) <u>2 3</u> (I, II, III, IV, V, VII) <u>4 5</u> (I, II, III, IV, V, VII)                   | S $\beta b$ , K $\beta b$ , Kd $\beta b$              | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 7</u>   | $\beta b$  | <u>1</u> (I, II, III, IV, V, VII) <u>2 3</u> (I, II, III, IV, V, VII) <u>4 7</u> (I, II, III, IV, V, VII)                   | S $\beta b$ , K $\beta b$ , Kd $\beta b$              | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 8</u>   | $\alpha b$ | <u>1</u> (I, II, III, IV, V, VII) <u>2 3</u> (I, II, III, IV, V, VII) <u>4 8</u> (I, II, III, IV, V, VII)                   | Sab, Kab, Kdab                                        | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 8</u>   | $\beta b$  | <u>1</u> (I, II, III, IV, V, VII) <u>2 3</u> (I, II, III, IV, V, VII) <u>4 8</u> (I, II, III, IV, V, VII)                   | S $\beta b$ , K $\beta b$ , Kd $\beta b$              | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 9</u>   | $\alpha b$ | <u>1</u> (I, II, III, IV, V, VII) <u>2 3</u> (I, II, III, IV, V, VII) <u>4 9</u> (I, II, III, IV, V, VII)                   | Sac                                                   | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 9</u>   | $\alpha c$ | <u>1</u> (I, II, III, IV, V, VII) <u>2 3</u> (I, II, III, IV, V, VII) <u>4 9</u> (I, II, III, IV, V, VII)                   | Kc, Sac, Kac (cs), Kdac (cs)                          | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 9</u>   | $\alpha b$ | <u>1</u> (I, II, III, IV, V, VII) <u>2 3</u> (I, II, III, IV, V, VII) <u>4 9</u> (I, II, III, IV, V, VII)                   | Sac                                                   | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 9</u>   | $\alpha c$ | <u>1</u> (I, II, III, IV, V, VII) <u>2 3</u> (I, II, III, IV, V, VII) <u>4 9</u> (I, II, III, IV, V, VII)                   | Kc, Sac, Kac (cs), Kdac (cs)                          | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 5</u>   | $\beta$    | <u>1</u> (I, II, III, IV, V, VII) <u>2 3 4</u> (I, II, III, IV, V, VII) <u>5</u> (I, II, III, IV, V, VII)                   | S $\beta b$ , K $\beta b$ , Kd $\beta b$              | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 7</u>   | $\beta b$  | <u>1</u> (I, II, III, IV, V, VII) <u>2 3 4</u> (I, II, III, IV, V, VII) <u>7</u> (I, II, III, IV, V, VII)                   | S $\beta b$ , K $\beta b$ , Kd $\beta b$              | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 5</u>   | $\gamma a$ | <u>1 2</u> (I, II, III, IV, V, VII) <u>3 4</u> (I, II, III, IV, V, VII) <u>5</u> (I, II, III, IV, V, VII)                   | MCa, MZa                                              | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 7</u>   | $\alpha a$ | <u>1 2</u> (I, II, III, IV, V, VII) <u>3 4</u> (I, II, III, IV, V, VII) <u>7</u> (I, II, III, IV, V, VII)                   | Sac                                                   | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 8</u>   | $\alpha a$ | <u>1 2</u> (I, II, III, IV, V, VII) <u>3 4</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII)                   | Sac                                                   | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 5 | 23 | <u>1 2 3 4 9</u>   | $\alpha a$ | <u>1 2</u> (I, II, III, IV, V, VII) <u>3 4</u> (I, II, III, IV, V, VII) <u>9</u> (I, II, III, IV, V, VII)                   | Sac                                                   | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 6 | 24 | <u>1 2 3 4 5 8</u> | $\beta b$  | <u>1</u> (I, II, III, IV, V, VII) <u>2 3 4 5</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII)                 | S $\beta b$ , K $\beta b$ , Kd $\beta b$              | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 6 | 24 | <u>1 2 3 4 5 8</u> | $\alpha a$ | <u>1</u> (I, II, III, IV, V, VII) <u>2 3 4 5</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII)                 | Sac                                                   | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 6 | 24 | <u>1 2 3 4 5 8</u> | $\beta a$  | <u>1</u> (I, II, III, IV, V, VII) <u>2 3 4 5</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII)                 | S $\beta a$ , MZa                                     | {1} {2} {3} {4} {5} {6} {7} |
| 3 | 6 | 24 | <u>1 2 3 4 5 8</u> | $\beta b$  | <u>1 2 3</u> (I, II, III, IV, V, VII) <u>4 5</u> (I, II, III, IV, V, VII) <u>8</u> (I, II, III, IV, V, VII)                 | S $\beta b$ , K $\beta b$ , Kd $\beta b$              | {1} {2} {3} {4} {5} {6} {7} |



|   |   |    |                                                  |            |                                                                                                                                                                                                                                |                                        |                             |
|---|---|----|--------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-----------------------------|
|   |   |    |                                                  |            | <b>II, III, IV, V, VII)</b>                                                                                                                                                                                                    |                                        |                             |
| 4 | 6 | 30 | <u>1</u> 2 <u>3</u> 4 <u>7</u> <u>8</u>          | $\alpha b$ | $\underline{1}$ (I, <b>II, III, IV, V, VII)</b> 2 <u>3</u> (I, <b>II, III, IV, V, VII)</b> 4 $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b>                                          | Sab, Kab, Kdab                         | [1] [2] [3] [4] [5] [6] {7} |
| 4 | 6 | 30 | <u>1</u> 2 <u>3</u> 4 <u>7</u> <u>8</u>          | $\beta b$  | $\underline{1}$ (I, <b>II, III, IV, V, VII)</b> 2 <u>3</u> (I, <b>II, III, IV, V, VII)</b> 4 $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b>                                          | S $\beta$ b, K $\beta$ b, Kd $\beta$ b | [1] [2] [3] [4] [5] [6] {7} |
| 4 | 6 | 30 | 1 <u>2</u> 3 4 <u>7</u> <u>8</u>                 | $\alpha a$ | 1 <u>2</u> (I, <b>II, III, IV, V, VII)</b> 3 <u>4</u> (I, <b>II, III, IV, V, VII)</b> $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b>                                                 | Sac                                    | [1] [2] [3] [4] [5] [6] {7} |
| 4 | 7 | 31 | <u>1</u> 2 3 4 <u>5</u> <u>7</u> <u>8</u>        | $\beta b$  | $\underline{1}$ (I, <b>II, III, IV, V, VII)</b> 2 3 4 <u>5</u> (I, <b>II, III, IV, V, VII)</b> $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b>                                        | S $\beta$ b, K $\beta$ b, Kd $\beta$ b | [1] [2] [3] [4] [5] [6] {7} |
| 4 | 7 | 31 | 1 2 <u>3</u> 4 <u>5</u> <u>7</u> <u>8</u>        | $\beta b$  | 1 2 <u>3</u> (I, <b>II, III, IV, V, VII)</b> 4 <u>5</u> (I, <b>II, III, IV, V, VII)</b> $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b>                                               | S $\beta$ b, K $\beta$ b, Kd $\beta$ b | [1] [2] [3] [4] [5] [6] {7} |
| 4 | 7 | 31 | 1 2 3 <u>4</u> <u>5</u> <u>7</u> <u>8</u>        | $\beta a$  | 1 2 3 <u>4</u> (I, <b>II, III, IV, V, VII)</b> <u>5</u> (I, <b>II, III, IV, V, VII)</b> $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b>                                               | S $\beta$ a, MZa                       | [1] [2] [3] [4] [5] [6] {7} |
| 5 | 7 | 37 | <u>1</u> 2 <u>3</u> 4 <u>5</u> <u>7</u> <u>8</u> | $\beta b$  | $\underline{1}$ (I, <b>II, III, IV, V, VII)</b> 2 <u>3</u> (I, <b>II, III, IV, V, VII)</b> 4 <u>5</u> (I, <b>II, III, IV, V, VII)</b> $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b> | S $\beta$ b, K $\beta$ b, Kd $\beta$ b | [1] [2] [3] [4] [5] [6] {7} |
| 5 | 7 | 37 | <u>1</u> 2 <u>3</u> 4 <u>7</u> <u>8</u> <u>9</u> | $\alpha b$ | $\underline{1}$ (I, <b>II, III, IV, V, VII)</b> 2 <u>3</u> (I, <b>II, III, IV, V, VII)</b> 4 $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b> <u>9</u> (I, <b>II, III, IV, V, VII)</b> | Sac                                    | [1] [2] [3] [4] [5] [6] {7} |
| 5 | 7 | 37 | <u>1</u> 2 <u>3</u> 4 <u>7</u> <u>8</u> <u>9</u> | $\alpha b$ | $\underline{1}$ (I, <b>II, III, IV, V, VII)</b> 2 <u>3</u> (I, <b>II, III, IV, V, VII)</b> 4 $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b> <u>9</u> (I, <b>II, III, IV, V, VII)</b> | Sac                                    | [1] [2] [3] [4] [5] [6] {7} |
| 5 | 7 | 37 | 1 <u>2</u> 3 <u>4</u> <u>5</u> <u>7</u> <u>8</u> | $\beta a$  | 1 <u>2</u> (I, <b>II, III, IV, V, VII)</b> 3 <u>4</u> (I, <b>II, III, IV, V, VII)</b> <u>5</u> (I, <b>II, III, IV, V, VII)</b> $\underline{7}$ (I, <b>II, III, IV, V, VII)</b> <u>8</u> (I, <b>II, III, IV, V, VII)</b>        | S $\beta$ a, MZa                       | [1] [2] [3] [4] [5] [6] {7} |

**Key:**

Static visual variables

1 size; 2 form; 3 value; 4 colour; 5 grain; 6 orientation; 7 brilliance; 8 transparency; 9 aura; dynamized variables are underlined

## Sound variables

② Pitch; ③ Register; ④ Loudness; ⑤ Timbre; ⑥ Duration; ⑦ Rhythm; ⑧ Rate of change; ⑨ Order; ⑩ Frequency

## Entities / measurement levels

$\alpha$  point entities;  $\beta$  line entities;  $\gamma$  area entities;

a - nominal scale measurable entities; b - ordinary scale measurable entities; c - quantitative scale measurable entities

| Methods of presentations                       |                                                     | Functionalities                          |                                                      | Types of animation |
|------------------------------------------------|-----------------------------------------------------|------------------------------------------|------------------------------------------------------|--------------------|
| Sab – Ordinary point signatures,               | Sβc – Quantitative line signatures,                 | F1 - Navigation                          | F4g – choice of the extent                           | 1M – mono module   |
| Kab – Ordinary point choropleth maps,          | Kβc (cs) - Quantitative line choropleth maps,       | F2 – Import of layers or sub-animations  | F5 – Choice of the method of data processing         | 1L – mono level    |
| Kdab – Ordinary point cartodiagrams            | Kdβc (cs) - Quantitative line cartodiagrams         | F3 – Programming of animation            | F6 – Choice of the type of visualization             | MM – multi module  |
| Kc – Dot method,                               | KαBb – Ordinary Bertin’s choropleth map,            | F4 – Edition of animation:               | F7 – Analysis of spatio-temporal data                | ML - multilevel    |
| Sac – Quantitative point signatures,           | Kγb – Ordinary area choropleth maps,                | F4a – choice of information              | F7a – comparison of layers                           |                    |
| Kαc (cs) – Quantitative point choropleth maps, | KDγb – Ordinary dasimetric choropleth maps,         | F4b - query of information               | F7b – comparison of layers with animation            |                    |
| Kdac (cs) - Quantitative point cartodiagrams,  | KαBc - Quantitative Bertin’s choropleth map,        | F4c – choice of the scope of information | F7c - comparison of animations                       |                    |
| Sβb – Ordinary line signatures,                | Kγc(cs) - Quantitative area choropleth maps,        | F4d - choice of them mode of information | F7d – intersection of layers and animation           |                    |
| Kβb – Ordinary line choropleth maps,           | KDγc(cs) - Quantitative dasimetric choropleth maps, | F4e – choice of period                   | F7e – intersection and/or incrustation of animations |                    |
| Kdβb - Ordinary line cartodiagrams             | Sαa – Qualitative point signatures                  | F4f – choice of location                 |                                                      |                    |
| Ic – isoline maps,                             | MCa – Chorochromatic method maps,                   |                                          |                                                      |                    |
| Sβa – Qualitative line signatures,             | MZa – Range maps                                    |                                          |                                                      |                    |

The methods distinguished by italics are conditional for seventh age group

## Age groups

{1} {2} {3} {4} {5} {6} {7} - correct combination of variables for labelled age groups

{1} {2} {3} {4} {5} {6} {7} {8} conditional combination of variables for labelled age groups